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PATENTS AND THE COMMERCIALIZATION OF NEW TECHNOLOGY

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Chapter 1
Executive Summary

Introduction

This report is an assessment of the incentives provided by the U.S. patent system for developing new technology-based enterprises, that is, the new "Xeroxes" and "Polaroids", that contribute to the creation of new jobs, increased productivity, and strong economic growth.

The U.S. patent system, by securing to inventors for limited times the exclusive rights to their inventions, has been accorded a vital role in encouraging and assisting innovation (the practical implementation of inventions) and the creation of new technology enterprises. Today, concerns are being raised about the lagging growth rate of the U.S. economy and the world-wide competitiveness of U.S. industry. Technological innovation is seen by many as a means of rejuvenating the economy and the patent system, being one of the major Congressionally-provided incentives for innovative activity, has received particular attention.

Recent studies by the Executive branch as well as the private sector have raised questions about the continued effectiveness of the patent system as an incentive for innovation because of the apparent uncertain reliability of patents in the face of legal challenge and the difficulty that the patent owner frequently faces when attempting to enforce a patent. This report examines the patent system to determine the reliability of patents, the practicality of enforcing patents, and how effective patents are for stimulating new technology enterprises.

General Background of the Patent System

The United States Constitution grants to Congress the authority to establish a patent system in order to "promote the progress of science and

protection had been available for the invention.

But there are inefficiences associated with patent systems: patent monopolies may be granted where unneeded to secure innovations; patents owned by others can block or hinder further innovation; inventive activity may tend to be directed only to areas in which patents can be obtained; costs are incurred in operating the system; and the patent monopoly, an essentially unregulated monopoly, is subject to abuses. The net benefit of the patent system to society is not susceptible to a rigorous analysis because of the unavailability of data, the unreliability of data that do exist, and the absence of a comparative environment without a patent system. Economists, however, generally believe that the net benefits to society of the patent system are positive, albeit unprovable and inconclusive. The greatest net benefit appears to come from risky innovations which typically would not have been undertaken, or undertaken as promptly, in the absence of patents.

In practice, an inventor seeking a patent files a patent application with the government (the Patent and Trademark Office). A patent examiner in the Patent and Trademark Office examines the patent application to determine whether it meets the requirements for patentability. An important aspect of this examination is a search of the examiners' search files (predominantly containing U.S. and foreign patents and some technical literature) to locate relevant prior art to the invention as a basis to determine whether the invention meets the required standard of inventiveness. The average time spent by the patent examiner per patent application is about 15 hours of which 3.5 hours is for prior art searching. If the patent application meets the requirements for patentability, it is allowed by the examiner and then issued.

Once the patent is granted, a patent owner may enforce his patent against another using his invention without permission (an infringer) by suing him in the Federal courts. The alleged infringer may defend on the basis that he did not infringe the patent or that the patent is invalid,

- The leading grounds for court findings of invalidity are that the patented technology was obvious or lacked novelty over the prior art. In most cases the invalidating prior art was not known to the patent examiner when granting the patent, but it is estimated that in about one-third of the findings of invalidity the court expressly or implicitly disagreed with the standard of patentability applied by the patent examiner.

- Published court decisions indicate that mechanical patents are litigated more often than electrical or chemical patents and are held invalid more frequently. A correlation appears to exist between the complexity of the invention and the court's finding regarding validity of the patent in that patented inventions of limited complexity are more often held invalid than those of moderate or high complexity.

- Although a statutory presumption of validity accompanies a patent granted by the Patent and Trademark Office, in practice the courts give little weight to this presumption because of a lack of an adversary relationship in the examination process and the perceived bias of the Patent and Trademark Office in favor of patents.

- Patent litigations frequently cost each party $50,000 to $1,500,000 or more and take years to resolve but the cost and duration are not significantly different than other high stakes litigations. The costs are primarily affected by the number and complexity of litigable issues and the procedural requirements of the American judicial system, particularly discovery. These procedures are not easily controlled by the court and can be abused to exert economic pressure, especially against an individual or small business.

- While the evidence is inconclusive, it appears that, problems

value of patents, the effect that these changes will have is uncertain and is unlikely to be observable in the short-term.

Patent Reliability and Enforcement and Innovation

While granting that weaknesses exist in the U.S. patent system, there is little empirical evidence demonstrating the effect of patent reliability and the practicalities of enforcement on the rate of innovation. Much that is said on this subject is based on opinion and anecdotal accounts.

This does not preclude the existence of a nexus between patent reliability and enforcement costs and innovation. From an intuitive standpoint, apprehension about patent reliability and enforcement diminish the incentive value of patents, and individuals and small businesses, often being most dependent on patents, would be most affected.

The evidence that is available indicates that patent reliability and enforcement have quite varying effects on innovation decisions and that alternatives to the patent system such as trade secrets are widely relied upon to protect inventions. For example, a 1981 survey of small, high technology firms by the National Science Foundation found that patenting and licensing problems were rated least important in a list of 11 problem areas which affect innovation faced by such companies. It was the only area which a majority of survey respondents agreed was not a major problem. The researchers concluded from interviews with company officials that this area was under reasonable control and that, rather than pay attorney fees to press infringement suits against large competitors, small high-technology firms often choose either to keep their ideas as trade secrets, or to license their patents, or merge with larger companies to avoid patent enforcement costs.

Another survey study of small businesses conducted for the Small Business Administration also found that many firms are depending on trade secrets rather than patents to protect their technology. Important reasons

activities depends on the type of invention and the type of decisionmaker. For example, the pharmaceutical industry rarely pursues the development and regulatory approval processes for a new drug unless it can be patented. On the other hand, much of the innovation in the electronics industry has occurred without patents; and for products which require large capital costs for manufacturing, such as automobiles, patents may have little bearing on investment decisions due to the limited ability of a competitor to enter the market.

How the decisionmaker, whether a manager, entrepreneur or investor, views patent reliability and enforcement costs is important in determining the incentive value of patents. Due to the complexities and the near impossibility of accurately assessing the value of a patent, it appears that many decisionmakers rely on intuition and general perceptions of patents rather than technical, marketing and legal analyses of the specific patents involved. Because of the lack of balanced information and suitable methods for evaluating the reliability and costs of enforcement of patents, there is a risk that widely publicized liigation statistics and anecdotal accounts relating to patent reliability and enforcement will bias the perceptions of patents.

Equally important to the role of patents as an incentive for innovation and the creation of new technology enterprises is the effect that patents subsequently have on the new technology enterprise, industry and society in general.

The private benefits ultimately realized by the innovator through patents are difficult to determine; assessing the social benefits in terms of improved products, convenience, lower costs, and improved living standards is even more difficult.

Clearly, many factors contribute to the social and private rates of return, and patents are just one of those factors. Indeed, patents provide the potential for profit motivated innovators to increase their private

discourage the trade and customers from dealing in a competitor's product through the threat that they would be sued for infringing the patent.

Since the report of the Temporary National Economic Committee in 1941, a number of changes have occurred in patent law through legislation and judicial decisions to reduce the likelihood of business aggression by the patent owner. However, the uncertainty of the validity of a patent and the expense of challenging it in court still provide opportunities for business aggression.

Often, the strategy for using the patent and developing the technology determines the patent owner's benefit. For instance, Ray Dolby developed noise reduction units for tape recording systems. Rather than exploiting the large consumer market, he first limited his sales to the small, professional music recording market, thereby not attracting competition. The reputation which he developed in this small market enabled his company to achieve a strong market position when he later entered the consumer market. Once he entered the consumer market, he offered licenses to all manufacturers with the condition that the Dolby name and logo be displayed on the front of the equipment. Even though rival technology was developed it proved unsuccessful since the standards had been established by Dolby's units and consumer identification was strong.

How Reliable are Patents?

In a perfect world, every patent granted should enjoy unquestionable reliability. Such is not the case and probably never will be. There are too many incentives, too many variables, and too many participants involved in the patent system. In terms of its ultimate utility, patent reliability reflects the validity of the patent, the adequacy of the scope of its claims, and the respect given to the patent by potential competitors. The predominant factor affecting the reliability of patents, however, is patent validity.

Where patents were found invalid for lack of novelty or obviousness over the prior art, a substantial factor was the inability to ascertain the most relevant prior art. Differences in judgement were a lesser, but not insignificant, factor.

In about 60 percent of the cases in which patents are found invalid, the decision is based on prior art that was not previously considered by the patent examiner. Several studies, including one conducted by OTA, indicate that this new prior art is usually another U.S. patent. On the basis of these studies, OTA estimates that for about one-third of the patents found invalid, better prior art than that specifically considered by the Patent and Trademark Office was the cause of the invalidity.

A significant portion of the decisions of patent invalidity was based on prior art other than patents and printed publications, such as prior use and sale, or general knowledge within the industry, and most often this prior art was known to the patent applicant before the patent was issued.

The patents most often involved in patent litigation appear to be in the general and mechanical arts (81 percent), as opposed to chemical (11 percent) and electrical (8 percent), yet only about 50 percent of the issued patents are in the general and mechanical arts. Nearly two-thirds of the mechanical and electrical patents adjudicated are found invalid whereas about 42 percent of the adjudicated chemical patents are found invalid. These findings suggest that mechanical patents are of the least certain validity.

An OTA study seems to indicate a correlation between the complexity of the patented invention and the likelihood that the patent was held invalid when challenged in court. Inventions that can be easily understood have a higher rate of invalidity holdings. The study further indicated that the frequency that (1) prior art not specifically considered by the Patent and Trademark Office led to the invalidation and (2) the courts disagreed with the patentability judgement of the Patent and Trademark Office, is greatest

areas in patent examination. The likelihood of the quality review program finding what it believes to be a more pertinent prior art document by repeating a search is about 7 out of 100. In about one-quarter of the reviewed cases, the reviewer concludes that the patent examiner did not continue the search far enough. When the reviewer expands the search, in about 12 percent of the cases a prior art document believed to be more relevant to the invention is uncovered.

The financial resources available to the Patent and Trademark Office also affect its performance. For fiscal year 1982, the Patent and Trademark Office estimates the cost of examination to be about $1,200 per patent application, one-half of which is devoted to examiner salaries and benefits.

The quality of examination depends on the quality of the patent examiner. As with any profession, a wide range of capabilities exists among individual members. Aptitude for patent examining and motivation are also significant factors affecting the quality of examination. One of the most visible influences on examiner motivation was the introduction of production goals by the Patent and Trademark Office in the mid-1960s. The production goals have had some beneficial effects in terms of increased efficiency. The system requires the patent examiner to use his time judiciously and to quickly identify and pursue only meaningful issues. But the emphasis on production has resulted in dissension between the examiners and management. Introduction of production goals gave rise to a new union, the Patent Office Professionals Assocation, and these goals have been a key factor in negotiations between the union and management.

Supervision and oversight are also important to establish and maintain quality patent examinations. The immediate supervision of patent examiners is provided by supervisory primary examiners who are responsible for setting standards of patentability within particular fields of technology. The demands on the supervisor's time are heavy in terms of his responsibilities, the number of individuals reporting to him, and the

In summary, there are many factors that influence patent examination quality including the time available for the examination, the ability and motivation of the individual examiner, the supervision provided, the integrity of the search file and ease of retrieval of relevant information from the search files. Hence, there is a limit to improvement in overall patent examination quality that an improvement in any one of these factors can achieve.

Deterioration in any of these factors may create difficulties that can significantly impair the ability of the Patent and Trademark Office to maintain its present level of patent examination quality. While every factor affecting patent examination quality will require resources to maintain present levels of quality, none will be more in danger of deterioration that the examiners' search files. Unless the ability to retrieve relevant documents from the examiners' search files improves, the efforts required to conduct adequate prior art searches will increase to the point that they are no longer feasible.

Effecting changes in the quality of patentability judgements, quality of searching, quality of patent examiners or quality and type of supervision is likely to be difficult because of the present environment at the Patent and Trademark Office. There is a reluctance among some patent examiners to change their patent examination and searching techniques. The Patent and Trademark Office management must maintain an emphasis on high levels of production to prevent excessive buildup of unexamined patent applications. Also, the ability of the Patent and Trademark Office to make changes in its operations is somewhat limited by the patent examiners' union, limited funds, and the long range unpredictability of funding levels.

How Practical is the Enforcement of Patents?

The patent owner has the responsibility to police his patent. If it is being infringed, the patent only gives him the right to sue the alleged

seeking an opinion from the Patent and Trademark Office as to the validity of a patent. This occurs less than 600 times per year, and only 106 cases in fiscal year 1981 involved an adversary proceeding.

These statistics indicate that there is a policy dilemma. On the one hand, Congress and the courts have strongly emphasized that the public interest should be considered in resolving issues of patent validity because the effects of a patent monopoly extend beyond the parties to the dispute. On the other hand, the practicalities of patent enforcement foster the private resolution of patent validity disputes.

Recent Changes in the Patent System

Congress has been attentive to the problems with the patent system and has recently enacted two major pieces of legislation to improve patent reliability and enhance the practicalities of enforcing patents. In P.L. 96-517, Congress enabled an issued patent to be reexamined by the Patent and Trademark Office to determine its validity over prior art. Reexamination proceedings went into effect in July 1981, and permitted anyone to request that the Patent and Trademark Office reexamine a patent in view of prior art patents or printed publications upon the payment of a $1,500 fee.

Preliminary evidence tends to indicate that patent practitioners are approaching reexamination with caution and that this new and unproven procedure is not being widely used. (For the first six months of operation, 94 requests for reexamination had been filed.) One reason that has been advanced for its infrequent use is the limited involvement which a challenger is permitted in the proceedings. Also, only certain issues affecting patent validity can be considered in reexamination proceedings and this limits its usefulness.

Recognizing the growing problem of prior art searching, Congress, also in P.L. 96-517, required the Patent and Trademark Office to submit by

The multiple, and often unpredictable, consequences that will inevitably follow any changes in the existing U.S. patent system suggest that the Congress faces three alternative policy options at the present time:

A major revamping of the patent laws could provide a stronger basis upon which to deal with future problems but only if its scope extended beyond patent reliability and the practicalities of enforcement to include issues beyond the purview of this OTA assessment, such as patent-antitrust interfaces, patentability standards, and international cooperative patent systems.

OPTION 3: Selective Legislative Activity

Congress could maintain the status quo in areas of the patent laws which are directly addressed by recent legislation while selectively undertaking activities in other areas. Thus, as with Option 1, an opportunity exists to observe the effects of reexamination and the Court of Appeals for the Federal Circuit, but Congress could investigate proposals for independent improvements in the patent system. The approach does risk continuing the patchwork development of the patent system; however, it may be more feasible for Congress to address patent revisions one at a time.

Proposals for Revisions to the Patent Statutes

A review of past studies of the patent system provide a plethora of recommendations to improve patent reliability and enhance the practicalities of patent enforcement. These studies can provide some guidance as to potential areas for legislative consideration, particularly in connection with Option 3. The studies have recommended three general approaches: providing more resources for the examination of patent applications to improve the quality of patents; providing a different class of patents (including different standards of patentability); and providing mechanisms for resolving patent disputes that do not necessitate court litigation. OTA explored representative activities for each of these general approaches.

for evaluating their patentability is beyond the capability of the Patent and Trademark Office. Moreover, the manner in which an internal review program is implemented can affect its effectiveness. Hence, while some improvements in patent quality can be expected, an internal review program is not likely to increase the public perception of the value of patents.

b. Increasing Examiner Time for Prior Art Searching

Increasing the time available for patent examiners for conducting searches of the prior art can improve patent examination quality but the evidence, while not conclusive, suggests that it would reduce. But not substantially, the frequency that patents are issued with questionable validity. Additional search time can improve the quality of searching and the most profitable use of additional time appears to be conducting searches in additional data bases (e.g., commercially-available computer data bases) that contain a broader spectrum of prior art. However, existing commercially-available computer data bases are expensive to use and require expertise. The Patent and Trademark Office study requested by Congress may better define the viability of computer-assisted search systems and the need for increased time allocation for searching.

c. Improving Access to the Prior Art

Past government studies have recommended the improvement of examiners' search files by upgrading their integrity and developing a mechanical, or computer-assisted, search system. The Patent and Trademark Office plans to cope with the increasing volume of prior art by continued reclassification of the existing files and, as noted earlier, Congress has called for the development of a plan for computer-assisted searching.

Reclassification is essential to ensure over the long term that reasonable prior art searches can be conducted within the patent examiners' time constraints. Patent reclassification is expensive, and the complexity of reclassification increases even more rapidly than the growth of the

system and Congress has an opportunity to tailor a lesser patent system to meet its objectives. For example, the lesser patent could require some level of invention over the prior art or it could require only novelty and offer its owner protection from only the blatant copyist.

As with utility patents, there is no reliable or conclusive evidence that a system of lesser patents will benefit society through increased innovation and greater disclosure of technical information. Inventions that result in major technological break throughs and the creation of new industries generally can be patented under the present system. But lesser patents can play a supplemental role.

Because of the uncertainties of the effect of lesser patents on innovation, patent owners and society in general, Congress could experiment with adopting lesser patents in a defined technology areas. A technology area such as computer chip design is useful for experimentation since strong interest groups exist on both sides of the issue and will provide a critical forum for evaluation of the effects.

Resolving Patent Disputes Outside the Court System:

The reasons for the high cost of litigating patent disputes are inherent in the American judicial system and the problem of expense is shared by other high-stakes litigations. Reducing the expense of resolving patent disputes by denying access to the court system or materially altering the procedural due process of litigants in the court is not Constitutionally permissible.

However, Congress can authorize a non-judicial forum, or para-judicial system from which parties can seek a less expensive resolution of patent disputes. The para-judicial system could accomplish less expensive resolutions of disputes through, for instance, limiting discovery and using quasi-judges who are familiar with the technology and patent law. Reexamination is one form of a non-judicial forum, but the issues that can

outcome of the litigation) are approaches that shift reduce the importance of economic pressure in resolving patent disputes and provide less of an incentive to seek a court resolution of the dispute. Until experience develops with reexamination (or perhaps other non-judicial forums for resolving patent diputes that are adopted by Congress), the need to affect the judicial process to reduce economic incentives to seek court resolutions will be uncertain.

Conclusion

The U.S patent system is a functioning, vital element of the American economy. Many inventors, innovators and investors continue to rely on patents to protect their ideas and to justify important business decisions, and some innovative activities would not be undertaken, or undertaken as promptly, without the promise of patent protection. Yet the patent system is imperfect and its imperfections generally affect those who rely most heavily on patents.

The uncertain reliability of patents and the cost of enforcement, in terms of both time and money, have a perceptible but probably unquantifiable impact on innovation and the development of new technology enterprises. Thus, while there are valid reasons for seeking to improve patent reliability and to reduce the costs of enforcement, it is impossible to demonstrate that an investment in such remedies will be automatically translated into innovation or economic benefits.

Today, concerns are being raised about the growth of the U. S. economy and the world-wide competitiveness of U. S. industry. As in the past, technological advancement is seen by many as a means to spur economic growth. Various mechanisms or tools through which Congress can encourage and facilitate the undertaking of innovative activities and the creation of new technology enterprises are being studied by many diverse private and public groups. The patent system, being one of the major Congressionally-provided incentives for innovative activity, has received special attention.

Particular Congressional interest has been given to the problems associated with launching the new technology-based enterprise (new technology enterprises), i.e., the new "Xeroxes" and "Polaroids". Accordingly, this report focuses on the operation, administration and effectiveness of the patent system to determine whether there are shortcomings that might reduce the value of patents in encouraging the development of such new enterprises. Although new technology enterprises are highlighted in this report, patents obviously affect a much broader and equally important range of innovations, for example, improvements in existing products or processes and new uses for existing products.

While much of the report will be pertinent to these broader types of innovation there are many patent-related issues that are not considered such as the patentability of computer programs and genetically-engineered life-forms and the effect of government regulations (e.g., those governing pharmaceuticals and pesticides) that reduce the portion of the patent term in which the innovator can fully enjoy his patent monopoly. (FN-reference Impacts of Applied Genetics and Patent-Term Extension reports) Similarly, patent problems that uniquely affect a small segment of patent owners (e.g., such as specific patent licensing provisions) are not treated. Appendix I provides a list of topics developed by OTA and its Advisory Panel for this report which could be considered in a study of patents.

Innovation is the practical implementation (commercialization) of inventions and is the culmination of the innovative process which begins with the generation of a technically feasible idea (invention), proceeds with the refinement of that idea (development), and results in the introduction and initial use of new products or processes in the market place. (See, for example, Small Businesses are More Active As Inventors Than As Innovators in the Innovative Process, U.S. General Accounting Office (December 31, 1981) p.1)

New technology enterprises bring wholly new products to commercialization, and wholly new product innovation generally involves more risk than pursuing new processes to make existing products or improvements to existing products. The new technology enterprise must not only hurdle technical barriers in developing the new product and its production facilities, but must also establish a market. Furthermore, the nature of the problems that might be encountered and the efforts required to resolve these problems cannot always be foreseen and this uncertainty weighs heavily as a factor increasing the riskiness of new technology enterprises. The technical and commercial uncertainties associated with new product innovation are particularly acute for new businesses, which do not have existing sources of income, lines of supply, marketing structures, or reputations.

New product innovation is not only risky but also extremely complex. To provide some idea of this complexity, table 2-1 offers a summary of many of the key activities, actors and resources involved in the innovative process. The generation of an idea is only the start of an innovative process which ultimately must meld technical research and development skills, production skills, financial skills, and commercial development and marketing skills to achieve commercialization of a new product. Moreover, completing the innovative process does not necessarily mean that the new technology will be accepted in the marketplace: The adoption of the technology will often depend on the activities of the new technology enterprise once the new product is placed on the market, including modifications based on consumer response.

A fundamental question is what motivates the undertaking of new product innovation with its associated risks, uncertainties and complexities. Certainly the promise of large financial gain is the major, and most obvious, incentive. However, many other factors influence the desire to give birth to a new technology enterprise. These factors can be personal, social, or commercial. Personal factors include the desire to be creative or to gain personal recognition, prestige or self-satisfaction or simply for the excitement involved in risk taking. Social factors include the general attitude toward innovation, perceived societal needs, perceived social obligations, governmental activities and policies, and the general economic climate. While commercial factors are dominated by the desire for financial gain, competitive pressures and the behavior of industry members, future resource shortfall and the desire for growth are the factors that could influence undertaking innovative activities.

The relative importance of the motivational factors changes with the stages and participants in the innovative process. For instance, an inventor may be significantly motivated by his desire to be creative, whereas an investor in the technology may be almost exclusively motivated by financial gain potential.

As can be seen from this brief discussion, there are many influences that bear on the innovative process, and the bringing of a new product to commercialization involves the interaction of many actors and resources. It is not surprising that even though innovation has been extensively studied, the process does not lend itself to accurate forecasting. No master formula has been developed for combining ingredients and achieving successful new product innovation. Although explanations can often be given as to why a particular innovation was a success or failure, that which proves successful in one situation may fail in another.

disclosed for others to use. (p. 269) The Committee for Economic Development in its report, Stimulating Technological Progress, January 1980, echoed the importance of patent reliability and the need to reduce the costs of enforcing patents. (p. 51-57)

The concerns about patent reliability and feasibility of enforcement are not a recent phenomenon but rather have existed since the time the U.S. patent system was first adopted. For instance, in 1850, Representative William L. Dickinson remarked that

> "...for many years inventors and others have experienced much vexation and inconvenience by reason of the imperfect operation of the law..."
> ..."The present system protects neither the inventor nor the public, and ... begets and fosters endless and profitless litigation." (Referred to in Margaret M. Conway, Expediting Patent Office Procedure - A Legislative History, Study No. 23, Subcommittee on Patents, The Remarks and Copyrights of the Senate Committee on the Judiciary (1960) p. 5.)

The same concerns were expressed in hearings held by Representative Oldfield in 1912. A 1945 report by Dr. Vanevar Bush, Director of the Office of Scientific Research and Development, to the President stated that

> "...uncertainties in the operation of the patent laws have impaired the ability of small industries to translate new ideas into processes and products of value to the nation." (Science, The Endless Frontier, p. 16)

The first stated objective of the 1966 President's Commission's on the Patent System was to "raise the quality and reliability of the U.S. patent." Another objective was to reduce the expense of obtaining and

Chapter 3

A Brief Description of the Patent System

A Context for the Patent System

A patent is a grant by the Government of a right for a limited period of time to exclude others from making, using or selling an invention. In return for the grant, the patent owner must disclose his invention to the public.

Patents promote the progress of science and the useful arts in several ways:

- They encourage research since they provide a mechanism for protecting research results from commercial use by others;
- They encourage the development of new products and processes since they can enable the patent owner to establish an exclusive market position for a new product or a competitive advantage for a new process, thereby enabling him to earn a greater profit and to recover his investment costs;
- They provide a mechanism for the transfer of technology to others who may put the invention to practical use; and
- They provide the public with technical information that can lead to further technological advance, which information might not be disclosed if no patent protection were available for the invention.

Granting patents is one of the variety of activities available to the Federal government to encourage innovation.

Each of these basic types of property rights can be valuable to a new technology enterprise. Patents and trade secrets can protect technical information; trademarks can assist in establishing a market for the new product and a reputation for its manufacturer; and copyrights can protect labels, technical and sales literature, and can offer some protection for computer programs. From the standpoint of encouraging and assisting new product innovation, patents and trade secrets appear to be the most significant of the basic types of property rights in technical information.

It is clear that direct governmental activities, other than those that support the patent system, can have the most immediate and pronounced effect on innovation. No attempt has been made in this study to measure or rate the impact of these activities or to suggest ways in which they might be improved. Each provides its own contribution to the fostering of innovation. The patent system, likewise, has unique attributes which distinguish it from other government activities.

For example:

- The patent system can affect all stages of the innovative process and many of the actors.
- The financial incentives provided by the patent system occur only with completion of the innovative process.
- The market and not the Federal government determines the extent of the financial gain that can be obtained due to a patent.
- Patents are relatively neutral to the technology, and the determination of the technology to be developed does not reside in the judgment by the Federal government of the value of the technology.

example, the financial gains obtainable through the market due to the patent monopoly indirectly favor certain types of innovation over others; and the operation and administration of the patent system can have an indirect effect favoring certain types of innovations and innovators over others.

In summary, the patent system is unique in the way that it promotes the progress of science and the useful arts; its attributes are not like those of other governmental activities for encouraging and assisting innovation.

The Patent System and Economic and Technical Progress

There have been numerous studies of the patent system from an economic or social standpoint. (See for instance, Julius W. Allen, Economic Aspects of Patents and the American Patent System: A Bibliography. Study No. 14, The Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary (1958); John Driffill, Carole Kitti, Mary Summerfield and Charles Trozzo, The Effects of Patent and Antitrust Laws, Regulations, and Practices on Innovation, Volume III: Annotated Bibliography, Institute for Defense Analysis, Arlington, Va., February 1976). Some commentators have viewed it with skepticism, arguing that the patent system actually retards development or serves as an inefficient mechanism for stimulating progress. (e.g., Yale Brozan, S. Colum Gilfillan, S. Melman) Others insist that much of our technological developments would not occur without the patent system. (G. Frost, Ch. 1, p. 4-19; Pat. Subcomm. of DPR) And still other commentators believe that the influence of the patent system is generally positive but that the evidence available is inconclusive for demonstrating that overall the patent system is beneficial or detrimental to technological progress. (Machlup) The following is a brief discussion of why there is such broad disagreement. A more expansive discussion of the economics of the patent system is provided in Section I of the accompanying background paper, Issues Concerning the Patent System.

Also, patents can tend to divert inventive effort away from technologies in which patents are difficult to obtain and toward other technologies less appropriate or less useful to society simply because the technology is readily patentable. Patents can also be used to frustrate innovation, for example, by preventing the commercialization of improvement inventions. Finally, the patent system is costly to maintain. It absorbs resources through the funding required for the Patent and Trademark Office, the courts, attorney fees, and the research and management efforts to support patent activity. (See, for instance, S. Colum Gilfillan, Invention and the Patent System, U.S. Congress, Joint Economic Committee, December 1964, pp. 81-95; Machlup; Scherer, ch. 16; Alfred E.Kahn; "The Role of Patents", Competition, Cartels and Their Regulation, J. P. Muller, Editor, North-Holland Publishing Co., Amsterdam (1962), p. 308-346, 311-318))

With undeniably beneficial and detrimental effects of patents on innovation and society in general, the question becomes whether, on balance, the patent system is beneficial. The debate may never be resolved. The Banks Commission, established by the British government to study and make recommendations for improving the British patent system, stated in its report regarding economic assessments of patent systems:

> "We have been unable to locate any relevant report or series of reports made in the United Kingdom or elsewhere which are generally accepted as based on an economic assessment made in depth and with academic objectivity. This is probably not surprising, as for such an assessment it would ideally be necessary to have factual information on the economic development of an industrial country ... such comparative information does not exist." (Banks Committee Report, p. 10)

Likewise, the noted economist Dr. Fritz Machlup has written:

with probable benefit-cost ratios of 5:1 to 50:1." (Robert F. Dale and James K. Huntoon, A Cost-Benefit Study of the Domestic and International Patent Systems, IDEA, vol. II, no. 3, 1967, pp. 351-406, 405)

But the authors caution:

"No claim is made that this study proves that the patent system provides a net economic benefit. There are so many uncertainties and so much inadequate data that the only claim made is that the statistical consistency of the data sample gives substantial evidence that the patent system is making a positive contribution to the domestic and world economies." (p. 356)

The patent system perhaps offers the greatest net benefit to society through its effect on new technology enterprises. Because of the high risks involved, the introduction of wholly new products often requires a strong financial incentive. The financial gain obtained by the new technology enterprise, however, is likely to be modest in comparison to the substantial benefits to society in terms of new jobs, industries, and avenues for international trade. (Scherer, p. 454)

Despite criticisms and the clear inefficiencies of the patent system, most economists who study it conclude that it is perhaps the only tool of its kind available to the government to stimulate innovation. Critics focus on changes to enhance the net benefit to society rather than disbandment of the patent system. As stated by the noted economist, Alfred E. Kahn:

"Given such safeguards and alternatives, to be applied when the occasion demands, it is difficult to envisiage

TABLE 3-1

Summary of the Types of Protection

Type of Protection	Subject Matter	Patentability Requirement	Patent Right	Patent Term	When Established	Administered By
Utility Patent	useful processes, machines, articles	novel and unobvious	right to exclude others from making using or selling	17 yrs.	1790	Patent and Trademark Office
Design Patent	ornamental designs	"	"	3½, 7 or 14 yrs.	1870	"
Plant Patent	a sexually reproduced plants	"	"	17 yrs.	1930	"
Plant Variety Protection Certificate	sexually reproduced plants	novel	right to exclude others from selling	18 yrs.	1970	Department of Agriculture

SOURCE: Derived from Title 35, United States Code, and P.L. 91-577 as amended by P.L. 96-574.

directed to important inventions are provided in table 3-2. When a patent owner attempts to enforce a patent, the claim is compared with the product or process against which the enforcement action is directed to determine whether an **infringement** exists. If the patent is infringed, the patent owner has the right to stop the infringer from making, using or selling the invention (unless the infringer is the Federal government and then the patent owner can only obtain a reasonable royalty).

The claim is also a key in determining whether the patent is **valid**, that is, properly granted. To be patentable, the invention defined by the claims can neither be known nor obvious to others. By statute, an invention is not patentable

> "...if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains..."
>
> (35 U.S. Sec. 103)

In essence, the statute requires one passing on the obviousness of an invention to ascertain what was the state-of-the-art at the time the invention was made and determine whether a hypothetical skilled individual having complete knowledge of the state-of-the-art would have made the same invention using only his ordinary skill. If it can be shown that a claim encompasses subject matter that was known or obvious to one of ordinary skill in the art prior to the invention, the claim is invalid in its entirety and no part of the claim can be enforced. To make this determination of whether an invention was known or obvious, reference is made to the **prior art**. The sources of knowledge from which prior art can arise is defined by statute. In general, the prior art includes all patents and printed publications in the world and public use or knowledge

of the invention in the United States. Table 3-3 provides a more detailed guide to the present statutory definition of prior art as used in patentability determinations.

The scope of a claim is critically important. The scope of the claim is the amount of subject matter encompassed by the claim. To provide meaningful protection for an invention, the scope of the claim must be sufficiently broad to cover the commercially viable aspects of an invention but not so broad as to encompass subject matter which was known or obvious over the prior art. The common practice is to have a series of claims of varying scope in a patent. Thus in the event that prior art is found that renders broader claims invalid, the narrower claims might continue to protect aspects of the invention.

Securing a Patent:

The progress from an invention to an issued patent is characterized by three stages: the preliminary evaluation stage, the patent application drafting stage, and the patent examination stage.

In the preliminary evaluation stage, the existence of a potentially patentable invention is recognized, and the invention is analyzed to determine its importance and scope. If the invention appears to be significant, the potential for patentability may be investigated. The investigation almost always includes a consideration of the prior art to ascertain whether the invention was known or likely to have been obvious, and consequently unpatentable. The investigation of the prior art is also helpful in determining the breadth of the invention.

If the invention is promising, it advances to the patent application drafting stage. The patent application is comprised of the papers submitted to the Patent and Trademark Office requesting that a patent be granted. These papers include a document corresponding to the sought patent and contains the specification and sought claims. The patent

application also includes an oath or declaration by the inventor that he is the first and orginal inventor of the claimed subject matter and that he believes the claims to be patentable. The patent application must be accompanied by filing fees.

The responsibility for preparing the patent application and ensuring its accuracy and completeness rests with the patent applicant. Typically the patent applicant retains a patent attorney to prepare the patent application. Often attorney fees are $800 to $1,400 for preparing a patent application of minor complexity. (American Patent Law Association, Report of Economic Survey, October, 1981, p. 36)

About 100,000 patent applications are filed per year. Of the patent applications filed, about 40 percent are filed by foreign patent applicants. In the patent exmaination stage, a **patent examiner** reviews, or examines, the patent application to determine whether it meets all requirements for patentability. The patent examiner is required to have a bachelor's degree in science or engineering. Presently the Patent and Trademark Office has about 960 patent examiners, each of whom is assigned to an **art unit**, which examines patent applications in a defined technology area. The average patent examiner has about 100 patent applications assigned to him per year.

The primary task of the patent examiner is to determine whether the invention is novel and unobvious over the prior art, and a significant activity performed by the examiner is conducting a search to determine the prior art. The search is almost always exclusively conducted in the **examiners' search files** which contain about 24 million documents, arranged according to the **patent classification system.** The patent classification system has about 350 broad subject-matter categories, or **classes**, each of which is broken down into **subclasses.** There are approximately 108,000 subclasses. The patent classification system is unique to, was designed by, and is maintained by the Patent and Trademark Office. The examiners' search files contain U.S. patents, foreign patents, and non-patent

If the patent examiner does not believe that the patent application is allowable, the patent applicant can appeal the decision of the patent exmainer to the Board of Patent Appeals, which is an appellate body within the Patent and Trademark Office. Annually over 3,000 appeals are filed to the Board of Patent Appeals. If the patent applicant is still unsatisfied, the decision of the Patent and Trademark Office can be appealed to the United States Court of Customs and Patent Appeals (83 appeals filed in FY 1981) or the United States District Court for the District of Columbia (8 appeals filed in FY 1981).

Sometimes a patent applicant claims an invention that has already been claimed by another patent applicant or in a patent. Since the Patent and Trademark Office must grant a patent to the first inventor, the Patent and Trademark Office declares an **interference** and conducts an interference proceeding to determine who was the first inventor. About 300 interference proceedings are initiated per year. The interference proceedings are conducted before the Board of Patent Interferences in the Patent and Trademark Office. Decisions of the Board of Patent Interferences can be appealed to the United States Court of Customs and Patent Appeals (13 cases filed in FY 1981) or United States District Courts (6 cases filed in FY 1981).

Once a patent is issued by the Patent and Trademark Office, it has no authority to revoke the patent with the exception of **reissue proceedings** and **reexamination proceedings**. Reissue proceedings are initiated when the patent owner surrenders the patent to the Patent and Trademark Office and requests correction of an error made without deceptive intention that renders the patent wholly or partly inoperative or invalid. In FY 1981, 538 reissue patent applications were filed. The corrected patent, issued as a **reissue patent**, remains in force for the unexpired part of the term of the original patent. Reexamination proceedings went into effect in July, 1981, and permitted anyone to request that the Patent and Trademark Office reexamine a patent in view of prior art patents or printed publications upon the payment of a $1500 fee. The Patent and Trademark Office can

The patent owner is responsible for policing his own patent. If he believes his patent is being infringed and cannot privately work out an agreement with the alleged infringer, his only means of redress is through the courts. If the court finds that the patent claims have been infringed, it can issue an injunction and can order damages to be paid to the patent owner.

The alleged infringer can use several lines of defense: he may argue that he did not infringe the patent claims; he may argue that the patent is invalid; and he may argue that as a matter of equity the patent is unenforceable. A patent can be found unenforceable, even though otherwise valid and infringed, if the patent owner did not deal with the Patent and Trademark Office in full candor or misused his patent rights. Because of the extensive and complex legal and technical issues that must be considered in determining whether a patent is valid, infringed, and enforceable, patent litigation is frequently expensive and time consuming.

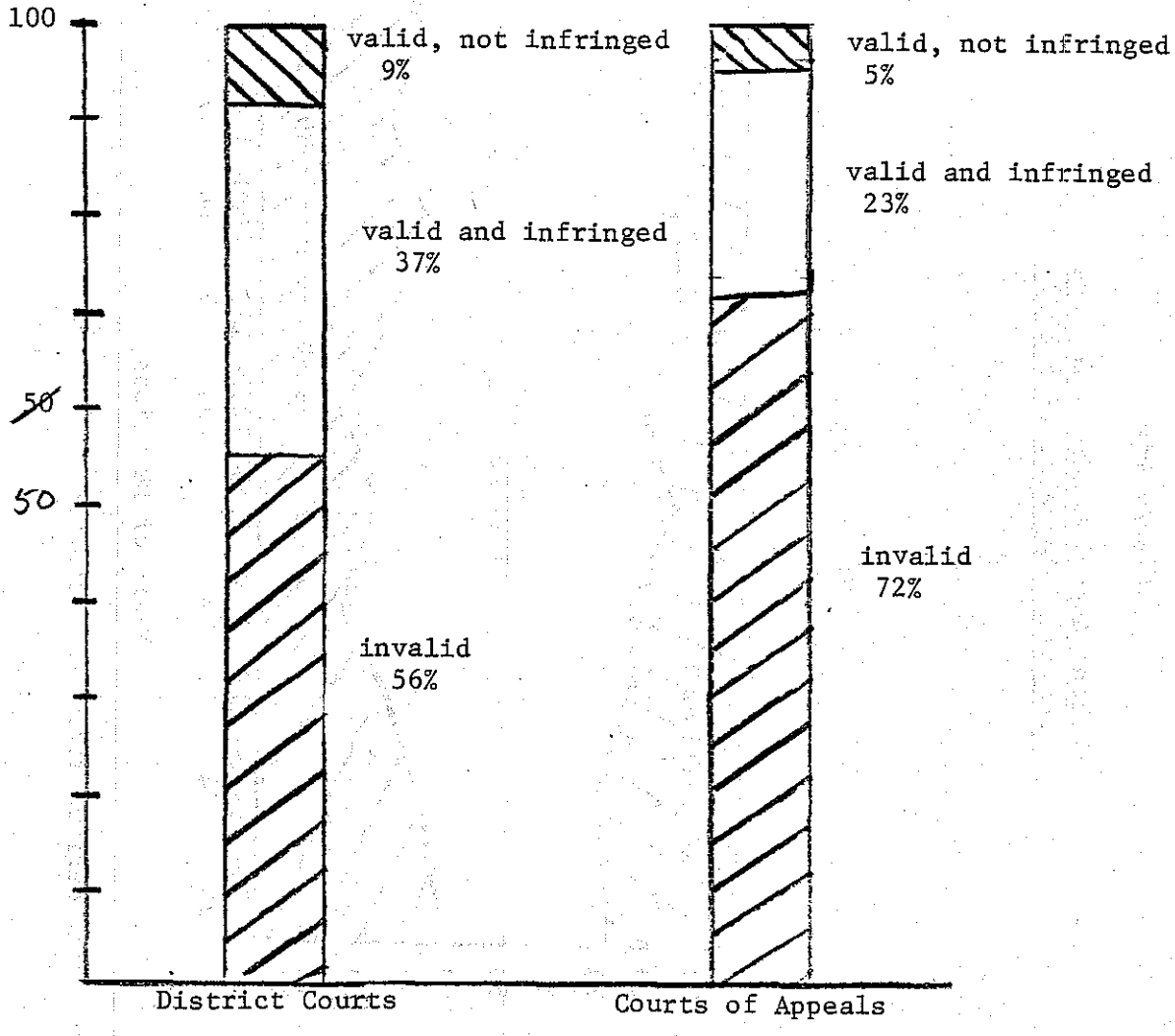
If the patent owner is successful in the litigation, the infringer can be ordered to cease infringement by the court. The patent owner may also be granted damages to compensate him for past infringement. The court has the authority to increase the damages up to three times the amount found. Attorneys' fees can be awarded to either party in exceptional cases. Usually, willful infringement or bad faith is required for granting increased damages or attorneys' fees. In practice, however, proving the bad faith of a party and that the bad faith warrants the assessment of attorney fees or multiple damages is difficult and expensive. (Gerald Rose and John E. Rosenquist, Attorneys' Fees, APLA Quarterly Journal, vol. 8, No. 1 (1980) 66-102; Joseph M. Fitzpatrick, Damages in Trademark and Patent Infringement Litigation, APLA Quarterly Journal, vol. 8, No. 1 (1980) 29-45) Moreover, the assessment does not occur until the litigation is finally resolved.

A discussion of patent litigation is found in chapter 6 and patent infringement and remedies are discussed in greater depth in section II.C. of the background paper accompanying this report.

income from all royalties, regardless of source, to be over $8 billion in 1976; see Robert B. Bangs and John F. Creed, Licensing Experience of U.S. Corporations in the Encyclopedia of Patent Practice and Invention Management, edited by Robert Calvert (Robert E. Krieger Publishing Company, Huntington, N.Y.) 1964, p. 541-545, at 545, for an estimate of $200 to $300 million in the late 1950s.)

Figure 4-1

Dispositions of Patents Adjudicated
In Reported Decisions for
The Years 1970, 1975 and 1980



Source: OTA

SOURCES: Supreme Court Decisions 1876 - 1954, G. Frost, the Patent System and the Modern Economy, Study No. 2, Subcommittee on Patents, Trademarks, and Copyrights, of the Senate Committee on the Judiciary (1957) p. 59.

Courts of Appeals Decisions 1890-1914, H. Mayers, the United States Patent System in Historical Perspective, Patent, Trademark, and Copyright Journal of Research and Education, Vol 3 (1959) p. 52

Courts of Appeals Decisions 1925-1954, P. J. Federico, Adjudication of Patents, 1948-54, Journal of the Patent Office Society Vol 33 (April 1956) p. 244.

Courts of Appeals Decisions 1955-63, R. J. Dearborn and R. B. Boal, Adjudications by circuits and arts involved, Encyclopedia of Patent Practice and Invention Management, Calvert ed. (1964) p. 23.

Courts of Appeals decions 1964-1972, G. K. Koenig, Patent Invalidity -- A statistical and substantive analysis, Clark Boardman Co. Ltd. (NY, 1964) p. 4-13.

Table 4-7 reports the percentage of adjudicated patents that have been found valid and infringed by appellate courts over the last 100 years. While the percentages have fluctuated for each of the Courts of Appeals and the Supreme Court, there are no apparent long term trends. Over 50 percent of the adjudicated patents were found invalid. The fluctuation of the decisions of the different levels of courts seem to be in harmony, and it has been noted that these cycles appear to coincide with the national attitude toward patents and innovation. (C. Marshall Dann in Calvert, p. 21, see also H. R. Mayers, The United States Patent System in Historical Perspective, IDEA, vol 3, 1954, p. 33-52) This suggests that some of the uncertainty of patent validity is attributable to the general environment for innovation rather than to the patent laws or the performance of the Patent and Trademark Office.

Because court decisions are rendered on only a small fraction of patents (less than 0.5 percent), and the sample of patents in litigation is not likely to be representative of all patents, it is difficult to project from this information the frequency with which patents of questionable validity are issued. It is likely that many patents are not enforced and many inventions never exploited by their owners because the patents are of doubtful validity. But this is difficult to prove because the necessary information has not been collected nor can it be collected in a practical and reliable manner. However, even though the magnitude of non-litigated patent validity problems cannot be determined, these problems can be very instrumental in affecting perceptions about the patent system and the certainty of patent validity.

Several techniques have been used to develop estimates of the percentage of patents that have questionable validity. An internal review by the Patent and Trademark Office of randomly selected patent applications allowed by patent examiners indicates that about 5 percent of the patents issued by the Patent and Trademark Office have at least one "clearly unpatentable" claim, that is, reasonable patent professionals would likely agree that a defect exists. (Derived from private communications with PTO,

SOURCES: Supreme Court Decisions 1876 - 1954, G. Frost, the Patent System and the Modern Economy, Study No. 2, Subcommittee on Patents, Trademarks, and Copyrights, of the Senate Committee on the Judiciary (1957) p. 59.

Courts of Appeals Decisions 1890-1914, H. Mayers, the United States Patent System in Historical Perspective, Patent, Trademark, and Copyright Journal of Research and Education, Vol 3 (1959) p. 52

Courts of Appeals Decisions 1925-1954, P. J. Federico, Adjudication of Patents, 1948-54, Journal of the Patent Office Society Vol 33 (April 1956) p. 244.

Courts of Appeals Decisions 1955-63, R. J. Dearborn and R. B. Boal, Adjudications by circuits and arts involved, Encyclopedia of Patent Practice and Invention Management, Calvert ed. (1964) p. 23.

Courts of Appeals decions 1964-1972, G. K. Koenig, Patent Invalidity -- A statistical and substantive analysis, Clark Boardman Co. Ltd. (NY, 1964) p. 4-13.

Since the quality of West German and Japanese patent examination is generally regarded as at least equivalent to that in the United States, there is a basis for presuming that a similar percentage of patents of questionable validity are issued by the United States Patent and Trademark Office. But there are differences in the standards for patentability and in the types of issues that can be considered in challenging the validity of a U. S. patent and in the West German and Japanese opposition proceedings. Moreover, even with the latter there are many patents that do not have sufficient economic or technical value to justify challenging the patent. Thus, the West German and Japanese opposition statistics understate the frequency with which patents having questionable validities are issued. With an understanding of the limitations of this technique, it would suggest that at a minimum between 10 and 20 percent of U. S. patents have questionable validities.

The foregoing discussion points to a general lack of understanding of the magnitude of the problem of patents with uncertain validities and the inability to measure the magnitude of the problem, let alone determine any trends. Best indications are that an appreciable number of patents have questionable validities.

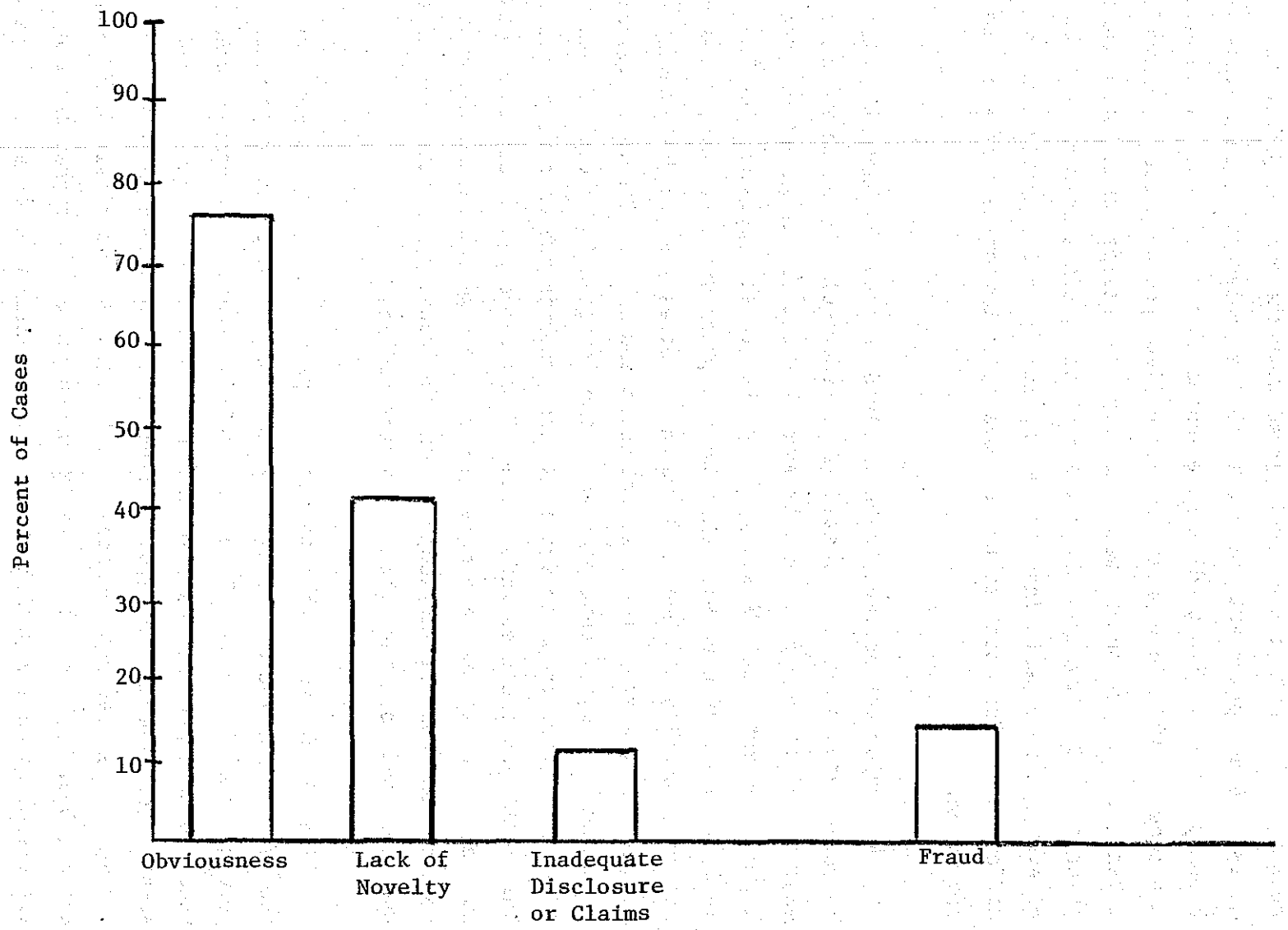
The Causes of Patent Invalidity

The existence of a significant patent validity problem, albeit of indeterminate magnitude, has been identified, and the focus of the following discussion is on the likely causes of uncertainties in patent validity. With an understanding of the causes of the problem, legislative approaches can be designed that cure the problem rather than treat only its outward manifestations.

A primary source of information about the causes of patent invalidity are court decisions. Although court decisions may not be indicative of the frequency that issues of patent validity arise, they do provide an indication of the types of problems that occur and what causes those

Table 4-2

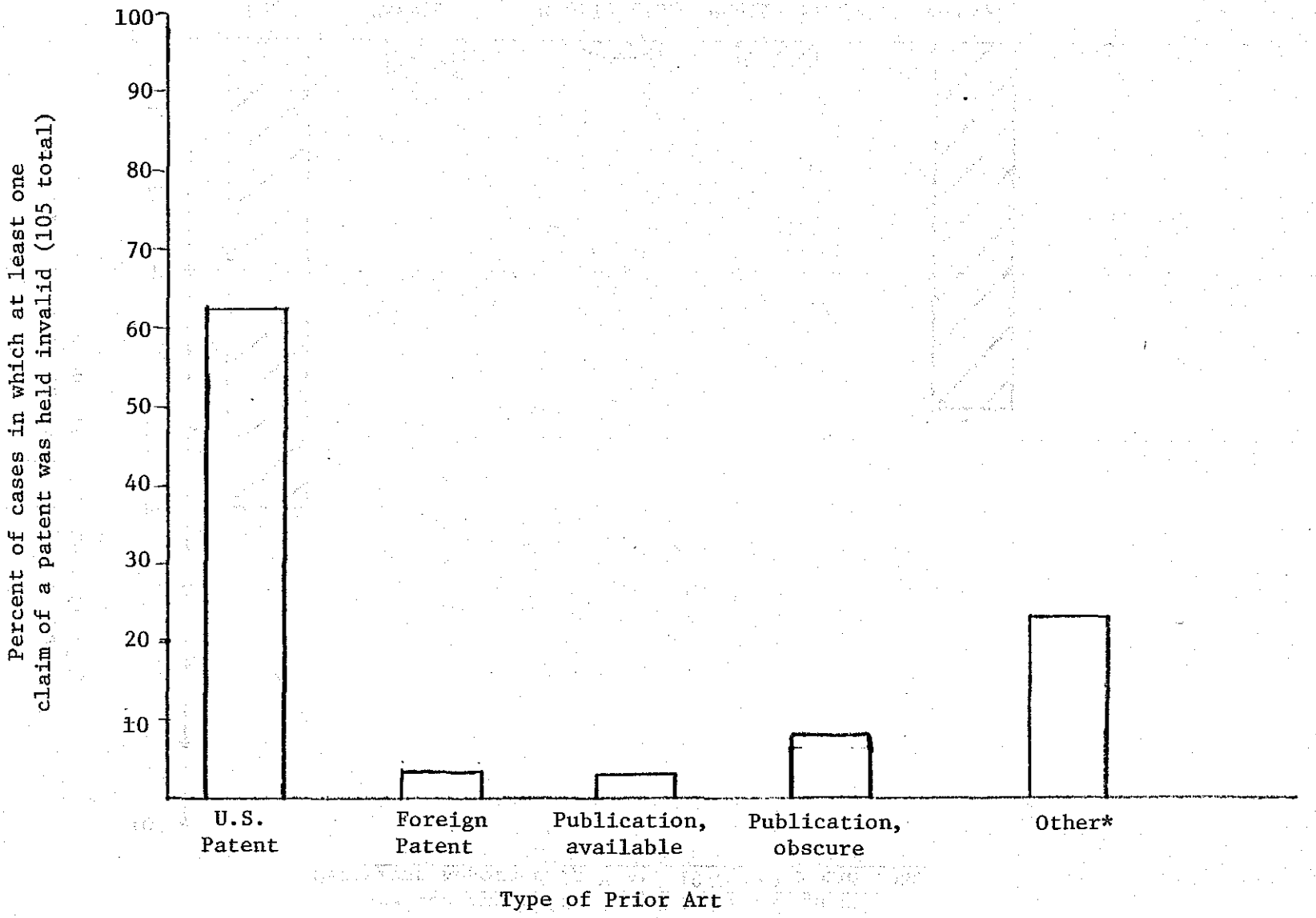
Grounds for Invalidity
Cases in which at least one claim in a adjudicated patent was held invalid
Reports in 1970, 1975 and 1980



Source: OTA

Figure 4-3

Invalidating Prior Art
District Court Decisions Reported
In years 1970, 1975 and 1980



* Includes general knowledge, prior use or sale, invention of another.

Source: OTA

A correlation appears to exist between the complexity of the invention and the likelihood that an adjudicated patent will be held invalid. OTA found that in the reported court decisions in 1970, 1975 and 1980, all patents were invalidated in 72 percent of the 127 cases involving patents on inventions of little complexity; and all patents were invalidated in 56 percent of the 138 cases involving inventions of medium complexity and in 31 percent of the 13 cases involving inventions of major complexity. The complexities were subjectively determined based on the ease with which the technology could be understood by a lay person and not whether the invention was obvious over the prior art. Most mechanical patents were judged to involve easily understood technology. This correlation suggests that the inventions that can be easily understood are likely to result in patents with very uncertain validity.

One reason that patents relating to less complex technologies may have greater uncertainties of validity is that it is more likely that more prior art exists and hence there is a greater chance that new prior art will be found that is more relevant to the invention. Another explanation is that the complexity of the technology influences the subjective determination of whether the claimed invention is obvious. (R. Lewis Gable, The Presumption of Patent Validity and Suggestions for Strengthening the Presumption, IDEA, vol. 8, (1964) 255-271, 261-262) Of the 34 decisions in 1970, 1975 and 1980 in which the patent was invalidated over known prior art, two-thirds involved easily understood technology and none involved technology of difficult complexity (OTA). Thus, it appears that differences in judgements concerning the obviousness of inventions is most likely to arise when the technology can be easily understood.

Since the certainty of the validity of a patent can be influenced by the care expended by the patent applicant in preparing and prosecuting the patent application, and the results of a litigation can be affected by the ability of a party to present its case, the reported court decisions for 1970, 1975 and 1980 were analyzed to determine the effect of the size of the party on the outcome of the litigations. The analysis showed that

Table 4-5

Frequency of Patent Invalidity as a Function of
Patent Owner and Alleged Infringer Sizes
Reported Decisions: 1970, 1975 and 1980

Patent Owner Size	Alleged Infringer Size	
	Small	Large
	percent of cases where at least one claim in a patent was held invalid	
Individual	72.7 (16 of 22)*	70.4 (19 of 27)
Small	57.6 (38 of 66)	65.8 (25 of 38)
Large	61.1 (22 of 36)	57.8 (26 of 45)

*The parenthetical expression indicates the number of cases in which there was a holding of invalidity and the total number of cases decided

SOURCE: Office of Technology Assessment

For example, the patent applicant can ensure that the patent application is in a proper form and meets all the technical and substantive requirements for patentability; he can make a thorough investigation of the invention to determine that the claims are properly drawn and he can conduct a thorough investigation of the prior art. The patent applicant can also conduct himself in a manner to avoid any implication of fraud of misrepresentation before the Patent and Trademark Office.

From a practical standpoint, however, these efforts require time and money, and achieving a perfect patent regardless of the effort expended is virtually impossible. For example, the patent applicant is often called upon to make decisions on issues for which there is no clear, correct answer, and he must anticipate how the Patent and Trademark Office as well as any court that might review his patent would resolve the issues. Moreover, there is a natural tendency for patent applicants to make elaborate and excessive claims for their inventions as they seek the broadest possible protection for their ideas. If left unchallenged by the Patent and Trademark Office, these far-reaching claims can be the basis for the patent being found invalid when tested in court. (George E. Frost, "A Brief Reply to Some Criticisms of the Patent System," IDEA, vol. 15, 1971, pp. 46-48)

While there are many activities that the patent applicant could undertake to enhance the reliability of the patent, he is legally obligated to pursue only a few of these activities. For instance, the patent applicant has no legal obligations to conduct an investigation of the prior art, nor need he sufficiently investigate the invention to ensure that the claims will provide meaningful coverage. There are also many decisions that the patent applicant must make (such as identifying the true inventor and disclosing the best mode for practicing the invention) that are not feasible for the Patent and Trademark Office to review. Further, from the OTA study of reported patent decisions, the frequency that patents are found invalid over prior art that is not a patent or printed publication but rather is unpublished information available to the patent applicant,

quality of patents issued and the costs of achieving that quality. Therefore, the primary thrust of the Patent and Trademark Office is toward protecting the public by assuring that patents are granted for inventions and that the inventions are adequately disclosed within reasonable costs.

The Patent and Trademark Office usually does not have the resources nor sufficient knowledge of the invention to improve the quality of patent applications other than with respect to its patentability over the prior art and the adequacy of the disclosure.

The Courts:

The third major actor influencing patent reliability is the courts. While the primary role of the courts is to resolve questions of infringement and validity of patents, they also effect and affect public policy regarding the patent system. The courts serve as part of the checks and balances system on the patent system. If the courts perceive that the Patent and Trademark Office has become too liberal in granting patents, they can invalidate patents and thus send a message to patent applicants and the Patent and Trademark Office that the level of patentability needs to be raised. In 1966, the Supreme Court explicitly provided such a message:

> "... it must be remembered that the primary responsibility for sifting out unpatentable material lies in the Patent Office. To await litigation is -- for all practical purposes -- to debilitate the patent system. We have observed a notorious difference between the standards applied by the Patent Office and by the Courts." (Graham v. John Deare Co. of Kansas City, 383 U.S. 1, __)

Because of the critical role the courts play in the operation of the patent system, the quality of judicial review of patents is important. Many factors exist that can potentially affect the perceived quality of

invention must accomplish something greater than what would be expected from the combination of the old elements. Other courts hold that synergism is not required for patentability.

While the effect of inconsistent court decisions on the value of patents is difficult to judge, some adverse effect appears to exist. (Commission on the Review of the Federal Court Appellate System, Structure and Internal Procedures: Recommendations for Change, 67 F.R.D. 195, 369 (1975)) One study has indicated that the existence of inconsistent court decisions has influenced decisions of a number of companies not to attempt to enforce their patent rights. (Judith H. Obermayer, The Role of Patents in the Commercialization of New Technology for Small Innovative Companies, Research & Planning, Inc. Cambridge, Mass. (1981) p. 43)

The concern over inconsistent court decisions on patent matters has led to the passage of legislation which provides a Court of Appeals for the Federal Circuit with exclusive appellate jurisdiction over patent cases. (P.L. 97-164, 1982)

Counteracting the uncertainties inherent in the judicial process is the statutorily provided presumption of validity of patents (35 USC, Sec. 282). This presumption of patent validity, however, has been fragile and repeatedly challenged. The courts usually dispense with the presumption of validity when prior art or other information not considered by the Patent and Trademark Office is at issue in the litigation. While this is obstensibly the reason for the presumption of validity being easily overcome, other concerns seem to exist which tend to give the statutory presumption of validity only nominal effect.

For example, the Patent and Trademark Office is commonly perceived to have a bias in favor of patents. Some support their assertion of a bias on the grounds that the Patent and Trademark Office exists to grant patents. They further point to the fact that most of the Commissioners of Patents and Trademarks and many other appointed PTO officials are lawyers who have specialized in patents and thus likely to have a bias toward patenting.

validities. By far, the most common cause for patents being found invalid in litigation is that the claimed invention lacked novelty or was obvious over the prior art. In most instances it appears that the prior art was not known to either the patent applicant or the patent examiner before the patent was issued. However, not infrequently the judgments of the courts and the Patent and Trademark Office differ as to whether a claimed invention is patentable over prior art known to the patent applicant and the patent examiner prior to the issuance of the patent. In a significant number of instances, the prior art is not a patent or printed publication but is published information known to the patent applicant and likely not available to the patent examiner.

The court decisions indicate that the uncertainty of patent validity appears to be correlated to the complexity of the technology to which the invention pertains. Patents in technology areas which can be easily understood are most susceptible to being found invalid by a court. Moreover, the instances in which the courts disagree with the judgment of the Patent and Trademark Office in granting a patent over the known prior art are most likely to involve patents relating to technologies that can be easily understood. As the patent relates to technology that is more complex, its reliability appears to increase regardless of whether the technology is mechanical, electrical or chemical in nature and regardless of the apparent economic resources of the patent owner.

The patent applicant, the Patent and Trademark Office and the courts each affect the reliability of patents. While the patent applicant has the most influence over the reliability of a patent, he is often faced with questions for which there is no clear, correct answer, but a decision must be made. That decision, even if reviewed by the Patent and Trademark Office, is still subject to being found improper by a court if the patent is challenged. Hence, reliability of patents can, in these instances, be predicated on the ability of the patent applicant and the Patent and Trademark Office to anticipate the likely disposition of the courts to the issue. To some extent this ability will be enhanced by recent legislation

Chapter 5

THE PERFORMANCE OF THE PATENT AND TRADEMARK OFFICE

Introduction

As shown in the previous chapter, the performance of the Patent and Trademark Office is a major factor within the control of the Government for affecting the reliability of patents. The focus of this chapter is to examine the performance of the Patent and Trademark Office and develop an understanding of the underlying reasons for that performance. Once the underlying reasons have been identified one can obtain a better understanding of the types of Congressional activities that could materially affect the quality of patent examination.

At the outset it should be recognized that perfect patent examination quality is probably unattainable regardless of the resources expended for patent examination. A balance must be struck between the desired quality of patent examination and the costs of obtaining that quality. This balance is established by the coaction of the policy established by Congress through legislation, oversight and appropriations; and the implementation of that policy by the Executive Branch.

Understanding where that balance has been drawn is difficult due to the lack of any definitive method for determining the quality of patent examination. Most available measures of patent examination quality are subject to criticism because the sample of patents upon which the measurement is made may not accurately reflect the entire population of issued patents or because the evaluation of the patents is so inherently subjective that biases are inevitable. However, even though the available measures may not accurately depict patent examination quality, they can be very helpful in identifying the causes of problems affecting patent examination quality and the viability of proposed solutions to those problems.

Table 5-1
Commissioners of Patents
and Trademarks, 1970-1982*

	Dates of Service		
William E. Schuyler	May 7, 1969	to	August 25, 1971
(Acting Commissioner)	August 26, 1971	to	January 6, 1972
Robert Gottschalk	January 7, 1972	to	June 20, 1973
(Acting Commissioner)	June 21, 1973	to	February 10, 1974
C. Marshall Dann	February 11, 1974	to	August 31, 1977
(Acting Commissioner)	September 1, 1977	to	June 4, 1978
Donald W. Banner	June 5, 1978	to	June 30, 1979
(Acting Commissioner)	July 1, 1979	to	November 28, 1979
Sidney A. Diamond	November 29, 1979	to	January 17, 1981
(Acting Commissioner)	January 18, 1981	to	July 7, 1981
Gerald J. Mossinghoff	July 8, 1981	to	----------

* Commissioner of Patents prior to January 2, 1975

SOURCE: The Story of the U.S. Patent and Trademark Office, GPO (July 1981)

However, regardless of whether the quality of patent examination is involved, the frequency of disagreements over patentability is expected to detract from the confidence that individuals and businesses are willing to place in patents. Furthermore, these differences can give rise to a reluctance of courts to place much weight in the patentability determinations made by the Patent and Trademark Office. Even so, it is general practice not to challenge the validity of a patent in court if the only basis for alleging invalidity is that the claimed invention is unpatentable over the prior art considered by the patent examiner.

The internal Patent and Trademark Office review of quality in patentability determination indicates that errors in judgment by patent examiners do occur. The quality review program estimates that less than about 1 percent of the patent applications allowed by patent examiners have claims which are "clearly unpatentable" over the cited prior art. (PTO, private communication) Because of the "clearly unpatentable" test that is used, the quality review program is expected to understate the frequency of error in patentability determinations.

The decisions of the Patent and Trademark Office Board of Appeals also reflect on the quality of patentability determinations. The patent applications before the Board of Appeals have been determined by the examiner to not be allowable (see Chapter 3). Thus, this internal review looks at a different spectrum of patent applications than does the quality review program. Generally about 4 percent of the patent applications filed are appealed to the Board of Appeals. While some variance exists from year-to-year, in 1981, in 21 percent of the appeal disposals the decision of the patent examiner was reversed (PTO, Annual Report, Fiscal Year 1981, p. 39). Many of these reversals may be questions of legitimate disagreement rather than errors in patentability judgment by the patent examiners.

These internal reviews seemingly indicate that errors in patentability judgment by the patent examiners occur relatively infrequently and are just as likely to be in allowing as not allowing patent applications.

Table 5-2
Summary of Patent and Trademark
Office Invalidity Study
Based on Reported Cases, Calander
Years 1976 - 1979*

	Number of Cases
I. Patents held invalid	
a. Total	265
b. Based on Prior Art	191
II. Type of Prior Art in holding of invalidity	
a. U.S. Patent	142
b. Foreign Patent	58
c. Literature	51
d. Other	83
III. Court relied on same prior art as patent examine	
a. Applied different standard of patentability	33
IV. Court applied different prior art then patent examines in finding invalidity	
a. Total	163
b. Different prior art was:	
1. more relevant	74
2. less relevant	14
3. cumulative	36
c. Different prior art was located	
1. same area examiner searched	64
2. area usually searched	19
3. area not usually searched	34
4. not in examiner's search files	84

* Includes reported cases from District Courts, Courts of Appeal, Court of Claims, Other

SOURCE: Patent and Trademark Office, undated internal memoranda

Patent and Trademark Office have been returned to the general fund of the U.S. Treasury. Recently enacted legislation will alter the availability of funds for the Patent and Trademark Office effective October 1, 1982. Although the appropriations process will still be controlling, revenues from fees will be credited to the Patent and Trademark Office Appropriations Account rather than the general fund. This legislation further provides that the Patent and Trademark Office will establish its own fee schedule so as to recover 50 percent of the patent examining (patent application processing) costs rather than have the fees specifically established by legislation. (P.L. 96-517) The Patent and Trademark Office has recommended that as of the beginning of fiscal year 1983 it be permitted to recover 100 percent of the patent examining costs through fees. Legislation authorizing increased fees is presently being considered by Congress. (S. 211, S. 2326, H.R. 6260, 97th Congress) Figure 5-1 summarizes the income from fees and operating costs for the Patent and Trademark Office for fiscal years 1965 through 1981, and the projections for 1982 and 1983, and table 5-3 summarizes the Patent and Trademark Office budget for 1981 and projections for 1982 and 1983.

For fiscal year 1982, the cost for examining the average patent application is estimated to be $1,150. Of this amount, approximately 50 percent is devoted to patent examiner salaries and 15 percent to patent printing costs. Figure 5-2 summarizes the breakdown of costs per patent application.

The Patent Examiner Resource:

The patent examiner resource is affected by the quality, training and supervision of the individual patent examiners.

There are no objective methods for measuring the quality of patent examiners. As with any profession, a wide range of capabilities exist among individual members with some having greater capabilties than others. (Eugene W. Geniesse, The Examination System in the U.S. Patent Office,

Table 5-3
Patent and Trademark Office
Budget, FY 1981-1983
(Dollar amounts in Thousands)

	1981 Acutal Amount	1982 Current Amount	1983 Estimate Amount
Patent Process:			
Examination-professional	$ 47,497	$ 48,257	$ 66,176
Examination-clerical	7,620	7,498	11,097
Appeals	2,049	2,071	2,759
Interferences	750	768	910
Patent printing	13,468	14,094	15,268
Executive Direction & Administration	10,167	11,285	14,918
Subtotal	81,551	83,973	111,128
Trademark Process:	8,301	9,287	12,255
Information Dissemination:	26,298	25,701	31,551
TOTAL	116,150	118,961	154,934

SOURCE: PTO

Committee Print, Subcommittee on Patents, Trademarks and Copyrights. Senate Committee on the Judiciary (1961) p. 8) The distribution of the quality of patent examiners may thus provide a better understanding of the patent examiner resource than the average quality.

One key to achieving a high quality patent examiner staff is the ability to attract qualified individuals to become patent examiners. This ability has been impeded by a variety of factors, some generally applicable to the entire Government and some unique to the patent examining occupation.

In the 1980-81 recruiting campaign, the Patent and Trademark Office was surprised by its lack of success in attracting college seniors in the engineering disciplines. Of the 277 formal offers that were extended, only 19 accepted positions. Positions were formally declined by 125 applicants and 133 failed to respond. Of those who declined, 58 percent stated that the refusal was caused at least in part by low pay. A number of those who did accept positions were not in the upper part of their class. The Patent and Trademark Office reestablished its goals in 1982 and hoped to hire only those who graduate in the upper part of their class (3.0 of 4.0 GPA) or who have industry experience. However, since hiring goals were not being met, these criteria have varied. At present, the Patent and Trademark Office has virtually met its goal for new hires during fiscal year 1982. Of 538 offers, 230 have accepted. (PTO, private communication, June 15, 1982).

Considerable training is required to become a proficient patent examiner. Each examiner receives an extensive training program that involves class room and on-the-job training. The new examiner receives a two-week introductory course which covers the fundamentals of the patent law, patent examining and searching. After completing the introductory course, the new examiner is assigned a docket of patent applications and begins patent examining under the supervision of an experienced examiner. During the first year, the patent examiner receives an additional 100 hours of lecture training in the Patent Academy. Upon completing the Patent

functions with a minimum of support help such as typists, research aides, and clerks.

There is a boredom factor because of the nature of the work. From a professional standpoint, many patent examiners wish to be transferred to nonexamining positions such as acting members of the Board of Appeals, Board of Patent Interferences, Solicitor's Office, Assistant Commissioners Office, Quality Control, Office of Legislation and International Affairs and Office of Technology Assessment and Forecast.

The motivation of the patent examiner is determined by the individual but is influenced by the policies established by the management of the Patent and Trademark Office and by the policies and positions of the union that represents the patent examiners. These policies establish an environment which can affect the patent examiner's sense of self esteem, professionalism, and the areas in which efforts are profitably expended for advancement.

The policy which appears to have had the greatest effect on the motivation of the patent examiner is the adoption of compact prosecution and production goals by the Patent and Trademark Office in the mid-1960's. Prior to compact prosecution, the patent examiner was credited by the number of "actions", or formal communications, which occurred with patent applicants. The examination of the patent application was often undertaken in a piecemeal fashion with a number of actions occurring and patent application pendency averaged about 36 months. Compact prosecution emphasized resolving all issues regarding the patentability of a normal patent application in two office actions.

To ensure that the compact prosecution policy would be adopted, the Patent and Trademark Office changed the way it measured the patent examiner's productivity, giving credit only for first actions and disposals (patent applications allowed or abandoned). Raises and promotions were dependent upon meeting certain production goals. In establishing goals,

TABLE 5-4

Production of Examining Corps from 1974 to 1981 (Fiscal Year)

	1974	1975	1976	1977*	1978*	1979*	1980*	1981*
Percentage of Examiners achieving at least:								
70 Percent of Quota	94	97	96	97	98.5	98	99.5	99.1
90 Percent of Quota	77	85	80.5	85.5	90	89.5	95	93.8
100 Percent of Quota	57	67	64.5	69	76	73.5	81.5	81.9
110 Percent of Quota	33	22	39.5	39	42	37	39	41.5

*an average of one hour added to average examining time

SOURCE: Patent and Trademark Office, private communication January 1982.

examiners who report to him. The supervisory primary examiner also fills the traditional role of a manager in maintaining employee morale, developing individuals, and serving as a conduit of information between upper management and the patent examiners.

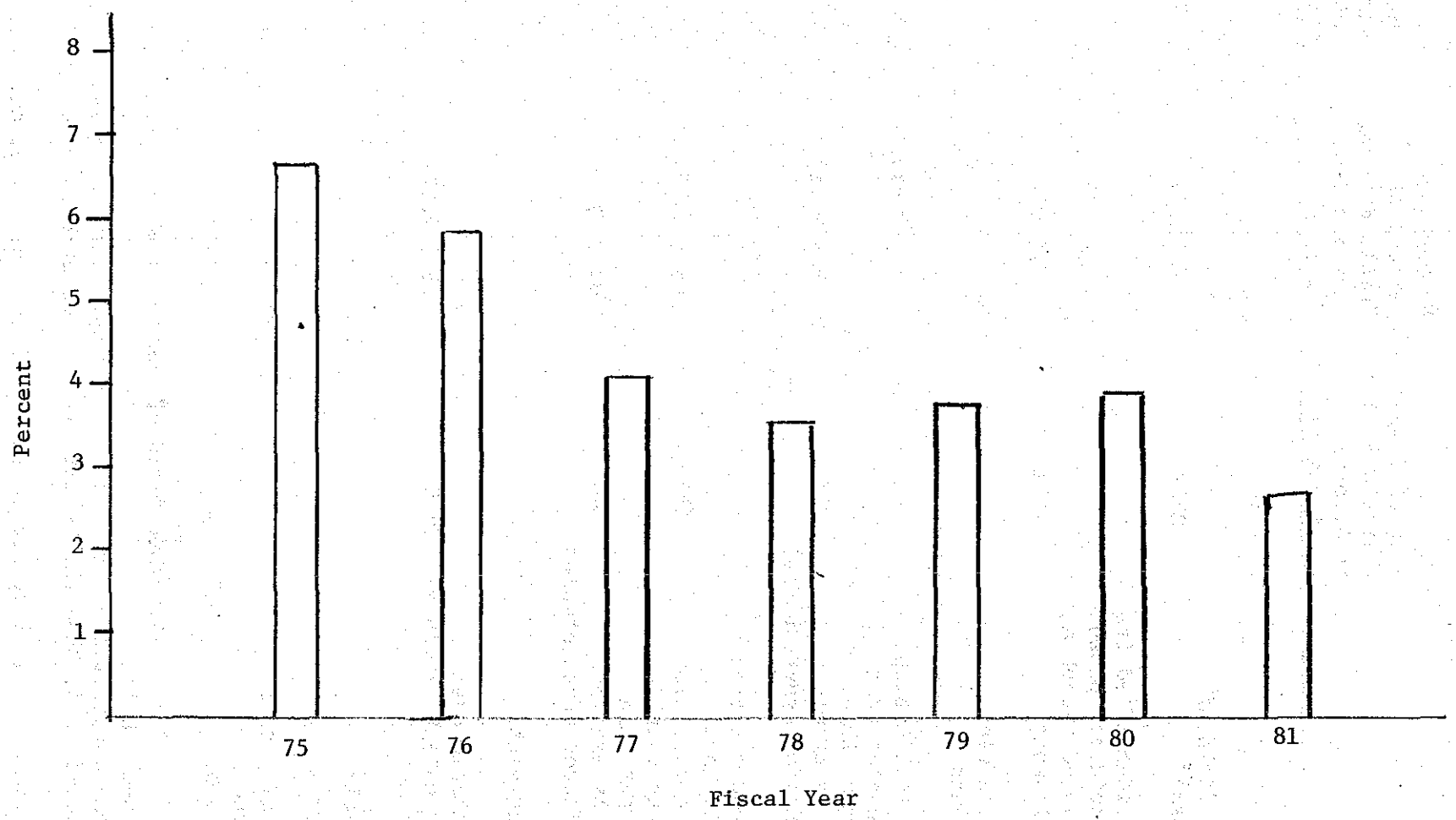
The performance of the supervisory primary examiner in establishing the quality of patent examination is affected by the time available for supervision, his familiarity with the technology, and incentives provided by management. The demands on the time of the supervisory primary examiner are heavy in terms of his responsibilities, the number of individuals reporting to him, and the administrative tasks which he must perform, often without clerical assistance. These demands limit the ability of the supervisory primary examiner to keep abreast of the technology which can adversely affect the quality of the training and review of his staff. The production goal system provides an incentive for the supervisory primary examiner to urge the patent examiners in his art unit to exceed their production goals more than to urge quality performance. The supervisory primary examiner is evaluated in part on the production of his art unit, and the minimum acceptance level for his art unit is greater than the total of the minimum acceptance levels of the patent examiners who report to him.

Despite the importance of the supervisory primary examiner positions, not all qualified individuals seek these positions. A number of qualified individuals have indicated that the position of a supervisory primary examiner is unattractive because the position holds little prestige and has little authority or involvement in policymaking within the Patent and Trademark Office. Moreover, since many of the qualified individuals have been at or near the Federal pay cap, little monetary incentive exists to assume more responsibility and to take on the psychological strain of a management position.

Other supervisory mechanisms used by the Patent and Trademark Office are less direct than the supervisory primary examiner but nonetheless appear to be very important in assuring quality patent examination. These

Figure 5-3

Percent of Patent Application Reviewed
by the Quality Review Program
Found to have Clearly Unpatentable Claims*



* This percentage reflects clearly unpatentable claims actually found. Since 80 percent of the reviewed cases do not receive full review, this measure understates the percentage of applications that would have clearly unpatentable claims.

Source: Patent and Trademark Office.

quality review program being used in performance appraisals. Regardless of whether the quality review program has had a provable effect on the actual quality of patent examination, a psychological effect on patent examiners exists.

The Patent and Trademark Office is in the process of adopting a performance appraisal program that is being instituted Government-wide. The effect of the program is uncertain, and its effect will be dependent on the manner of its implementation. There is concern among patent examiners about the performance appraisal program and its implementation and this concern had led to a breakdown of negotiations between the Patent and Trademark Office management and the union representing the patent examiners. The primary responsibilty for conducting the appraisal will be with the immediate supervisor, and the appraisal will include quality and production factors. Table 5-6 summarizes the performance standards to be used.

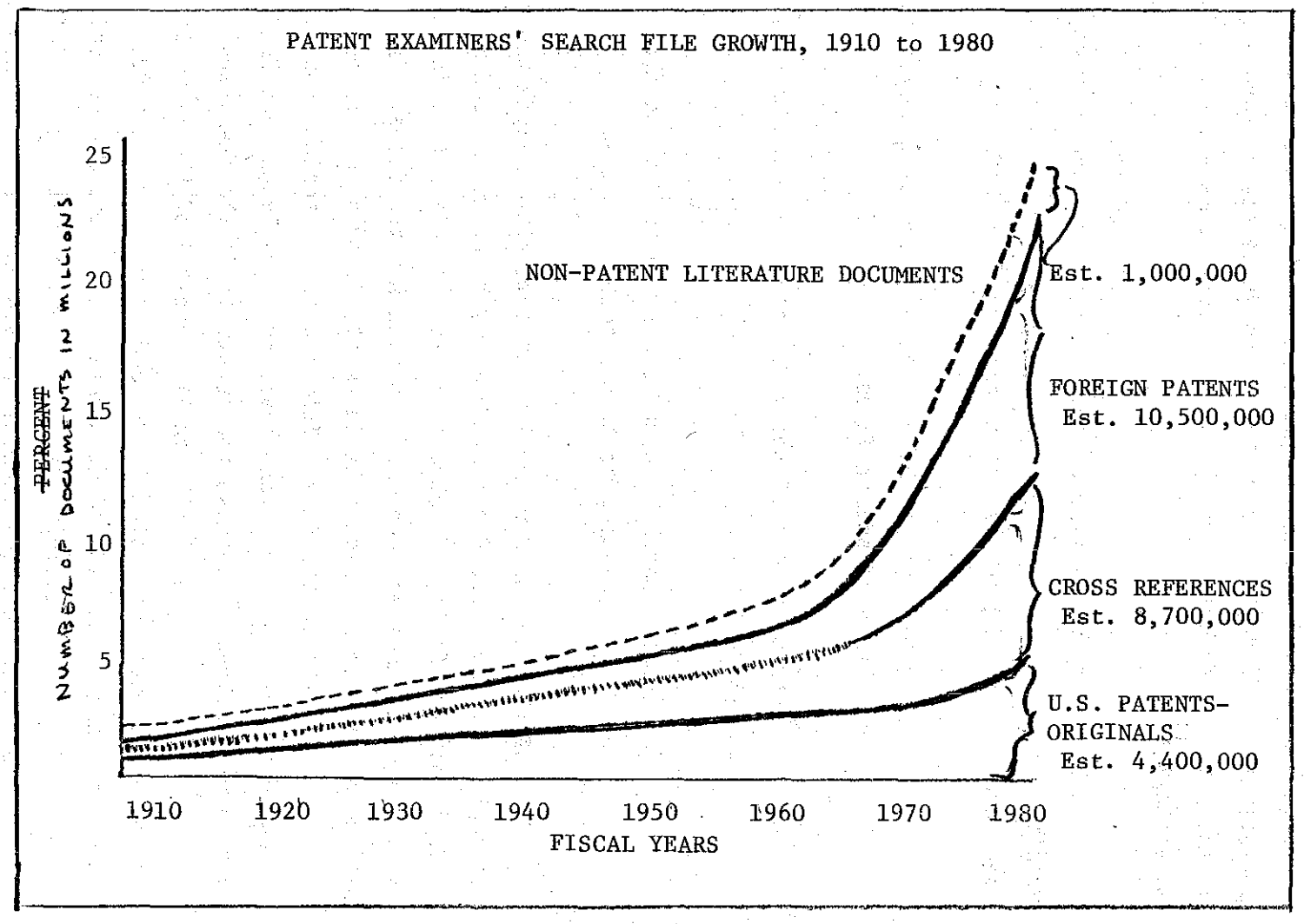
The Search File Resource:

The patent examiners' search file resource is affected by the types of documents placed in the file, the integrity of the file and the ease of recovery of relevant documents from the file.

The examiners' search file resource has been expanding at an increasing rate both due to the increasing knowledge base and due to more foreign patents and technical literature being included in the files. Figure 5-4 illustrates the accelerating growth of the examiners' search files.

In part because of obligations incurred under the Patent Cooperation Treaty of 1978, the Patent and Trademark Office has upgraded the examiners' search files by providing a more complete collection of foreign patents. Currently 250,000 foreign patents from the principal industrial countries are being added to the files annually. However, the incorporation of

Figure 5-4



Source: Patent and Trademark Office

subclasses. Hence, a missing document in one subclass may be present in another searched by the examiner. Also, many patent examiners become familiar with the contents of the search files after several years of experience and can recall a document even though it may be missing. (Surveys and Investigative Staff report of the House Appropriations Committee on the Operations of the Patent and Trademark Office, February 1, 1980, p. 9)

The third aspect of the search file resource is the ability of the patent examiner to locate relevant documents. Although the number of documents in the examiners' search files has trebled in the last 20 years, the time available to the patent examiner for prior art searching has been maintained at a relatively constant level. The primary reason that the search time could remain relatively constant is reclassification, that is, regrouping documents contained in existing subclasses into a greater number of new subclasses. Thus, the number of documents per subclass can be reduced and the new subclass groupings can better reflect the current needs of the patent examiners for identifying appropriate subclasses for prior art searching. Without reclassification, the additional time required by the patent examiners to conduct a search would grow at a substantially greater rate than the rate of growth of the overall examiners' search files. (Donald Stein, 1978)

The Patent and Trademark Office estimates that about 10 percent of the examiners' search files are growing at such a high rate that they require, or will require reclassification in the immediate future. (B. Huther, Patent and Trademark Office, private communication, March 1982) The present reclassification efforts are much less than is required and in recent years, the reclassification efforts have been decreasing. See table 5-7. Unless reclassification is diligently pursued the files may expand to the point that reclassification is no longer feasible or practical. In other words, it is easier to conduct 10 reclassification projects, each containing 1,000 documents, then one project containing 10,000 documents.

In addition to the examiners' search files, patent examiners have access to the Scientific Library located in the Patent and Trademark Office and commercially-available computer-assisted search services. However, the primary search base for almost all patent examiners is the examiners' search files. The computer-assisted search services have been relatively unused. Until recently, the Patent and Trademark Office had only one, centralized terminal for accessing the computer-assisted search bases and a trained librarian was required to operate the terminal. No encouragement had been provided to use the computer-assisted search bases since they had not been adequately tested to determine their usefulness. Currently the Patent and Trademark Office has made available certain computer assisted search data bases for each of the 16 examining groups. These data bases (Pergamon, IFI-Plenum, Derwent and Chemical Abstract Service) are heavily weighted toward the retrieval of patent documents and, other than for the chemical technologies, no technical literature searching capability is provided. Due to budgetary restraints, the use of these data bases will be limited. Two experimental computer-assisted search systems are also being used to search U.S. patents by selected patent examiners to enable the Patent and Trademark Office to gain information about the weaknesses and attributes of computer-assisted searching and equipment.

Defects in the search file resource will not necessarily be reflected in the adequacy of patent examination since often a less than best prior art document will be adequate to deny patentability. Further, in some technologies there are key prior art documents that represent relevant prior art to many improvement or analogous inventions. (R. S. Campbell and A. L. Nieves, Technology Indicators Based on Patent Data: The Case of Catalytic Converters, Battelle Pacific Northwest Laboratories, Richland, Washington, prepared for the National Science Foundation (September 1979) p. 9.60) Additionally, the potential impacts of the defects are reduced since many patent applicants conduct their own prior art searches and make the results of the searches available to the Patent and Trademark Office. Hence, there are a number of factors that tend to cloud the relationship between the search file resource and the quality of patent examination.

Table 5-8

Comparison of U.S., West German and Japanese Patent Examining Resources

EXAMINER:	U.S.	West Germany	Japan
Education	B.S.	equivalent of M.S.	equivalent of B.S
Experience	None	5 yr. industrial or research	None
Language	English	German & practicing in one other language	Japanese, training courses in other languages
Social Status	Low	High	High
Turnover	Was high, now low	Low, now high*	Low
Training	formal and on the job no formal past first year	formal and on the job, no formal past first year	formal and on the job, no formal past past first year
Production Quotas	Yes	No	No
Hours per Application	about 15	about 31**	unknown
SUPERVISION:			
Quality review	Yes	No	No
Supervisory review	Yes	Yes	Yes
Employees per supervisior	~~10~~ 12	4.5	20-30
Formal production quotas for supervisor	Yes	No	No
SEARCH FILES:			
Integrity problems	Yes	No	No
Computer use	very limited increasing	very limited future plans uncertain	very limited future plans uncertain
Reclassification	Centralized	by examiner	by examiner
Public access to Examiners' Prior Art Files	Yes	No	No

*Due to the unique circumstances of the start-up of the European Patent Office which has been hiring German Patent Examiners.
**Includes time spent on oppositions which may be up to about 50% of examiners' time.

SOURCE: Office of Technology Assessment, Information Japan and West Germany derived from Jack Q. Lever, The Patent Systems of the Federal Republic of Germany and Japan -- Personal Interviews with Patent Practitioners

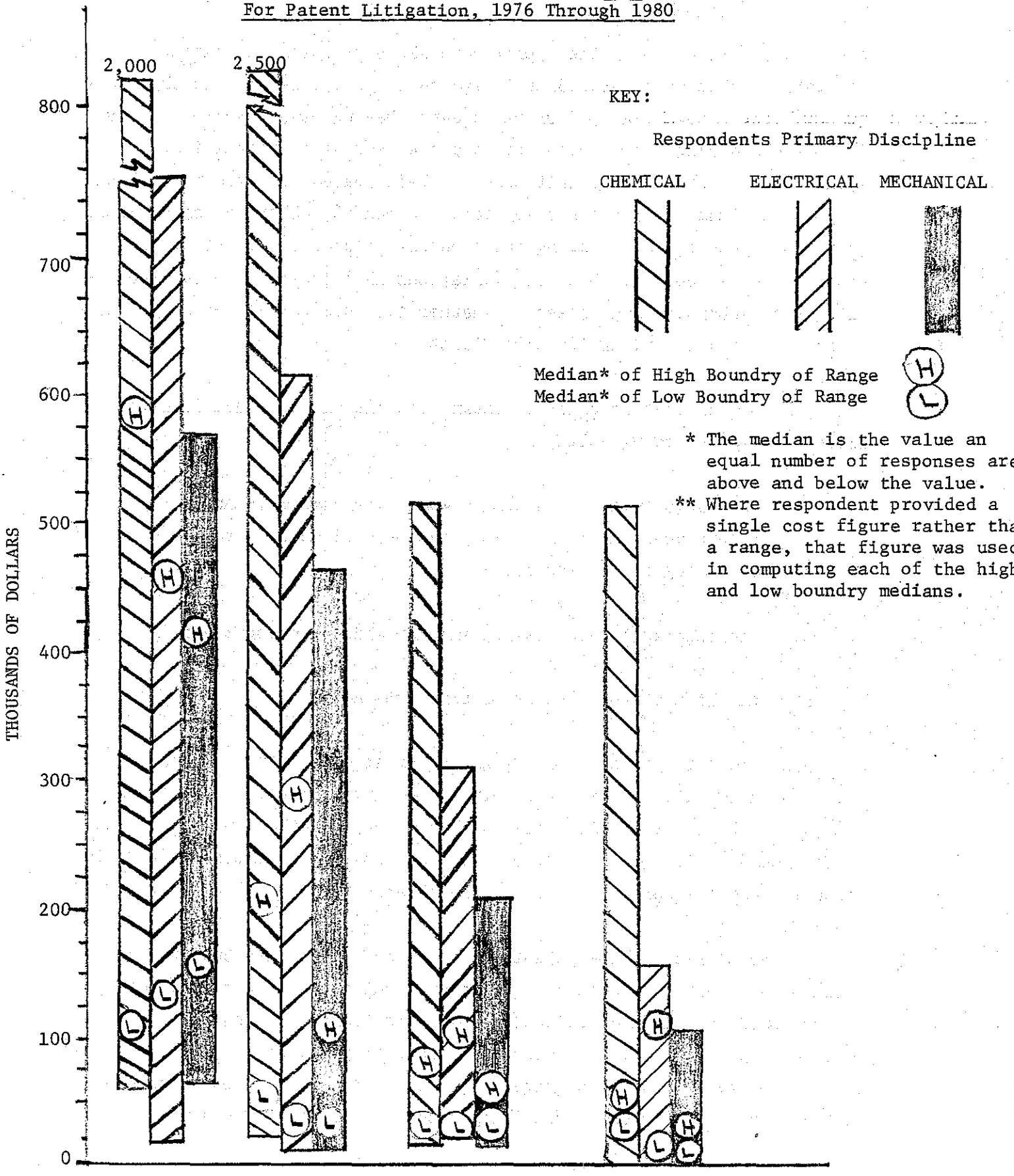
improvement in any of these factors may not result in a perceptible change in overall quality.

On the other hand, a deterioration in any of these factors may create a weak link that can significantly impair the ability of the Patent and Trademark Office to maintain its present level of patent examination quality. While all of the factors affecting patent examination quality will continue to require resources to maintain the present level of patent examination quality, none will be more in danger of deterioration than the examiner's search files. The examiner's search files now contain about 24 million documents and are growing at an ever increasing rate. Unless the ability to retrieve relevant documents from the examiners's search files improves, the efforts required to conduct adequate prior art searches will increase at a greater rate than the growth rate of the examiner's search files until conducting searches as a part of patent examination is no longer feasible.

Effecting changes in the quality of patentability judgments, quality of searching, quality of patent examiners or quality and type of supervision is likely to be difficult in view of the present environment in the Patent and Trademark Office. The patent examiner is expected to be reluctant to change the patent examination and searching techniques that he has developed through experience. The Patent and Trademark Office management must continue to place priorities on maintaining a high level of production from the examining corps to prevent excessive buildups of unexamined patent applications. Further, the ability of the management to make changes in its operation is somewhat limited by the unionization of the Patent and Trademark Office, the limited availability of funds, and the long range unpredictability of funding levels.

Figure 6-1

Cost Range to Large Corporations
For Patent Litigation, 1976 Through 1980



Source: OTA

Table 6-1

Factors Which Can Be Litigated in Patent Disputes

I. The Infringement of the Patent Claims
- o Do the claims read on the alleged infringement, if not, did the alleged infringer use the essence of the invention and is it equitable to extend the claims to cover the alleged infringement?
- o Is the alleged infringer the party infringing, contributing to the infringement of, or inducing the infringement of the claims?

II. Novelty of the Claimed Invention
- o Was the invention known or used in the U.S. or patented or described in a printed publication before the invention by the patent applicant?
- o Was the invention in public use or on sale in the U.S. or patented or described in a printed publication more than one year before the patent application was filed?
- o Was the invention described in a patent by another who filed his patent application before the invention by the patent applicant?
- o Was the invention made in the U.S. by the patent applicant before it was made by another who did not abandon, suppress or conceal it?
- o Did the patent applicant patent the same invention in another U.S. patent?

III. Obviousness
- o Was the invention obvious over the prior art at the time it was made to a person having ordinary skill in the art to which the subject matter pertained?

IV. The Patent Applicant
- o Was the patent applicant the inventor of the claimed invention?
- o Did the patent applicant abandon the invention?
- o Did the patent applicant meet his duty of candor in dealings with the Patent and Trademark Office?

V. The Disclosure
- o Is the disclosure of the invention sufficient to enable any person skilled in the art to make and use it?
- o Does the disclosure provide the best mode contemplated by the inventor for carrying out the invention?
- o Was new matter introduced into the patent application after it was filed?

VI. The Claims
- o Do the claims particularly point out and distinctly claim the invention?
- o Are the claims supported by the disclosure?
- o Are the claims broader than the invention?

thus efforts to educate the court on the law may also be time consuming and expensive.

Frequently the stakes involved in patent litigation are high, leading usually to a hotly contested and thus complex and expensive proceeding. There is strong incentive to maximize the chances of winning, and all out efforts are expended. Further, since some view the litigating attorney's record as an indication of the attorney's competence, the litigating counsel have an interest beyond fees for services in encouraging the client to take every available opportunity to enhance the likelihood of victory.

Patent litigation, however, is not unique in expense and duration. Other high stakes actions such as antitrust litigation and securities litigations are typically expensive and time consuming. (Staff Report of The Subcommittee on Patents, Trademarks and Copyrights of the Senate Committee on the Judiciary, An Analysis of Patent Litigation Statistics, 1961, p. 2)

An understanding of the costs and duration of a patent litigation can be obtained through a reference to the stages and activities in a patent infringement litigation. A patent litigation is generally characterized by five stages: the pre-suit stage, the pre-trial stage, the trial stage, the appeal stage, and, if the patent is upheld and infringed, the accounting stage. This discussion examines some of the causes of the expense and duration of patent litigation in order to provide a basis for ascertaining what legislative activies, if any, can reduce the costs of litigation while preserving fairness to the parties.

The stages of the patent ligitation are discussed below. In the discussion, the times and costs involved are based on estimations and do not necessarily represent the costs and time that will actually occur in a specific infringement litigation. Figure 6-2 graphically summarizes the progress of a litigation.

The Pre-suit stage:

The initial activity in the course of a patent infringement litigation is the recognition by the patent owner that his patent is possibly being infringed. The discovery might be from suspicion or knowledge. The patent owner could proceed immediately to file a suit. Often, however, the patent owner conducts a more thorough investigation of the suspected infringement and an evaluation of his patent to determine the likelihood that the patent will be upheld and infringed if litigated. The investigation and evaluation usually take from several weeks to months and may range in costs from $5,000 to $50,000. (The descriptions of the litigation progress, activities and costs in this and the following sections derives from D. E. Stout, Enforcement of Patents, a report prepared under contract to OTA.)

If a defect in the patent is found, the patent owner may seek to correct the defect. He may file a reissue application, that is, a request to the Patent and Trademark Office to issue another patent in which the defect is remedied. Alternatively, he may request reexamination of the patent if the defect is the result of a new prior art document. Conducting the reissue or reexamination procedures will normally require six months or more and several thousand dollars in expenditures.

The patent owner may decide to advise the suspected infringer of the patent and perhaps offer it for license. Although an incentive appears to exist for the patent owner to attempt to resolve the dispute prior to filing suit, frequently, the operation of the patent laws discourages such an attempt. This is because the patent owner may perceive that he has a greater chance of success in a particular federal district court because he believes that its interpretation of the law or general disposition toward patents is more favorable toward him. Since the party filing suit has the opportunity to select the forum most favorable to him, he may wish to immediately file before the alleged infringer is given any grounds to file a declaratory judgment action (a suit which is proper only when the patent owner has threatened suit and which requests that the court declare the

With an adequate discovery, the trial can proceed expeditiously, in an orderly way and with the best evidence available to the parties. The trial proceeding sought by the U.S. judicial system is one which develops the issues rather than one in which the parties attempt to win by surprising the opponent so that the issues are not fully developed by both sides. Specific discovery activities include requests for admissions, requests for the production of documents, interrogatories and depositions. The discovery efforts are legally bounded by the Federal Rules of Civil Procedure which permit discovery of all subject matter which appears reasonably calculated to lead to the discovery of evidence which is admissible at trial.

The nature of the discovery proceeding readily lends itself to abuse and is not easily policed. If not voluntarily undertaken by the parties, the policing of abuse in the discovery proceeding is the responsibility of the court. It is often very difficult to draw a line between a permissible discovery activity which might uncover relevant information and a discovery activity which is intended to be oppressive. The determination of what is a permissible discovery activity may require the judge to develop an intimate knowledge of the legal and technical issues and may take considerable time and effort which the judge may not have available. (Caleb M. Wright, p. 411) (See also, Martha Middletown, Judge Urges Cutting Needless Costs, Delays, American Bar Association Journal, vol. 68, May 1982, pp. 525-526, for indications that problems are not unique to patent litigation.) Further, the judge has an incentive to allow discovery when disputes occur since an error in favor of discovery will likely not result in a new trial being ordered by the Appeal Court. Refusal to allow the discovery could be grounds for the Appeal Court to order a new trial.

With the wide range of possible issues which can be litigated in a patent suit, the scope of discovery can be quite expensive. Moreover, since most patent suits involve a highly successful product which can justify the expense of litigation, the sources of potentially relevant information can be voluminous. The interest of the parties is usually best

The expense of a motion depends upon its complexity and may be less than $1,000 to $50,000 or more. The papers relating to a motion must be filed in a short time frame; however, a ruling on the motion will depend upon the available time of the court, and thus the ruling may occur immediately or may not occur for several years. Moreover, some rulings or motions can be directly appealed, for example, a ruling on a summary judgment that the patent is invalid. Hence, the time for resolving that motion may be increased by six months to two years. Until the matters raised by motions are resolved, the trial can not occur.

The pre-trial stage is often the most expensive and time consuming aspect of patent litigation. Inherently, the costs and time required may serve as an incentive to the parties to resolve the dispute.

Trial stage:

The trial may be conducted before the judge or may be a jury trial. The selection of the type of trial is up to the parties. A jury trial is required if either the plaintiff or defendant request it. Often the selection is based on an evaluation of whether a jury or a judge would be more favorable to the position of a party. The selection can make a considerable difference in the duration of the trial stage. In a jury trial, the jury renders a verdict at the conclusion of the trial. When the trial is before a judge, the judge usually requests that post-trial briefs and proposed findings of fact be submitted shortly after the completion of the trial, and then the judge prepares a carefully constructed opinion. Even though the opinion may be issued within months of the trial, it is sometimes issued much later. There are accounts of opinions being rendered two years after the trial was completed.

The costs of the trial for each of the parties depend on the number and complexity of the issues to be argued. A simple trial may require less than 5 days whereas complex cases may involve 4 or more weeks in the court room. The average patent trial takes about 3 to 4 weeks. The costs also

Accounting Stage:

If damages are sought for past infringement, the court usually waits until the issues of infringement and validity of the patent are resolved, particularly when the trial is a non-jury trial. The accounting proceedings are tantamount to another trial and can involve complex issues. (Laurence R. Hefter and Herbert H. Mintz, Accounting in Patent and Trademark Cases, APLA Quarterly Journal, vol. 8, no. 1, 1980, pp. 46-65) The decision by the trial court on accounting can be appealed. The accounting proceeding may require months to years to complete and frequently involves costs of $10,000 to $100,000.

In summary, the expense and duration of patent litigation is the cummulative effect of a number of factors: the number of issues that can be relevant in a patent dispute, the complexity of the technology and the law, the American judicial procedure favoring broad pre-trial discovery, the actions of the parties, and the involvement and responsiveness of the courts. Thus, the ability of one party to the litigation to prevent the costs of a litigation from escalating or to secure a rapid resolution of the dispute is limited. Hence, a prospective litigant must recognize the possiblity that litigation costs could reach into the $100,000's and many years will be required to obtain a final decision for the courts. Given the potential costs and litigation pendencies, the decision to litigate tends to be heavily influenced by business considerations, and litigation has the potential to foster abuses of the patent system. To a large extent, however, the expense, duration and potential for abuse associated with patent litigation can be attributed to the American judicial system and is not unique to the patent system.

Mechanisms for Resolving Patent Disputes

The mechanisms for resolving patent disputes consist of private resolutions and resolutions through the courts or through the Patent and Trademark Office reissue and reexamination proceedings.

Data on the number of patent disputes resolved by federal courts or by Patent and Trademark Office proceedings do not reflect the total number of patent disputes. Unfortunately there is no reliable study which indicates how often patent validity and infringement conflicts occur. One study found as a result of surveys of small and large companies that 22 percent (34) of the small company respondents and 91 percent (21) of the large companies had been involved in a patent conflict (including patent interferences). Twelve of the small companies and thirteen of the large companies reported that they had been involved in a patent suit. (Obermayer, p.41) This study only listed the companies having patent conflicts and not the number of conflicts per company. Hence, it probably fails to reflect the true volume of serious patent validity and infringement disputes.

OTA conducted a survey of patent counsel from large corporations in order to obtain some understanding of how frequently patent disputes resulted in litigation. Fifty-four percent of the 118 respondents stated that less than 10 percent of their patent disputes resulted in litigation. See table 6-2. These data do have shortcomings. It is likely that the responses to the survey were based on estimates, rather than actual data. Most patent counsel do not maintain records of patent disputes. Also, the definition of a patent dispute probably varied among the patent counsel. To some a patent dispute may have required a confrontation and disagreement with the other party, and others may have considered patent validity and infringement problems that were solved without contacting the other party as a patent dispute. With these cautions in interpreting the data from the survey, it still appears that the overwhelming portion of patent disputes are resolved privately. OTA estimates based on these studies that somewhere between 5000 and 15,000 patent disputes per year are resolved privately (i.e., between 5 percent and 20 percent of the patent disputes proceed to litigation).

Comparison with West Germany and Japan

The West German and Japanese litigation systems are significantly different than the system in the United States. As a result, patent litigation is significantly less expensive in these countries than in the United States, and the validities of more patents are tested in judicial and non-judicial public forums in West Germany and Japan than is the case in the United States.

In both West Germany and Japan issues of validity and infringement are decided by different courts. The court considering the infringement issue is not required to suspend its proceedings while the matter of patent validity is resolved.

Validity issues must initially proceed in the patent office, and the decision of the patent office can be appealed to the patent court. Consequently, unlike in the United States, the patent offices in these countries play a critical role in ascertaining the validity of patents. Both countries have "opposition" proceedings in which a patent application which is believed by the patent office to be allowable, is published prior to being granted and then may be challenged by anyone who wishes to present evidence as to why it should not be issued. Because the challenge of patent validity must be resolved by the patent office and because the costs to a challenger are significantly greater after the patent is issued than they are in an opposition proceeding, most challenges occur through oppositions.

The litigation procedures in West Germany and Japan are also quite different than those in the United States. In West Germany, the litigation procedure is carried out in three basic steps: first, the parties present their positions in documents referred to as pleadings which discuss both the facts and the applicable law; second, the court decides the issues on which evidence will be taken; and third, a trial is conducted in which the witnesses and the evidence are presented. There is no pre-trial discovery

few patents are litigated. In part this can be attributed to cultural aversion to litigation which is stronger in Japan than in West Germany. (Lever, DOE, p. 144) It is also due to the greater presumption of validity given to a West German or Japanese patent. But also, the absence of many patent litigations evidences that virtually all infringement issues are privately resolved. Table 6-3 summarizes the comparative data.

CHAPTER 7

THE IMPLICATIONS OF PATENT RELIABILITY AND THE PRACTICALITIES OF PATENT ENFORCEMENT ON INNOVATION AND SOCIETY IN GENERAL

Introduction

Chapters 4 to 6 explored the reliability of patents and the practicalities of their enforcement. How these factors affect innovation, industry and society in general is largely unknown, with most analyses being based on intuition and anecdotal accounts.

The effect that unreliable patents and costly litigation have on patent owners is clear. It is not surprising that some patent owners regard it as inequitable when a patent granted by the government is later found invalid by the courts after expensive and time consuming litigation. However, the Supreme Court has said, "The patent monopoly was not designed to secure to the inventor his natural right in his discoveries. Rather, it was a reward, an inducement, to bring forth new knowledge." ..."The primary responsibility for sifting out unpatentable material lies in the Patent Office, to await litigation is -- for all practical purposes -- to debilitate the patent system." (Graham v. John Deere Co., 383 U.S. 1, 9 18 (1965)) The author of the opinion, Justice Tom C. Clark, later wrote:

> "Most people acknowledge that the patent system is a slipshod incentive device. It produces many unnecessary and undesirable monopolies and it provides no incentive at all for some types of conduct essential to progress in the useful arts. The point is that patents are not to be awarded because the inventor is deserving or in need of compensation, patents must issue according to rational criteria that allow only those patent monopolies that are consistent with the Constitutional purpose of inducing invention and disclosure." (T.C. Clark, The Patent System Deserves Clean Hands, APLA Quarterly Journal Vol 1 (Dec. 1972) p. 9-13, 9)

Patent Activity Profile, Volume I, circa 1980, p. A2) This drop can be attributed to many factors including: a perception that patents have less value because of their uncertain validity and the high cost of patent enforcement, the increasing cost of obtaining patents, greater selectivity in seeking patents because of economic factors, and a decline in the number of patentable inventions emanating from research activities. Consequently, the value of these patent statistics for judging the impact of patent reliability and enforcement costs is quite limited. (Edmund W. Kitch, The Use of Patent Statistics in Science Indicators, p. 57-61, The Meaning of Patent Statistics, National Science foundation (1978) and Keith Pavitt, "Using Patent Statistics in 'Science Indicators': Possiblities and Problems," same book, p. 63-104, particularly p. 66-68)

Moreover, the innovation process is so complex and interactive that attempting to attribute by empirical evidence an increase or decrease in innovation to changes in patent reliability and enforcement costs would not only be difficult but also probably inconclusive. As stated in chapter 3, cost-benefit studies on the patent system as a whole have been subject to much potential error and debate. (See Robert F. Dale and James K. Huntoon, A Cost Benefit Study of the Domestic and International Patent Systems, IDEA, vol. 11 (1967) 351-405, 354 and 405; Scherer, p. 454)

The difficulty in quantifying the effect of patent reliability and costs of enforcement does not preclude the existence of a nexus between patent reliability and enforcement costs and innovation. From an intuitive standpoint, apprehension about patent reliability and enforcement diminishes the incentive value of patents, and individuals and small businesses least able to bear the costs would be most affected. (Scherer, p. 450).

A 1981 study by the National Science Foundation explored through surveys the major problems of small, high-technology firms. It concluded from 1232 usable responses that patenting and licensing was rated least important of the 11 problem areas listed with 29 percent of the firms

OTA asked 264 members of the Industrial Research Institute (large, research-conducting corporations) whether in the last 10 years they had terminated development of a promising new product candidate because of either uncertain patent reliability or patent enforcement difficulty or expense. About 9 percent of the 158 respondents replied that they had failed to commercialize a product due to uncertain patent validity, and about 4 percent said that they had failed to commercialize a product due to enforcement difficulty or expense. These figures, however, are not representative of all firms. Moreover, they probably overstate the effect of patent reliability and enforcement costs on decisions to innovate since patents may have been only one of the reasons but not the exclusive basis for the decisions. Also, the inventions may have been recognized by the companies as being clearly unpatentable and, thus, no uncertainty of validity was actually involved. Therefore, at least for this segment of innovators, it is seldom that patent reliability and enforcement costs directly affect the decision to undertake innovative activities.

For individuals and small firms, patents can be important for securing financing. One study based on a survey of small businesses concluded that the existence of patent protection is frequently a vital link in connecting technology with the funds necessary to achieve successful development and making of inventions. The study further indicated that the smaller of the small businesses usually considered patents to be more critical than did large businesses. (Obermayer, p. 36-37) OTA interviewed 8 venture capitalists who invest in small, high-technology companies. The interviewees were from venture capital firms, banks and corporations in the New York City area. In general, the venture capitalists did not believe that greater patent reliability or lesser costs of enforcement would significantly increase the value of patents in investment decisions. But the prospect of involvement in litigation is a significant deterrent to these investors. As one investor stated, "If we felt that we would spend more time in court defending a patent position, we would be reluctant to go ahead with the deal." In part, the lack of significance of patent reliability and enforcement costs on investment decisions is attributable

In essence, the confidence that a decisionmaker in the innovative process is willing to place in patents is a key to determining the incentives for innovation provided by patents. Little is statistically known about this factor, but it appèars that the degree of confidence varies over a wide range. At one extreme, greater confidence than warranted is placed in patents. As one commentator stated:

> "As the obstacles of the inventor have grown, patents, to an increasing extent, have stimulated him through delusion rather than reward." (Floyd L. Vaughan, The United States Patent System, University of Oklahoma Press (1956) p. 261)

At the other extreme, little confidence is placed in patents, and they are thought to provide minimal protection. (E. von Hippel, Getting New Products from Customers, Harvard Business Review, vol. 60 (1982) 117-122, 122)

An understanding of how decisionmakers determine how much confidence they are willing to place in patents can be of assistance in ascertaining how patent reliablity and enforcement costs are affecting innovation and whether change in patent reliability or enforcement costs will be reflected in the confidence placed in patents.

One method that a decisionmaker could use to arrive at a confidence level for a patent is through a review of the specific patent. This method, however, presents practical problems.

From a theoretical standpoint, the key issues in evaluating a patent are:

- how much greater profit per unit sold and greater total sales can be expected if the technology is patented (will a

areas of uncertainty. Moroever, analyses can easily become overly optimistic in the environment of enthusiasm for a new product or process. (James Stancill, Realistic Criteria for Judging New Ventures, Harvard Business Review, vol. 59, (Nov.-Dec., 1981) p. 60-72, 60)

These complexities in evaluating patents raise the likelihood that the decisionmaker will rely heavily on intuition, or cursory appraisals, in assessing the value and strength of patents. (Stephen Rudy, "Patent Asset Evaluation", Journal of the Patent Office Society, vol. 37 (1955) p. 571-607) This seems to be confirmed by OTA's interviews with venture capitalists who generally agreed that the value of a patent is often determined on a purely subjective, qualitative and informal basis, and that it is unlikely that a legal opinion would be sought on the validity of a patent.

The implications of intuitive approaches to patent evaluation are that general perceptions of patent reliability and enforcement costs become controlling over analyses of the specific patent and investment opportunity. While there is no sound statistical evidence known to OTA to show how important general perceptions are in evaluating patents, they can play an important role.

The bases for decisionmakers to form their general impressions of patents are varied and include direct experience and information obtained from the media, education, collegues and patent counsel. There are risks that the experience and information may not provide an accurate picture of patent reliability and costs of enforcement.

As discussed in chapter 4, the reliability of patents in general is not known to any degree of accuracy, and there are few measures available for assessing patent reliability. Emphasis has been placed on litigation statistics because they are the most visible statistics relating to patent reliability and the rate at which patents are found invalid by the courts. Many books and articles relating to patents have emphasized the likelihood

based on intuitive analysis. The evidence that does exist is inconclusive and suggests that problems with patent reliability and enforcement costs are not having an effect on a majority of these decision. This is not unexpected since for many types of inventions and innovations, patents are not primary considerations in deciding whether to undertake the activity. But for those inventions and innovations for which patents may be essential to provide the economic justification to undertake the activities, the concerns over patent reliabilty and enforcement costs have more significant implications.

How the decisionmaker, whether a manager, entrepreneur or investor, views patent reliability and enforcement costs is important in determining the incentive value of patents. A wide range of views exist and it appears that many decisionmakers rely on intuition and general perceptions of patents rather than technical, marketing and legal analyses of the specific patents involved. Because of the lack of balanced information and suitable methods for evaluating the reliability and costs of enforcement of patents, risks exist that widely publicized litigation statistics and anecdotal accounts relating to patent reliability and enforcement will bias the perceptions of patents.

The Implications of Patent Reliability and Enforcement Costs After Innovation

Equally important to the role of patents as an incentive for innovation and the creation of new technology enterprises is the effect that patents subsequently have on the new technology enterprise, industry and society in general.

The private benefits realized by the innovator through patents are difficult to determine; assessing the social benefits is even more difficult. Two studies have attempted to measure in a broad sense the social and private rates of return from investments in research and development for a total of 37 innovations of varying importance, not all of

The Patent, Trademark, and Copyright Research Institute of the George Washington University conducted a survey study based on sample patents issued in 1938, 1948 and 1952 to selected large and small companies. The study found that for large companies, 52.3 percent of the patents were categorized as being in current, past, or intended future use and that 73.6 percent were considered "useful" by the patent owner (either through commercial exploitation, or because of competitive or other value). For the small companies, 74.8 percent of the patents were reported in current, past or intended future use, and 79.4 percent were considered to be "useful". The study explored whether the patent owners considered their past or currently used patented inventions to have had a beneficial effect. Overall, 84.2 percent were found to have a favorable effect in terms of increased sales, reduced production costs and other favorable factors. The study results pertaining to the effect of patented innovation are summarized in tables 7-1 and 7-2.

The study further attempted to learn whether the use of the patented invention resulted in a net monetary gain or loss. Few useable responses were obtained, and there is some question as to the accuracy of the responses. However, a wide variation was found. For patented inventions resulting in a gain, the median was $22,000; that is one-half of the inventions resulted in a net gain at the time of reporting of $22,000 or more, and one-half of less than $22,000. The average gain (for the 76 respondents) was over $440,000 with the range being from $1,000 to $15 million. Six respondents reported net losses with the average loss being $10,000. (Barkev S. Sanders, Patterns of Commercial Exploitation of Patented Inventions by Large and Small Corporations, Patent, Trademark, and Copyright Journal of Research and Education, vol. 8 (1964) p. 51-92)

Because of the expected tendency of respondents to inflate their successes and a reluctance to report any patent as devoid of value, the results of the survey may overstate the exploitation of patented inventions. Moreover, since the data is two decades old, additional caution must be exercised in drawing conclusions relevant to the present

Table 7-2

The Use of Patented Inventions In Past or Current Use At Time of Survey for ~~Secret~~ Select Patents Issued in 1938, 1948 and 1952

Industry Use

Corporations grouped according to net sales in 1949	Extensively No.	%	Moderately No.	%	Limited No.	%	All Other [1] No.	%
Larger Corporations	77	37.9	53	26.1	63	31.0	10	4.9
Smaller Corporations	34	38.2	26	29.2	26	29.2	3	3.8
(Total)	111	38.0	79	27.0	39	30.5	13	4.5

Volume of Sales

	Markedly No.	%	Moderately No.	%	Slightly No.	%	Not at all No.	%	Other [1] No.	%
Larger Corporations	22	10.8	40	19.7	45	22.2	47	23.1	49	24.2
Smaller Corporations	12	13.5	23	25.8	24	27.0	17	19.1	13	14.6
(Total)	34	11.6	63	21.6	69	23.6	64	21.9	62	21.2

Production Costs

Larger Corporations	19	9.4	32	15.8	30	14.8	65	32.0	57	27.0
Smaller Corporations	5	5.6	10	11.2	7	7.9	15	57.3	16	17.9
(Total)	24	8.2	42	14.4	37	12.7	116	39.7	73	25.0

[1]Includes "unknown" or unanswered and all other replies not included in the specific categories shown.

SOURCE: B. S. Sanders, p. 76, 77, 79.

was strong. (David Ford and Chris Ryan, Taking Technology to Market, Harvard Business Review, v. 59 (Mar.-Apr. 1981) p. 117-126, at 121-124) Although patents were required by Dolby to have licensable technology, it is likely that had Dolby initially entered the large consumer market, non-infringing, competitive technology of large manufacturers would have captured the market.

While a basic patent has often led to the formation of a new industry, in some instances improvement patents have been obtained to maintain a monopoly position and thereby continue to secure increased private returns after the expiration of the basic patent. One of the most frequently cited cases involves the incandescent lamp, however, similar accounts exist for the telephone, float glass, and xerographic copying industries. General Electric acquired Thomas Edison's basic patents on incandescent lighting and developed a market. General Electric then obtained the patents on tungsten filaments and inside frosting, as well as other improvements. Through advertising and pricing the public demand shifted to the products covered by the improvement patents, and the company was able to control the market. The patent on inside frosting was eventually declared invalid by the Supreme Court, and in 1949, a New Jersey District Court ordered General Electric, among other things, to dedicate to the public its patents on incandescent lamps and lamp parts. (Vaughan, p. 120, 121, 225)

(FN--More recently, Xerox Corporation entered into a consent decree under which it would offer its basic plain paper copier patents at no royalty and its other patents at nominal royalties, plus the right to non-exclusive license under any xerographic patents of the licensee. (Antitrust, Uncertainty and Technological Innovators, p. 31. See also discussion regarding E. I. duPont de Nemours & Co. titanium dixoide technology at p. 21-22. DuPont prevailed in the litigation.))

The preceeding examples illustrate three situations in which patented inventions led to private gains for the patent owners, yet in each, the patent played a different role. For Dr. Smith, the returns would have been

The private benefits to the patent owner can be achieved regardless of the validity of the patent. The Temporary National Economic Committee reported in 1941 that litigation was being used by some patent owners as a weapon of business aggression. (Final Report and Recommendations of the Temporary National Economic Committee, Senate Document No. 35, 77th Congress, First Session (1941), reprinted in Journal of Patent Office Society, vol. 23 (May 1941) p. 383-389) The weakest of patents can offer a threat to potential defendants because of the expense and disruption of patent litigation, and the patent owner may be able to intimidate the trade and customers from dealing in a competitor's product under the threat that they would be sued for infringing the patent. (D. L. Ladd, Business Aggression Under the Patent System, University of Chicago Law Review, Vol. 26 (Spring 1959) p. 353-375, 367) For example, International Industries and Developments, Inc., owned a patent on a liquid cleaner for silver. Farbach Chemical Co. also made a liquid cleaner for silver. Without analyzing the competitor's cleaner or notifying the competitor, the patent owner mailed 8,000 letters to the trade stating that persons selling unlicensed cleaners would be prosecuted as infringers. The court found that the patent was not infringed and that the patent owner used unfair competition. (International Industries and Developments, Inc., v. Farbach Chemical Co., 145 F.Sup. 34 (S.DP. Ohio, 1956))

Although the courts will find unfair competition practices or antitrust violations if the patent owner uses his patent in bad faith as a tool of business aggression it is difficult to draw the distinction between a good faith and bad faith situation. For example, in 1977, Loctite Corp. sued its smaller competitor, Fel-Pro, Inc., for patent infringement. Loctite had tested Fel-Pro's product, an anerobic sealant, to determine whether it infringed the patent; however, the person who conducted the tests for Loctite questioned their validity. A dispute arose over whether Loctite purposefully withheld, concealed and suppressed the evidence concerning the uncertainty about the infringement. Fel-Pro asserted that Loctite was using the suit solely to thwart competition. The District Court judge found in favor of Fel-Pro and ordered Loctite to pay to Fel-Pro

The other side of the coin is that the unreliability of patents and the practicalities of enforcing patents can lead to business aggression by competitors of the patent owner. As stated in a staff report of the Subcommittee on Patents, Trademarks, and Copyrights:

> "The present uncertainty with respect to the judicial 'standard of invention' plus the delays and costs of litigation may induce a patent holder to grant a license to the infringer rather than sue." (An Analysis of Patent Litigation Statistics, Staff Report of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 86th Congress, second Session (1961 p. 6))

The courts have the power to grant multiple damages as a deterent to business aggression by competitors to the patent owner. (35 USC Sec. 284). However, the courts have generally exercised this power only when the infringement has clearly been willful and wanton. (Joseph M. Fitzpatrick, Damages in Trademark and Patent Infringement Litigation, APLA Quarterly Journal, vol. 8, no. 1 (1980) p. 29-45, 42) Determining what is a good faith belief that the patent is invalid or not infringed and that which is a bad faith belief is difficult, and because of the public interest involved in patent validity, good faith is often liberally construed by the courts. (Yoder Bros. v. California-Florida, Plant Corp., 537 F2d 1347 (CA 5th, 1976)) Even if the issue of patent validity or infringement is raised in good faith, the duration of the litigation may well favor the alleged infringer since if he lost, he might be enjoined from practicing the invention in the future but would have enjoyed past use of the patent at a reasonable royalty. (See Devex Corp. v. General Motors Corporation _____ (CA5, 1981) in which damages were assessed for past infringement and interest charged from the date the infringement began.)

royalties during the court litigation; and, the licensor is prohibited from terminating the license because the patent was challenged. (_____) While this policy facilitates patents being challenged in court, there are anecdotal accounts of a patent owner being threatened with a suit by a licensee challenging the validity of his patent in order to secure more favorable licensing terms. Moreover, since the licensee risks only his attorney fees, an attractive business plan is to negotiate a license under the most favorable terms possible and then challenge the patent.

To provide some idea of the frequency that licensees challenge patents, court cases were reviewed from the District Court and Court of Appeals, reported in the United States Patents Quarterly in 1980, in which a decision concerning patent validity or infringement was rendered. Eight of the 89 decisions explicitly stated that a patent license agreement was involved. In five of the eight suits, the patent was found valid. The number of suits involving parties to a license agreement was probably greater since the reported opinion may not have explicitly said whether a license agreement existed. OTA also surveyed the patent counsel of 211 large corporations. Of the 118 useable responses, only 8.5 percent indicated that assertions of patent validity were the most common problems in their existing licensing agreements. The primary problems were complaints that the financial terms of the license agreement had become unacceptable and assertions that certain product modifications were not covered by the patent or the license agreement. This survey is not intended to be representative of the universe of patent owners and licensees, and small companies may have different experiences with problems in their licensing arrangements.

In conclusion, patent reliability and the practicalities of enforcing patents have quite varying effects on patent owners, on commerce, and society in general depending on the relative positions of the parties and their strategies. The uncertainty of the validity of a patent often enables the cost and duration of patent litigation to become a material factor in determining the private benefit received by the patent owner and

Chapter 8
Legislative Approaches Affecting Patent Reliability and the Practicalities of Enforcing Patents

Introduction

Although the U.S. patent laws have been frequently amended and were finally codified in 1952, the basic principles underlying those laws have remained relatively unchanged since 1836. This has not been for lack of recommended reforms. There have been numerous studies of the patent system and recommendations to change the patent laws. In recent years, there have been two major studies by the Executive Branch pertaining to patents: The Report of the President's Commission on the Patent System, 1966; and the Domestic Policy Review on Industrial Innovation, 1979. These studies have been supplemented by others, both governmental and private. Representative of the more recent studies are The Committee for Economic Development statement on Stimulating Technological Progess, 1980 (large business oriented); and The Small Business Administration, Office of Advocacy Task Force on Small Business and Innovation, 1979. Each of these studies recommended major changes in the patent laws.

While not all inclusive, these four studies provide an insight into the particular types of recommendations that have been offered which could affect patent reliability and the practicalities of patent enforcement. Table 8-1 provides in summary form those recommendations that appear directly related to these issues and their status. These studies, however, made many recommendations other than those recited in table 8-1 that can have an effect, albeit less direct, on patent reliability and the practicalities of enforcement. Appendix III provides a complete list of these recommendations.

A focus of this chapter is to review the implications of the general approaches recommended by these studies for improving the reliability of

Table 8-1 (con't)

Recommendation	Pres. Comm.	DPR-PAT	DPR-SB	DPR-PI	CED	SBA	Status
More judicial control over-discovery	Rec XXIV	Prop IV	-	(page 197[5])	-	-	No legislation (legislation not required for implementation)
Voluntary arbitration	-	-	-	-	page 55	-	Passed by Senate S. 2255, 94th Congress Proposed in 97th Congress, H.R. 6260
Court decision on stipulation of facts	Rec XXV	-	-	-	-	-	No legislation (legislation not required for implementation)
Permit licensee to agree not to challenge patent	-	Prop X	-	-	-	-	No legislation (legislation setting forth rights passed by Senate S2255, 94th Congress)
Action against importer of product made by infringing process	Rec XXI	-	-	-	page 57	-	International Trade Commission established (19 USC 337)
Legal aid for protection from patent infringement	-	-	-	page 198	-	-	No legislation
Specific Sugestions for Study, No Recommendations							
Different classes of patents	-	Item D	-	-	page 57	-	No legislation
Expert panel for patent dispute resolution	-	Item F	-	-	-	-	No legislation

Pres Comm: The Report of the President's Commission on the Patent System, 1966
DPR-Pat: Advisory Subcommittee on Patent and Information Policy, Domestic Policy Review, 1979
DPR-SB: Advisory Subcommittee of Small Business Members, Domestic Policy Review, 1979
DPR-PI: Public Interest Subcommittee Houce, Domestic Policy Review, 1979
CED: Committee for Economic Development, Stimulating Technology Progress, 1980
SBA: Small Business Administration Office of Advocacy Task Force, Small Business & Innovation, 1979

[1]Generally believed not necessary if a national court of appeals for patent disputes were established
[2]Recommended against patenting computer programs
[3]Generally believed that Government's need to develop a computer-based search and retrieval system is unsubstantiated
[4]Generally believed that reexamination would increase rather than decrease litigation costs
[5]Generally believed that would be ineffective and not provide the savings necessary to enable individuals and small businesses to be involved in litigation

SOURCE: Office of Technology Asssessment.

As can be seem from the previous chapters, this recent Congressional legislation is expected to have an appreciable effect on patent reliability and enforcement as it is implemented and assimilated into the patent system. Although it is too early for the ultimate impact of this legislation to be accurately assesssed (reexamination has been implemented only since July 1981, the report on computers is not yet complete, and the new court begins its operation in October, 1982), the potential effects have been considered in the following discussions of the three general legislative approaches.

Providing More Resources to Improve the Quality of Patent Examination

The ultimate goal of any patent examination is to issue only patents on inventions that are patentable over all the prior art and fully meet all other statutory requirements for issuance. Practicalities of funding, manpower, and the subjective nature of patentability determinations dictate that this goal of total reliability is not feasible.

The broad issue, therefore, is what quality of patent examination should be sought. Beyond the fact that patent examination quality is virtually impossible to measure with any reasonable degree of precision, some standard must be selected for evaluating the costs and benefits of changes in the quality of patent examination. Is the standard to be the impact on innovation; the effect on individuals whose confidence in patents is crucial to decisions affecting innovation; or is it sufficient to try and achieve as high a quality as can feasibly be obtained? Each of these will suggest a different optimum quality of patent examination from a cost/benefit standpoint.

The 1966 President's Commission and the 1979 Domestic Policy Review both used the "impact on innovation" standard in strongly recommending that funding for the Patent and Trademark Office be increased to provide for better quality patent examination so that the reliability and enforceability of patents was enhanced. But both studies relied on

with patent examination quality are that prior art searches conducted by examiners can fail to uncover the prior art most relevant to the claimed invention, and that the judgment used by the patent examiner in determining patentability can be unsound. In addition, many courts appear to lack confidence in decisions of patentability by the Patent and Trademark Office. At least some of this lack of confidence derives from the courts' perception of the quality of patent examination and from a general distrust of ex parte proceedings.

The studies cited earlier proposed four general types of activities to address these particular problems. They are: establishing an internal review of all allowed patent applications; increasing examiner time for prior art searching; improving access to prior art; and, permitting public involvement in the granting of patents. These activities will be discussed below.

Internal review: The Domestic Policy Review Subcommittee on Patent and Information Policy specifically recommended expanding the Patent and Trademark Office quality review program to improve the quality of patent examination. (DPR, p. 154) The Public Interest Subcommittee in its comment on the Patent Policy report suggested that "an office should be created within the Patent and Trademark Office to represent the public interest and assure the expeditious issuance of valid patents, prompt rejection of others, and the overall compliance with potential provisions." (DPR, p. 197) Each of these approaches provides for an internal review of decisions to grant patents and offers the potential for increasing the quality of patents in general.

A more extensive internal review of decisions to grant patent applications provides the potential for a better and more uniform quality patent. As discussed in Chapter 5, only a portion of the allowed U.S. patent applications are internally reviewed either through the quality review program or by the supervisory primary examiner. The depth of these reviews varies. But they demonstrate that there is room for improving the

of three examiners (two technical and one legal), thus providing a form of internal review. Since the European Patent Office received its first patent application in 1978, there has not been a sufficient record to base a sound determination on the level of quality and uniformity of patentability decisions.

Because of the lack of accepted and accurate measures of patent examination quality, any improvement in patents in general due to internal reviews may not be clearly recognized by the public, let alone quantified, particularly in the short-term. Thus, internal reviews may not effectively change the public perception of patent reliability.

Implementation of an internal review system could pose problems for the Patent and Trademark Office. For instance, the internal review program would eliminate "full signatory" authority for patent examiners and adversely affect the patent examiner's perception of his role. Therefore, opposition could be expected from patent examiners.

Also, the manpower requirements of the Patent and Trademark Office would increase significantly as a result of internal review. Assuming that the amount of time required for a limited review of an allowed patent application would be somewhere between 2 and 4 hours and if the internal review were to involve searching, at least an additional 2 to 4 hours, and assuming 60,000 patent applications were allowed per year, a minimum of 100 additional man years would be needed for limited reviews and 300 additional man years if the reviews involved searches. The manpower to meet these requirements is not currently available, and staffing and training would take several years with a disruption of patent examining operations during that period of time.

In summary, implementation of an internal review program would present major institutional problems for the Patent and Trademark Office. Although reviews could improve the reliability of patents by reducing the frequency of examining mistakes, public awareness of this improvement would

(See table 5-5) Since the standards used by the quality review program are quite restrictive, it is likely that the quality review results understate the likelihood that better prior art will be uncovered. This evidence, while not conclusive, suggests that, assuming all other factors (such as examiners' search file size) remain the same, an increase in time available for searching would result in an appreciable, but not substantial, decrease in the frequency that patents are issued with questionable validities.

Clearly, however, there is room for improvement in searching, and more time allocated for searching can achieve improved quality of searching. The most profitable use of any additional search time appears to be to conduct searches in additional data bases (e.g., commercially-available computer data bases) rather than extending the search of the examiners' search files into additional, and much less relevant, subclasses. The additional data bases can thus serve to double-check the results of the primary search of the examiners' search files in the event that a pertinent document was overlooked or missing from or not properly classified into the relevant subclass. Moreover, the additional data bases can contain technical literature and foreign patents not typically found in the examiners' search files. The problem with extending searches into additional data bases is that few appropriate data bases are available and those that exist are difficult and expensive to access. The most logical supplementary data bases are the commercially-available, computer-assisted search systems that are frequently used by private parties seeking to challenge the validity of patents and that often contain documents not found in the examiners' search files. These require some expertise to use and can be expensive (many data bases charge about $100 per hour of access time). There is no adequate information available to determine conclusively how much improvement in search quality would be achieved through the use of commercially-available search systems, and at what cost. Studies presently being conducted by the Patent and Trademark Office are expected to provide some data.

without regard to funding (P.L. 96-517, Sec. 9). (OTA has not attempted to review the Patent and Trademark Office plan, nor has it conducted an independent study of computerized search systems.)

Although computer-assisted searching is being widely used by the private sector, manual searching of patents at the files of the Patent and Trademark Office still appears to be the predominant search effort.* (FN-OTA survey of Industrial Research and Institute members (large research oriented corporations) indicated that 92 percent of 158 respondents had computer-assisted search capabilities; OTA survey of ACPC indicated that for important inventions in their major area of research, 89 percent of the 118 respondents would consult the patent files at the PTO to determine the relevant prior art to assess potential patentability and 52 percent would consult existing computer-assisted search systems.) The existence and use of commercial computer data bases for prior art searching does not mean that the technology exists to efficiently use computer-assisted searching as the primary information retrieval tool for patent examination. Moreover, computer-assisted search systems have implications for the operation of the Patent and Trademark Office and for society in general. Accordingly, a clear focus needs to be placed on the objectives of the system.

The major considerations in assessing computer-assisted search systems are:

- o whether the system provides an improvement over the existing manual system in terms of the thoroughness of the search, cost effectiveness, and user compatability and can grow with changing technology and file growth.

- o whether the existing paper-based system can be maintained as an effective and reliable information retrieval tool.

text search eliminates the dependence on correctly assigned index terms and can recover information which may be of only secondary importance in the document but of primary importance to the search. Hybrid searching techniques are available that combine these two systems.

It is important that the complete text of the patent including its drawings should be quickly available through the computer system to minimize the time required for the examiner to determine whether it is relevant to the subject of the search. If the examiner must turn to another data base (such as the examiners' search files) to obtain these documents, the time and effort required can discourage thoroughness.

The manner of implementing a computer-assisted search system is as important to its success as the technology. The institution of a computer-assisted search system in the Patent and Trademark Office would represent a major change in operation. Staffing requirements would be affected; patent examiners would need to develop new skills and, at least initially, the time to conduct a computer-assisted search would exceed that required for the patent examiner to conduct a manual search of the examiners' search files.

Some employees of the Patent and Trademark Office are likely to resist the adoption of a computer-assisted search system because of concerns that staffing requirements will change with the advent of computers and that the production goals for the patent examiners may be affected. Support staff dislocation will occur if the examiners' search files are disbanded.

Because patent examiners will find computer searching involves different types of skills than manual searching, some resistance is expected. (Report of the Surveys and Investigative Staff, House Appropriations Committee, February 1, 1980, p. 9-10) Manual searches require plodding through a mass of documents to uncover those of relevance. Computer searching requires that the patent examiner have the skill to develop a strategy that will retrieve all of the relevant doucments without

and completeness. Until the computer-assisted search system is shown to be more effective, the paper examiners' search files will continue to be an important, if not the most important, data base for the patent examiner.

Increased reclassification activities have significant implications for the quality of searching. In the short term, reclassification can reduce the number of documents in a given subclass and thus enable the patent examiner to review more thoroughly the documents in the subclass and to extend search to more subclasses. In the long term, since the Patent and Trademark Office has found that without reclassification the time required for searching increases more rapidly than the increase of documents in the examiners' search files, reclassification will be necessary to enable reasonable prior art searches to be conducted within the patent examiners' time constraints. (D. Stein, internal PTO memorandum, 1978) Moreover, computer-assisted search systems that could be adopted by the Patent and Trademark Office are based on the patent classification system. Thus, reclassification needs may continue beyond the time that the paper files are replaced with computer-assisted search systems.

In the last 20 years the documents in the examiners' search files trebled yet the average time spent by the patent examiner on prior art searching has been maintained at a relatively constant level through reclassification. While there are limits to reclassification, that is, eventually the subclasses become so narrowly directed that a greater number of subclasses will have to be searched to make a reasonably thorough search of a concept, the point of diminishing returns appears to be well in the future.

Patent reclassification is expensive, and the complexity of reclassification increases even more rapidly than the growth of the examiners' search files. Hence, maintaining the examiners' search files can be expected to require ever increasing efforts. However, techniques such as computer utilization are expected to be developed which will increase the efficiency of reclassification.

arguments of those who opposed the granting of the patent, and thus stimulated the patent examiner to more thoroughly consider the public interest. Other studies have placed a greater importance, on inter partes proceedings. For example, the Public Interest Subcommittee of the Domestic Policy Review recommended inter partes proceedings to challenge the granting of patents on a selective basis. (DPR, P. 197) (See P.J. Federico, Opposition and Revocation Proceedings in Patent Cases, Study No. 4, Senate Subcommittee on Patents, Trademarks and Copyrights, reported in Journal of the Patent Office Society, vol. 39 (1957) p. 325-355)

Congress has considered adopting procedures through which the public could have an input into Patent and Trademark Office decisions on whether to grant a patent. However, these have not been adopted primarily because of concerns that such procedures would significantly delay the issuance of a patent and facilitate the harassment of small business and independent inventors. (Senate Report No. 94-642, Patent Law Revision 94th Congress, 1st Session (1976) p. 27) The legislative emphasis has therefore been on post-issuance proceedings, and reexamination proceedings that embody a form of post-issuance review of patents were enacted in 1980.

Post-issuance public proceedings, however, cannot provide the patent owner with greater assurance of the reliability of his patent unless his patent becomes involved in a proceeding. Nor do post-issuance proceedings go to the heart of the problem raised by many judges, that is, the absence of an inter partes proceeding prior to the granting of a patent.

The Practicalities of Pre-Issuance Public Involvement Proceedings:

Almost all major industrial countries have proceedings in which the public may oppose the granting of a patent before issuance (oppositions). The experience with these foreign opposition systems is a useful guide. (Edward F. McKie, Jr., Proposals for an American Patent Opposition System in Light of the History of Foreign Systems, Journal of the Patent Office Society, vol. 56 (1974) p. 94-102; Robert H. Jacob, "Undesirable Aspects of

In West Germany and Japan there is little tactical reason for not challenging a patent application before it is granted. First, the time required for the opposition proceeding reduces the effective patent term which runs from the time the patent application is filed. Only after the patent is granted can the patent owner enjoin others from making, using or selling the invention, although he can collect damages in the amount of a reasonable royalty for infringement prior to the grant of a patent. Second, after the patent is granted, a challenger must still go the patent office to contest the validity of the patent and these revocation, or nullity, actions are more expensive and place a greater burden on the challenger than an opposition. The validity of patents is determined by the patent office but issues of infringement are decided independently by the courts. Thus, a challenger may be enjoined from making, using or selling the invention even though the patent is likely to be found invalid by the patent office.

The disadvantages of the opposition system relate primarily to the delays in resolving the issues. Without an appeal, the delays are frequently about three to four years in West Germany and Japan (Schweihardt, p. 169 and Takehiko Suzuye, Patent Opposition System in Japan, A.P.L.A Quarterly Journal, vol. 4 (1976) 202-214, 208) There are anecdotal accounts of oppositions being resolved after the challenged patent has expired. (McKie, p. 97)

Another problem which has been noted with opposition systems is the burden that is placed on the independent inventor and small business to review allowed patent applications for purposes of opposition. There is some disagreement as to the magnitude of the burden placed on individuals and small businesses. One group, primarily composed of private practitioners, argues that monitoring the published patent applications is not a problem and involves moderate costs and reasonable amounts of time. (Ruger, p. 154) Others argue that many individuals and small businesses lack the resources for monitoring published patent applications. (McKie, p. _)

uncertainties as to whether a court will apply the same standard for patentability as the patent examiner.

Since validity issues of U.S. patents are decided by the District Courts, some concern exists as to whether a pre-issue public involvement proceeding would provide as great an increase in patent reliability as experienced in these countries. This concern appears to be borne out by experiences with inter partes protests in reissues. (See the Patent and Trademark Office comments supporting abolishing "no-fault" reissues, 47 F.R. May 19, 1982, p. 21746, 21748)

The potential for abuse could be reduced by making the public involvement proceeding an essentially ex parte proceeding such as now exists with reexamination and as was proposed by the President's Commission on the Patent System in 1966. (Pres. Comm., p. 23-24) A question arises as to whether the absence of an inter partes proceeding will detract from the confidence placed in the Patent and Trademark Office decision in the public involvement proceedings. Some guidance can be gathered from experiences with reexamination. Because of the brief time since reexamination was implemented, insufficient data exists from which to draw a conclusion. However, preliminary results indicate that the courts are looking at reexamination with mixed views. In one case, a District Court ordered the patent owner to seek a reissue even though a reexamination proceeding was underway because the court preferred the adversial nature of the reissue proceeding. (Dresser Industries, Inc. v. Ford Motor Co._____ (N..D. Tex))

Another concern which has been expressed about the operability of procedures for the public to seek a decision from the Patent and Trademark Office on the validity of a patent is that the public may have little incentive to use the proceeding. (Abramson, Should the U.S. Adopt A Reexamination Ssytem, Journal of the Patent Office Society, vol. 52 (1970) 407-427) Although there is widespread use of opposition proceedings in West Germany and Japan, there are indications that similar incentives do

The present patent reexamination and litigation procedures provide no significant incentive for the use of pre-issuance public involvement proceedings, and thus these proceedings are not expected to increase appreciably the value of patents as incentives for undertaking innovation. However, if the quality of patent examination deteriorates, pre-issuance public involvement may yet become important as a means of giving some degree of certainty of validity to patents but incentives will still be required to encourage pre-issuance public involvement over reexamination or litigation once the patent issues.

Increasing Resources for Patent Examinations

Implementation of each of the above activities requires an increase in the resources (funding and manpower) of the Patent and Trademark Office per each patent application examined. The increase can be accomplished through direct means, such as by increasing appropriations or patent fees, or by indirect means, such as reducing the number of patent applications examined.

Direct means: There has been a recent emphasis on having users pay for Government-provided services rather than supporting these services with general tax revenues. At the present time Congress is considering legislation that would alter the source of funding of the Patent and Trademark Office for Fiscal Year 1983. Under this legislation (S. 2211, S. 2326, and H.R. 6260, 97th Congress, Second Session), patent fees would recover substantially 100 percent of the cost of patent application examination rather than the less than 25 percent covered by the present fee levels. (Section 2 of P.L. 96-517 provided for a 50 percent recovery of costs through fees, but was not slated to go into effect until FY 1983.) Under the new proposals the Patent and Trademark Office fees would be increased to cover the costs of activities to enhance the quality of patent application examination. For example, the Patent and Trademark Office budget for fiscal year 1983 (based on the assumption that the legislation will be enacted) calls for the recovery of expenses for implementing

"A major objective of this committee in recommending deferred examination is that more time should be available to the patent examiner in the handling of patent applications." (Patent Law Revision, Report 94-642, Committee on the Judiciary, February 24, 1976)

It appears that deferred examination would reduce the number of patent applications being examined. The experience of West Germany and Japan with deferred examination supports this conclusion. Examination is requested in about 60 percent of patent applications in West Germany and about 70 percent in Japan. Most of the requests for examination are submitted within one year of the patent application filing date, however, examination can be delayed up to 7 years in both countries. (Lever, DOE, p. 18-20 and 32-36)

Deferred examination would constitute a major change in the U.S. patent laws, and would require the evaluation of other changes. For example, the President's Commission, among other recommendations, urged that the adoption of deferred examination be accompanied by provisions requiring the publication of patent applications and enabling any party to request the examination. (President's Commission, p. 20) The West German and Japanese patent laws have other provisions which are material to their deferred examination systems. Most notably, in West Germany and Japan the patent application is published promptly and the public is provided an opportunity to oppose the granting of a patent.

The publication of patent applications enables the public to be aware that a patent might issue in a certain technology. The opposition proceedings also affect the implications of deferred examination. Under the West German and Japanese patent systems once a patent is granted the patent owner can not only seek to have any infringement stopped but can also obtain a reasonable royalty for the use by others of the invention between the date of publication of the patent application and the grant of

Most of the arguments for and against deferred examination have been based on opinion and have been directed at the ancillary provisions, such as application publication and opposition proceedings, that render the system operable. In interviews with West German and Japanese practitioners conducted by OTA, mixed reviews of their deferred examination systems were obtained. While almost all West German practitioners noted that deferred examination had solved the problem of large backlogs of unexamined patent applications, opinion varied as to whether deferred examination was preferred to immediate examination. In general, large corporations seemed to prefer deferred examination: They make more frequent use of deferred examination, have the ability to capitalize on information provided by published applications, and have the sophistication to review published applications to reduce the uncertainty of whether a patent will issue and, if so, its likely scope. Practitioners representing small clients generally agreed that their clients normally request an immediate examination of their patent applications and thus deferred examination provides no significant direct advantage. The uncertainty of whether a published patent application will issue and, if so, its scope, was a serious problem because of the inability of many smaller clients to evaluate the applications. The concept of permitting a third party to request examination, that has been proposed in the United States to prompt a rapid resolution of uncertainties resulting from unexamined patent applications, exists in west Germany, but is rarely used. (Lever, DOE, p. 21-26, 27-29)

Interviews with Japanese practitioners yielded responses similar to those of the West German practitioners except that deferred examination appears to be used more frequently by large corporations in Japan than by large corporations in West Germany. Because of the rapid increase in filed patent applications in Japan, the backlog in Japanese patent applications awaiting examination is substantial, but still much less than had deferred examination not been instituted. (Lever, DOE, p. 36-38, and 39-40).

This section focuses on lesser patents. Lesser patents are defined as a separate class of patents and can be granted for inventions that do not meet the patentability standards for utility (regular) patents. Thus, the class of lesser patents would include petty patents and patents which have limited grounds upon which their validity can be attacked. The discussion of lesser patents will therefore have some relevance to incontestable patents but is not intended to provide a thorough analysis of incontestable patents. (Some papers favoring incontestable patents are L. James Harris, "Reflections on Some Pending Legislation - Parts III and IV", Journal of the Patent Office Scoeity, volume 56 (1974) 462-471, 523-543; Howard I. Forman, "Do We Really Need a 'Pefect Patent'" The Conference Board Record, vol. xiii (January 1976) 49-52, 51, 52; and L. James Harris and Regan Fay, "Certain Incontestable Patents are Warranted", Journal of the Patent Office Society, volume 60 (1968) p. 27-53)

Prior to discussing the implications of lesser patents, it is necessary to ascertain that Congress has the power to establish a lesser patent system.

Questions have been raised as to whether the constitutionally granted power to establish a patent system extends to the power to establish a lesser patent system since the Supreme Court's interpretation of "invention", as used in the Constitution, requires a level of inventiveness that lesser inventions could not meet. (Graham, et. al., v. John Deere Co., 383 US 1__ (1966)) Without regard to the issue of Congressional power granted under the patent clause, Congress still appears to have the necessary authority under its constitutional power to regulate interstate commerce. This is the same power under which the trademark laws were established. (Art I, Section 8, Clause 3)

General Considerations Regarding Lesser Patents

The implications of a lesser patent system can vary widely depending upon the system adopted and the manner in which it is implemented.

key utility patent was found to be invalid, could provide the additional incentive needed to undertake the innovation. Lesser patents could also provide additional incentives to pursue inventions which require many years to develop. With this type of invention a potential innovator anticipates that the patent on the basic invention will be at or near expiration when the new product is commercially introduced. Examples of major innovations for which the basic patents expired before commercialization was achieved include power steering and office photocopiers. The prospect of securing patent-type protection on improvement inventions may therefore be the only patent incentives anticipated by the innovator. Lesser patents, because a lesser standard of patentability would be used, strengthen the anticipation that the improvement invention will be protected. However, it can be argued that the back-up protection provided by lesser patents is likely not be be a material factor in decisions to innovate because of the lesser patents' limited scope and term.

Lesser patents are likely to be most frequently used to protect minor improvements in existing products and processes and gadgets. Although these inventions can create new industries and jobs and contribute to productivity and world-wide competitiveness, many would be introduced in the absence of any patent-type protection. Another class of innovations that could be affected by lesser patents are those for which utility patents are not meaningful. For example, the rapidly developing electronics industry has been by-passing patents because the patentable technology is so quickly out-moded. (National Academy of Engineering, Antitrust, Uncertainty and Technological Innovation, Washington, D.C. (1980) p. 12) Seemingly, the fact that the technology is rapidly advancing argues against the need for patent protection; however, such a broad brush analysis does not fully consider the implications of the absence of patent protection in terms of the effect no patent protection has on the selection of projects for innovation.

Lesser patents can affect utility patents by enabling the standard of patentability of utility patents to be raised. The U.S. Patent and

inventor's purposes. However, the experience with "defensive publications" by the Patent and Trademark Office (under this program the inventor abandons his right to a patent in return for a disclosure of the invention and the right to be involved in an interference if another claims the invention) indicates that few (about 100 to 200 per year) patent applicants are willing to forego 17-year patent protection. This suggests that utility patent protection will still be preferred over the use of a lesser patent system even if the primary purpose of obtaining a patent is to eliminate the risk that another could patent the invention..

The preceeding discussion has focused on the implications of lesser patents on innovation and on utility patent monopolies. While these considerations are important for society, there are other viewpoints which should be considered such as natural rights to one's own creation and the inequity perceived by inventors when blatant copying is permitted.

Foreign Experience with Lesser Patents

As stated above, the specific type of lesser patent system adopted and the manner in which it is implemented will determine, in part, the effect of lesser patents. To complement their regular patents, West Germany and Japan have adopted lesser patent systems which are called "utility model" systems. These utility model systems have had mixed results. Their successes and failings can provide some insights to help in assessing the effects of various elements of lesser patent systems.

The legal requirements for utility models in the two countries specify that the inventions must be articles (three dimentional structures), not processes, chemicals or most electrical circuits (since circuits are perceived as surface distinctions, not three dimentional articles), and they must be novel and exhibit the use of some inventive skill. There are differences, the most notable being that Japanese utility models are examined and the West German utility models are not, and the term of the Japanese utility model is longer. A summary of the Japanese and West German utility model systems is provided in table 8-2.

The major complaint about the West German and Japanese patent systems is the application of the "some inventive skill" standard for utility models. Many believe that distinguishing between that which is a little inventive and that which is truly inventive is difficult, if not impossible. Critics say that in practice the standard of inventions for utility models is substantially the same as that for regular patents. (H. G. Lynfield, "German Utility Models", Journal of the Patent Office Society, vol. 47 (1965) 374-390, 382; Lever, p. 46)

Many Japanese patent practitioners interviewed by OTA also criticized their utility model system because of the lengthy time required for the Japanese patent office to examine the utility model application. Since quick protection, like that provided by the West German utility model system, is not available, and little differences are perceived between the standards of invention for utility models and regular patents, some Japanese practitioners believe that filing utility model applications is not warranted. Despite these criticisms, the filings of utility model applications are increasing in Japan. (Lever, DOE, p. 62-68)

The West German patent practitioners interviewed by OTA criticized their utility model system because without an examination, the validity and scope of the utility model are not known by the patent owner until the utility model is litigated. This uncertainty is believed to result in less confidence being placed in a utility model than in a regular patent. In recent years, the filing of utility model applications has been decreasing. Whether this decrease is due to reduced confidence in utility models is uncertain. (Lever, DOE, p. 52-57) The West German utility model system has been under review by the German Association for the Protection of Industrial Property and Copyrights. Despite the shortcomings of the system, the panel recommended that it be continued because of the need for quick and inexpensive patent protection. The study group recommended that utility models not be examined nor be extended to more complex technologies because of the difficulty to the public of ascertaining the scope of protection of the utility model. (Lever, DOE, p. 57-60) (Jung and Hirsh,

TABLE 8-3
Major Elements of Lesser Patent Systems

The rights granted by a lesser patent

- Do the rights enable the lesser patent owner to exclude others from making, using or selling the invention or solely the ability to collect reasonable compensation for the making, using or selling of the invention by others?

The duration of the lesser patent

- How long is the lesser patent term and when does it start to run?
- Should the lesser patent term depend on whether the invention is commercialized?

The scope of protection of the lesser patent

- Is the entire inventive concept protected or is the protection extended only for copying a product or process specifically disclosed in the lesser patent?

The subject matter patentable under the lesser patent

- What classes of inventions such as articles, chemicals, or processes can be covered by the lesser patent?
- Is novelty sufficient for granting a patent or must some level of inventive skill be present?
- If inventive skill must be present, is the standard objective or subjective?

The granting procedure

- Is the Patent and Trademark Office responsible for granting lesser patents or is another government agency?
- Are lesser patent applications examined for novelty and, if required for patentability, level of invention?
- Can a utility patent and a lesser patent be granted on the same invention?

Copyright Patents: These lesser patents would differ from the preceding types of lesser patents in that the right to exclude others from making, using or selling the claimed invention would only extend to the specific manufactured article disclosed in the lesser patent and not to any different product even though it may use the same inventive concept. The inventions which could be patented would be limited to manufactured articles that are original and novel. Copyright patents would not extend to articles in which the only invention resided in the ornamental design. Copyright patent applications would not be examined for novelty, and copyright patents would have a 3-year term that could be extended for another 5 years if the article were commercialized. The copyright patent would be similar to a copyright. Thus, to prove infringement, the copyright patent owner has the burden of proving that an ordinary observer would consider the alleged infringement substantially and materially similar to the article of the copyright patent and that copying likely occurred in that the alleged infringer had access to the patented article. As with unexamined utility models, the owner also has the burden of proving that the article is novel.

Table 8-4 provides a brief summary of some of the likely costs and effects of the four lesser patent systems. The following discussion relates to the more important effects of the lesser patent systems and their elements.

Patents of innovation would probably have the greatest effect on utility patents. Because of the high standard of patentability for patents of innovation, the inventions for which patents of innovation would be sought would likely otherwise have been the subject of a utility patent application. The greater reliability provided by the more objective standard of patentability for patents of innovation may offset the lesser term and requirement for commercialization associated with patents of innovation so patent applicants will select patents of innovation over utility patents. In essence, for the grant of a more reliable patent, a lesser patent term is given and the public is assured that innovation

occurs. The assurance that innovation will occur is enhanced by permitting anyone who commercializes the invention prior to the patent owner, to have the right to continue those activities. However, since many of the inventions covered by patents of innovation would have been covered by utility patents, the extent to which patents of innovation will affect the rate of innovation is uncertain.

Patents of innovation will likely have the strongest effect on the applied standard of patentability of utility patents. Since the standards of patentability for patents of innovation are similar to those of utility patents, a tendency may exist for the patent examiner and the courts to demand a higher standard of invention from utility patents. For example, arguments are now frequently presented to the Patent and Trademark Office and to the courts that an invention is "unobvious" because, despite a long felt need and the efforts of others to solve the problem, no one had produced the invention. While the arguments based on these factors (often termed "secondary indicators") are not uniformly successful, the inclusion of these factors in the standard of patentability for patents of innovation will increase the belief that if the secondary indicators must be used to demonstrate unobviousness, then the invention is not patentable under utility-patent standards.

From the standpoint of providing the most reliable and most easily enforced patent protection, copyright patents appear to have the most attributes since the standard for patentability is wholly objective and requires only novelty. Although proving substantial and material similarity and access can be more difficult than proving infringement of a utility patent (i.e., determining what is substantially and materially similar to the manufactured article described in the copyright patent is more complex than determining whether an alleged infringing article falls within the scope of a patent claim), copyright patents should still be less costly to enforce than utility patents since issues of obviousness or inventive skill are not litigated. However, infringement of a copyright patent could be easily avoided since it protects the form of an article and

uncertain validity of the unexamined utility models limits its value as an incentive for innovation. (See Crotti,p. 582 for further observations regarding the adoption of a German-type utility model in the United States)

The patent for innovation and the examined utility model would probably provide little, if any, advantages to applicants or the Patent and Trademark Office over utility patents: the patent disclosures will need to be as extensive as those for utility patents and the examination time would approximately equal that of patents. While the cost to the applicant of preparing applications for unexamined utility models might be nearly as high as the cost of preparing applications for utility patents, some savings would occur because no patentability examination would be conducted. Because copyright patents would only have to describe the article embodying the invention, they could be prepared inexpensively and often without professional assistance.

Of the four types of lesser patents, the unexamined utility models and copyright patents would place the least additional burden on the Patent and Trademark Office.

Even lesser patents that were not examined would create some burden for the Patent and Trademark Office due to the administration of the lesser patent system and the search files. Copyright patents would frequently add little to the knowledge base because of the low standard of patentability and limited disclosures, and the cost of incorporating them into the examiner's search files would probably outweigh the benefits of the additional disclosures.

As can be seen from this cursory review of the four types of lesser patents, the specific elements can dramatically affect the implications of a lesser patent system. The policymaker has broad freedom to fashion a lesser patent system which can accomplish his specific policy objectives.

Congress can authorize a non-judicial forum, or para-judicial system, from which parties can seek a less expensive resolution of patent disputes. The para-judicial system could accomplish less expensive resolutions of disputes through, for instance, limiting discovery and using quasi-judges who are familiar with the technology and patent law.

Congress by enacting reexamination has created a para-judicial system for resolving certain matters in patent disputes (35 USC Sect. 302-307). While reexamination is a significant step, it cannot serve to resolve infringement, patent misuse, or even issues of patent validity that do not involve patentability of the claims over disclosures in patents or printed publications (35 USC 301).

Binding voluntary arbitration has been proposed as an alternative forum for resolving patent disputes by the Committee on Economic Development (Stimulating Technological Progress, p. 55, January, 1980) and the United States Chamber of Commerce. Recent emphasis has been placed on encouraging the use of binding voluntary arbitration by Chief Justice Burger. (Burger, Warren E., "Isn't There a Better Way?", American Bar Association Journal 68 pp. 274-277, March, 1982). This section explores binding voluntary arbitration and administrative patent law panels as alternative forums for the resolution of patent disputes.

Binding Voluntary Arbitration: In binding voluntary arbitration, the parties agree among themselves to waive their rights to seek redress in the court system and agree to be bound by the decision of an arbitrator. The decision of the arbitrator would only be challengeable in the courts for matters such as impropriety in the arbitration proceeding.

Binding voluntary arbitrations are widely used in resolving many types of disputes, and have been authorized by Congress in the Federal Arbitration Act (Title 9, USC). (Virtually all states have arbitration statutes that authorize voluntary arbitration and provide controls on the arbitration procedures; for example, in California, the arbitrator is not

Since the rules and procedures of the arbitration, as well as the arbitrator and issues to be arbitrated, must be agreed upon by the parties, major areas for disagreement exist that can result in lengthy and expensive efforts even before the arbitration begins. Arbitrations that limit discovery can achieve cost reductions but can jeopardize the ability of the parties to present their positions adequately and fairly. One commentator, who has served as an arbitrator in patent disputes, has stated that discovery should be fairly complete for a sound arbitration of patent disputes. (Davis, James F., "A New Approach to Resolving Costly Litigation", Journal of the Patent Office Society, Vol. 61, pp. 482, 1979)

Binding voluntary arbitration will have little, if any, effect on the value of patents in general and will not enhance the patent-provided incentives to undertake innovation. The only patents that will be involved in arbitration are those in which sufficient economic interest exists to have a dispute worth resolving and in which the parties can come to an agreement to arbitrate. If one party to a patent dispute believes that strategic advantages exist with court litigation or that an adverse resolution can have a significant effect on its operations, it is unlikely that an agreement to arbitrate would be reached. (J. F. Davis, supra)

A published case history of a successful arbitration (Paul Janicke, and Roger Borovoy "Resolving Patent Disputes by Arbitration: An Alternative to Litigation", Journal of the Patent Office Society, 62 (6) pp 337-360, June 1980 and "Mediation and Arbitration of Patent Issues", Intellectual Property Law Review -- 1981, p. 17-37) relates the experience of two major companies, Shell Oil Company and Intel Corporation, in resolving a dispute as to whether Shell patents on semi-conductor inventions were infringed. (Intel had decided that a validity challenge, under the circumstances, was not worthwhile.) The authors, who represented the parties to the arbitration, state their belief that the arbitration succeeded because of the mutual trust of the parties, and their desire and willingness to save time and money. They also argue that the arbitration was possible because the computer chip was not in Shell's line of business

The policy implications of arbitration of patent disputes affect more than the parties themselves. For example, society can benefit from binding voluntary arbitration. The use of arbitration would free the court system of some disputes. On the other hand, there is a public interest in patent validity. It is on this basis that the courts have held voluntary arbitration agreements unenforceable.

One of the public interest concerns is that a finding of validity by the arbitrator would prevent the challenger from contesting the validity of the patent in the courts. The challenger, however, may be the only party having sufficient economic interest to test the validity of the patent. The policy set forth by the Supreme Court in holding that agreements by licensees not to contest the validity of patents were unenforceable (Lear v. Adkins, 162 USPQ 1, 1969) would, to some extent, be modified if binding voluntary arbitration were permitted. However, arbitrators, although perhaps not having the same degree of public interest concerns as the courts, are more likely to reflect the public interest concerns than the parties themselves. For those cases which would be resolved by arbitration, litigation might be precluded or unjustified for many because of the expense. Hence in those cases in which litigation would not occur, arbitration increases the likelihood that the public interest would be considered in their resolutions.

There is another public interest concern in that if a patent is found to be invalid by the arbitrator the invalidity would apply only between the parties to the agreement. The patent owner could continue to enforce his patent against others. Legislative options exist that would result in arbitration having an effect on more than the parties to the arbitration. One option is to require the arbitrator to request reexamination in all instances in which a significant question of the validity of the patent over printed prior art exists. A finding of invalidity by the Patent and Trademark Office would nullify the patent.

The administrative proceedings would have an established procedure and panel of judges, thereby eliminating the necessity for the parties to negotiate these factors as would be required for an arbitration. Also, the administrative proceedings would be made public as are court proceedings, and the decision of invalidity would invalidate the patent itself. Another difference is that the administrative law judges would be charged with protecting the public interest.

While the administrative procedure can be mandatory, the right of the parties to seek a resolution in the courts cannot be constitutionally compromised. Because mandatory administrative proceedings offer the potential of adding to the duration and expense of litigation, only voluntary proceedings under which the parties agree to forego their right to the courts, are reviewed herein. However, mandatory proceedings were suggested by the Subcommittee on Patent and Information Policy in which a panel of patent attorneys, who receive no compensation, would resolve validity issues with a statutorily established time limit. No discovery by the parties would be permitted but the panel would have the power of subpoena and discovery. (DPR, p. 163)

Having administrative law judges with expertise in patent law and technology could facilitate the proceedings and represent some savings to the parties. However, in order to reduce significantly the duration and expense of litigation, it would be essential that the administrative proceedings limit discovery, the primary area of expense in court litigations. An example of an existing administrative law panel that has limitations on discovery primarily through the imposition of time limits is the International Trade Commission. (19USC Sect 1337(b)). The International Trade Commission has jurisdiction to resolve, among other things, patent validity and infringement disputes in connection with actions to stop the importation of products. (19USC Sect 1337(a)) Often the International Trade Commission is the exclusive forum to resolve the dispute (e.g., for the importation of a product made by allegedly infringing a U. S. patent directed to a process for making the product).

The broader social implications of administrative proceedings include the expense of operating an administrative law panel and whether, as a matter of practice, the administration law judges would consider the public interest as well as the courts. As with voluntary arbitration, it must be recognized that the alternative to administrative proceedings for many cases may not be court litigation but rather private settlements. The expense of the administrative proceedings could be off-set through user fees; however, the implications of user fees is not addressed in this paper.

In conclusion, administrative patent law panels can provide advantages to the parties and to the public over binding voluntary arbitration; however, these advantages (e.g., providing existing procedures and panels) can be provided privately, for instance, by the American Arbitration Association. Further, these advantages are not so significant that on balance administrative proceedings are clearly superior to arbitration. While it is difficult to make reliable predictions it is expected that administrative proceedings would not be appreciably more widely used than binding voluntary arbitration.

Other Factors Affecting Patent Litigation

The high costs of patent litigation have often been cited as one of the foremost reasons for a decrease in the value of patents. (e.g., DPR, Patent Subcommittee, p. 155; Small Business Subcommittee, p. 269; and Public Interest Subcommittee, p. 197, Presidents' Commission p. 39 to 42) Litigation costs can inhibit the exercise of legal rights, particularly by individuals and small businesses. (L.A. Times 9/7//81 and WSJ 10/12/81)

While providing mechanisms outside the court system for resolving patent disputes offers the potential (but without guarantee) for less expensive resolutions of patent disputes, these mechanisms, such as reexamination, do not necessarily curb abuses and could exacerbate them. (DPR, p. 197) Thus, a party which can gain through exerting economic

No. 81-30A, March 12, 1977, Congressional Research Service, and Court Awarded Attorneys' fees and Equal Access to the Courts, University of Pennsylvania Law Review, vol. 122, No. 3 (January 1974) 636-713).

The patent laws also provide an exception to this general U.S. rule by allowing attorneys' fees to be awarded in exceptional cases (35USC § 285). This exception was enacted in 1946 in connection with amending the basis of recovery in patent infringement suits such that the award can be on the basis of a reasonable royalty and the expense of proving actual profits need not be undertaken. The House bill permitted the court to grant reasonable attorneys' fees to a patent owner who is given injunctive relief against the infringer (H.R. 5311, 79th Congress, Second session). The Senate amended the House bill to emphasize that courts had the discretion to grant attorneys' fee and that recovery could be made by whomever prevailed. The purpose to be served by allowing the courts discretion to award attorneys' fees was to discourage infringement of a patent by any one thinking that all he would be required to pay if he lost would be a reasonable royalty and also to prevent a gross injustice to an alleged infringer. (S. Report No. 1503, 79th Cong. 2nd Session, p. 2, 1946)

One study of the award of attorneys' fees in patent litigation concluded that the congressional intent to deter infringement and prevent "gross injustice" has been fulfilled. (Alan M. Ahart, Attorneys' Fees: the Patent Experience, Journal of the Patent Office Society, vol. 57, No. 10, October 1975, 608-641, 641) However, the Subcommittees on Patent and Information Policy, Small Business and Public Interest of the Domestic Policy Review seemingly dispute this conclusion. (DPR, p. 155, 197 and 269) These Domestic Policy Review Subcommitees stressed the continuing problem created by the financial inability of or lack of economic justification for a party to become involved in patent litigation, noting that the award of attorneys' fees is too remote. Even though a litigant may expect to prevail, he has no assurance that the court will award attorneys' fees. What could be the effect if the award of attorneys' fees were more certain?

From the standpoint of the parties to a patent dispute, it is not clear that awarding attorneys' fees will provide a benefit over the existing situation in which attorneys' fees are awarded only in exceptional circumstances. Moreover, the newly created Court of Appeals for the Federal Circuit could have an effect of making the award of attorneys' fees under the present statute more predictable and thereby better achieve the congressional intent to discourage infringement and prevent gross injustice.

Mandatory Preliminary Injunction

Currently, the standards for granting preliminary injunctions in patent litigation are more stringent than in other types of litigation. Generally in non-patent cases the party requesting the preliminary injunction must show that he has a reasonable likelihood of success in the litigation and that if the activities of the other party were to continue pending the outcome of the litigation, a material and irreparable harm would occur. In patent litigation, the patent owner must additionally show that the patent is "beyond a question" valid and infringed. The courts that fashioned this policy cite two reasons for applying a higher standard in patent cases: 1) the public interest is served when invalid patents are challenged, and 2) since the Patent and Trademark Office lacks the resources to examine all relevant prior art, the public must rely on interested parties to uncover relevant art and challenge the patent. (Simson Bros. v. Blancard & Co., 22 F2d, 498 (CA2, 1927), and Rosenberg v. Groov-Pin Corp. 81 F2d 46 (CA2, 1936)) In view of the more stringent standard, few preliminary injunctions are granted in patent cases. For the period 1953 through September 1978, 54 reported opinions involved requests for preliminary injunctions, and about one-third were granted. (Burton and Dorr, Preliminary Injunctive Relief, Journal of the Patent Office Society, vol. 60 (October 1978) 597, 631)

A recent case in which a preliminary injunction was issued involved a generic pharmaceutical company entering the market for a drug six months

Under the proposed system of mandatory preliminary injunctions, patent owners would not be required to demonstrate that material and irreparable harm would occur if the alleged infringement were to continue pending the outcome of the litigation. Rather, the burden falls on the alleged infringer to show that the granting of a preliminary injunction, all other conditions being met, would be inequitable.

The proposed system of preliminary injunctions would encourage the use of the reexamination proceedings. The patent owner would have an incentive for seeking reexamination, and the alleged infringer, knowing that reexamination is inevitable, would be motivated to initiate the reexamination proceedings. Since the reexamination process is substantially ex parte and therefore within the control of the Patent and Trademark Office, the parties to a dispute would have little opportunity for inducing delay.

Questions, however, are raised by placing such importance in the reexamination proceedings. Even if the Patent and Trademark Office errs in its decision on reexamination that the claimed invention is still patentable, the burden on the challenger to avoid having a preliminary injunction issued may discourage the pursuit of the challenge in the courts. Since traditionally the courts have given little weight to Patent and Trademark Office decisions affirming patentability because of the less than full inter partes nature of the proceedings, the likelihood that the courts would disagree with the Patent and Trademark Office determination is appreciable. (See, Karl F. Jorda, Judicial Reaction to Reissue/Reexamination, presented before the New York Patent Law Association Continuing Legal Education Weekend Seminar, November 13-15, 1981.) As critics of the reexamination approach have stated, the ultimate effect of reexamination may be to lower the standard of invention for patentability. (Edward S. Irons and Mary Helen Sears, Patent Reexamination: A Case of Administrative Arrogation, Intellectual Property Law Review, 1981 (Gerald Rose, Ed.) p. 285-307) Moreover, even if the challenge of the patent is continued in the courts, the existence of a preliminary injunction provides no incentive to the patent owner to seek a prompt resolution.

Chapter 9
Conclusion

This report is directed to the question of how effective are patents for stimulating and nurturing new technology enterprises in light of their uncertain reliability and the difficulties of enforcement. In exploring this question it has become evident that simple answers are inadequate.

The patent system exists and is being vigorously used. Many inventors and innovators continue to rely on patents for protecting their ideas and investments, and some innovative activities would not be undertaken, or undertaken as promptly, without the promise of patent protection. It is often the individual or small company that must place the greatest reliance on patents to protect investments in innovative activities.

Thus, for many, the patent system is working. It is not perfect, and the imperfections generally affect those who rely most heavily on patents. To ignore the patent system and allow it to deteriorate would have the greatest detrimental effect on those who need the patent system the most. It would reduce its value as a meaningful incentive to encourage the undertaking of innovation, and patents would become primarily a means for maximizing private gain from innovative activities that would have been undertaken even without patent protection.

Patents do not have perfect reliability, and the costs, in terms of both time and money, to enforce patents through litigation can be very substantial. How these factors influence innovative activity, new technology enterprises and society in general, vary widely according to differences in technology, patent owner size and position within the industry,and patent owner strategy. In essence, each situation is unique. To characterize the patent system broadly as being effective or ineffective is to overlook such key issues as whether the patent system is being effective in certain areas where innovation beneficial to society

initiatives to improve prior art searching through the use of computer-assisted search systems. Each of these activities can enhance the reliability of patents, and reexamination and the Court of Appeals for the Federal Circuit can affect the practicalities of enforcing patents. The effect of these changes on innovation and society in general are unlikely to be observable in the short-term.

The Congress faces three alternative policy options at the present time:

1. Delay major legislative activity relating to patent reliability or enforcement until the effects of recent legislation and Patent and Trademark Office initiatives can be observed;

2. Undertake a major revamping of the patent laws; and

3. Adopt selective revisions to the patent laws which are substantially different from the thrusts of recent legislation and Patent and Trademark Office initiatives.

OPTION 1: Delay legislative activity (the status quo)

The inability to assess the effect of recent legislation and Patent and Trademark Office initiatives raises the question of whether additional changes to the patent laws would be premature. Once the full effect of the recent legislation and initiatives can be seen, the legislative approaches which can most effectively address the remaining problems can be identified with more certainty. Moreover, experience with the practical effects of reexamination and a single Court of Appeals for the Federal Circuit will provide guidance on the likely effectiveness of proposals such as permitting public involvement in Patent and Trademark Office decisions to allow patent applications prior to the issuance of a patent and reducing the incentive to seek court resolution of patent disputes by awarding attorneys fees to the prevailing party or granting preliminary injunctions.

insufficient data to resolve disagreements over the objectives of a patent system and the proper structure of the patent system, a major revamping of the patent laws would be a difficult and lengthy undertaking.

OPTION 3: Selective Legislative Activity

This option differs from option 1 in that problems affecting patent reliability and the practicalities of enforcement which are not directly affected by reexamination, the Court of Appeals for the Federal Circuit, and the Patent and Trademark Office initiatives in computer-assisted searching, could be subject to near-term legislative consideration.

Thus, consideration of legislative approaches such as public involvement in the granting of patents and decreasing the incentives for seeking court litigation in resolving patent disputes could be delayed until the practical effect of these recent activities can be observed.

The major problem areas within reach of legislative action, but not addressed by the recent activities are patentability judgments and prior art searching by the Patent and Trademark Office and the absence of a non-judicial forum for resolving all matters relating to patent disputes. Thus, selective legislative activities might include:

Increasing the resources for patent examination by:

- providing greater internal review of allowed patent applications by the Patent and Trademark Office
- increasing the time available to patent examiners to examine a patent application, particularly for improving prior art searching
- improving the quality of the examiners' search files through increased reclassification activities and file integrity reviews.

Appendix I

The Breadth of Topics for Investigation Concerning the Patent System

As with any report of this nature, considerable effort is required to narrow the scope of the study to that which is manageable but yet is inclusive of the major issues of concern to the requesting Committees. Thus, there are many topics that have not been addressed in this report, but this does not diminish their importance.

This appendix provides in outline form a list of topics which warrant consideration in the context of studies of patent systems. Despite its length, OTA makes no pretension that the outline includes all issues. It does, however, represent the combined input of OTA staff, the Working Group that assisted OTA in developing the study, and the Advisory Panel for the study. It is hoped that the outline will serve to stimulate consideration, whether by Congress, the Executive Branch, or the private sector, of other issues that have vital importance to the patent system and society in general.

- Business-related Elements

  - financial reward (owner)
  - risk of financial loss
  - consumption of profits and resources to innovate
  - need to maintain market position in fast moving technology
  - costs of retooling, refinancing, reorganization
  - fear that innovation may soon be outdated requiring recommitment of resources or may outdate existing facilities
  - need to obviate resource shortfall to stay in business
  - existence of standards to facilitate adoption of innovation
  - organizational structure of institution
  - variety across industry

2. How can the federal government influence innovation?

  - funding of research and development
  - regulation and control
  - provision of market for innovation, procurement policies
  - intervention in specific industry
  - management, technical and marketing assistance
  - policy (or lack of policy) toward coordinating government toward innovation
  - policy toward licensing technology
  - policy toward industry structure and competition (e.g., antitrust)
  - policy toward national technological status in the world context
  - policy toward dissemination of technological information
  - tax incentives such as tax credits and amortization controls by taxes or by regulations
  - endorsement and recognition of innovation
  - public recognition of achievement
  - establishment of legal rights to protect inventions
  - facilitating protection and enforcement of legal rights to inventions
  - rights of and rewards to government employee inventors

3. What can a patent document (by itself) do to stimulate or discourage innovation?

  - reflect values of the government toward innovation which supports progress
  - provision of enforceable right protection invention (property right)
  - establish mechanism for trade in inventions
  - provide means for disclosure of inventions (source of information to maintain awareness of competitor's activities)
  - provide means for public recognition of achievement
  - consume resources, cost of maintaining patent system

Topic B: What effects can patents have on technological exploitation by new technological enterprises, and how do these effects impact innovation by these new technological enterprises?

1. What are the factors required to establish a new technological enterprise?

- o Financial resources (greater risks involved with greater level of innovation or change)
- o New product (or saleable and licensable technology)
- o Personnel resources (may overlap)
  - o entrepreneural support
  - o product champion
  - o management (phases: initial, building and operational) (management support and quality)
  - o technical
  - o staff support (e.g., legal, accounting, tax)
- o Production
  - o channels of supply at competitive prices
  - o manufacturing capabilities and quality control
  - o government approval (local, State, federal) and compliance with federal regulations
- o Marketing
  - o market entry (existing organization usually favored by private and governmental practices)
  - o market demand (existing or created) and product acceptance (consumer education)
  - o market position
  - o distribution channels and dealer relationships
  - o consumer service
- o Motivation (e.g., desire to be independent, financial reward by production, marketing or being acquired, etc.)

2. Which of these factors can be affected by patents, and what effect can a patent have on these factors?

- o Effects of patents held by the new enterprise (how patents can be used)
  - o resource to attract venture capital
  - o resource for cross-licensing to acquire technology or a right to use patented technology
  - o saleable or licensable resource
  - o exclusive market position to establish business
  - o prestige and reputation

Topic C: What are the elements of a patent law, and how does it operate to promote innovation?

What are the potential elements which could be provided in a patent law? How are such potential elements of a patent law presently treated by the patent law, and what is the effect of the present treatment on innovation? What modifications to the present law should be considered to promote innovation?

- o What subject matter can be patented?
  - o presently new and useful processes, machines, manufactures, and compositions of matter can be patented
  - o should Congress be required to act to extend patentability to radically new technologies?
    - o should patents be granted for computer programs?
    - o should Congress modify or classify patentability of life forms?
    - o should pharmaceuticals and pharmaceutical methods continue to be patented?
  - o what level of utility should be present:
    - o intermediate to final useful product
    - o speculative activity
    - o technical advancement in the art
- o Who can apply for patents?
  - o presently only the inventor can apply for a patent
  - o problems in determining who is inventor, consequences of an error
  - o corporate patents, owner-in-interest
    - o formal designation of substantively involved people
  - o employee incentives
    - o employed inventor rights
    - o government employee-inventor rights
- o What is the standard for patentability?
  - o The present standard is novel and unobvious to one of ordinary skill in the art at the time of the invention.
  - o Should secondary considerations such as meeting a long felt need or commercial success be statutory bases for patentability?

- o filing (or supplying technical information) abroad without a license
- o filing abroad more than one year prior to filing in U.S.

- o Should other bars exist?
- o Should the Patent Office have the right to require restriction?
- o Should certain classes of new matter be permitted in patent applications (e.g., to update disclosure in view of recent work)?

- o What disclosure should be required of a patent applicant?

  - o presently an application must provide an enabling disclosure and a disclosure of the best mode
  - o how extensive should the enabling disclosure be (to understand the invention or to use and make invention)?
  - o should Patent Office determine adequacy of specification (if so, should patent be incontestable on that grounds)?
  - o requirements for examples (propriety of paper examples)
  - o should the best mode be identified as such, and should it be up-dated?
  - o should the patent applicant be required to conduct an art search and submit the results of the art search?

- o When should patent examination occur?

  - o presently all patent applications are examined.
  - o should delayed examination be permitted?
  - o should patents be granted without examination with an opposition or examination if a concern exists over the patent?

- o Should a modified or different system be adopted instead of present interference practice to determine which of two or more inventive entities should be awarded a patent?

  - o current practice is to award patent to first inventor making the invention to this country who did not abandon, conceal or suppress invention.

  - o present problems with interference practice:

    - o complexity and expense of interference proceedings
    - o duration of interference proceedings even in simple cases
    - o delay of issuance of entire patent application during interference proceeding
    - o relatively few cases have different results than if first-to-file system were adopted
    - o antitrust overtones if settlement achieved

Topic D: What is the impact of patent use (including enforcement and licensing) on new technological enterprises?

1. What are the significant elements of patent litigation and the effect of these elements on the expense of litigation and their impact on new technological enterprises?

   - o limited venue to patentee-plaintiff (infringer-plaintiff for declaratory judgement has much broader venue)
   - o wide scope of discovery (possible limitations of legislative action)
   - o probability of counterclaims (e.g., patentee infringing defendant's patent, antitrust, ect.)
   - o probability of assertion of fraud in the procurement of the patent
   - o extensive use of pretrial motions (possible limitations of legislative action)
   - o large number of grounds of defense to patent infringement including patent invalidity and patent unenforceability
   - o lack of technical and patent expertise in judiciary
   - o little likelihood of preliminary injunction, hence delay is in favor of infringer (statutory standards)
   - o usual lack of speed in obtaining judicial action either on pretrial or trial matters
   - o little likelihood of assessment of attorney fees
   - o wide variance in expected damages (can Congress influence?)
   - o lack of uniformity in court decisions, differences between courts on questions of law (will unified court of appeals help?)
   - o decision of patent invalidity is *in rem* whereas a decision of patent validity is *in personam*; (possible limitations of legislative action)
   - o expense

2. What other barriers to litigation should be considered?

   - o the importation of a product made by an infringing process is not actionable in the federal district courts. (International Trade Commission is only recourse and requires proving economic damage).
   - o potential antitrust, misuse exposure.

3. What alternatives to the present litigation system should be considered?

   - o Patent Court at trial level
   - o Effect of reexamination:
     - o ability to correct mistake (perhaps a Patent Office product recall system)

- licensee retains license only for time sufficient to develop non-infringing product

- government assistance to small business or individual to effect licensing.

- o Costs to patent applicants for fees, including potential maintenance fees (is a change in fee structure needed?) (Should individuals and small businesses have different fee structure?)
- o Adequacy of funding to Patent Office (appropriations process)
- o How patent fees are handled (independent of appropriations process)
- o Service functions
  - o providing patent copies and files
  - o collecting and cataloging scientific information
  - o maintaining search room and retrieval system (e.g., facilitating the ability to learn whether or not an anticipated activity poses infringement risks)
  - o remote availability of search files
  - o advertising and promotion of patent system and dissemination of information to enhance understanding of patent system
  - o assistance to individuals and small businesses to overcome the barriers of complexity when dealing with the patent system.

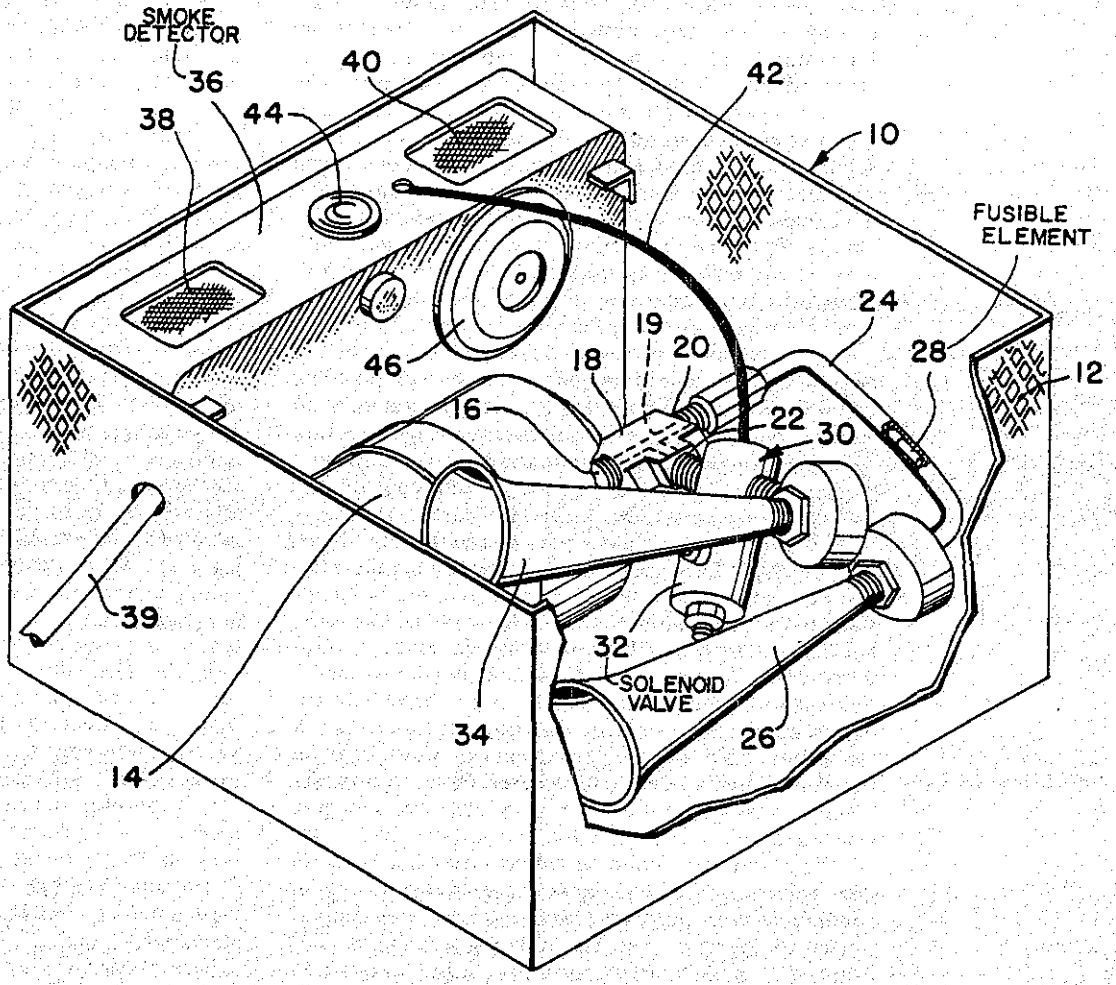
2. What other government practices can affect the patent system? How? And can this effect, if adverse, be modified by patent legislation?

- o assistance (entrepreneural, managerial and finanancial) to inventors and small businesses in developing and finding markets for inventions and innovation
- o acquisition, indexing and distribution of technical information (particularly foreign technical information) to improve patent search base by other than the Patent Office (e.g., NTIS)
- o non-patent regulation preventing enjoyment of full patent term (patent term restoration)
- o assistance to domestic enterprises in developing world-wide patent position and in enforcement of ex-U.S. patent rights
- o should the government obtain patents?
- o government patent policy (title, exclusive rights, etc. of public financed inventions and development)
  - o recoupment
  - o compulsory licensing after period of exclusivity
  - o anti-trust problems
- o effect of government funding of research and development on patents.
- o effect of Freedom of Information Act on patents
- o government policy toward patent-antitrust interface

APPENDIX II

SAMPLE PATENT

The patent shown below was signed by President Gerald R. Ford and issued to Sidney Jacoby during bicentennial ceremonies held in Philadelphia's Independence Hall in 1976.


SMOKE DETECTOR
36
38
44
40
42
10
FUSIBLE ELEMENT
24
19
20
18
28
12
46
16
22
30
39
32
SOLENOID VALVE
34
26
14

trically operated smoke detector wherein the heat detector is not effected by possible electrical failure of the smoke detector.

It is another object of the present invention to provide a novel combination smoke and heat detector alarm system which is capable of generating an alarm signal in the smoke detector portion of greater intensity than heretofore possible.

It is another object of the present invention to provide a novel combination smoke and heat detector alarm that is simple in design, inexpensive in manufacture and trouble free when in use.

Other objects and a fuller understanding of the invention will be had by referring to the following description and claims of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, wherein like reference characters refer to similar parts throughout the several views and in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a rear perspective view of the invention with the rear cover removed and partially broken away to expose details of interior construction.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Although specific terms are used in the following description for the sake of clarity, these terms are intended to refer only to the particular structure of my invention selected for illustration in the drawings, and are not intended to define or limit the scope of the invention.

Referring now to the drawing, I show in FIG. 1 a combination smoke and heat detector alarm system **10** of the self-contained type wherein the component parts are mounted within an enclosing cabinet **12**. The cabinet **12** is preferably fabricated of expanded metal or other material providing a high percentage of open area to thereby permit the ambient air to readily pass therethrough. Thus, the products of combustion (if present) can readily reach the smoke detector installed within the cabinet **12**. Similarly, elevated temperatures caused by a fire can directly impinge upon a heat responsive element **28** contained within the cabinet **12**.

The source of energy which preferably is in the form of a compressed gas cylinder **14** stores a quantity of liquified compressed gas (not shown) which preferably is liquified "Freon." The gas cylinder **14** is provided with a threaded outlet **16** which is utilized both for cylinder filling purposes prior to installation and to permit the exit of gas therefrom upon the detection of smoke or heat in the manner hereinafter more fully set forth. A threaded fitting **18** of generally T-shaped configuration is threadedly engaged in the outlet **16** and has interior channels **19** communicating with the interior of the gas cylinder **14** to permit gas flow either through the top opening **20** or through the side opening **22** upon actuation of a detecting device.

A first gas conduit system **24** leads from the top opening **20** of the threaded fitting **18** and connects at its other end to a first horn **26** or other suitable sounding device. A fusible element **28** which may be in the form of a eutectic alloy designed to melt at a predetermined temperature, for example 136°F. or 174°F., is interposed in the first conduit system **24** in conventional manner to detect the presence of heat in the vicinity of the combination alarm system **10**. Thus, upon detecting the presence of temperature sufficiently

elevated to activate the device, the fusible element **28** will melt to thereby open the first gas conduit system **24** to permit the flow of gas from within the cylinder **14** through the threaded fitting **18**, through the first gas conduit system **24** and into the diaphragm horn **26** for alarm sounding purposes.

A second gas conduit system **30** connects to the side opening **22** of the fitting **18** and leads through the solenoid operated valve **32** to a second gas operated horn **34**. The solenoid operated valve **32** is movable from a closed position wherein no gas can flow from the cylinder **14** through the second gas conduit system **30** to an open position wherein gas freely flows from the compressed gas cylinder **14** through the solenoid operated valve **32** to the second diaphragm horn **34** for alarm sounding purposes. The solenoid may be any suitable gas type solenoid valve such as the valve manufactured by Skinner Precision Industries, Inc., New Britain, Connecticut rated for 110 volt, 6 watt service.

A smoke detector **36** of approved design such as a photoelectric smoke detector or an ionization products of combustion detector is mounted within the cabinet **12** and has its sampling air inlets **38, 40** conveniently positioned to continuously sample the ambient air. Electrical energy to power the smoke detector may be supplied through a conventional electrical cord **39** which can be connected to a usual source (not shown) of 110v. electrical current in a well known manner. The smoke detector **36** should be of suitable type to close a relay or comparable device (not shown) to energize an electrical circuit **42** for solenoid valve **32** operation purposes as hereinafter more fully set forth. One detector that has been found suitable for this purpose is Model A1-711 as manufactured by Algenik Industries, Inc., Fort Lauderdale, Florida as listed and approved by Underwriters' Laboratories, Inc. This particular smoke detector **36** also includes a separate heat detector **44** and alarm sounding device **46** but these latter two features do not form a part of the present invention. See U.S. Pat. No. 3,383,670, for further details of this detector.

Upon detection of a predetermined density or concentration of smoke in the ambient atmosphere in accordance with recognized standards, such as the standards prepared by Underwriters' Laboratories, Inc. and the American Society for Testing and Materials, the smoke detector **36** will function to trigger a device such as a relay, semiconductor switch or similar device (not shown) which acts to energize the electrical circuit **42**. The circuit **42** functions the solenoid operated valve **32** to thereby open the second gas conduit system **30** to expose the second horn **34** to the gaseous contents retained under pressure within the compressed gas cylinder **14**. The passage of the gas (not shown) from the cylinder **14** through the second horn **34** activates the horn to thereby render the second horn directly responsive to the presence of smoke as detected by the smoke detector **36**. Thus, it is seen that the first horn **26** is responsive to the presence of heat as controlled by the fusible element **38** and the second horn **34** is directly responsive to the presence of a concentration of smoke as controlled by the solenoid operated valve **32** upon function of the smoke detector **36**.

It will be appreciated that the fitting **18** simultaneously pressurizes the first gas conduit system **24** and the second gas conduit system **30** by exposing both gas conduit systems to the gaseous contents of the compressed gas cylinder **14**. In this manner, either the sys-

APPENDIX III

RECOMMENDATIONS OF SEVERAL

PRIOR STUDIES OF THE PATENT SYSTEM

Application Filing and Examination

V. 1. Either the inventor or assignee may file and sign both the preliminary and complete applications.

Any application filed by the assignee shall include a declaration of ownership at the time of filing and, prior to publication of the application, shall include a declaration of originality by the inventor and evidence of a recorded specific assignment.

2. Every application shall include, at the time of filing, the name of each person believed to have made an inventive contribution.

3. Omission of an inventor's name or inclusion of the name of a person not an inventor, without deceptive intent, shall not affect validity, and can be corrected at any time.

VI. Claim for a priority date must be made when a complete application is filed.

VII. Publication of a pending application shall occur eighteen to twenty-four months after its earliest effective filing date, or promptly after allowance or appeal, whichever comes first.

An applicant, for any reason, may request earlier publication of his pending complete application.

An application shall be "republished" promptly after allowance or appeal subsequent to initial publication, and again upon issuance as a patent, to the extent needed to update the initially published application and give notice of its status.

VIII. Unless a later filed application is:

1. A continuation application and is filed before the occurrence of any of the following events: (a) the abandonment of, (b) the allowance of all pending claims in, or (c) the filing of an appeal to the Board of Appeals as to any claim in, the original parent application; or

2. A continuation-in-part application and is filed before the publication of any of its parent applications; or

3. A divisional application filed (a) on one of the inventions indicated to be divisible in a restriction requirement and is filed during the pendency of the application in which the restriction was first required, or (b) during the pendency of the original parent application;

XII. The Patent Office shall develop and maintain an effective control program to evaluate, on a continuing basis, the quality of the patents being issued by the examining groups and art units therein, and to furnish information for the publication of an annual rating of the overall quality of the patents issued each year.

Direct Review of Patent Office Decisions

XIII. A Patent Office decision refusing a claim shall be given a presumption of correctness, and shall not be reversed unless clearly erroneous.

XIV. Either the applicant or the Patent Office may appeal from a decision of the Court of Customs and Patent Appeals to the United States Court of Appeals for the District of Columbia Circuit, and from a decision of the latter court either may petition the Supreme Court for a writ of certiorari.

Procedure for Amending and Cancelling Patents

XV. The Patent Office, upon receipt of a relatively high fee, shall consider prior art of which it is apprised by a third party, when such prior art is cited and its pertinency explained in writing within a three year period after issuance of the patent. If the Patent Office then determines that a claim should not have been allowed, the patent owner shall be notified and given an opportunity ex parte both to rebut the determination and to narrow the scope of the claim. Failure to seek review, or the affirmance of the Patent Office holding, shall result in cancellation of the claim.

When the validity of a claim is in issue before both the Patent Office and a court, the tribunal where the issue was first presented shall proceed while the other shall suspend consideration, unless the court decides otherwise for good cause.

Anyone unsuccessfully seeking Patent Office cancellation of claims shall be required to pay the patent owner's reasonable cost of defending such claims, including attorney's fees. The Commissioner shall require an appropriate deposit or bond for this purpose at the start of the action.

XVI. A claim shall not be broadened in a reissue application.

Liability and Enforcement

XVII. For infringement of a claim which appears in both an application as initially published and in the issued patent, damages may be obtained for an interim period prior to issuance. Such period shall be measured from after the occurrence of all of the

XXIV. Offices of "Civil Commissioner" shall be created in those U.S. district courts where justified by the volume of patent litigation. In patent cases, unless otherwise ordered by a district court judge for good cause, a Commissioner shall conduct pretrial hearings, preside at depositions of parties, supervise discovery proceedings upon an accelerated and abbreviated basis, make preliminary rulings upon the admissibility of proofs, and be empowered to vary the burdens of proof for good cause in secrecy cases.

XXV. A party to a patent case seeking to reduce his litigation costs, with the consent of the adverse party, may submit his case to the court on a stipulation of facts or on affidavits without the usual pretrial discovery. This procedure may be used where no injunctive relief is asked and only limited damages are sought. Incentives shall be provided to consent to this procedure, as set forth below.

Statutory Advisory Council

XXVI. A Statutory Advisory Council, comprised of public members selected to represent the principal areas served by the patent system, and appointed by the Secretary of Commerce, shall be established to advise him, on a continuing basis, of its evaluation of the current health of the patent system, and specifically, of the quality of patents being issued and the effectiveness of any internal patent quality control program then in operation, and whether an optional deferred examination system should be instituted or terminated.

Every fourth year the Council shall publish a report on the condition of the patent system including recommendations for its improvement.

The membership shall consist of not less than twelve nor more than twenty-four. The term of appointment shall be four years, with a maximum tenure of eight years. An executive director, and other support as deemed necessary, shall be provided.

Patent Office Operations

XXVII. The Patent Office should be supported adequately to insure first-class staffing, housing and equipment, and

Patent Office financing should be established on the following basis:

1. The Patent Office should not be required to be entirely self-sustaining.

2. The Commissioner of Patents should be authorized to set fees

Transition

XXXI. The legislation implementing the proposed recommendations of the Commission should become effective as soon as practical with regard to both patents and pending applications.

Government Patent Policy

XXXII.

International Action

XXXIII. The United Sates should take a position in favor of the proposed revision of the Paris Convention whereby a right of priority may be based on an application for an inventor's certificate.

XXXIV. Efforts should be made to have the Paris Convention modified to remove any obstacle to measuring the term of a patent from an effective foreign filing date.

XXXV. The Commission believes that the ultimate goal in the protection of inventions should be the establishment of a universal patent, respected throughout the world, issued in the light of, and inventive over, all of the prior art of the world, and obtained quickly and inexpensively on a single application, but only in return for a genuine contribution to the progress of the useful arts.

To this end the Commission specifically recommends the pursuit of: (1) International harmonization of patent practice, (2) the formation of regional patent system groups, and (3) a universal network of mechanized information storage and retrieval systems.

Proposals with Major Impact on Innovation

I. Upgrade the Patent and Trademark Office

- The Patent and Trademark Office (PTO) should be given sufficient funds and resources to thoroughly and carefully process patent applications so that the reliability of resulting patents is greatly improved and the enforceability of such patents is enhanced.

- The PTO should expand its quality control program to review a greater sampling of allowed patent applications, thus ensuring more uniformity in the quality of the issued patents.

  The PTO should improve the integrity and completeness of the PTO's primary search tools, i.e., the patent search file and its scientific library.

- To the extent feasible, the PTO should develop, have developed, or use an available computerized patent and prior art search system to better assure the findings and consideration of the closest prior art by the examiner.

- The Treasury should earmark certain patent and trademark fees for use by the Patent and Trademark Office to pay the costs of PTO products (e.g. copies) and services (e.g., examination and registration).

II. Provide for Reexamination of Patents

The PTO should initiate a system for the reexamination of U.S. patents by any party requesting such reexamination during the life of the patent. The reexamination system should provide for submission of written agruments by the patentee and other interested persons concerning patentability over prior patents or printed publications. Such reexamination should be handled on an expedited basis by the PTO so that a prompt decison can be rendered.

III. Provide a Specialized Appellate Court for Patent Cases

A centralized national court with exclusive appellate jurisdiction (subject to Supreme Court review) over patent-related cases should be provided as a vehicle for insuring a more uniform interpretation of the patent laws and thus contributing meaningfully and positively to predicting the strength of patents.

IV. Reduce Cost of Patent Litigation

opinions on all claims for patent infringement no later than 6 months after the initial claim is filed.

D. Different classes or forms of Patents: The different proposals considered were:

- o Incontestable patents that would become incontestable with respect to obviousness after a period of 5 years had passed after it was issued.
- o Guaranteed patents that would be guaranteed by the U.S. Government as to their validity.
- o Elite or super patents that would receive a more comprehensive search and examination.
- o Petty patents that would not require nonobviousness and would run for less than 10 years.

E. Other proposals for modification of the patent system

- o Patent terms would be extended to coincide with commercialization.
- o Patent terms would run 20 years from the earliest effective U. S. patent application filing date.

F. Ideas for reducing the cost of litigation

- o An expert panel of uncompensated patent lawyers and the Board of Appeals of the Patent and Trademark Office would independently decide patent litigation issues, and the decision of the panel could be appealed only to a special appellate court unless the panel's and Board of Appeal's decisions differed in substance.
- o Prior public use would not bar a patent unless it was substantial in cost or number.
- o Prior public use would not bar a patent if the use was not obvious to the public on inspection or analysis of the product available to the public.
- o Patent owners who are individuals, universities, nonprofit organizations or small businesses would be given priority in infringement litigations before the Federal courts.
- o Judges for patent trials would be patent experts.

G. Impact of Antitrust Laws on Innovation:

- A new mandatory reexamination procedure should be instituted in the Patent and Trademark Office whereby a litigant who raises a defense of invalidity of a patent based on new found heretofore unconsidered art should first test the assertion of invalidity in the Patent Office where the most expert opinions exist at a much reduced cost.

- The budget of the Patent Office should be increased sufficiently to allow for more thorough searching of prior art using the most modern search technology.

- The patent laws should be amended to recognize that the reliability of patents is a keystone in the commitment of funds to carry out commercializations of patented inventions, and incontestability should be mandated after a period of time so as to result in absolute reliability, except in cases of fraud.

- Legislation should be passed to give small businesses title to inventions, and incontestability should be mandated after a period of time so as to result in absolute reliability, except in cases of fraud.

- Legislation should be passed to give small businesses title to inventions made under government contracts, with the provision that commercialization be undertaken in a reasonable time. If such commercialization is not undertaken, title should revert to the Government and the Government should license small businesses. As an alternative, small business should be able to obtain title to inventions developed under government awards if they invest an amount of capital at least equal to the amount of the R&D award under which the invention occurred. Likewise, with inventions made in national laboratories, the Government should preferentially license small business concerns.

- Small businesses should be able to obtain (with appropriate restrictions) compulsory licenses through suitable proceedings in cases where uncommercialized patents block entry into new markets.

- The Justice Department should be required to undertake competitive impact studies for taking antitrust action against small business when a small business is attempting to exploit the full property rights afforded by its patent.

<u>Public Interest Subcommittee</u>

Enhancing Reliability and Reducing Cost

A thorough review should be conducted in which a wide variety of viewpoints and expertise is tapped for recommendation of reforms to the patent system. The review should consider the following proposals:

- Hearings should be conducted to determine the inequity of the present compensation system as perceived by inventors and its possible effect on innovation.

invention within the ten-year period, then the government shall be entitled to collect up to 50 percent (50%) of all net income above these figures until such time as the amount of government research money has been repaid.

6) Any title holder to a subject invention or his assignee shall not grant to any person the exclusive right to use or sell any subject invention in the United States unless that person agrees that any products embodying the subject invention or produced through its use shall be manufactured substantially within the U.S. unless this provision is waived by the funding agency.

7) Federal agencies are authorized to grant exclusive, partially exclusive, or non-exclusive licenses on government owned patents to achieve commercialization.

8) After public notification of the government patents available for licensing the agency will then require that potential licensees submit plans outlining how the invention will be developed and marketed. If the agency determines that the granting of an exclusive or partially exclusive license will not lessen competition it will give first preference in its licensing to qualified small businesses.

9) All contractors not covered under this proposal will continue to operate under the existing agency programs.

B. The Patent Office shall develop a practical, effective and low-cost per use computer-based search and retrieval system for its own use and public access with particular concern for its usefulness to small business firms. The system shall include appropriate classifications for and require the submission of supplemental information to make accessing easier, more complete and to provide more information concerning a patent's use and potential application.

C. The Patent Office and the Small Business Administration shall jointly and urgently conduct a study of the feasibility of devising a modified version of the patent law and regulations for use by small businesses, and individual inventors. The goal of such a modified version shall be to reduce the time and cost of securing and defending the patent rights of small businesses and individual inventors to reduce the present inequity resulting from the greater ability of large business to make effective use of the patent laws and regulations.

D. The Patent Office shall conduct a study regarding the feasibility of initiating a compulsory licensing requirement for patents which are not being adequately exploited and shall report back its findings to the Congress within one year.

- Government-owned patents should be licensed to all domestic manufactures on a royalty-free basis.

- The Patent and Trademark Office should be provided adequate funding to eliminate the unnecessary backlog in the work of that office.

Recommendations for Further Examination

- The concept of shorter-term lesser patents should be considered for introduction in the United States.

- The United States should work with other industrial countries to improve patent protection in Third World countries while avoiding any improper interference in the affairs of other countries.

Recommendations Presented in
Stimulating Technological Progress
A Statement by the
Research and Policy Committee of the
Committee for Economic Development

Changes in Patent Policy to Enhance the Economic Climate

First-to-File Patent System: The first to file a patent application should be granted the patent if more than one patent application is filed on the same invention. If another invents the invention prior to the patent applicant who is awarded the patent, the prior inventor would have a personal right to use the invention.

Reexamination of Patents: A challenger of a patent should be given the right to take references that it believes are strong enough to invalidate the patent to the Patent and Trademark Office and ask for reexamination in light of those references. The requester would pay fees that would approximate the Patent and Trademark Office costs involved.

Arbitration of Patent Disputes: Arbitration should be available for those who wish to use it.

Additional Recommendations on Patent Policy

- A single patent appeals court should be established to eliminate the current problem of inconsistency in precedents between existing Circuit courts.

- The recommendations of the 1978 National Commission on New Technological Uses of Copyrighted Works should be implemented to provide legal protection to the authors of computer programs and to assure that rightful processors of copies of computer programs can use or adopt those programs for their own use.

- U.S. owners of patented processes should be able to enforce their patents against goods made abroad with those processes and then imported into the United States.

- A patent owner should be able to receive an extension of a patent's life equal to the length of government regulatory delays.

- So that government-funded research and development will be used for commercial products, government contrators should in most instances receive title to the inventions and patents made under government contract.

Recommendations Presented in
SMALL BUSINESS & INNOVATION
A Report of an SBA Office of
Advocacy Task Force

A. Small businesses should be allowed to retain patent rights on inventions made under Federally-supported research according to the following provisions:

1) Each small business shall have a reasonable amount of time to elect to retain title to subject inventions. The Federal agency may retain title if the invention is made under a contract for operation of a government owned research or production facility, or in exceptional circumstances when it is determined that restriction or elimination of the right of the contractor to retain title to a subject invention would better promote the policy and objectives of this bill.

2) Whenever the funding agency determines that it should retain title to a subject invention a copy of this decision shall be sent to the Comptroller General. The Comptroller General will then review this decision and inform the head of the agency of his determination as to whether or not this retention of title is justified. The Comptroller General will also submit an annual report to the House and Senate Committees on the Judiciary on agency implementation of this bill.

3) Each funding agreement shall contain provisions to: (1) insure the right of the Federal Government to receive title to any subject invention not reported to it within a reasonable time; (2) insure the government's right to receive title to inventions when the inventor does not intend to file for patent rights; (3) guarantee that the agency shall have a nonexclusive, nontransferable paid-up license to use the invention; and (4) insure the right of the funding agency to require periodic reports on the utilization or efforts at obtaining utilization of the subject invention.

4) The Federal agency has the right to require the subject inventor of his assignee to grant additional lieenses if the agency feels that sufficient steps are not being taken to achieve commericalization. Additional licensing may also be required to alleviate health and safety needs, or under provisions for public use as specified by Federal regulations.

5) If the patent holder receives $250,000 in after-tax profits from licensing any subject invention during a ten-year period, or receives in excess of $2,000,000 on the sale of products embodying or manufactured by a process employing the subject

1) The patent office should have a program to assist individual inventors and very small business persons in applying for and obtaining patents.

2) The disclosure of all material information could be improved by the replacing of the ex parte, the reliance solely on written submission, method of patent application with what has come to be considered a conventional administrative agency approach. Such an approach could include public advocacy proceedings and require patent briefs, to induce disclosure of the invention in specification. Such a procedure need not be followed in all cases if the patent office could identify classes of patents most likely to be litigated. An analysis should be conducted comparing the increased costs of this type of initial investigation with the costs of later challenge and litigation, including the cost of problems caused by uncertainty.

3) An office should be created within the patent office to represent the public interest and assure the expeditious issuance of valid patents, prompt rejection of others, and the overall compliance with patent provisions.

4) Do away with explicit production goals for patent examiners, which still stress quantity rather than quality of patents.

5) Consideration should be given to making the Patent Office an independent agency, similar to the Federal Trade Commission to allow it to better carry out its quasi-adjudicatory functions.

6) The cost of patent protection in our litigious society probably cannot be slashed enough to make it affordable to individuals and very small businesses. The Government must provide a pool of sophisticated legal aid for those who cannot afford to protect themselves from patent infringement.

Government Funded Research

- o Taxpayer-funded research should remain the sole property of the Government.
- o A certification requirement, with criminal sanction, should be adopted to defer the private use of patents under government contracts.

Regulatory Delay

- o Patent terms should not be extended due to delays in commercialization caused by government regulations.

Rights of the Inventor

- The licensable nature of the rights granted by a patent should be clarified by specifically stating in the patent statute that: (1) applications for patents, patents, or any interests therein may be licensed in the whole, or in any specified part, of the field of use to which the subject matter of the claim of the patent are directly applicable, and (2) a patent owner shall not be deemed guilty of patent misuse merely because he agreed to a contractual provision or imposed a condition on a license, which has (a) a direct relation to the disclosure and claims of the patent, and (b) the performance of which is reasonable under the circumstances to secure to the patent owner the full benefit of his invention and patent grant. This recommendation is intended to make clear that the "rule of reason" shall constitute the guideline for determining patent misuse.

- The Department of Justice should conduct an "innovation impact study" and a "competitive impact study" before bringing any action against a patentee alleging antitrust violation.

H. Miscellaneous

- The U.S. Government should consider making it mandatory on all their international negotiating meetings at the United Nations and at other places to include people from the private sector who are expert in the matters being discussed.

- Mechanisms should be developed by which such unpatented technology is not misappropriated from its proprietor through the activity of governmental regulation and other disclosures to the Government, coupled with requests by competitors for information under FOIA.

- Make it a crime for anyone to knowingly infringe a valid patent.

- Change to a first-to-file system, so that the first applicant to file on an invention would be entitled to the patent. Our current patent laws award the patent to the first-to-invent (provided certain conditions are met), rather than the first-to-file.

Ad-Hoc Committee of Small Business Members

- The Patent and Trademark Office should develop a practical and effective computer-based search and retrieval system for its own use and public access, with particular concern for its usefulness for small business firms.

The Supreme Court, through the Judicial Conference should require each Federal court to exercise a high degree of control over the conduct of patent litigation, with particular concern for the time and expense of discovery.

V. Transfer Commercial Rights to Government-Supported Research to Private Sector

The patent rights on the results of Government-sponsored research to should be transfered to the private sector for commercialization.

Other Proposals which would Increase Innovation (need not have been unanimously approved by the Subcommittee)

VI. Extend Patent Term to Compensate for Delays in Commercializaton Caused by Government Regulations.

VII. Encourage Other Countries to Provide U.S. Innovators the Right to Obtain Enforceable Patent Rights

VIII. Patent Rights to be Available for New Technological Advances

- o New life forms should be patentable.
- o Patent protection should be extended to use-specific formulations of chemical compositions (e.g., a herbicide) that contain old chemicals wherein the invention resides in the new use.
- o Computer programs and software should be patentable.

IX. Clarify the Statutory Definition of Patentable Invention: 35 U.S.C. Sec. 103

- o The statutory standard for patentability should be amended to ensure the taking into account of the so-called secondary considerations involved in determining the presence or absence of nonobviousness.

X. Permit Licensee to Agree Not to Challenge Licensed Patent

Other matters considered (no recommendations)

A. Compensation of employed inventors: Corporations would be required by law to compensate employees for their inventions.

B. Financial Stimulus of Innovation: Financial assistance would be provided by the Federal government to individuals and small business.

C. Infringement of U.S. Patents by the U.S. Government: The Executive Branch would require that agencies must render final

Recommendations Presented in
Advisory Committee on Industrial Innovation
Final Report
(Domestic Policy Review)

Subcommittee on Patent and Information Policy

(Report on Information Policy)

I. The Accessibility of Information in the Patent Document

The Patent Office should undertake at the earliest possible date to complete the development of an effective computer based search and retrieval system so as to improve the value and effectiveness of issued patents.

The Patent Office should support the development of appropriate classification and indexing schemes and provide an umbrella under which to integrate the systems for the various technologies.

The Patent Office should encourage the development of user oriented patent data bases in specific areas by organizations that would be most responsive to user needs. To achieve this innovation in private patent information services, the Patent and Trademark Office must clarify the present and potential role of the Patent Office in patent dissemination.

II. The Relevance of the Patent Document to Innovation

The Patent Office should develop and require the submission with the patent application of an information (or cover) page which would not be part of the legal document but which would provide easier accessing of the patent and more information concerning its use and potential application.

III. Improving Awareness and Use of Patent Literature

The Patent Office should strengthen its depository system and should plan to install its automated search system in key locations around the country when completed.

The Patent Office should encourage creation of new private sector systems.

The Patent Office should consider providing education, technical and financial assistance, particularly to individuals and small businesses to use the system effectively.

for Patent Office services within broad guidelines established by Congress. Such fees shall be apportioned in accordance with the cost of providing the services.

3. The Patent Office should be authorized to establish a "revolving fund" of all its receipts to support its operation.

XXVIII. The applicant should be permitted to amend his case following any new ground of objection or rejection by the Patent Office, except where the new ground of objection or rejection is necessitated by amendment of the application by the applicant.

XXIX. A study group comprising members from industry, technical societies and government should be established to make a comprehensive study of the application of new technology to Patent Office operations and to aid in developing and implementing the specific recommendations which follow.

1. The United States, with other interested countries, should strive toward the establishment of a unified system of patent classification which would expedite and improve its retrieval of prior art.

The United States should expand its present reclassification efforts.

2. The Patent Office should be encouraged and given resources to continue, and to intensify, its efforts toward the goal of a fully mechanized search system.

3. The Patent Office should acquire and store machine-readable scientific and technicl information as it becomes available.

The Patent Office should encourage voluntary submission by patent applicants of copies of their applications in machine-readable form.

4. The Patent Office should investigate the desirability of obtaining the services of outside technical organizations for specific, short-term classification and mechanized search projects.

XXX. The Patent Office should:

1. Proceed vigorously with the implementing of its plan for microform reproduction of all search files; and

2. Cooperate with foreign national patent offices and international patent organizations to develop a worldwide index of patents and published applications for patents.

following events: (1) the initial publication, (2) a Patent Office holding that the claim is allowable, and (3) a transmittal to the alleged infringer of actual notice reasonably indicating how his particular acts are considered to infringe the claim.

The applicant's election to create such interim liability, by his transmittal of notice, shall constitute the granting of a reasonable royalty, nonexclusive license, (1) extending only until the issuance of the patent for any infringement involving a process, and (2) extending to and beyond issuance for any infringement involving a machine, manufacture or composition of matter, which is made prior to the issuance of the patent.

In exceptional cases, damages for interim infringement up to treble reasonable royalties may be assessed.

XVIII. The term of a patent shall expire twenty years after its earliest effective U.S. filing date.

XIX. The term of a patent, whose issuance has been delayed by reason of the application being placed under secrecy order, shall be extended for a period equal to the delay in issuance of the patent after notice of allowability.

XX. The filing of a terminal disclaimer shall have no effect in overcoming a holding of double patenting.

XXI. The importation into the United States of a product made abroad by a process patented in the United States shall constitute an act of infringement.

XXII. The licensable nature of the rights granted by a patent should be clarified by specifically stating in the patent statute that: (1) applications for patents, patents, or any interests therein may be licensed in the whole, or in any specified part, of the field of use to which the subject matter of the claims of the patent are directly applicable, and (2) a patent owner shall not be deemed guilty of patent misuse merely because he agreed to a contractual provision or imposed a condition on a licensee, which has (a) a direct relation to the disclosure and claims of the patent, and (b) the performance of which is reasonable under the circumstances to secure to the patent owner the full benefit of his invention and patent grant. This recommendation is intended to make clear that the "rule of reason" shall constitute the guideline for determining patent misuse.

XXIII. A final federal judicial determination declaring a patent claim invalid shall be <u>in rem</u>, and the cancellation of such claim shall be indicated on all patent copies subsequently distributed by the Patent Office.

The later filed application shall not be entitled to the effective filing date of a parent application for matter disclosed in the parent, and the parent, if published, shall constitute prior art against the later filed application.

IX. Standby statutory authority should be provided for optional deferred examination.

An optional deferred examination system shall include the following provisions:

1. The examination shall be deferred at the option of the applicant, exercised by his election not to accompany the complete application with an examination fee.

   Request for examination, accompanied by payment for an examination fee, may be made anytime within five years from the effective filing date of the application.

2. A deferred application shall be promptly inspected for formal matters and then published.

3. Any party, without being required to disclose his identity, may provoke an examination upon request and payment of the fee.

4. Unless made special upon the request of any party, an application initially deferred shall be inserted in the queue of applications set for examination in an order based on the date of payment of the examination fee.

5. Examination of pending parent or continuing applications shall not be deferred beyond the time when examination is requested of any of the parent or continuing applications.

X. The applicant shall have the burden of persuading the Patent Office that a claim is patentable.

XI. The Patent Office shall consider all patents or publications, the pertinency of which is explained in writing, cited against an application anytime until six months after the publication which gives notice that the application has been allowed or appealed to the Board of Appeals. If the Patent Office, after the citation period, determines that a claim should not be, or have been, allowed, the applicant shall be notified and given an opportunity ex parte both to rebut the determination and to narrow the scope of the claim. The identity of the party citing references shall be maintained in confidence.

Public use proceedings, as at present, may be instituted during the citation period.

RECOMMENDATIONS PRESENTED IN THE REPORT OF THE U.S. PRESIDENT'S COMMISSION ON THE PATENT SYSTEM

Patentability of Inventions

I. Prior art shall comprise any information known to the public, or make available to the public by means of disclosure in tangible form or by use or placing on sale, anywhere in the world, prior to the effective filing date of the application.

A disclosure in a U.S. patent or published complete application shall constitute prior art as of its effective (United States or foreign) filing date.

II. A preliminary application may be used to secure a filing date for all features of an invention disclosed therein, if the disclosure subsequently appears in a complete application. Requirements as to form shall be minimal and claims need not be included.

One or more preliminary applications may be consolidated into one complete application filed within twelve months of the earliest preliminary or foreign application relied on.

III. Prior art shall not include, as to the inventor concerned, disclosures of an invention resulting from:

1. A display in an official or officially recognized international exhibition; or

2. An unauthorized public divulgation of information derived from the inventor.

IV. The classes of patentable subject matter shall continue as at present, except:

1. All provisions in the patent statute for design patents shall be deleted, and another form of protection provided.

2. All provisions in the patent statute for plant patents shall be deleted, and another form of protection provided.

3. A series of instructions which control or condition the operation of a data processing machine, generally referred to as a "program," shall not be considered patentable regardless of whether the program is claimed as: (a) an article, (b) a process described in terms of the operations performed by a machine pursuant to a program, or (c) one or more machine configurations established by a program.

tem 24 or the system 30 can be activated upon sensing respectively the presence of a sufficient concentration of smoke or of a predetermined elevated temperature. Should a fire develop and generate sufficient quantities of smoke and sufficient elevated temperatures to activate both the smoke detector 36 and the fusible element 28, then both horns 26, 34 will be simultaneously activated to thereby generate an alarm sound of much greater intensity than that possible from only a single sounding device. Thus, as a fire develops intensity, the single unit 10 is designed to greatly increase the alarm intensity capabilities.

For example, by employing the applicable Underwriters' Laboratories, Inc. test procedures, a single horn 26 was activated and a generated sound in the range of 115 dBa was noted. Then the second horn 34 was simultaneously activated and readings in the range of 118–120 dBa resulted. As set forth in a publication entitled "Household Fire Warning Equipment Spot Type Detectors," published by Fire Equipment Manufacturers Association (FEMA), May 1974, page 12, each increase of one decibel is equal to an effective increase in intensity of sound of 26 percent.

Although I have described the present invention with reference to the particular embodiments herein set forth, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction may be resorted to without departing from the spirit and scope of the invention. Thus, the scope of the invention should not be limited by the foregoing specification, but rather only by the scope of the claims appended hereto.

I claim:

1. In a combination smoke and heat detector alarm, the combination of

A. a self contained source of energy,

1. said source including an energy outlet,

2. said source being compressed gas;

B. a first conduit system communicating with the outlet,

1. said first conduit system including a first sounding device, said first sounding device being a gas operated horn,

2. said first conduit system including first valve means to regulate the flow of energy from the source to the first sounding device,

3. said first valve means being movable by non-electrical energy from a closed condition to an open condition upon sensing a predetermined high temperature in the vicinity of the alarm; and

C. a second conduit system communicating with the said outlet,

1. said second conduit system including a second sounding device, said second sounding device being a gas operated horn,

2. said second conduit system including second valve means to regulate the flow of energy from the source to the second sounding device,

3. said second valve means being movable by electrical energy from a closed position to an open position upon sensing a predetermined quantity of smoke in the vicinity of the alarm.

2. The alarm of claim 1 wherein there is no direct connection between the first sounding device and the second sounding device.

3. The alarm of claim 1 wherein the first valve means comprise a fusible element, said fusible element melting upon the presence of elevated temperatures to move the first valve means from the said closed condition to the open condition.

4. The alarm of claim 3 wherein the first valve means positions entirely within the first conduit system.

5. The alarm of claim 1 wherein the second valve means include an electrically powered smoke detector.

6. The alarm of claim 5 wherein the second valve means include a solenoid operated valve, said valve being normally closed to prevent the flow of compressed gas through the second conduit system, said valve being opened by the smoke detector upon detection of the predetermined concentration of smoke, said valve being positioned within the second conduit system.

7. The alarm of claim 6 and a fitting attached to the outlet, said fitting having a single inlet connection to receive compressed gas from the outlet, said fitting having a first connection to the first conduit system and a second connection to the second conduit system, the said first connection, second connection and the inlet connection being interiorly interconnected to simultaneously pressurize both the first and second conduit systems.

8. The alarm of claim 7 wherein the first and second conduit systems include means to simultaneously conduct energy to the first and second sounding devices whereby the horns can be operated simultaneously.

9. The alarm of claim 8 wherein the means to conduct energy to the first and second sounding devices include means to function the first and second valve means simultaneously.

10. The alarm of claim 8 wherein the means to conduct energy to the first and second sounding device include means to function the first and second valve means individually.

11. The alarm of claim 1 wherein one horn generates a sound of intensity in the range of 115 dBa and wherein the alarm includes means to increase the intensity of the sound by a range of approximately 78 percent to 130 percent.

12. The alarm of claim 11 wherein the means to increase include means to function the first and second sounding devices simultaneously.

* * * * *

COMBINATION SMOKE AND HEAT DETECTOR ALARM

BACKGROUND OF THE INVENTION

The present invention relates generally to the field of alarm devices and more particularly, is directed to a combination smoke and heat detector alarm system which is equally responsive to either the presence of heat or to the presence of smoke.

The general premise of the need for protecting occupants of buildings from the danger of fire has long been a building design concept and many types of electrically operated and mechanically operated fire alarm systems have been developed by prior workers in the field. The prior art types of fire alarm systems have varied greatly in reliability, complexity, scope, cost and in the basic protection features afforded by each particular type of design. Additionally, distinctions have traditionally been made between alarm systems suitable for commercial and industrial establishments, and in alarm systems particularly designed for residential use.

Alarm systems such as manual fire alarms, automatic fire alarms, central station connected systems, local supervisory alarm systems, coded and non-coded alarm systems, sprinkler alarm systems and others have been developed for particular applications in specified occupancies. It will be appreciated that the initial cost both in basic equipment price and in the cost of installation varies widely between the different systems available. The safety and reliability features offered by the various systems also are widely divergent. Accordingly, the selection and design of an alarm system when planning a new building or when installing an alarm system in an existing building forms an important design decision dependent upon such factors as the type of occupancy, the type of building construction, the number of persons to be protected, the equipment cost factor, etc.

More recently, tests have been conducted and investigations have been made of actual fires wherein it has been determined that in many instances, the buildings subject to fire become untenable from smoke long before they are untenable due to the elevated temperatures of a fire. Because of this added awareness, much thought has been given recently to personnel protection in buildings. In accordance with these recent studies, safety from smoke considerations now form an important building design parameter. Numerous smoke detection devices have been developed to a degree wherein they are quite reliable and are now in general use. The prior art smoke detection systems have, until now, been employed usually to trigger alarm systems in commercial and apartment buildings upon presence of smoke to thereby warn the building occupants. Because of the added awareness of the dangers inherent in residential fires, many self-contained, single station, relatively inexpensive units have been specifically designed for residential use in an attempt to reduce the number of fatalities resulting from residential fires. Such units have traditionally incorporated a sounding device in the form of a bell or horn and a detecting device which was either responsive to the presence of smoke or to the presence of heat.

There are many reported instances wherein a relatively smoky fire did not generate sufficient heat to actuate a heat-actuated alarm until it was too late to warn the building occupants of the presence of deadly smoke. Other instances have been documented

wherein the heat of a fire builds up so quickly as to render a building untenable from heat before sufficient quantities of smoke are generated to activate a usual smoke detection device. Existing smoke detector systems have sometimes failed to properly function when the electrical power required for operation was interrupted by action of the fire itself. Other smoke detector systems have proved deficient to a degree in that the associated alarm device of existing single station units cannot develop sound levels above 93 dBa. Accordingly, a single station unit which incorporates a sounding device capable of emitting alarm signals of greater intensity and which can be actuated both by a heat actuated device and by a smoke actuated device would be most desirable. Heretofore, no such combination unit has been made available for public use.

SUMMARY OF THE INVENTION

This invention relates generally to the field of alarm systems, and more particularly, is directed to a self-contained alarm system that is equally responsive to the presence of smoke and to the presence of heat.

The alarm device of the present invention includes a self-contained energy source which may be in the form of a conventional compressed gas bottle containing an easily compressed gas in liquid form such as "Freon" gas. A fitting connects to the gas cylinder outlet and feeds two separate gas conduit systems, each system of which leads to a separate sounding device, such as a gas operated horn of the type capable of producing an alarm signal of 115 dBa.

Interposed in one of the gas conduit systems is a fusible element which may be in the form of a eutectic alloy which is designed to melt at a predetermined temperature for example, 136° or 174°, depending upon the predetermined conditions of use. Interposed in the second gas conduit system is a conventional solenoid operated valve which is normally closed but which may be moved to its open position upon triggering of a self-contained smoke detection device. The smoke detection device may be of any well-known, approved type such as a photoelectric cell smoke detector or an ionization products of combustion smoke detector. Thus, the combination smoke and heat detector of the present invention is completely self-contained and is equally responsive both to the presence of a predetermined elevated temperature and to the presence of a sufficient concentration of smoke.

It is therefore an object of the present invention to provide an improved combination smoke and heat detector alarm of the type set forth.

It is another object of the present invention to provide a novel combination smoke and heat detector alarm which includes in combination a self-contained source of energy and two sounding devices, one sounding device being responsive to the presence of heat and the second sounding device being responsive to the presence of smoke.

It is another object of the present invention to provide a novel combination smoke and heat detector alarm that is completely self-contained and through a single gas cylinder functions a first horn upon presence of elevated temperatures and a second horn upon presence of a predetermined concentration of smoke.

It is another object of the invention to provide a novel combination smoke and heat detector alarm system which incorporates an independent, mechanically operated heat detector and an independent, elec-

United States Patent [19]

Jacoby

[11] **3,938,115**

[45] **Feb. 11, 1976**

[54] **COMBINATION SMOKE AND HEAT DETECTOR ALARM**

[75] Inventor: **Sidney Jacoby**, Philadelphia, Pa.

[73] Assignee: **Evergard Fire Alarm Co., Inc.**, Philadelphia, Pa.

[22] Filed: **June 13, 1974**

[21] Appl. No.: **478,928**

[52] **U.S. Cl.** ..... **340/237 S**; 116/106; 116/137 R

[51] **Int. Cl.²**..... **G08B 17/04**; G08B 17/10

[58] **Field of Search**..... 340/237 S, 227 R, 227.1, 340/228.5, 229, 404, 405, 406; 116/65, 70, 106, 114 Y, 142 FP, 2, 3, 5, 67 R, 101, 102, 103, 140, 137 R

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Primary Examiner—John W. Caldwell
Assistant Examiner—Daniel Myer
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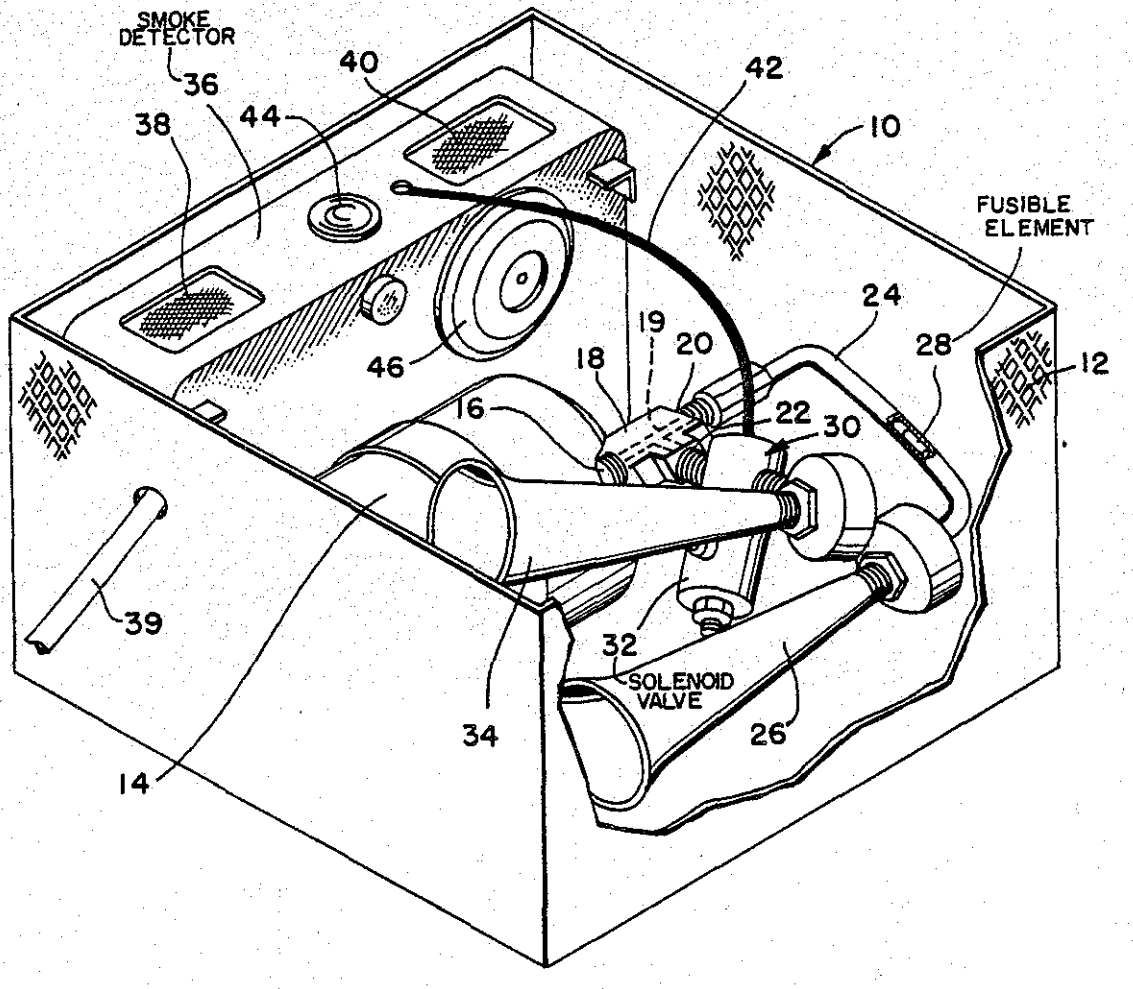
[57] **ABSTRACT**

A combination smoke and heat detector alarm including a self-contained stored energy source in the form of a cylinder of compressed gas. A T-fitting connects to the cylinder and feeds separate conduit systems leading to individual sounding devices. A fusible element is interposed in one of the conduit systems to automatically permit transfer of the compressed gas to a first sounding device upon the presence of elevated temperatures. A solenoid operated switch is interposed in the other conduit system to normally prevent the flow of gas. The solenoid is responsive to a smoke detector and is wired to open the solenoid valve upon sensing the presence of a predetermined concentration of smoke.

12 Claims, 1 Drawing Figure



- o conflict of interest when Department of Justice handles Title 35 matters
- o tax policy as it affects innovation (e.g., definition of reduction to practice, research and development)
- o lack of unified policy toward innovation by government (lack of policy coordination, lack of spokesman for innovation, lack of quantification of significance of innovation to U.S.)
- o government procurement policies (favoring existing technology, effect of government's ability to have right to have invention practiced and be liable for only reasonable royalties)
- o government assistance to procure and defend patents.

Topic E: What is the impact of Patent Office practices and other government practices on the patent system as they affect new technological enterpises and what changes may be considered to enhance the viability of new technological enterprises?

1. What operations of the Patent Office can affect new technological enterprises, what is the effect and should modifications be considered?

- o Status of Patent Office and its effect on new technological enterprises
  - o present status is reporting to Assistant Secretary of Commerce
  - o elevation of status in Commerce Department
  - o merging Patent Office with other government innovation agencies, perhaps as new Department
  - o independent agency
- o Reliability of patents issued (how reliable should they be?)
  - o integrity, design and maintenance of search basis and means for information retrieval, mechanization of searching
  - o maintenance of qualified and adequate sized examining corps
  - o training of examining corps (both in patent law and in technology)
  - o adequacy of time to conduct examination
  - o quality review of patent examination results
  - o reexamination or other post examination or granting procedure (discussed in Topic D.)
- o Quality and effectiveness of Patent Office operations
  - o complexity of Patent Office procedures as a contributing factor to attorney expenses (can Congress influence?)
  - o requiring applicant to conduct prior art search and provide statement
  - o communication with patent applicants
  - o management practices in maximizing utilization of resources
  - o ministerial functions such as mail handling, secretarial assistance, patent printing
- o Processing time for patent applications
  - o paper processing
  - o substantive examination
  - o appeals processing
  - o interference processing

- ability of Patent Office to handle quasi-inter partes proceedings (both resources and procedure compatability)
- acceptance of Patent Office decision by courts
- potential vehicle for delay or acceleration of resolution
- expertise in art and patent examination
- ability to cull out weak patents resulting in greater confidence in patent system
- decreased emphasis on original examination since if patent is important, Patent Office will have another review of it
- separation of patent validity from infringement issues may be artificial

- Arbitration of patent disputes:

  - agreement between parties to arbitrate selection of arbitrator
  - scope of appeal from arbitration
  - scope of arbitration to include invalidity and estoppel effect of finding of patent invalidity.

- quasi-judicial administrative proceeding to determine both patent validity and patent infringement issues
- opposition proceeding, inter partes, patentability issues only
- voluntary informal court (non-binding) as an assessment of likelihood of success in litigation
- cancellation proceedings.

- Incontestable patents:

  - Should any incontestable patents be granted?
  - Limited grounds for defense based on invalidity or unenforceability.

4. What considerations in patent licensing warrant study?

- right of licensee to recover back royalities if patent held invalid
- policy toward allowing licensee to sue for invalidity and the effect on licensor, especially small licensor (licensee may terminate or retain license during suit)
- exlusive right to non-staple article through patented method of use
- antitrust and misuse problems, e.g., tie-in package licensing, grant backs, field of use, etc.
- coersions by large licensor on small licensee

  - large firms demanding non-exclusive license form supplier (particularly effect on small business)

- controversy often revolves around issues ancillary to priority and to who invented first.

- Possible modifications or different procedures

  - can modifications be made in the present law to overcome the foregoing problems?
  - should patentability be an issue in an interference?
  - should the number of issues ancillary to priority be reduced?
  - should time restrictions be placed on interference proceedings in the Patent Office?
  - should the Patent Office immediately grant a patent to the claims not in the interference proceeding?
  - should independent innovator be given right to continue using invention patented by another when the invention was being used prior to the filing of the patent application?
  - should a first-to-file system be adopted?

- What rights should be granted by a patent?

  - currently patents provide rights to exclude others from making, using or selling
  - should compulsory licenses be considered for inventions bearing directly on the public welfare (e.g., pharmaceuticals, energy?)
  - should compulsory licenses be considered for unused inventions (or maintenance fees assessed) to weed out non-used inventions?
  - how long should patent rights exist?

    - when should patent term start?

      - currently, term starts from date of patent issuance (should continuation and continuation-in-part practice continue?)
      - should term start from date of filing, with legal rights for intervening time during patent application prosecution?

  - what is the effect of the large number of U.S. patents secured by foreign nationals (about 40 percent of total U.S. patents) on the U.S. economy and should foreign nations have the same patent rights as U.S. citizens?
  - extension of patent term due to non-patent government regulation.

- Should patents be denied to frivolous inventions, e.g., should a technical advance in the art be required?
    - patent of recordation (petty patents)
    - regular patents
    - incontestable patents
    - patent of importation (exclusive right for limited time for bringing technology to the U.S. which is new to U.S.)
- What should be the available prior art base for determining patentability?
    - known to others in this country prior to invention (should that knowledge be specifically expressed as being public knowledge by staute rather than by judicial interpretation?)
    - oral disclosures available to the public (as basis for assessing level of skill in art at time of invention) (in what country?)
    - prior patents and publications
        - should one-year grace period continue to be permitted (is this inherently deceptive to those not familiar with patents in view of the absolute novelty limitations in most major foreign countries)?
    - prior use (by inventor or another, whether or not use is secret use, in what country)
    - prior sale
    - secret prior art
        - previously filed patent application
        - work done by another and not concealed or suppressed (Sec. 102 (g))
        - not the original inventor (Sec. 102 (f))
        - is Sec. 102 overly complex?
        - should there be a cut-off date on prior art, i.e., such that a lost art could be patentable?
- What other bars to patenting should exist?
    - presently existing bars include:
        - abandonment of invention
        - concealment and suppression of invention (no prompt filing of patent application to promote progress of the useful arts). (Should this extend to other than interference situations?)

- o enhanced attractiveness for acquisition, patents as a source for depreciation
- o more freedom to use external expertise since proprietary position is not protected exclusively by trade secrets.

- o Effects of patents held by others
  - o technical resource to assist in innovation
  - o infringement problems
    - o requirement to license, risk litigation or design around
  - o inhibition to spin-off inventors from prior employers.

3. What business decisions of new enterprises can be influenced by the presence or absence of patents? (May depend upon industry characteristics)

- o whether or not to undertake or complete innovation
- o level of risk to be undertaken
- o choice of market for new product (e.g., limited, specialized market or general consumer market)
- o mode of marketing
- o price of technology if it is to be sold or licensed
- o extensiveness of any further research and development.

4. Are there differences in the effect of patents on these factors identified in Question 2 and business decisions identified in Question 3 depending upon the size of the enterprise?

4. Which of the items identified in Question 3 can affect the elements which stimulate or discourage innovation which were identified in Question 1? Considering the number of factors influencing innovation identified in Question 2, what is the
5 level of importance of the patent system on the elements identified in Question 1?

5. Which of the elements identified in Question 1 are subject to changing with time?

Background: Definitions

1. Innovation (involves commercial implementation, includes invention)
2. Invention (involves practice or likelihood of practice)
3. Idea (involves general idea which may not be practicable)
4. Individual inventor/entrepreneur
5. Small business
6. Larger, established business
7. New technological enterprise

Topic A: What elements stimulate or discourage innovation? Which of these elements can a patent system impact?

1. What are the elements which stimulate or discourage innovation?

- Societal and Governmental Elements
  - favor or disfavor which society views innovation
  - contributions to society provided by innovation
  - cost of innovation process to society
  - economic climate
  - perceived societal needs
  - predisposition of rights to inventions
- Governmental:
  - basic policy or lack of policy towards innovation (including inadvertent policy)
  - administration by government of policy toward innovation
  - funding or sponsorship of research
  - provision of market for innovation
  - regulations and controls
  - status of coordination of policies, and the administration of policies, regarding innovation within government
- Individual Elements
  - monetary reward (creator)
  - ego satisfaction
  - peer, societal and institution recognition
  - professional isolation during innovation process
  - sense of accomplishment
  - frustration of failures
  - freedom from outside direction, freedom from non-creative tasks
  - propensity to take risks
  - frustration with status quo

Providing lesser patents

Expressly permitting voluntary arbitration of patent disputes.

Each of these legislative possibilities, as discussed in chapter 8, have positive and negative implications and require policy judgments as to whether the net effects on patent owners, innovation, and society in general warrant its adoption.

This approach does risk continuing the patchwork development of the patent system; however, it may be more feasible for Congress to address patent revisions one at a time.

While there are benefits in being able to observe the effects of recent legislative and Patent and Trademark Office initiatives, there is a risk that problems not directly addressed by these recent activities will continue to reduce the value of patents in creating and nurturing new technology enterprises. Moreover, assessing the extent of the benefits is dependent upon the degree of precision with which the effects of the recent activities can be determined and analysed. The very nature of the link between patents and innovation limits the precision that can be achieved. To assist Congress in its own analysis an advisory commission could be established to monitor and periodically report on the effects of the recent activities and to identify future needs. The commission might be composed of members of various interest groups and disciplines concerned with the patent system to secure objectivity and balance.

OPTION 2: Major revision in patent laws

The modifications that have occurred in U.S. patent laws have been, in essence, minor tinkering. Discrete changes have been made in attempts to improve the overall patent system by overcoming the shortcomings in particular aspects of the patent laws. This patchwork approach by its very nature produces inconsistencies that can have adverse effects on patent owners, innovation and society in general.

While the evidence does not clearly support a current need for major revisions in the patent laws, it is conceivable that the continuing pressure of a rapidly expanding prior art data base, the increasing complexity of patent law and the continuing potential for abuses in court litigation, will exceed the ability of discrete modification to maintain an operable patent system in the future. A major revamping of the patent laws could provide a stronger basis upon which to deal with future problems. However, such a major revamping would be most profitable if its scope extended beyond patent reliability and the practicalities of enforcement to include patent-antitrust interfaces, patentability standards and international cooperative enforcement. Because of resistance to change and

could and should occur, and whether for those areas in which the patent system is effective, society's interest are being well served.

The varying and often unpredictable effects of the patent system are inherent to the system because patents are granted on the basis of the existence of a new and useful invention and not on whether the invention will ultimately be beneficial to society, whether it will lead to an innovation, or whether the patent owner will exercise his patent rights in the best interests of society. In other words, by the very nature of the process by which they are granted, patents are a blunt tool whose effectiveness is determined by the objectives, power and skill of the individual welding the tool. Such ancillary forces tend to govern the amorphous influence of patents. Patent reliability and the practicalities of patent enforcement are equally important in shaping the patent system and its effect on innovation, new technology enterprises and society, and are co-active with the other forces, attenuating or amplifying their effects on patents.

It is difficult to dispute the intuitive logic of the argument that enhanced reliability and reduced costs of enforcement would, as a general rule, increase the value of patents to their owners. However, any change in patent reliability or the practicalities of enforcement must result in repercussions within the patent system, influencing the way it affects innovation and society in general due to the complex and intertwined relationships of its various elements. Moreover, a change may have one effect on incentives to innovate, another on the operation of technology enterprises, and a third on the degree of fairness which the system accords to inventors, innovators, and the public interest.

The patent system is presently undergoing major changes: reexamination procedures have recently been implemented and a Court of Appeals for the Federal Circuit with essentially exclusive jurisdiction over appeals from patent suits in the District Courts will soon be established. Additionally, the Patent and Trademark Office has undertaken

The mandatory preliminary injunction is expected to affect society in other ways. As indicated earlier, the high cost of litigation and the more favored position of challengers often leave the patent owner with little choice but to license his patent. The mandatory preliminary injunction would enhance the ability of the patent owner to retain an exclusive market position, rather than licensing the patent. An exclusive market position would provide the patent owner with greater control over the pricing of the product. If licensing were desired, the patent owner would probably be able to obtain higher royalties since the threat of a preliminary injunction increases his bargaining position. Whether the increased strength provided by mandatory preliminary injunctions would translate into greater patent incentives for innovation is uncertain.

The greatest benefit to be derived from the mandatory preliminary injunction system would be that it would make patent enforcement more viable for individuals and small businesses. However, the bond requirement for a preliminary injunction could pose practical problems for individuals and small businesses.

In conclusion, the court-made policy affecting preliminary injunctions in patent disputes was created before the adoption of reexamination. The period of time that reexamination has been in existence has not been sufficient for the courts to reevaluate the standards that will be applied for granting preliminary injunctions. Since the new Court of Appeals for the Federal Circuit will have exclusive jurisdiction over appeals in patent suits, the reevaluation process is likely to proceed more quickly than if it were conducted by each Circuit Court of Appeals.

before the relevant patent was to expire. The court found that the infringement was willful and calculated, first, to beat the competitors to the market and thereby gain a dominant share of the generic market for the drug, second, to minimize the risk that the patent owner would sue since only a short period of the patent term was being compromised. Also the court noted that to permit one competitor to enter, others would follow and their combined effect would be to cause significant harm to the patent owner. (Premo Pharmaceutical Laboratories, Inc. v. USV Laboratories, Inc., et al., 203 USPQ 853 (S.D.N.Y., 1979)

For purposes of discussion, let us assume a method for granting preliminary injunctions has been established. Courts would be required, under the following conditions, to issue preliminary injunctions requiring the cessation of activities alleged to constitute a patent infringement:

- The patent owner had demonstrated a reasonable likelihood existed that an infringement of the patent would be found upon completion of the trial.

- Each prior art document asserted by the alleged infringer to invalidate the patent had been considered by the Patent and Trademark Office in a reexamination proceeding.

- The alleged infringer failed to show that a reasonable likelihood existed that the court would find the patent invalid or, as a matter of equity, unenforceable due to the conduct of the patent owner.

- The patent owner posted a bond in an amount established by the court and in accordance with the principles set forth in the Federal Rules of Civil Procedure. (Rule 65(c))

- The granting of a preliminary injunction would not be clearly inequitable.

Although there are many variants, the following method for awarding fees was used as a basis for exploring this question. Assume that the courts would award attorneys' fees to the prevailing party in both settled and court-decided cases unless the awarding would be inequitable, and that the court would determine the amount of the award on the basis of the complexity of the suit,. rather than on claimed costs, to minimize disputes over the amount of the award.

The implications of awarding attorneys' fees, in terms of impact on innovation and society in general, will be an outgrowth of the effect of the awards on the parties to a patent dispute. Consequently, this discussion is directed to the effects on the parties.

There is no consensus of opinion as to the effect of awarding attorneys' fees, and because of the differences in legal systems, it is difficult to draw meaningful conclusions from experiences with awarding attorneys' fees in other countries. Requiring the loser to pay the winner's attorneys' fees could discourage non-meritorious litigations, but because of the uncertainty of the outcome, the potential cost, if a loss occurs, might discourage a party from pursuing a justifiable issue needing court resolution. (Cohen, 79-81) Because of the potential expense, and the complications and uncertainties of patent litigation, the net effect of awarding attorneys' fees would tend to discourage litigation, and individuals and small businesses would likely be the most discouraged. (See Ahart, 57 JPOS at 640) Thus, alternatives to litigation, especially reexamination and private settlements, would be sought by such parties to resolve their disputes. These resolutions would tend to be final. For example, if a patent were upheld in reexamination by the Patent and Trademark Office, the challenger has an incentive not to challenge the Patent and Trademark Office determination in court because the enhanced presumption of validity would increase the likelihood that he would lose. This reliance on alternatives to litigation, particularly in areas in which the law is uncertain, raises the broader issue of protecting the public interest.

pressure has the apparent ability to use, or not to use, the alternative mechanisms to his favor. For example, if the patent owner does not have the resources for patent litigation, an alleged infringer may wish to pursue the dispute in the courts (rather than through reexamination), a strategy to weaken the patent owner's bargaining position. It should be recognized that there is no substantiated proof regarding how widespread the abuses are now, nor has the reexamination process been in effect long enough to ascertain its effect.

The award of attorney fees and the granting of preliminary injunctions (that is, the court ordering the alleged infringement to stop pending the outcome of the litigation) are approaches that can reduce the importance of economic pressure in resolving patent disputes and provide less of an incentive to seek a court resolution of the dispute and thereby enhance the usefulness of alternative mechanisms. The implications of these approaches are discussed below.

Award of Attorneys' Fees

There have been a number of proposals involving attorneys' fees to reduce the cost of litigation or to minimize inequities that can arise from the costs involved. These have ranged from awarding attorneys' fees to the prevailing party in a litigation (H.R. 5467, 96th Congress), to providing a pool of sophisticated legal aid at government expense for those who cannot afford to protect themselves from patent infringement. (DPR, Public Interest, p. 198)

Unlike most other countries, U.S. courts as a matter of practice do not require that the losing party pay the attorney fees of the prevailing party. (The Alaskan and Nevada State courts provide an exception.) In general, the only exceptions to this rule are litigations which are encouraged to implement public policy and litigations in which one of the parties acted in bad faith. (See for further discussion, Henry Cohen, Awards of Attorneys' Fees by Federal Courts and Federal Agencies, Report

The limited discovery procedures of the International Trade Commission have received mixed reviews. On the one hand, the proceedings have been expeditious. Disputes must, by law, be resolved within 12 months (18 months in complex cases) from the notice that an investigation has commenced. But as a trade-off, discovery has been limited in time to usually about 5 months .(Donald V. Duvall, "The Expeditious Adjudication of Section 337 Unfair Import Trade Practice Cases at the United States International Trade Commission," APLA Quarterly Journal, Vol 9 (2) pp. 157-171, 165, 1981). The presiding administrative law judge has the authority to limit the kind and amount of discovery to enable the proceeding to be completed in a timely fashion. (19 CFR 210.30) There have been complaints from involved parties that they have not had adequate time to prepare for trial. The due process limits imposed by the statute have not yet been fully tested. (Duvall, "Adjudication Under Statutory Time Limits: The I. T. C. Experience," 32 Ad. L. Rev. 733, 744 (ABA 1980); see also, John Urquhart, Canada Challenges U.S. Legal Procedure in Patent Disputes, The Wall Street Journal, February 17, 1982, p. 33)

Whether parties, given a choice, would be willing to forego a comprehensive discovery provided by the courts for the possible time and cost advantages of an administrative proceeding is uncertain. As with binding voluntary arbitration, factors such as the amount in controversy, the importance of the patent, and the mutual trust of the parties, are expected to be determinative of whether to undertake the risk of a proceeding offering limited discovery. Hence the frequency of use of administrative proceedings, if available, to resolve patent disputes may be on the same order as that for binding voluntary arbitration. The administrative law panel would be governed by the Administrative Procedure Act (5 USC, Sect 551), and therefore its decisions would be reviewable by the courts. However, the review is considered in the manner of an appeal rather than a new trial, and the standard for reversal is that the decision was clearly contrary to the evidence or arbitrary, capricious or discriminatory.

An alternative to requiring reexamination would be to require that the decision of the arbitrator be made part of the public record of the patent. Although the decision would not affect the patent, the public would be made aware of what the arbitrator believed to be defects in the patent. A finding by an arbitrator that the patent was not valid would create an inference that the patent would be found invalid by a court, and this inference would diminish the statutory presumption of validity should the patent owner attempt to enforce the patent against another party. Further, the patent owner could anticipate efforts by the other party to obtain the details of the arbitration decision through discovery.

In summary, binding voluntary arbitration of patent disputes will benefit those parties that are able to agree to the proceedings and exercise discipline in the proceedings; however, potentials for abuse exist. The frequency with which voluntary arbitration will be used is subject to speculation, but because the parties must agree to the arbitration and its finality, its use is not likely to be widespread. While questions of the effect of arbitration on society exist, they are not susceptible to quantification. The policymaker can minimize any negative effects on society by requiring that issues of patentability over prior art be resolved through reexamination by the Patent and Trademark Office or by requiring the decision of the arbitrator to be placed in the public record of the patent.

Administrative Patent Law Panels: The Federal government could establish, within the Executive Branch, administrative law panels that would resolve all aspects of patent disputes including the validity and infringement of the patent and whether the patent can be enforced as a matter of equity. Other issues that do not directly relate to the patent law, such as anti-trust, which sometimes arise in patent disputes, would not be considered by the administrative law panel.

This legislative approach is explored to contrast another type of forum for resolving patent disputes with binding voluntary arbitration.

and that the parties pre-agreed to damages of $500,000 in the event that the patent was found to be infringed. In their judgment, had the stakes been higher ($5,000,000) or had the patent been of direct commercial interest to Shell, no agreement to arbitrate would have been achieved.

These observations bring into question the frequency that binding voluntary arbitration would be used by the parties to a dispute. Some circumstances seem more favorable for voluntary arbitration. For example, it is likely that the agreements to arbitrate would often be made as provisions to patent license agreements. Since the possibility of a dispute is remote, the parties would be more willing to enter into agreements to arbitrate. Patent owners, particularly small patent owners, would benefit from including binding voluntary arbitration provisions in licensing agreements because the licensee would have sacrificed his ability to go to court where he could have withheld royalty payments pending the outcome of the suit and thereby exerted economic pressure on the licensor.

Another class of potential user would be one who cannot afford litigation, yet has an earnest desire to seek an independent resolution of disputes. But binding voluntary arbitration is not likely to place parties having disparate economic resources on a more equal footing in resolving a patent dispute than court litigation. Because the parties must establish the ground rules of the arbitration, the relative bargaining positions of the parties may have a greater influence in arbitrations than in court resolutions of disputes.

It is difficult to estimate reliably how many will use binding voluntary arbitration to resolve patent disputes and whether it will provide a more expeditious and less expensive route for resolving disputes. Nonetheless, the growing emphasis and acceptance of voluntary arbitration in other areas implies the likelihood of use of voluntary arbitration in patent disputes.

permitted to award attorney fees.) The law is presently unclear as to whether parties can use binding voluntary arbitration to resolve patent disputes. Several courts have held that binding arbitration of patent validity is against public policy. (Zip Manufacturing Co. et. al. v. Pep Manufacturing Co., 44 F2d 184, USDCD Del (1930); Beckman Instruments, Inc. v. Technical Development Corp., 167 USPQ 10, CCA7 (1970); and Babcock & Wilcox Co. v. Public Service Company of Indiana, 193 USPQ 161, DCSD Indiana (1976)) The lack of consensus on this issue among the courts has purportedly deterred the use of binding voluntary arbitration in patent validity and infringement disputes. The American Arbitration Association, the leading private organization for providing qualified arbitrators and facilitating arbitration, reports that it is aware of only one arbitration in 1980 and none in 1981 that involved issues of patent validity or infringement. (Frank Zotto, private communication, April 27, 1982)

Because of the uncertainty about whether agreements to arbitrate and the decisions of an arbitrator will be enforced by the courts, legislation authorizing voluntary arbitration (S. 2255) was passed by the Senate in the 94th Congress, and in the 97th authorizing legislation has been introduced as H.R. 6260. The issues before the policymaker include not only whether voluntary arbitration in patent disputes should be permitted, but also if it is permitted, what constraints, if any, are to be placed on the parties.

Binding voluntary arbitration offers the potential for, but does not guarantee, less expensive and more expeditious resolution of patent disputes. Favoring the speed and lesser expense of the proceedings are that the arbitrator could be selected on the basis of his familiarity with the technology and patent law; that the proceedings need not await the availability of the court; and that the standards for discovery used by the courts need not be employed. However, these benefits depend on the willingness of the parties to cooperate in all aspects of the arbitration and on the performance of the arbitrator.

Conclusion

Because of the uncertainties associated with lesser patents, a possible approach to minimize the risk while providing an opportunity to gain practical knowledge of the effects of lesser patents on innovation, patent owners and society in general, is to limit lesser patents to explicitly defined technology areas. One technology area which is relatively well defined and which could provide insights into the implications of lesser patents is semi-condutor chip design. The protection of chip designs has been proposed in Congress but has received a mixed reception from industry (H.R. 1007, 96th Congress, 1st Session, "Technology--How 'Silicon Spies' Get Away With Copying", Business Week (April 21, 1980) _____) However, the advancement of the technology and increased expense of chip designs may prompt a reconsideration by industry. In any event, there are still the strong opposing opinions, and hence a criticial forum for evaluation of lesser patent systems exists.

RESOLVING PATENT DISPUTES OUTSIDE THE COURT SYSTEM

Voluntary Arbitration and Administrative Patent Law Panels

The expense of resolving patent disputes in the court system is a major factor determining whether a patent will be enforced or challenged in court.

The causes of the expense in litigating patent disputes are inherent in the American judicial system, and the problem of expense is shared by many other high-stakes litigations. Reducing the expense of resolving patent disputes by denying access to the court system or materially altering the procedural due process of litigants in the courts is not Constitutionally permissible. Article VII of the Bill of Rights guarantees the right to trial and Article V assures that no one can be deprived of property without due process of law. (See, Beacon Theaters Inc. v. Westover, 359 US 500 (1959), and Dairy Queen, Inc., v. Wood, 369 US 469 (1962))

not the inventive concept. Thus, copyright patents are expected to provide effective incentives only in situtations in which copying the article provided commercial advantages. For example, copying a computer chip may involve a fraction of the cost of designing a chip with a different appearance but using the same inventive concept. Copyright patents would also be of value for products which have consumer identification with the specific form of the inventions.

Two of the major concerns about copyright patents are that they may be used to block innovation and that the access requirement to prove infringement may discourage innovators from searching the prior art. Copyright patents could be used to block innovation if a party not having the intent to commercialize an invention obtained a group of copyright patents in a technical area (that is, "fences-off" a technical area) in hopes that a manufacturer would infringe and would have to compensate the copyright patent owner for the infringement. The likelihood that this would occur appears remote because of the limited scope of copyright patents; however, by limiting the term of the copyright patent and enabling it to be extended only if the invention is commercialized, the effect of any such activity would be minimized. Alternatively, the law could be structured so that copyright patent rights would vest only after commercialization by the patent owner such as exemplified in connection with the patent for innovation and to prove infringement access to the commercialized article would need to be shown.

The effects of both utility models are expected to be intermediate. The subjective standard for patentability (the exercise of some inventive skill) provides a greater risk of differences of opinion of patentability (and hence less reliability) than the standards for patents for innovation and copyright patents. As in West Germany and Japan, the standards applied for utility models and utility patents might, in practice, be very similar. Perhaps, for examined utility models, if an agency other than the Patent and Trademark Office examined the applications, the difference between utility models and utility patents would be more easily recognized. The

Table 8-4
Summary of Analysis of Lesser Patent Systems

TYPE	Patent and Trademark Office Cost for Examination	Time for Processing by Patent and Trademark Office	Applicant's Costs	Certainty of Validity
Patent of Innovation	Same as utility patent, about $1000	Same as utility patent, about 2 years	Same as utility patent	Same as utility patent
Examined Utility Model	Same as utility patent, about $1000	Same as utility patent, about 2 years	Same as utility patent	Same as utility patent
Unexamined Utility Model	less than $300	2-3 months	Less than utility patent	Greater than utility patent
Copyright Patent	less than $300	2-3 months	Much less than utility patent	

application. Any party making, using or selling the invention prior to the date the patent owner commercialized the invention would retain a right to continue the activity irrespective of the patent. The patent application would be examined for patentability by the Patent and Trademark Office, and the claimed invention would be patentable if the claimed invention were novel and (1) not obvious over information expected to be known by one of ordinary skill in the art, or (2) filled a long-felt need, or (3) were technologically successful where others had failed. The major differences between patents of innovation and utility patents are the linkage between patent rights and innovation, the limitation in prior art that can be used to assess obviousness, and the provision of more objective criteria for assessing patentability.

Examined Utility Model: These lesser patents would apply to manufactured articles but unlike the West German and Japanese utility models, items such as electrical circuits (including computer chips and memory storage devices) could also be patented. Examined utility models would be granted for inventions that were novel and exhibited the exercise of some inventive skill. Examined utility models would provide the right to exclude others from making, using or selling the claimed inventions. The utility model application would be examined by the Patent and Trademark Office, and the term would run for 7 years from the date of issuance.

Unexamined Utility Model: These lesser patents would be the same as the examined utility models applications but would not be examined to determine whether the claimed inventions were novel and exhibited the exercise of some inventive skill. When the utility model owner seeks to exercise the patent rights against an alleged infringer in court, the owner has the burden of proving that the invention claimed in the utility model is novel and exhibits the exercise of some inventive skill, and he must submit at the time of filing the suit a certification that a reasonable prior art search has been conducted and the results of that search.

"Thoughts on a Future Reform of the German Utility Model Law", AIPPI Journal, June 1979, p. 115 et seq.)

In West Germany and Japan, the most frequent users of the utility model systems are individuals and small businesses. The larger businesses that make frequent use of utility model systems are general manufacturers and automotive manufacturers. In interviews with OTA, Japanese and West Germany patent practitioners representing individuals and small businesses typically supported the utility model system, noting that the utility models offered their clients patent protection at less cost than regular patents. However, they indicated that their clients use regular patents for significant inventions. (Lever, DOE, p. 56-57; p. 65-68)

Four Types of Lesser Patents

The effects of a lesser patent system will largely depend on the specific form of the system. There are many elements of a lesser patent system that must be established by statute and a wide range of options exists for most of these elements. To provide an understanding of the variations possible, table 8-3 summarizes the major elements of lesser patent systems and the various options that are available.

In this section, OTA has fashioned four lesser patent systems for purposes of illustrating the nature and magnitude of effects both positive and negative, that are possible. The selection was not made on the basis of achieving the maximum benefits from a lesser patent system; indeed, the optimal lesser patent system will depend on the objectives that are sought. Some of the key elements of the four lesser patent systems are described below.

Patents of Innovation: These lesser patents would provide the right to exclude others from making, using or selling the invention only after the patent is granted and the patent owner has commercialized the invention. The patents would expire 15 years from the filing of the patent

TABLE 8-2

Summary of West German and Japanese
Lesser Patent (Utility Model) Systems

	West Germany	Japan
Standard for patentability:	Some degree of invention	Some degree of invention
Term:	6 years from filing	15 years from filing or 10 years from grant whichever is first
Subject matter:	manufactured articles	manufactured articles
Examination:	only for formal requirements, quicker than regular patent	for patentability, about the same time as regular patent
Regular patent and utility model on invention:	Yes	No
Filings (1979):	10,962 (no regular patent application filed) 25,903 (regular patent application filed on invention)	185,455
(1974):	14,142 (no regular patent applicaiton filed on invention) 29,637 (regular patent application filed on invention)	157,591
Regular patent filings (1979):	56,495	174,567
(1974):	64,925	149,319
Determination of validity:	In courts, owner must certify that prior art search has been conducted	Japanese patent office

SOURCE: Office of Technology Assessment, derived from J. Lever, "Personal Interviews - Japanese and West German Patent Systems".

Trademark Office has been accused of lowering its standards by granting patents to gadgets or simple technologies. (Afred F. Crotti, The German Gebrauchsmuster, Journal of the Patent Office Society, vol. 39 (1957) 566-82, 568) The West German patent office is known for its uniformly strict standard for patentability and the attendant difficulty of obtaining gadget patents. The existence of petty patents in West Germany has been recognized as a factor that has enabled a high standard to be maintained. (Crotti, p. 567) When the patent examiner is not faced with the dilemma of wholly denying a patent applicant any protection for his invention, doubts regarding patentability can be more easily resolved in favor of not granting patents. Also, if lesser patents were granted instead of utility patents for inventions of simple complexity, it is likely that the general perception of patent validity would improve somewhat. For example, OTA in its study of reported patent decisions for 1970, 1975 and 1980 found that in about 75 percent of the Courts of Appeals cases, all patents were found invalid. If simple complexity inventions were deleted, in about 60 percent of the cases, all patents were found invalid.

The existence of lesser patents can also help assure that the 17-year patent term is only granted for the most significant inventions. (J. Markham, Inventive Activity: Government Controls and the Legal Environment, p. 602) Lesser patents provide a means for preventing extending monopoly power significantly beyond the expiration date of the basic invention patent when the improvements are covered by lesser patents instead of utility patents. There is a practical problem, however, in encouraging the inventor of improvement inventions to seek lesser patents instead of utility patents. (F.M. Sherer, Industrial Market Structure and Economic Performance, Second Ed., Rand McNally (1980) p. 455)

The incentive to seek a lesser patent instead of a utility patent can be provided by the anticipated lack of success in obtaining a reliable utility patent, as in West Germany. Also, an inventor may chose a lesser patent because it is less expensive to obtain and enforce than a utility patent, or because the lesser patent protection is adequate for the

Regardless of the particular type of lesser patent system, some observations can be made about the general effects of lesser patents. Lesser patents, by definition, provide protection to inventions which could not obtain utility patents. Hence many inventions which would otherwise have been in the public domain would be eligible for lesser patents.

This raises the question of whether society in general will benefit from a lesser patent system through, for example, increased innovation and greater disclosure of technical information. There are no definitive answers to this question, and, as with patents in general, reliable and conclusive data is unavailable. Reliance must be made on intuitive reasoning to judge the societal benefits of lesser patents.

One of the objectives of the patent system is to secure disclosures of inventions in return for the granting of patent rights. It can be argued that lesser patents are a poor bargain in that rights are granted while the inventions disclosed may be so minor that their disclosures do not advance the understanding of the technologies. However, for inventions which previously could only be protected through trade secrets, lesser patents may result in disclosure of technical information which might otherwise have been kept secret. The extent to which meaningful trade secrets would be abandoned in favor of a lesser patent is uncertain, but with the scope and term of a lesser patent being limited, there would be incentives for opting in favor of trade secret protection.

The degree that innovation would be enhanced by lesser patents and the type of innovation that would be fostered is also uncertain. From one standpoint, the inventions that result in major technological breakthroughs and the creation of new industries generally can be patented under the present system. Thus, it can be argued that lesser patents are not likely to be critical factors in the development of new products and new technology enterprises. But lesser patents can play a supplemental role in the development of this type of innovation. For example, a lesser patent by offering a relatively secure fall-back position in the event that the

In summary, proposals for deferred examination will meet with controversy. Although deferred examination can enable patent examiners to devote more time to the more important applications, it is not clear that an overall benefit will result. The primary beneficiaries of a deferred examination system would be large corporations which might, at relatively little cost, be able to establish defensive positions, based on unexamined patent applications. Individuals and small businesses would probably defer examinations relatively infrequently and would be affected the most by the uncertainty presented by unexamined patent applications. They would benefit if examinations, when requested, were conducted more promptly and if the quality of examinations was meaningfully increased.

A Lesser Patent System

Introduction:

The Subcommitee on Patent and Information Policy of the Domestic Policy Review considered proposals for different classes or forms of patents but made no recommendations, either because of lack of time to complete a thorough study or lack of consensus as to the wisdom of their adoption. (DPR, p. 161-162). The Subcommittee set forth four general approaches to different classes or forms of patents: incontestable patents, whose validity (after a prescribed period of time following issuance) could only be attacked on certain limited grounds; guaranteed patents in which the Government would pay the patent owner if the patent were declared invalid; elite patents which would receive a more comprehensive search and examination; and petty patents which would require novelty but not unobviousness, would offer limited protection to inventions and would have a shorter term than regular patents. Of these four classes of patents, incontestable and petty patents have received the most serious consideration. (American Bar Association, Section on Patent, Trademark and Copyright Law, Draft Report, Committee 108, 1982)

the patent. A patent application thus still has some deterrent effect on the use of the technology by others as long as a potential exists that a patent will be granted. Opposition proceedings reduce the deterrent effect since members of the public have the assurance that before the grant of the patent, the patent office will consider their arguments that the invention expressed in the patent application is not patentable.

Deferred examination has not been viewed with great favor, even by those proposing it. The President's Commission, even though recommending deferred examination, favored high quality immediate examination of all patent applications if it could be achieved without a constantly increasing backlog. (Pres. Comm. p. 19) The primary bases cited by critics for opposing deferred examination are that (1) the publication of patent applications is not economically justifiable since some patent applications will be unpatentable and thus provide no new knowledge, and successful patent applications would have to be published twice; (2) the longer period of uncertainty as to the scope of the claims that will be allowed by the Patent and Trademark Office chills innovation; and (3) the burden of determining the scope and validity of a patent that might issue would be shifted to the private sector and result in a wasteful duplication of effort and hardships for individuals and small businesses that have to undertake that responsibility.

The proponents argue that (1) deferred examination focuses limited examination resources on only the most important patent applications; (2) the public benefits from early disclosures of inventions; and (3) the costs of pursuing patent applications can be delayed thereby helping individuals and small business applicants. (See Hearings on S. 1321, Subcommittee on Patents, Trademarks and Copyrights of the Senate Commitee on the Judiciary, 93rd Cong., 1st Session (1978); M. Meller, Treating the Cause and Not the Symptoms - A Case for Delayed Examination, Journal of the Patent Office Society, Vol. 46, 247 (1964); E. McKie, Jr., Is Deferred Examination of Patent Applications Desirable in the United States: Journal of the Patent Office Society, vol. 55, 691 (1973); Lasker, "An Analysis of the Proposed Deferred Examination System" IDEA, vol. 11, 420 (1967))

computer-assisted search systems through patent fees. (U.S. Department of Commerce, Patent and Trademark Office Fiscal Year 1983 Budget Request, Fiscal Year 1982 Supplemental Budget Request, undated, circa January, 1982)

The proposal to increase patent fees has met with controversy. Concerns have been raised about the impact of the increased fees on innovation and on individual inventors and small businesses. (See testimony of Mssrs. J. Jancin and J. DeGrandi before the Subcommittee on Courts, Civil Liberties and the Administration of Justice of the House Committee on the Judiciary, April 22, 1982; see also, J. Cohen, Functions, Costs and Fees of the U.S. Patent Office, Journal of the Patent Office Society, vol. 54, pp. 462-485, July 1972) The Patent and Trademark Office anticipates that the increased fees will have little, if any, effect on innovation. (Testimony of G. J. Mossinghoff before the Subcommittee on Courts, Civil Liberties and the Administration of Justice of the House Committee on the Judiciary, March 11, 1982) However, much of the discussion has been based on conjecture, and there is little evidence to support either side of the controversy. The experience under the patent fee structure will provide some guidance as to the effect of further increases in patent fees to cover activities to enhance patent-examination quality.

Indirect means: An alternative to increased funding for patent application examination is to apply more selectively the existing level of resources so that all patent applications are not examined. The President's Commission on the Patent System of 1966 recomended standby statutory authority for optional deferred examination, that is, a patent application would not be examined unless examination was requested. The Commission implied that examination would not be requested for many patent applications that have little value; hence, more of the resources of the Patent and Trademark Office could be applied to the more important patent applications. (Pres. Comm., p. 19-23) The Senate in 1976 passed legislation that would have authorized deferred examination. (S. 2255, 94th Congress) The Senate Judiciary Committee report on the bill, stated

not exist in the United States. For example, preliminary evidence tends to indicate that reexamination is not being widely used; however, this may well be due to the caution with which patent practitioners are approaching the new and unproven procedure.

Another indicator is the experience in Great Britain where, as in the United States, the terms for patents granted prior to 1978 ran from the time the patent was granted and the courts determine the validity of a patent. Under a procedure in effect from 1949 to 1978, oppositions were permitted, but only about 1 percent of the allowed patents were challenged. Several studies indicated that the infrequent use of oppositions was due to little, or no, advantage being given to the challenger since the patent would run for its full term after the opposition and the challenger, if infringing the patent during the opposition, would be liable for damages. There was also felt to be a greater likelihood of success in challenging the patent in the courts than in the patent office. (Rene D. Zentner, Opposition and the Validity of Patents in English Speaking Countries, Journal of the Patent Office Society, vol. 40 (1958) 47-71; McKie, supra; and C. W. Morale, British Patent Opposition System, A.P.L.A Quarterly Journal, vol. 4 (1976) 104-113) These indicators seemingly show that, absent other changes in the patent laws, a pre-grant public involvement proceeding would not be widely used in the United States.

The President's Commission, in apparent recognition of the lack of incentives for oppositions in the British System, recommended that, as in West Germany and Japan, the patent term run from the date of filing of the patent application and that objections to the issuance of a patent be submitted in secret to avoid any prejudicial effect should the patent issue and the challenger later wish to contest its validity. (Pres. Comm., p. 23-24, 33-34) However, these modifications do not give the pre-issuance public involvement any clear tactical advantages over reexamination or litigation.

While the United States has not had an opposition system, quasi inter partes proceedings before the Patent and Trademark Office to determine patent validity have been permitted since 1977 in reissue proceedings. Traditional reissue proceedings call for a patent owner to surrender his patent to the Patent and Trademark Office with a request to correct defects that render the patent wholly or partly invalid. Prior to rule changes in 1977, the patent owner had to allege that there was a defect. The 1977 rules permitted a reissue to occur if information existed which might cause the examiner to deem the original patent wholly or partly invalid, a so-called "no-fault" reissue. (37 CFR Sec. 1.175(a)(4)) Since reissue files are open to the public, it is possible for an interested party to submit a protest to the grant of a reissue patent and submit such additional papers, or other involvement including inter partes interviews before the patent examiner, as the protestor considers appropriate. (MPEP 1901.07 to 1907)The "no fault" reissue proceedings have been criticized. The primary criticims are that the inter partes involvement is leading to lengthy and expensive proceedings, many courts are ignoring reissue results since a full inter partes proceeding does not occur, and the time requirements for handling protested reissue applications has exacerbated manpower problems in the Patent and Trademark Office. (Gary Samuels, Trends in Reexamination and Reissue, Speech before A.P.L.A, Chemical Practice Committee Meeting, November 4, 1981; Karl F. Jorda, Judicial Reaction to Reissue/Reexamination, presented before the New York Patent Law Association, November 11-15, 1981) The "no-fault" reissue proceedings are being eliminated as of July 1, 1982 (47 F.R. May 19, 1982, p. 21746)

The West German and Japanese experience with oppositions and the U.S. experience with protests in "no-fault" reissues indicates that inter partes proceedings before patent offices have the potential of becoming time consuming and expensive, and thus there is some basis for concerns about potential abuse. But, the West Germany and Japanese opposition proceedings appear to significantly strengthen the reliability and quality of the patents. In both countries, however, all challenges of the validity of patents must go to the patent office, thereby circumventing

Oppositions in Patent Cases, Journal of the Patent Office Society, vol. 39 (1957) 547-553)

The West German and Japanese opposition systems have been selected to provide some insight into the practicalities of operating with such arrangements. Oppositions are widely used in these countries. Approximately 20 percent of all patent applications allowed by the West German patent office are opposed. Moreover, in some technologies the rate of opposition is much greater. In the technology relating to plastics, approximately 50 percent of the allowed patent applications are opposed. (Frederich Schweikhardt, Opposition Proceedings in the Federal Republic of Germany, A.P.L.A Quarterly Journal, vol. 4 (1976) 157-172, 160) The frequency that Japanese allowed patent applications are opposed is somewhat lower -- about 15 percent. (Shigeru Yoshida, Opposition Procedures and Practices in Japan, AP.L.A Quarterly Journal, Vol 4 (1976)(215-222, 222) In both West Germany and Japan roughly one-half of the opposed patent applications survive the opposition.

Oppositions have been used for tactical purposes. Several German patent experts state that many German firms file oppositions against practically all allowed patent applications which could interfere with their commercial interests. (Gunther Eggert, Additional Comments, Primarily as Seen From Point of View of Chemical Practice, AP.L.A Journal, vol 4 (1976) 173-1786, 175 and Schweikhardt, supra, p. 167) The opposer may file an opposition more to gain concessions, for example, an inexpensive license, from the patent applicant than to prevent the issuance of a patent (Schweikhardt, p. 167 and Suzuye, p. 213). According to one estimate, about one-third of the oppositions are successful in obtaining a sufficient restriction of the opposed patent application to satisfy the opposer. (Rudolf Ruger, Opposition Proceedings in Germany -- As seen by an Attorney in Private Practice, AP.L.A Quarterly Journal, vol. 4 (1976) 143-156, 155) Although oppositions have tactical implications, the frequency of oppositions also appears to be responsive to the overall quality of patent examination. (Schweikhardt, p. 159)

Reclassification is not an activity that provides an immediately observable effect on the quality of patent examinations and may have little, if any, effect on the presumption of validity of patents although it would increase the reliability of patents. (William Carter Reynolds, International Aspects of the Presumption of Validity and the Mechanized Search, IDEA vol. 9 (1965) p 297-320, 307-308) The risk of not keeping pace with file growth through reclassification can be the loss of an effective tool for retrieving information. The failure will occur in the rapidly growing technologies which are, perhaps, the areas in which dissemination of patent information is the most important for innovation.

Providing for Public Involvement in Granting Patents:

As discussed in Chapter 4, many judges view with suspicion the ex parte process in the Patent and Trademark Office for granting patents. Supreme Court Justice Clark summarized much of the concern as follows:

> "The ex parte patent examination system presents two built-in hazards to the public interest. One is that the examiner might be a less-than-vigorous advocate of the public interest in making his judgments." ... "The second hazard lies in the fact that the ex parte system is not as likely to turn up all the facts necessary for the examiner to make an informed decision." (AP.L.A Quarterly Journal, vol 1, p. 10, 1972, "The Patent System Deserves Clean Hands")

The President's Commission on the Patent System recommended that the public be given an opportunity to intervene in decisions by the Patent and Trademark Office to grant patents and to provide information relevant to an informed decision on patentability. (Pres. Comm. p. 23-24) Although the recommendation did not suggest inter partes involvement, it did provide a method for presenting more facts to the patent examiner, including the

retrieving extraneous ones. The greatest transition problems will occur where computer-assisted techniques provide the greatest departure from manual techniques, for example, searches in mechanical technologies that have been conducted on the basis of function and searches that use drawings to screen documents. For that reason, the ability of the computer-assisted search system to simulate manual searching with a depiction of drawings and the ability to display each patent in a subclass would be attractive. Also, the ability to make marginal notations as search aides, as is commonly done in the paper files, would reduce transition problems and enhance the effectiveness of the system.

Aside from the technical capacity of a computerized system to retrieve relevant documents there are critical design problems that must be overcome to enable a patent examiner to use the system for extended periods of time. These include the resolution and print size on the visual display, and problems of fatigue induced by noise and heat. (Each terminal may emit as much heat as five to ten 100 watt light bulbs.)

The process of adopting a computer-assisted search system by the Patent and Trademark Office will require a long term effort and involve many uncertainties because the required technology is under development and unproven and because the system must be introduced into a complex employee-management environment with firmly established procedures. Hence, there must be effective planning and a long term commitment from Congress and the Patent and Trademark Office.

b. Reclassification

The maintenance of the paper examiners' search file through file integrity and completeness reviews and reclassification has been recommended in addition to the implementation of a computer-assisted search system. (See DPR-Patents, p. 154.) There is no basis for determining conclusively that with existing technology the examiners' search files can be replaced by a computer-assisted search system without loss of efficiency

- how the development and use of the system by the Patent and Trademark Office will affect private computer-assisted search system developers and vendors, particularly if the system is made available to the public.

Turning to the narrower focus on computer-assisted search systems and patent examination, its effectiveness will depend on technology and on services and implementation.

From the technology standpoint, one of the foremost considerations is the method by which relevant documents will be retrieved. Although many variants exist, there are two basic types of retrieval mechanisms: the first (index term searching) retrieves documents by a supplied code, e.g., an index term, an identification number, or a subclass designation corresponding to where the document is classified in the examiners' search files, the second (full-text searching) retrieves documents based on the words contained in the document itself. Thus, for example, in a full-text search, all patents containing the word "penicillin" could be recovered.

To operate within an index-term search system, the user needs to know the correct index term to use, and the indexer must have used the index term as a descriptor of the document. A full text search requires that the user think of all synonyms for the topic searched. A searcher desiring information on "chairs" must also search "seats" for the search to be complete. Full-text searching poses problems in that large amounts of material must be searched. Hence, full-text searching entails a much greater cost in computer inputting, computer storage, computer capacity and computer search time. For this reason, most of the presently available full-text searching is limited to searching abstracts rather than the full documents.

From the standpoint of retrieving information, each system has its own advantages. The index-term search allows retrieval on the basis of function much as the current patent classification system does. A full-

Improving Access to Prior Art:

The improvement of the examiner's search files has been recommended by the President's Commission in 1966 (p. 48); the Domestic Policy Review Subcommittee on Patents and Information Policy (p. 126 and 154) and the Subcommittee on Small Business (p. 270); and the Small Business Administration Task Force (p. 9). Specific activities recommended in these reports included improving the integrity and completeness of the examiners' search files and developing a mechanical (or computer-assisted) search system.

The discussion in chapter 5 provides an overview of the status of the examiners' search files and the accelerating increase in their volume. Concerns exist that the present state of the search files detracts from the ability of the patent examiner to identify the most relevant prior art within the average 3.5 hours available for searching. (Donald W. Banner, former Commissioner of Patents and Trademarks, testimony on April 20, 1982, before the House Appropriations Committee, Subcommittee on State, Justice, Commerce and Judiciary.) Moreover, the future ability of the patent examiner to retrieve the most relevant prior art is open to question in view of the increasing volume of prior art. Computer-assisted search systems and reclassification are the primary activities that the Patent and Trademark Office looks toward to enable the patent examiner to cope with the increasing volume of prior art.

a. Computer-Assisted Search Systems

Congress, recognizing the growing problem of prior art searching, has required the Patent and Trademark Office to submit by December 12, 1982, "a plan to identify, and if necessary develop or have developed, computerized data and retrieval systems equivalent to the latest state of the art which can be applied ... to the patent search file ..." and "... the patent classification system ...". The report is to specify the cost of implementing the plan and the amount of time needed to implement the plan,

be gradual. How many of the allowed patent applications which result in patents of questionable validity would be prevented is uncertain and depends greatly on how the program is implemented.

Increasing Examiner Time for Prior Art Searching: The Subcommittee on Patent and Information Policy and the Ad-Hoc Committee of Small-Business Members of the Domestic Policy Review specifically recommended that the examining corps should be increased to permit a more thorough searching of the prior art. (DPR, p. 154, 170) The Subcommittee stated that the search of the prior art is the most important part of the examination procedure and the failure of the Patent and Trademark Office to find pertinent prior art has led to patents being more vulnerable to attack in the courts. (DPR, p. 153)

Increasing the time available to patent examiners for conducting searches of the prior art can improve patent examination quality. It is unclear how much improvement will be provided by incremental increases in searching time. As discussed in chapter 4, patents which are found invalid by the courts are most often found so on the basis of U.S. patents that were not cited by the Patent and Trademark Office during the prosecution of the patent applications. Although on its face this suggests that increased searching could significantly improve patent quality, it must be recognized that many of the uncited patents which led to the invalidation were, according to several studies, no more pertinent than the documents cited by the patent examiner. (Koening, PTO) Moreover, the experience of the quality review program of the Patent and Trademark Office indicates that in 7 percent of the allowed patent applications the patent examiner missed a document which the reviewer judged better than the prior art cited by the patent examiner. These missed documents are not likely to be uncovered even if the examiner is given more time to search. However, the quality review program found that about 25 percent of the allowed patent applications had inadequate fields of search. By extending the search, a document that the reviewer believes is more relevant than the prior art cited by the examiner was found in 12 per 100 of these patent applications.

quality of patent examination even though the magnitude of potential improvement is uncertain.

Based on quality review data, it is estimated that about 5 percent of allowed patents have at least one clearly unpatentable claim. Virtually all of these clear errors could be detected by internal reviewers. Moreoever, since the standard used in internal review would not have to be the "clear error" test, as used by the existing quality review program, the number of improperly allowed patent applications prevented by an internal review would likely be greater, perhaps reaching 10 percent. But the actual number will depend on how the review program is implemented. One consideration is the relationship of the reviewer with the technology. A reviewer who is most familiar with the technology, and hence most able to provide the best review of allowed patent applications, is expected to be in the same examining group as the patent examiner; hence, his objectivity could be compromised.

Another consideration is the extent and thoroughness of the internal review. The depth of the reviews can be limited to obtaining an understanding of the claimed invention, reviewing the cited prior art and the communications between the patent examiner and the patent applicant, and checking the adequacy of the search. The experience with quality review suggests that this will be relatively ineffective since most clear defects are search related. An expanded review could include reconducting prior art searches to find any relevant documents overlooked in the patent examiner's search due to error or differences in judgment. Even with an expanded internal review, patents of questionable validity will be granted because they involve issues of patentability over which reasonable men can disagree and because uncovering the relevant information for evaluating their patentability is beyond the capability of the Patent and Trademark Office.

Some useful guidance may ultimately be obtained from the experience of the European Patent Office where patent applications are assigned to a team

intuitive judgements rather than empirical proof. As one critic of the 1966 report stated:

> "... the recommendations had little if any objective criteria to lead one to believe that their enactment would maximize the benefits that this nation may derive from the inventiveness of its citizens and others abroad who are interested to protect their inventions in the United States.
>
> ...(there were no) ... efforts to appraise empirically the operating potential of the substitute system which it recommended for adoption." (Barkev S. Sanders, Observations on the Presidential Commission's Recommendations for Recasting the U.S. Patent Laws, IDEA, vol. 12, 1968, p. 1069 et seq., at 1069.)

If one simply presupposes that enhanced patent examination quality is desirable and ignores the issue of the effect on innovation the question still remains: what resources for patent examination can be provided that will achieve an improved quality? Unfortunately, increasing the resources for patent examination does not necessarily result in significant improvements in patent examination quality. The effectiveness of increased resource allocation depends on the activities that are undertaken with the additional resources. The first part of this section examines the activities which could be undertaken to improve the quality of patent examination and what their effect on quality might be. Also important is how more resources could be made available for these activities, and this is briefly discussed in the second part of this section.

Activities for Improving Examination Quality

From the proceeding chapters, it can be seen that the major problems

patents and reducing the expense of patent litigation. Proposals such as increased judicial control over discovery and court decision on stipulations do not require Congressional legislation and therefore are not specifically reviewed. Also omitted are recommendations such as authorizing patents to be issued on types of inventions not now patentable (e.g., computer programs); permitting licensees to agree not to challenge the validity of the licensed patent; and providing a direct cause of action against an importer of a product made by a process which infringes a patent. Although these proposals raise important issues, they affect only certain types of innovations and innovators and thus do not have the same breadth of significance as the others. They are discussed more fully in the background report.

The recommendations made by these studies which affect the reliability and enforceability of patents, fall generally into three catagories:

1) Providing more resources for the examination of patent applications to improve the quality of patents.

2) Providing a different class of patents (including different standards of patentability).

3) Providing mechanisms for resolving patent disputes that do not necessitate court litigation.

It should be noted that Congress has recently enacted two pieces of legislation affecting the patent system. In P.L. 96-517, Congress enabled an issued patent to be reexamined by the Patent and Trademark Office to determine its validity over prior art so that patent validity matters can be resolved outside of court litigation; and required the Patent and Trademark Office to submit a report on computer data and retrieval systems that could be used in its operations, including prior art searching. The 97th Congress in P.L. 97-164 has established a Court of Appeals for the Federal Circuit with exclusive jurisdiction over appeals from patent validity and infringement decisions by the District Courts.

Table 8-1
Selected Recommendations of Four Studies Concerning Patent Reliability and Practicalities of Enforcement

Recommendation	Pres. Comm.	DPR-Pat	DPR-SB	DPR-PI	CED	SBA	Status
			Patent Reliability				
Applicant has burden of of showing patentability to Patent Office	Rec X	-	-	-	-	-	Implemented by Commissioner of Patents
Clarify definition of obviousness	-	Prop VI[1]	-	-	-	-	No legislation
Patents for computer programs, genetic engineering, etc.	(Rec IV[2])	Prop VIII	-	-	-	-	Supreme Court decisions permitting patenting under certain circumstances
Office to protect the public interest	-	-	-	page 197	-	-	No legislation
Public involvement in grant of of patent	Rec XI	-	-	page 197	-	-	Passed by Senate S. 2255, 94th Congress
Establish quality control in in Patent Office	Rec XII	Prop I	-	-	-	-	Implemented by Commissioner, but not expanded as proposed by DPR
Increased funding for quality examination	Rec XXVII	Prop I	Rec 7	-	-	-	No legislation (HR 6260, S2211, S2326, 97th Cong., increase appropriations but primarily for reducing pendency)
Search file improvement/ computer-assisted searching	Rec XXIX	Prop I	Rec 7	(page 143[3])	-	Rec 5(b)	Study on computers authorized P.L. 96-517; some computer-assisted searching implemented
Appeal to Court of Appeals from Court of Customs and Patent Appeals	Rec XIV	-	-	-	-	-	No legislation
			Practicalities of Enforcement				
National Court of Appeals for Patents	-	Prop III	-	-	page 56	-	Authorized P. L. 97-164
Patent Office review of validity of issued patents	Rec XV	Prop II	-	(page 197[4])	page 54	-	Authorized P.L. 96-517 (Reexamination)

the net social benefit. In some instances, the effect is an increased private gain by the patent owner; in others, the patent owner may be effectively denied any gain even though his patent is unchallenged or is upheld in litigation with no direct benefit to society.

In general, the patent owner can expect that if he prevails in an infringement litigation he will recover no more than reasonable royalties as damages. Thus, the patent owner often has an incentive to license his patents rather than bringing an infringement action. While this may adversely affect the private benefits to the patent owner, it does have broader policy implications. From the view point of society in general, the practical effect of weak patents is that the patent owner foregoes a monopoly position and licenses the patent, often at royalty rates lower than the cost of litigation. Another effect of incentives to license is that the potential for patents owned by others to hinder innovation is reduced. The reexamination procedure, however, is likely to improve the patent owner's bargaining position since, if the patent survives reexamination, the challenger has the additional burden of overcoming the reexamination decision by the Patent and Trademark Office.

It is often the case that the potential licensee may be the only party with sufficient economic interest to challenge the patent. The licensee can benefit from the patent and may have as much interest in avoiding a challenge to its validity as the licensor. For example, the Smith patent was essential to American Home Products to prevent direct competition to the oral contraceptive. In another example, General Electric entered into agreements with Krupp of West Germany to cross license patents relating to tungsten carbide, a hard metal used for cutting tools, and was able to set prices in the United States. It has been speculated that General Electric could have contested the Krupp patents, which were ultimately held invalid, but the combination of Krupp and General Electric patents permitted General Electric to control the market. (Vaughan, p. 151-152)

Where the licensee does not receive a benefit from the licensed patent, for example, when his own patents provide adequate protection from competition or he would receive a greater profit without any patent restrictions, the courts have removed disincentives for challenging the patent. For example, the licensee cannot be bound by an agreement not to challenge the validity of the patent; generally the licensee need not pay

$150,000, that is, about one-half Fel-Pro's legal costs. On appeal, the case was remanded to reconsider the amount of attorney fees with the admonition from the Court of Appeals that responsible action by Loctite and its attorneys could have greatly alleviated the cost and extent of the law suit. (Sanford L. Jacobs, Patent Law Suits Can Be Used to Keep the Competition Away, The Wall Street Journal, Monday, OCtober 12, 1981, p. 29; _____)

Since the report of the Temporary National Economic Committee in 1941, a number of changes have occurred in patent law through legislation and judicial decision to reduce the likelihood of business aggression by the patent owner. For example, the Declaratory Judgment Act of 1934 that allows a party threatened with infringement litigation to bring a suit to resolve the issues of infringement and reliability, has become firmly entrenched. The Supreme Court has held that a judgement of patent invalidity affects the patent itself, thus the patent owner cannot attempt to enforce his patent against others after it has been found invalid. (Blonder-Tongue Laboratories, Inc., v. University of Illinois Foundation, 402 U.S. 313 (1971)) Laws have been passed enabling attorney fees to be awarded in exceptional cases, and patents to be challenged through the much less expensive reexamination process at the Patent and Trademark Office. Antitrust considerations are also more pronounced. Recently, a District Court found a violation of the antitrust laws by a patent owner bringing only one infringement suit. (Platt Saco Lowell, Ltd. v. Spindel Fabrik Suesser-Schorr Stahlecker & Grill Gmbh, _____) In summary, the potential for business aggression provided to some patent owners by the costs of enforcement of patents have been reduced. Anecdotal accounts of business aggression can still be found; however, there is no valid assessment of the prevalence of the practice. Interestingly, one study reported from a limited survey sample that large companies often feel at a disadvantage when involved in a patent conflict because the other company was smaller, and that small companies often feel at a disadvantage because the other company was larger. (Obemayer, p. 42)

nominal without a patent; for Ray Dolby, the patent would have provided little return absent his ability to provide a recognized "industry standard" for noise reduction units, and for General Electric, patents were a necessary part of a long range effort to maintain its dominant market position. Patent reliability and the practicalities of enforcement would therefore be expected to have different implications in each situation. Because of the importance of the patent to American Home Products, Dr. Smith was effectively shielded from litigation costs. Ray Dolby, however, would probably have been severely hampered if he had been required to enforce his patents when first commercializing the noise reduction technology. General Electric apparently benefited from litigation costs and delays, and patent reliability did not appear to be much of a concern because of the number of patents involved.

Not all ventures based on patents prove to be successful and patents can lead to a loss of private benefits. For example, Robert Nowak obtained U.S. patent No. 3,750,722 on a capped funnel to put on the top of an oil can. Armed with the patent, Nowak sought to commercialize his device and exhibited it at trade shows. Competitors appeared with virtually identical capped funnels. The patent was ultimately held invalid in court after Nowak had expended over $75,000 in attorneys fees. (House Subcommittee on Courts, Civil Liberties and the Administration of Justice, Hearings _____, p. ___) Wayne Knitting Mills obtained a patent on a hosiery item and sued Rusell Hosiery Mills for patent infringement. After 15 years and over $500,000 in legal expenses, Wayne Knitting Mills won the suit and was awarded $250,000 in damages. (_____, Edwin Chen, U.S. Seeks to Speed Pace on Patents, Los Angeles Times, Monday, September 7, 1981, p. 1,7,8,9) The president of Thomas A. Edison, Inc., stated during Congressional hearings in 1912 that Edison spent more money obtaining patents, litigating them, and preventing infringements than he ever received in private benefits. (Oldfield Hearings of 1912, part 2, p. 32) The inventor of the vacuum tube, Lee De Forest, is reported to have won infringement suits on his patents only to find that he was financially compelled to sell his key patents. (Scherer, p. 453)

patent system. However, the data do suggest that many patented inventions are used and that private gains through the use of patented inventions are likely but that a wide variation in net gains (or losses) can occur independently of how extensively the patented invention is used. But still, this information is inconclusive as to the contribution of patents to private benefits.

Case histories have shown a wide variance in the apparent contribution of patents to private benefits. For example, Dr. Herchel Smith invented a group of complex chemical compounds while doing research in the late 1950's under a grant from American Home Products. One chemical compound that fell within this group was norgestrel, and Dr. Smith licensed his invention and patents to American Home Products. Norgestrel has since become the most widely prescribed oral contraceptive. By the mid-1970's, Dr. Smith had received over $40 million in licensing royalties on patents throughout the world and was expected to receive about $80 million by the time all patents expire. (Private communication, Vito Victor Bellino, Patent Counsel, American Home Products, October 11, 1980) This private return is exclusively dependent upon patents and does not include the private benefit enjoyed by American Home Products.

In another example, the Dolby noise reduction technology, the private gains were attributable primarily to marketing strategy that made the patent valuable. Ray Dolby developed noise reduction units that reduce noise in tape recording systems. Rather than exploiting the large consumer market, he first limited his sales to the small, professional music recording market, thereby not attracting competition. The reputation which he developed in this small market enabled his company to achieve a strong market position when he later entered the consumer market, and thereby set the standards for noise reduction equipment. Once he entered the consumer market, he offered licenses to all manufacturers with the condition that the Dolby name and logo be displayed on the front of the equipment. Even though rival technology was developed, it proved unsuccessful since the standards had been established by Dolby's units and consumer identification

TABLE 7-1

The Effect of the Use of Patented Invention On Sales or Production Costs, Select Patents Issued in 1938, 1948 and 1952 and in Current or Past Use at Time of Survey

Corporations grouped according to net sales in 1949	Increased sales				Reduced production costs[1]				Favorable on sales or production costs		Other favorable effect[2]				Favorable effect		All others[3]	
	Yes		No		Yes		No				Yes		No					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Larger Corporations	106	52.2	84	41.3	38	18.7	44	21.7	144	70.9	24	11.8	11	5.4	168	82.8	24	11.8
Smallest Corporations	59	66.3	29	32.6	7	7.9	21	23.6	66	74.2	12	13.5	3	3.4	78	87.6	8	9.0
(Total)	165	56.5	113	38.7	45	15.4	65	22.3	210	71.9	36	12.3	14	4.8	246	84.2	32	11.0

[1]With respect to patented inventions which were reported not to have increased the sales.
[2]With respect to patented inventions which were reported not to have increased sale or reduced productions costs.
[3]Includes unanswered and unknown.

SOURCE: Barkev S. Sanders, Patterns of Comercial Explolition of Patented Invention by Large and Small Corporations, Patent, Trademark, and Copyright Journal of Research and Education, Volume 8 (1964) p. 51-92, 81.

which were patented. (E. Mansfield, J. Rapport, A. Romero, S. Wegner and G. Beardsley, "Social and Private Returns from Industrial Innovation" Quarterly Journal of Economics, vol. 91 (May 1977) 221-240; T. G. Tewkesbury, M.S. Crandall & W. E. Crane, "Measuring the Societal Benefits of Innovation," Science, August 8, 1980, p. 658-___; and E. Mansfield, How Economists See R&D, Harvard Business Review, vol. 59 (November-December 1980) p. 98-106 (summarizing both studies)). Although noting the difficulties of obtaining information and calculating returns, the studies found that the median private rate of return was about 25 percent and the median social rate of return was about 70 percent. (E. Mansfield, p. 104) The studies found that the social rate of return often exceeded the private rate of return but there was no consistent relationship between the two. One innovation, for example, involved a new thread that enables sewing machines to operate at a higher rate of speed. The primary benefits flowed to the garment manufacturers and the purchasers of garments and competitors imitated the new thread readily and inexpensively. The social rate of return for this innovation was estimated to be 300 percent and the private rate of return, only 27 percent. In another innovation, identified only as an industrial product, the social rate of return was negative but the private rate of return was estimated to be 13 percent. (E. Mansfield, p. 104, 5) The studies found that the social rate of return exceeded the private rate of return by the greatest margin for those innovations that could be imitated inexpensively by competitors, regardless of their patentability. (Mansfield, et al.)

Clearly, many factors contribute to the social and private rates of return, and patents are just one of those factors. Indeed, patents provide the potential for profit motivated innovators to increase their private benefit from innovations at the expense of some of the social benefits. (Yale Brozan, Invention, Innovation and Imitation, The American Economic Review, Vol. 41 (May 1951) 239-257, 254) There is little available data to indicate the levels of private returns to innovators due to patents.

that a majority of court challenged patents will be found invalid and that patent litigation involves substantial costs. For example, one author recently wrote in a business magazine:

> "The United States patent law places the burden of detecting and prosecuting an infringement on the patentee. The practical benefits of a patent are often only realizable by spending considerable time and money in its defense. Also, patents awarded by the United States Patent System are more often than not found to be not valid, or not infringed, by U.S. courts. Because of these constraints, plus the likelihood that imitators can invent around the particular means protected by the patent, innovators in many fields do not rely much on patent protection." (E. von Hippel, Getting New Products from Customers, Harvard Business Review, vol. 60, no. 2 (March-April 1982) p. 117-122, 122)

(See also, Scherer, p. 449-450; E. A. Gee and C. Tyler, Managing Innovation, John Wiley & Sons, N.Y. (1976) 225-228;) These attitudes about the reliability and cost of enforcement of patents are not new (Vaughan, p. 199, 265) While this publicity regarding patent reliabilty and enforcement is likely to influence general perceptions of patents, the extent of that influence is uncertain. The accounts of great success in using the patent system can provide a positive picture to the decisionmaker and attract investment in innovative activities. (Victor Abramson, p. 8. Mr. Abramson argues that this is wasteful since it encourages spending resources in areas in which benefit is unlikely to occur and the result may be lower social returns overall.)

In summary, the nexus between patent reliability and the costs of enforcement and decisions to undertake innovative activities is primarily

competitive and infringing product surface in the absence of a patent)?

- o what is the probability that a non-infringing technology will be developed by a competitor to provide a competitive product?

- o what is the probability that the patent will be infringed and the patent must be enforced to halt the infringement?

- o what is the probability that if the patent is enforced, it will be found valid and infringed, and what will the practical effect of the enforcement action be on the new technology enterprise?

These issues are complex, and addressing the issues requires speculation as to future events. Moreover, because of their complexity, the decisionmaker must meld business, technical, and legal skills as well as intuition and insight in considering these issues. Thus, from this theoretical standpoint, the decisionmaker appears to face a virtually impossible task.

The costs of the inventive and innovative activities are not predictable with any certainty, and even after a new product has been marketed, profit forecasts often prove to be inaccurate. (Abramson, p. 8; G. Beardsley and E. Mansfield, A Note on the Accuracy of Industrial Forecasts of the Profitability of New Products and Processes, Journal of Business, vol. 51 (1978) 127-135) For example, Chester Carlson, the inventor of xerography, had difficulty attracting a developer because of the uncertain, but potentially extensive, research and development work required to make a commercial product and the uncertain market for a copying machine. Even Haloid Corp., the developer of the copier, did not foresee the widespread use of office copiers. (_____) Projecting whether competition will arise and if so, whether the patent would be infringed, and whether the patent validity will be upheld, presents further

to the investment selection methodology of many venture capitalists. This methodology relies on the management team and rapid advances in technology to provide protection from competition, and stresses short-term pay outs on investments. However, for technologies that require a long research and development period, the venture capitalists agreed that patents become almost a prerequisite for investment.

It is generally recognized that the value of patents in the decision to undertake innovative activities will differ depending on the type of invention and the type of decisionmaker. (e.g., Scherer, 448-450, Kahn, p. 319) For example, the pharmaceutical industry rarely pursues the development and regulatory approval processes for a new drug unless it can be patented. On the other hand, much of the innovation in the electronics industry has occurred without patents. (Antitrust, Uncertainty and Technological Innovation, National Academy of Engineering (1980) p. 12)

In situations in which patents are, at best, secondary considerations in the decision to undertake innovation, the reliability and cost of enforcement of patents would not be particularly important, although patented products are likely to be preferred over those that are not, other things being equal. (Dale and Huntoon, p. 357) But when patents are perceived to be important by the decisionmaker, patent reliability and enforcement costs can become material considerations. If the benefits provided by patents are perceived as being too speculative, innovations for which patents substantially enhance economic justification would be less attractive relative to other opportunities. This, however, is not to say that such innovations would not have come to fruition. For example, xerographic copying is often cited as an illustration of the incentive value of patents, and it is very probable that without a patent Battelle Memorial Institute and the Haloid Corporation would not have undertaken the efforts to develop the process. Yet, it has been argued that xerographic copying would ultimately have been developed in the absence of patents, but that patents served to encourage the risks to be undertaken at an earlier time, thereby hastening its development. (Scherer, p. 448)

reporting it as a major concern. It was the only area which a majority of respondents did not consider to be a major problem. The study found that most firms seem to feel that patenting and licensing was a problem area that they had under reasonable control. The researchers concluded from company officials interviewed in the course of the study that rather than pay attorney fees to press infringement suits against large competitors, small firms often choose either to keep their ideas as trade secrets, or to license their patents, or merge with larger companies. (Problem of Small, High Technology Firms, Special Report NSF 81-305, National Science Foundation (1981) p. 6)

Another survey study of small businesses also found that many firms are depending on trade secrets rather than patents to protect their technology. Important reasons for not obtaining patents were cost related; either the expense of obtaining the patent or of having to defend it. A number of small companies that responded to the survey indicated that patents were not sought because they were not sufficiently reliable and could too easily be ruled invalid. (Judith Obermayer, The Role of Patents in the Commercialization of New Technology for Small Innovative Companies, Research & Planning, Inc., Cambridge, Mass. (1981) a report to the Small Business Administration)

While these studies are not necessarily statistically representative of the universe, they provide some indication that perceptions of patent reliability and the cost of enforcement are having an effect on the use of patents. They also indicate that the shortcomings are not major problems for many businesses. However, the studies did not specifically explore the nexus between patent reliability and enforcement costs and innovation, or the type of innovation undertaken. They do not reveal, for example, whether any of the 362 firms in the National Science Foundation study that listed patenting and licensing as a major problem have decided not to undertake innovative activities in, or to direct their research activities away from, areas in which patents are important.

Thus, patentability determinations are made independent of equity to private interests. Excessive rewards are gained in some circumstances and in others, the patent owner, in essence, is penalized for having relied on patents to justify undertaking innovative activities only to be left with litigation expenses and an invalid patent. (F. L. Vaughan, p. 225-226, 261-275; Scherer, chapter 16, 439-458)

This chapter discusses the implication of patent reliability and the practicalities of enforcement from a broader vantage point. The first section looks at the effect of these concerns from the standpoint of incentives to undertake innovative activities. The second section is directed towards the effect that patent reliability and the practicalities of enforcement are having on industry, competition, improvement innovation and society in general. These discussions provide a framework to assess the effects likely to be caused by changes in patent reliability or enforcement costs.

Patent Reliability and Enforcement Costs and the Incentive to Undertake Innovative Activities

There is little empirical evidence demonstrating the effect of patent reliability and enforcement costs on the rate of innovation. Much that is said on this subject is based on opinion and anecdotal accounts.

Data which are available are often inconclusive. For example, patenting statistics are often looked upon as a barometer of innovation. (for example, see William S. Connor and Frederick M. Scherer, "Patent Statistics as a Measure of Technological Change", Journal of Political Economy, vol. 77, No. 3, (May 1969) 392-398, and Mary A. Holman, An Analysis of Patent Statistics as a Measure of Inventive Activity, The Meaning of Patent Statistics, National Science Foundation (1978) p, 39-55) The number of patents granted to U.S. companies has dropped from 37,160 in 1969 to 29,294 in 1978. (Patent and Trademark Office, Special Report--

Table 6-3

Comparison of U.S., West German and Japanese Patent Systems
For 1980

	U.S. (FY)	Japan	West Germany[1]
Patents Issued	56,618	48,308	21,300
Oppositions Filed	#	5,030	4,889
Oppositions Resolved		5,097	3,887
Oppositions Accepted or Patent not Granted	#	2,202	2,277
Number of Patent Disputes	5,000-15,000?	?	?
Patent Suits Filed	550 (818 patents involved)	45*	101**
Decisions Rendered	238 (385 patents involved)	***	64

#Reissue procedings enabled the patent owner to seek a determination of patentability by the Patent and Trademark Office after the patent was issued. For Fiscal year 1980, 641 reissue applications were filed and 305 reissue patents were granted).

[1]Only to December 12, 1980.

*requests for trial of invalidation of patent at the Patent Office.

**revocation suits in the Federal Patent Court

***the backlog in Japan grew substantially in 1980. In 1980, only six cases were render with 13 cases being withdrawn. For the period 1978 to 1980, the ratio of resolved cases to withdrawn cases was 1:1

SOURCE: Derived from J. Lever and PTO Annual Report for FY 1980.

under the German system as occurs in the United States. There is no obligation under German law for one party to disclose information to another. In fact, it is considered unethical for an attorney to interview witnesses prior to the trial. Further, under the German system the examination of the witnesses is done by the judge.

In Japan, the litigation procedures closely follow those in West Germany. However, although Japan does not have pre-trial discovery proceedings as in the United States, the Japanese attorney is encouraged to interview witnesses and develop the facts. Another difference from the German system is that the judge is not allowed to examine the witnesses.

Not only do the litigation procedures in West Germany and Japan mitigate against high attorneys' fees, but attorneys' fees are set by a schedule based on the value of the case. (By private agreement, a party can pay his attorney more than the scheduled fee.) The prevailing party in the litigation is awarded attorneys' fees or additional damages in the amount of the attorneys' fees. For a case valued at $500,000, in West Germany the attorneys' fees would be about $8,500 per party. For a case valued at $1,000,000, in Japan the attorneys' fees would be about $40,000 per party. (The foregoing information derived from Lever, DOE, chapter 5)

In interviews with West German and Japanese patent practitioners conducted by OTA, the most notable complaint about their litigation systems was the duration of the proceedings. Litigations may take five years to resolve. Complaints also were made about the anomaly of the dual system for validity and infringement issues in which a party may be enjoined from infringing a patent only for the patent to be later declared invalid. (Lever, DOE, p. 128, 129, 144, 145)

In both these countries, a public forum (their patent offices) resolves inter partes challenges to patent validity 10 to 20 times more frequently than in the United States. Even though the expenses of infringement and validity litigation are much less in these countries, very

TABLE 6-2

Frequency of Patent Disputes Resulting in Litigation for 118 Large Corporations

Frequency	Percent of Corporations
less than 10%	54.2%
between 10 and 30%	21.2
between 30 and 70%	11.9
between 70 and 100%	2.5
no answer	10.2

SOURCE: Office of Technology Assessment

About 500 patent suits involving some 700 to 900 patents are filed in the courts each year. More than one patent may be involved in the same suit, and different suits may involve the same patents. Hence, the actual number of patents that become involved in litigation may be less than 700 to 900. The patent disputes resolved by the courts have involved somewhere between 300 and 400 patents per year. (See the Patent and Trademark Office Annual Reports for the years 1979, 1980 and 1981)

Another method for resolving patent disputes (questions of validity only) are reissue proceedings. Under the present reissue practice, once the reissue application is filed by the patent owner, any member of the public can protest the issuance of a reissue patent. The protestor has limited inter partes involvement in the proceedings. (37 CFR 1.175(a)(4) and 1.291 and Manual of Patent Examining Procedure, 1901.07 to 1907) In 1981, 538 reissue patent applications were filed and 106 protests were filed. The Patent and Trademark Office estimates that 53 reissue applications were based on patents involved in litigation. (PTO, private communicaiton, June 15, 1982.) A change in the rules of the Patent and Trademark Office which will become effective on July 1, 1982, will substantially eliminate reissue proceedings as a way to resolve patent disputes. (Federal Register, vol. 47, no. 97, May 19, 1982, pp. 21746-21753)

Reexamination proceedings provide a mechanism for resolving patent disputes about patentability over certain types of prior art. Since the reexamination procedure has only recently been implemented, the early experiences with reexamination may provide an unsound basis to project the effect that it ultimately will have. In the first 11 months and six days, 216 requests for reexamination have been filed. 150 of these requests were filed by someone other than the patent owner. In 59 of the requests, the patent was involved in litigation, and in 5, a court authorized the parties to seek reexamination. (Private communication, PTO, June 15, 1982)

range widely and are frequently from $10,000 to $200,000. If a post-trial brief is required, an additional expenditure of $2,000 to $25,000 is usually involved.

Appeal Stage:

As of October 1, 1982, the appeal forum for patent suits will change to the Court of Appeals for the Federal Circuit. (PL 97-164) At the present time, appeals from the District Courts are to the Circuit Court of Appeals for the geographic area. The change is not expected to have a material effect on the cost of the appeal; however, the duration of the appeal proceedings will likely be more uniform.

The appeal procedure will continue to be the same: a notice of appeal and briefs are filed, and then the case is argued before the Court. The costs vary depending on the complexity of the appeal and will likely range from about $10,000 to $100,000. While the time frame of the appeal is only subject to speculation at this time, it will likely be about one year from the decision of the trial court to the decision of the Appeals Court.

After the decision by the Court of Appeals, a writ for certiorari can be filed to seek an appeal to the Supreme Court. The writ may often involve an expense of $5,000 to $25,000. A resolution of the writ occurs within the Supreme Court term, hence, the attempt to appeal to the Supreme Court, if unsuccessful, may take between 6 and 12 months.

Until the appeal stage is completed either by failure to take an appeal or by exhaustion of the appeal route, the decision of the trial court does not become final. Thus, if the trial court holds the patent to be valid and infringed and orders an injunction, the injunction does not typically go in to effect until the completion of the appeal process.

served by making as complete a discovery as possible, and much effort is often expended to find the "smoking gun" that will assure victory. The costs of discovery may range from less than $10,000 to more than $1,000,000 and may take from months to years.

Discovery offers many opportunities for delay and for imposing a financial burden on one's opponent. The complex nature of the issues in patent litigation "affords the occasion for the full application of obstructionist tactics." (An Analysis of Patent Litigation Statistics, p. 10) One study found that, on average, 25 to 40 percent of litigation costs are attributable to discovery. (L. James Harris, Terry M. Chuppe and LeMann Tri, An Empirical Study of Cost Factors in Patent Litigation, IDEA, vol. 15 (1971-72) pp. 523-541, 522-530) Draft revisions of the Federal Rules of Civil Procedure which relate to discovery have recently been issued by the Advisory Committee on the Federal Rules of Civil Procedure of the Judicial Conferences. While some of the proposed revisions provide the potential for controlling discovery abuses such as preventing unlimited frequency of discovery requests, others may tend to increase costs and delay. (Mary M. Schroeder and John P. Frank, Discovery Reform; Long Road to Nowheresville, American Bar Association, vol. 68, May 1982, pp. 527-574.)

Motions (requests that the court rule on matters prior to the trial) can also play a significant role in the pre-trial proceedings. Typical motions include requests that the venue (that is, the court that will decide the suit) be changed, that summary judgment be granted (that is, there is no material issue of fact and thus the court can rule on the case as a matter of law and without a trial), that a party comply with a discovery request, that a secrecy order be granted to protect trade secret information, and that extensions of time be granted to respond to discovery requests or other motions. Motions also include requests for the court to order the patent owner to file a reissue application to allow the Patent and Trademark Office to rule on a defect in the patent or to request reexamination of the patent.

patent invalid or not-infringed). (Neal A. Waldrop, The Patent Venue Statute, 28 USC 1400(b), Should Not be Repealed, APLA Quarterly Journal, vol. 4., no. 1, 1976, pp. 32-55, 49-51; and C. L. O'Rourke, Do Unto Others Before They Do Unto You Or: Current Trends in Declaratory Judgements, Journal of the Patent Office Society, vol. 57, Sept. 1975, p. 541)

The alleged infringer may be aware of the patent prior to the filing of the suit and may spend several weeks or months evaluating the patent. His expenses often range from about $5,000 to $50,000. He may take no action, initiate licensing negotiations with the patent owner, deny infringement, cease infringement, or file a declaratory judgment action if a threat to enforce the patent exists. The alleged infringer can also request that the patent be reexamined by the Patent and Trademark Office if new prior art documents which are believed to invalidate the patent are found.

Pre-Trial stage:

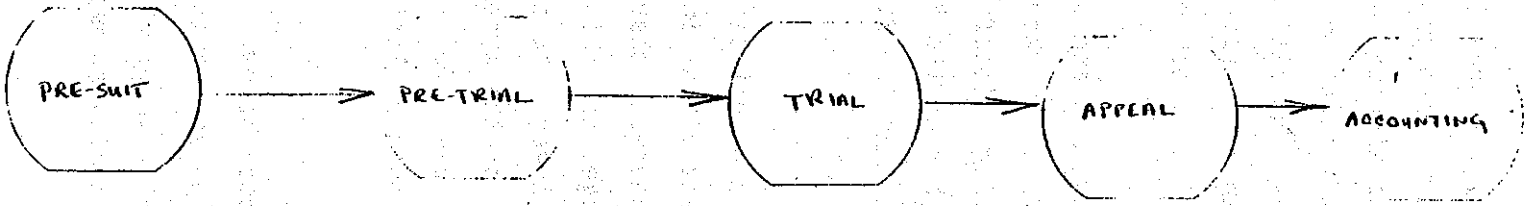
The first activity in the pre-trial stage is to file the suit. The papers that are filed (the complaint) by the party bringing suit (the plaintiff) can usually be quickly prepared. The other party (the defendant) is required to answer the complaint shortly thereafter and most frequently a counter claim is filed. For example, if the patent owner asserts infringement, the alleged infringer may counter claim that the patent is invalid or, that the patent owner has misused his patent or violated the anti-trust laws. The plaintiff must answer the counter claim promptly. This initial activity is relatively inexpensive, often costing less than $5,000 or $10,000.

The pre-trial stage then enters the motion and discovery period. Discovery activities involve seeking evidence and learning of the opponents case.

6-2

FIGURE ~~5.2~~

The Stages In A Patent Infringement Litigation



ACTIVITIES				
*Discovery of infringement *Evaluation of action to be taken	*Filing complaint oAnswer to complaint oPretrial motions oDiscovery	*Trial oPost-trial briefs oEntry of judgment	*Notice of Appeal oAppeal briefs oAppeal argument oDecision on Appeal	*Proof of damages oDecision on accounting (can be appealed)
DURATION				
Days to Years primarily within the control of the patent owner	Months to years primarily within the control of the parties but influenced by the court	Weeks to 2 years primarily within control of the court	Months to 2 years primarily within control of the court	Months to Years primarily within influenced by both parties and the court
COSTS PER PARTY (in thousands of dollars):				
1 - 50	10 - 2,000	10 - 200	10 - 200	10 - 100

SOURCE: Office of Technology Assessment

VII. Formalities

- o Did the patent applicant prior to filing the U.S. application, patent the invention or cause the invention to be patented in a foreign country based on a patent application filed in the foreign country more than 12 months pror to filing the U.S. patent application?
- o Did the patent applicant file or cause or authorize to be filed a patent application prior to six months after filing the U.S. application without a license from the Patent and and Trademark Office.

VIII. Conduct of the Patent Owner

- o Did the Patent owner waive his right to enforce the patent against the infringer by giving the appearance of allowing the infringement to occur?
- o Did the patent owner misuse the patent so that it is unenforceable?

SOURCE: Office of Technology Assessment, derived in part from Title 35, United States Code.

corporations to estimate the approximate range of costs for patent litigations that were settled or litigated through trial during the years 1976 through 1980. Eighty-four respondents having been involved in 269 litigations during that period provided the requested information. Although the survey can be criticized as being based on estimates by the respondents that might not reflect actual expenditures and as encompassing only those patent owners having the greatest financial resources, the results clearly confirm that wide variations in expenses do occur and that litigation expenses, regardless of whether the suit is settled or litigated through a trial court, can be significant.

A number of factors exist in patent litigation which can lead to patent litigation being costly:

- the large number of areas in which the validity and enforceability of the patent can be challenged (See table 6-1 for a summary of the areas);
- the complexities of the patent law and technology; and
- the high stakes that are often involved.

Many potential issues for litigation exist in a patent litigation. Even though not all issues are involved in every litigation, investigations of many of these issues are required to determine whether an issue exists which should be litigated. These investigations may be expensive and time consuming and frequently constitute the greatest expense in a litigation.

The complexity of the patent law and technology contribute to the expense and duration of patent litigation. While the courts are not unaccustomed to handling litigation involving technical subject matter, considerable time is still required for educating the court or jury so that the technology and testimony regarding the technology can be understood. Most courts preside over patent litigations relatively infrequently and

Chapter 6
The Practicalities of Enforcing Patents

The Expense of Litigation--Its Magnitude and Causes

The patent owner has the responsibility to police his patent. If it is being infringed, the patent only gives him the right to sue the alleged infringer in a civil action in the Federal District Courts to obtain an injunction to stop the infringing activities and collect damages for the infringement. Patent litigation is purported to be expensive, and concerns exist that the expense of litigation provides a practical barrier that prevents patent owners from enjoying their patent rights. How expensive is patent litigation, and what are the reasons for its costs? While the focus has been on the costs of litigation, the time that is required to resolve a dispute is also important. Concerns have been expressed that patent litigation is so lengthy that justice is in effect denied. (See, for instance, Staff Report, An Analysis of Patent Litigation Statistics, for a discussion of the concerns about litigation that existed in the 1950's and for the most part, exist today.)

The expense of litigation appears to vary widely depending on the particular circumstances involved. Anecdotal reports exist of litigation expenditures per party in excess of $2 million, as well as reports of costs less than $50,000. A 1978 presidential domestic policy review committee studying the patent system indicated that many trial attorneys advise their clients that they should be prepared to expend $250,000 for a patent litigation. (Report of The Industrial Subcommittee for Patent and Information Policy of the Advisory Committee on Industrial Innovation. February 6, 1979, p. 152)

The results of a survey conducted by OTA in order to obtain some framework for understanding the magnitude of litigation costs are summarized in figure 6-1. The survey asked the patent counsel of 211 large

difficult and potentially misleading. However, some indication of the quality of patent examination in West Germay and Japan can be gleaned from the statistics of opposed patent applications. In 1980, the West German patent examiners allowed 23,063 patent applications. It disposed of 3,887 patent applications which were opposed. Of these, 2,277 applications were determined to be unpatentable. In Japan 48,308 applications were allowed. It disposed of 5,037 applications that were subject to opposition, and 2,202 were successfully opposed and found unpatentable.* (FN-The volume of patent applications in the U.S. is substantially greater than in West Germany and Japan. In fiscal year 1980- 112,315 patent applications were filed; there were 96,484 patent application disposals; 61,227 patents were issued.) (Lever, DOE, p. 124, 135)

Summary -- The Performance of the U.S. Patent and Trademark Office

The U.S. Patent and Trademark Office provides an adequate examination for most patent applications, and its quality of examination is comparable to that of patent offices in West Germany and Japan. U.S. patents are, however, much less reliable than the West German and Japanese patents. This difference in reliability is attributable in part to the ability of the public to oppose the granting of a patent in West Germany and Japan.

Although the U.S. Patent and Trademark Office provides a patent examination on a par with that of the best patent offices in the world, the examinations are not perfect. The defects that can be isolated include improper judgement in making patentability determinations, inadequate prior art searching, and incomplete examiner's search files. While improvements can be made in each of these areas, it is not clear that a proportionate increase in patent examination quality and patent reliability will occur. There are many factors that influence patent examination quality including the time available for the examination, the ability and motivation of the individual examiner, the supervision provided, the integrity of the search file and ease of retrieval of relevant information from the search files, and the quality of performance by the patent applicant. Hence, material

Patent Examination Quality -- Comparison with West Germany and Japan

A comparison of the resources of the U.S. Patent and Trademark Office with those of West German and Japanese Patent Offices, which are commonly thought to have quality patent examinations, may be helpful in ascertaining factors which can materially affect patent examination quality. A summary of the comparison is provided in table 5-8.

The Japanese and West German patent offices appear to be better able to attract qualified patent examiners than the U.S. Patent and Trademark Office. The German examiner appears to be the most highly educated and to have the most technical experience. He also must have the ability to search documents not in his own language.

The U.S. Patent and Trademark Office is unique in providing a quality review program and a production goal system as part of its supervision resource. Review of patent examiner's work product by the immediate supervisor occurs in each country. The extensiveness of review appears to be about the same in each country.

The Japanese and West German patent offices profess to have no file integrity problem. Unlike the U.S. examiners' search files, the Japanese and West German examiners' files are restricted from use by the public. In West Germany, the files are maintainted in the patent examiner's office and only he has access to the files. Also, in Japan and West Germany the classification of the files is exclusively conducted by the patent examiner to suit his needs. The Japanese and West German patent offices rely on the examiner to know the art exceedingly well and to be able to locate relevant documents by memory rather than through investment in centralized classification and reclassification programs. This, however, can only be effective if a stable patent examining corps exists.

Because of the differences in the patent systems of the three countries, a side-by-side comparison of patent examination quality is

TABLE 5-7

Examiners' Search File Reclassification

	FISCAL YEAR				
	1977	1978	1979	1980	1981
Cross-Reference U.S. Patents	354,298	370,050	314,723	219,203	200,652
Foreign Patents	240,000	239,000	239,000	232,000	180,000
Original U.S. Patents	149,762	149,602	149,151	145,206	112,410
Total	744,060	758,652	702,874	596,409	493,072

SOURCE: Patent and Trademark Office, Annual Report, 1980, p. 45.
Patent and Trademark Office, Annual Report, 1981, p. 47.

foreign patents in the examiners' search files does not ensure that they will be considered by patent examiners since many examiners are unfamiliar with foreign languages. Often the patent examiner must rely on the drawings and a brief English-language abstract (usually only on foreign patents issued after the early 1970's) to judge the relevance of the patent. This information may be insufficient to make a sound judgment on patentability.

The integrity of examiners' search files are currently degraded by missing, misfiled, unfiled, out-of-sequence, incomplete and multilated documents. According to the Patent and Trademark Office:

- About 3 percent of the U.S. patents are permanently missing from the examiners' search files.
- Another 5 percent of the U.S. patents are temporarily missing at any given time.
- Examiners' search file defects are likely to be more numerous in subclasses relating to active technology areas.

Some of the reasons for the lack of integrity include the removal of documents from the files for further study by examiners and members of the public; improper filing of documents; improper classification of documents; and inadequate funds and personnel to maintain the files. Presently the only mechanism for ensuring file integrity is by a comparison with a list of documents to be in the file. This process is tedious and time consuming and hence not used by the patent examiner. The Patent and Trademark Office does have a program to improve the integrity of the examiners' search files. Since 1978, over 3 million (12 percent) of the 24 million documents have been reviewed, resulting in the addition of over 200,000 documents to replace missing or multilated documents. (PTO, private communication, Janaury 1982) File integrity data, however, overstates the deficiency of the examiners' search files because the search usually extends to several

TABLE 5-6

Performance Standards for
Patent Examiner Appraisal Program

I. Patentability Determinations (Has there been any clear error in the allowability of any claim).

II. Action Taken (Has there been any clearly unreasonable, arbitrary or caprious rejection of claims or formal requirements, and is the record clear and appropriately developed).

III. Production Goals

IV. Timeliness

SOURCE: Patent and Trademark Office

TABLE 5-5

Quality Review Program Results,
calender year 1981

	Size of Sample Reviewed Number of Allowed Applications	Number and Percent of Sample Reviewed Having Defect or Action	Actual or Estimated Number and Percent of Total Sample (2528 total of Allowed
Searching:			
1. Questionable field of search (formal)*	2528	436 (17%)	436 (17%)
2. Applications identified item 1 for which original patent examiner expanded search and rescinded allowance	123	2 (2%)	2 (neg.)
3. Reviewer reconducted search and found prior art:			
a) rendering application clearly unpatentable	459	11 (2.4%)	61 (2.4%)
b) more relevant than art found by examiner (may not render unpatentable)	459	32 (7.0%)	176 (7.0%)
4. Reviewer expanded search and found prior art:			
a) rendering application clearly unpatentable	667	45 (6.7%)	45 (1.8%)**
b) more relevant than art found by examiner (may not render unpatentable)	667	80 (12%)	80 (3.2%)**
Patentability Judgement:			
5. Clearly patentable over record before patent examiner	2528	26 (1.0%)	26 (1.0%)
Total: Clearly unpatentable (2 + 3(a) + 4(a)+5)	-	-	134 (5.3%)
Clearly unpatentable and more pertinent art found (2 + 3(b) + 4(b) + 5)	-	-	284 (11%)

*The formal standard for questionable field of search is more restrictive than the standard the reviewer in item 4 below

**Only those patent applications from the entire sample that had questionable fields of searc (informal) were considered, thus the results may be representative of the entire sample.

SOURCE: Office of Technology Assessment, Derived from Patent and Trademark Office data.

supervisory mechanisms include the quality review program and the newly initiated performance appraisal program.

The Quality Review Resource:

The Patent and Trademark Office quality review program was established in 1974 and reviews a randomly selected sample of allowed patent applications. About 4 percent of the patent applications that are allowed each year are reviewed. Of these, about 20 percent undergo an indepth review that includes reconducting the same prior art search used by the patent examiner.

The quality review program was intended to provide an overview of the performance of patent examiners. However, its effects seem to be broader. Since the adoption of the quality review program, the percentage of patent applications having at least one clearly unpatentable claim that it finds has dropped from 7 to under 3 percent of the total reviewed sample. Because not all patent applications receive the same degree of review, data understate the likely number of patent applications having clearly unpatentable claims. (PTO, Annual Report-FY81, p. 20) Figure 5-3 depicts the decrease in the estimated number of allowed patent applications having at least one clearly unpatentable claim for each of the fiscal years 1975 through 1981. Table 5-5 summarizes data from the quality review programs for fiscal year 1981.

The Patent and Trademark Office has no particular explanation for the decrease in clearly incorrect patent allowances; but, several hypotheses exist: it could be due to the stabilizing effect of the quality review program standards; it could be a result of patent applicants taking more of an initiative in ensuring that their patent applications are of good quality; or it could be a result of more care being taken by the patent examiners because they know that their work might be reviewed. It should be noted that the years with significant decreases in clearly unpatentable claims, fiscal years 1977 and 1981, concided with the results of the

Many patent examiners have objected to the production goal system believing that it adversely affects the quality of patent examination and the morale of the patent examiners. (Edward S. Bauer, President, Patent Office Professional Association, testimony on April 20, 1982, before the Subcommittee on State, Justice, Commerce, and Judiciary of the House Committee on Appropriations) This concern is one of the factors which gave rise to a new union in the mid-1960's, the Patent Office Professionals Association, which represents the non-supervisory examiners. The production goals have been a key factor in negotiations between the union and management. The importance of production goals in the relations between the union and the management of the Patent and Trademark Office has tended to entrench the production goal system in the operation of the Patent and Trademark Office.

The motivation of the examiner is also affected by the institutional environment which exists in large Government functions. For example, some patent examiners have expressed a feeling of lack of involvement in the policy setting structure of the organization and lack of control over support personnel.

Internal Review Resources:

The Supervision Resource:

The immediate supervision of patent examiners is provided by supervisory primary examiners. A supervisory primary examiner manages a group of patent examiners (usually about 8 to 14) in a particular field of technology. This operating unit is referred to as an art unit.

The role of the supervisory primary examiner can be quite important in establishing the quality of patent examination. The supervisory primary examiner is responsible for setting the standard of patentability within the art unit. This is accomplished through on-the-job training of new patent examiners and through reviewing the work done by the patent

consideration was given to the complexity of the art and the average patent application in the art (not the complexity of the specific patent application undergoing examination) and the level of expertise of the patent examiner.

Since compact prosecution and prosecution goals have been instituted, fewer examiners are handling more patent applications. For example, in fiscal year 1960, 81.4 patent applications were issued or abandoned per patent examiner and in 1981, that figure was 101.8 (PTO, private communication, January, 1982). Moreover, according to one measure, the efficiency of the patent examining corps appears to be increasing. As shown in table 5-4, an increasing percentage of patent examiners are meeting or exceeding their production goals.

The practical effect of production goals is to increase the importance of the time factor in the patent examiner's work. The system requires the patent examiner to use his time judiciously and to quickly identify and pursue only the meaningful issues. The examiner is encouraged to apportion his time on the basis of the complexity of the application so that the more important and more complex patent applications can receive more attention.

Short cuts are rewarded and have been widely adopted by examiners to expedite the examination. For example, the patent examiner may only read the claims and sufficient portions of the specification to obtain an understanding of the claimed subject matter. The prior art search may in some instances be conducted until adquate prior art, which may not be the best prior art, is found. If the patent applicant changes his claims after the first office action, the patent examiner may in some instances only consider the prior art already uncovered rather than conducting another search to determine whether prior art more pertinent to the new claims exists. The frequency with which these short cuts are used is not known, and the Patent and Trademark Office management does not agree that patent examiners cut short their searches or fail to reconduct searches if the claims are amended.

Academy a written examination is administered to the examiner to determine whether he has an adequate grasp of patent examining. Approximately 98 percent of the patent examiners pass the examination (PTO, private communication, January, 1982)

The on-the-job training of a new examiner continues for a period of five or more years. The intensity of the training and oversight during this period of time is within the discretion of the supervisor. When the patent examiner becomes proficient at patent examining, he can begin a program to become independent of supervisory review other than on a spot-check basis, that is, obtain "signatory authority". Approximately 78 percent of the patent examiners had signatory authority as of September 30, 1981. In 1970, 32 percent had signatory authority (PTO, private communications, January, 1982).

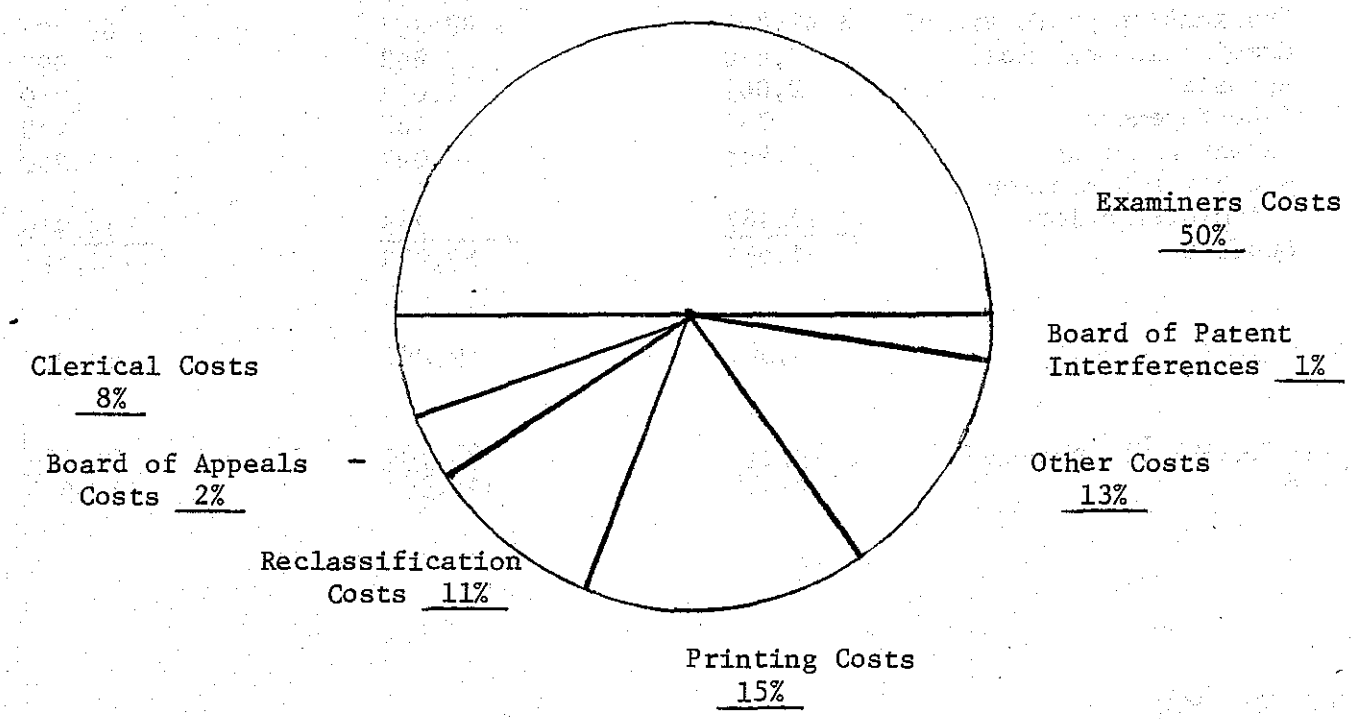
The continuing legal, technical, and procedural training programs for patent examiners are in the process of being strengthened. In the past, the schedule of training efforts has varied in response to budgetary constraints.

In the recent past, class room training progams in patent examining usually took place only when new developments in the law or patent examining procedures occurred or at the request of a supervisor when the training was believed helpful to the examiners to improve their proficiency and enhance the quality of their patent examinations. Field trips to research centers and trade shows to obtain a first hand knowledge of the state-of-the-art were relatively infrequent.

The aptitude of the individual for examining patent applications is a significant factor affecting the quality of examination. The patent examiner's primary task involves developing an understanding of the claimed subject matter, conducting a prior art search, and rendering decisions on the patentability of the claims and communicating those decisions in writing to the patent applicant. The patent examiner must perform these

Figure 5-2

Allocation of the Examination Costs
(estimated F.Y. 1982)

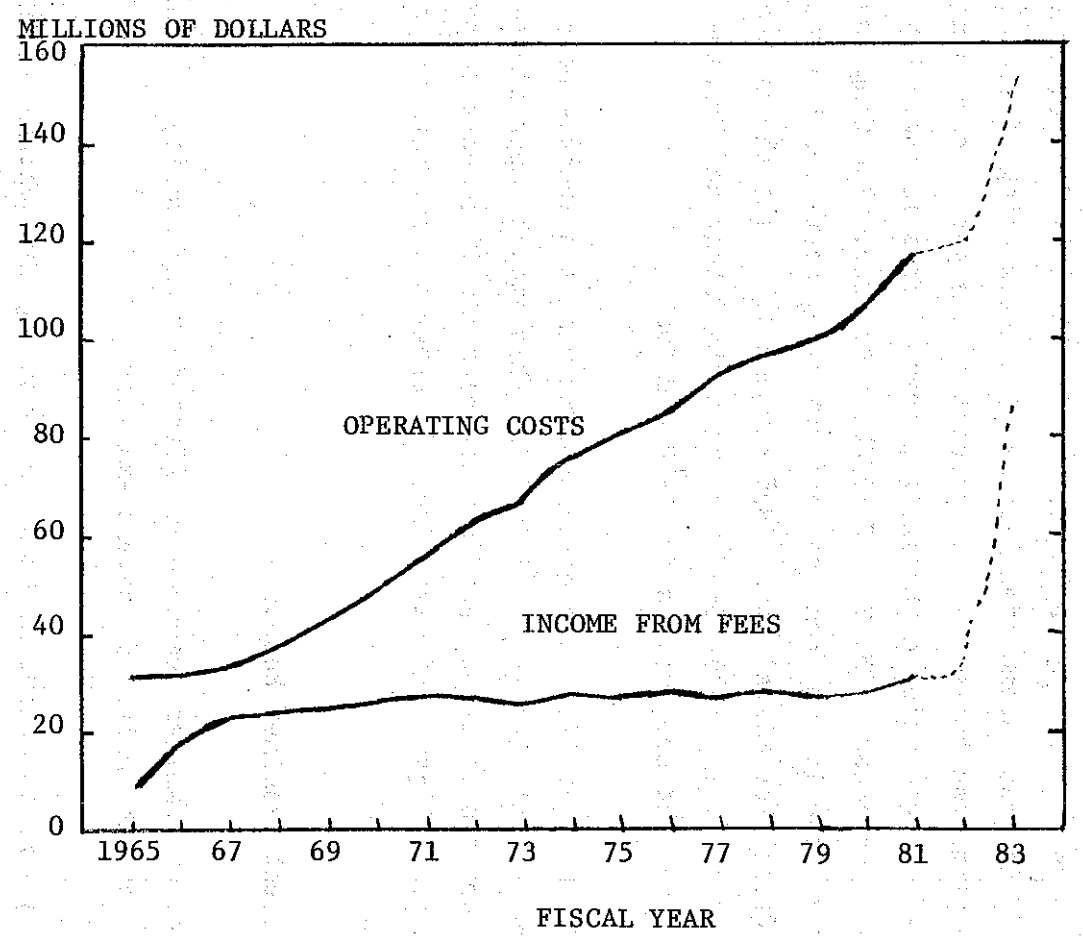


F.Y. 1982 Estimated costs per patent application:
Approx. $1150.00

Source: Patent & Trademark Office

Figure 5-1

Patent and Trademark Office
Fees and Operating costs
(1965-1983)



Source: PTO Annual Report, FY81
Projections for FY82 and 83 ~~have~~ from testimony of Gerald J. Mossingholf before the subcommittee on court, civil liberties and the administration of justices, House Committee on the judiciary. March 1982.

percent of the patent applications in which the search was extended by the original patent examiners because a question arose about the adequacy of the original search, the prior art did not result in a change in the decision to allow the patent application. The quality review study may understate the relevance of the prior art uncovered by extending the search since the Patent and Trademark Office is generally reluctant to rescind an allowance of a patent application and since the rescinding of an allowed patent application negatively affects the examiner's job performance rating. For example, when the quality reviewer expanded a search because he believed that the original field of search was inadequate, in about 7 percent of the cases he found prior art that he believed rendered the patent application clearly unpatentable. (PTO, private communication, June 1982)

The quality review program also confirms that occasionally more pertinent prior art can be found in the areas in which the patent examiner searched. When a reviewer reconducted the search, a more pertinent document was found in 7 percent of the cases in the same areas searched by the patent examiner. (PTO, private communication, June 1982)

While the court decisions and the quality review program results do not distinguish between inadequacies in the content of the examiners' search files and the quality of the patent examiners' performances, they do indicate that some improvement can be obtained by improving the quality of patentability searching of the existing examiners' search files. One way to approach this problem of improved patent searching is to consider the range of applicable resources.

Patent Examination Quality -- Resources

The Financial Resource:

The financial resources of the Patent and Trademark Office are determined through the appropriations process. All fees collected by the

Patent Examination Quality -- The Patentability Search

Uncovering all the pertinent prior art that can affect the patentability of a claimed invention is a monumental task since the prior art can include any document published in the world prior to the invention. It is therefore not surprising that the major cause for patents being invalidated by courts is lack of novelty or obviousness over prior art not considered by the patent examiner. While not all of the new prior art is more pertinent to the invention than the known prior art, a majority appears to be more pertinent. Several studies indicate that the new prior art that invalidates patents is most likely to be contained in documents which were available in the files of the Patent and Trademark Office. Thus questions regarding the quality of the patentability search are raised.

A study conducted by the Patent and Trademark Office of reported court decisions from January 1, 1976, to December 31, 1979, in which new prior art was used to invalidate a patent, indicated that the new prior art was most often a U.S. or foreign patent. Where the new prior art was available in the examiners' search files, it was or should have been in the subclasses searched by the patent examiner in 64 (39 percent) cases or would usually be searched by the patent examiner for that type of patent application in 19 (12 percent) cases. Table 5-2 summarizes the results of the Patent and Trademark Office study.

The court cases seem to indicate that a major problem with patent examination quality is the quality of prior art searching, and that the quality of searching could be substantially improved solely by improving the ability to retrieve U.S. and foreign patents.

The Patent and Trademark Office quality review program seems to confirm that prior art searching is one of the weakest areas in patent examination. For calendar year 1981, in about 17 percent of the reviewed patent applications, a question arose as to whether the patent examiner searched the proper areas of the prior art files. However, in about 98

Patent Examination Quality -- The Standards of Patentability

The Supreme Court has stated that a "notorious difference" exists between the standards of patentability applied by the Patent and Trademark Office and by the courts. (Graham v. John Deere Co. of Kansas City) An implicit question is raised as to the quality of judgment of the patent examiner in making patentability determinations. The primary measures that are available to investigate the quality of patentability determinations are court decisions and internal Patent and Trademark Office review.

The findings presented in Chapter 4 indicate that explicit or implicit differences in patentability judgments between the Patent and Trademark Office and the courts occur. This, however, does not necessarily support an allegation that a "notorious difference" in the standard of patentability exists.

A number of the differences in judgments can be attributed to factors unrelated to the quality of patent examination. For instance, expert testimony and other information not available to the patent examiner may be presented to the court. If that information had been available to the patent examiner, he might not have allowed the patent to issue. Also, the determination of patentability may be so close that reasonable men can differ. Additionally, the differences may reflect the quality of the decision by the court. Thus, while the quality of patentability judgments by the Patent and Trademark Office is far from perfect, the court decisions overstate the magnitude of the problem.

There are undoubtably some instances in which the patent examiner is swayed toward lessening the standard of patentability. The patent examiner, faced with a marginal invention which nevertheless makes a contribution to society, may be directed by a sense of equity to allow the patent application since otherwise the patent applicant would have no practical means for protecting his invention. (David L. Ladd, Business Aggression Under the Patent System, The University of Chicago Law Review, vol. 26, No. 3 (Spring 1959) 353-375, 362)

Accordingly, OTA's investigation of the performance of the Patent and Trademark Office has concentrated on the factors affecting the quality of patent examination rather than attempting to derive a value for the overall quality of patent examination. This investigation extends into three areas: the quality of judgment exercised in making patentability determinations (standards of patentability); the quality of the search of prior art; and the resources available to the Patent and Trademark Office.

These areas are directly related to the quality of patent examination; however, indirect factors can also have an influence on the performance of the Patent and Trademark Office. A factor which has had significant attention in the past has been the policy guidance accorded the Patent and Trademark Office. Since April 1925 the Patent and Trademark Office has been under the jurisdiction of the Department of Commerce. Concerns have been expressed from time to time that the Department of Commerce was not providing the Patent and Trademark Office with sufficient attention and direction. For example, in 1957 legislation (S. 1862, 85th Congress) was introduced which would have established the Patent Office as an independent agency in the Executive Branch of the government. The introduction of this legislation was noted to have prompted increased attention for the Patent Office from the Department of Commerce. (Report of the Committee on the Judiciary, United States Senate, pursuant to S. Res. 55, Report No. 1430 (85th Congress, Second Session, 1958) p. 16) Similar legislation was actively pursued in the 96th Congress (S. 2079 and H.R. 6933) but was not brought to the floor of either chamber for a vote because of opposition from the Executive Branch and promises of increased attention to the Patent and Trademark Office.

An additional complaint has been the lack of continuity of leadership within the Patent and Trademark Office. Since 1970 there have been six Commissioners and frequent and lengthy periods when the Patent and Trademark Office was headed by acting Commissioners. See table 5-1. As a result legislation was proposed to give the Commissioner of Patents and Trademarks a term appointment. (S. 2029 and H.R. 6933, 96th Congress)

providing the exclusive appellate jurisdiction for most patent cases in the Court of Appeals for the Federal Circuit rather than in the Circuit Courts of Appeals.

Another concern arises from suspicions about the ex parte nature of patent examination due to the potential it offers for abuse. The courts perceive that a patent examiner cannot be expected to have the same degree of interest in challenging a patent application as does a party having a direct interest in opposing the grant of a patent. Thus, many courts tend to believe that the absence of a true adversary proceeding before the Patent and Trademark Office leads to a bias toward the patent applicant. (See, for example, Fortas, Clark)

The courts also have been accused of being biased against patents because of an aversion to monopoly. One study which involved interviews with Federal judges concluded that frequently the interviewees stressed the fear of monopoly as the basis for applying a high standard for patent validity. (Lawrence Baum, The Federal Courts and Patent Validity: An Analysis of the Record, Journal of the Patent Office Society, vol. 56, No. 12 (December 1974) 758-787, 771)

Summary: Patent Reliability

The general perception of the reliability of patents appears to be significantly influenced by how well patents fare in litigation. A perception that patents in general are unreliable has been developed by many based on the fact that over 50 percent of the adjudicated patents are found invalid. The fate of litigated patents, however, does not convey the magnitude of the problem of patents having uncertain validities. But unless a convenient and visible measure is developed which enables those involved with the patent system to develop a more accurate perception of patent reliability, court decisions are expected to continue to be a major factor in establishing this perception.

Although court decisions do not accurately reflect the frequency with which patents in general have questionable validities, they can provide insights into the causes of patents being held invalid and the characteristics of patents that frequently have the most uncertain

judicial review. The courts are not infallible in making patentability determinations. (One indicator illustrating the performance of the courts is the disposition of appealed cases. One study found that for reported Courts of Appeals cases for 1953 to 1972, 38 percent of the District Court holdings of validity and infringement were reversed, 72 percent of the not infringed holdings were reversed and 10 percent of the invalidity holdings were reversed. Koenig, Table 16) Some of these are beyond the control of the courts, such as the quality of the patent, the skill of the litigating counsel, and the demeanor of the witnesses. Others relate to the ability of the courts to handle patent cases. For example, because of the large number of District Courts, judges may hear patent cases relatively infrequently and thus not gain expertise in patent law. Furthermore, the determination of patentability of an invention is subjective and requires the complex melding of legal and scientific principles. The skill required for that melding is one that is acquired through practice. (Caleb M. Wright, A View on Patent Litigation and on the Patent System, Journal of the Patent Office Society, vol. 59 (July 1977) p. 409-423, 411)

These factors can lead to an uncertainty in predicting how a court will decide a patent dispute. But uncertainties virtually always exist in litigation, regardless of the subject matter. Whether patent litigation poses a greater degree of uncertainty than other types of litigation is unknown.

Differences in the interpretations of the Constitution and the patent statutes among courts are expected not only because of the varying ability of courts to handle patent cases but also because the principles of stare decisis are applied, that is, the interpretation of the law is made with reference to previously decided cases. The case law is likely to develop differently in each court and circuit. These differences can have an effect on the perceived reliability of patents. Some of the differences in interpretation appear to be significant. For example, some courts hold that for an invention comprising a combination of old elements to be patentable, the combination must exhibit "synergism", that is, the

such as prior use or sale, (25 percent of the decisions by District Courts and 45 percent of the decisions by Courts of Appeals in which a patent claim is found invalid) suggests that the patent applicant's role is very important in assuring that a reliable patent is obtained. Hence, for all practical purposes the patent applicant has the exclusive responsibility for ensuring that the issued patent is reliable with respect to these issues.

The Patent and Trademark Office:

The Patent and Trademark Office plays an important role in determining the reliability of patents through the examination of patent applications. The foremost responsibility of the Patent and Trademark Office is based on the fundamental precept that the patent system is a mechanism for securing public disclosure of inventions in return for a grant of a limited monopoly. When the subject matter of a patent is known or can be readily derived from existing knowledge, the public interest is not served by the granting of a patent since nothing is added to the public knowledge. Moreover, if the Patent and Trademark Office erroneously grants a patent, social harm can occur because the expense and uncertainty of resolving its validity can discourage others from challenging the patent or using the technology.

An improperly granted patent can also result in harm to the patent owner if he bases his decision to innovate on the promise of a patent monopoly. If the patent is invalid, he may not recover his expenses for the innovation, and his technology, which he might otherwise have been able to maintain as a trade secret, has been disclosed to the public.

Ideally, a patent examination should provide an unquestionably valid patent, that is, one for which the public receives disclosure of an invention in return for granting a limited monopoly and one which guarantees the patent owner his rights. It is axiomatic that achieving such a result can be costly. Thus, a balance must be struck between the

Table 4-6

Frequency of Patent Invalidity as A Function of the Size of the Parties and the Complexity of the Invention from Reported Decisions: 1970, 1975 and 1980

Simple Complexity		
Individual Patent Owner	79% invalid	(26 of 33)*
Small Patent Owner		
Small Infringer	62% invalid	(21 of 34)
Large Infringer	72% invalid	(15 of 19)
Large Patent Owner		
Small Infringer	82% invalid	(9 of 22)
Large Infringer	81% invalid	(13 of 16)
Moderate Complexity		
Individual Patent Owner	61% invalid	(14 of 23)
Small Patent Owner		
Small Infringer	53% invalid	(16 of 30)
Large Infringer	53% invalid	(10 of 19)
Large Patent Owner		
Small Infringer	55% invalid	(12 of 22)
Large Infringer	52% invalid	(11 of 21)
Difficult Complexity		
Individual Patent Owner	-	(0)
Small Patent Owner		
Small Infringer	50% invalid	(1 of 2)
Large Infringer	-	(0)
Large Patent Owner		
Small Infringer	33% invalid	(1 of 3)
Large Infringer	25% invalid	(2 of 8)

*The parenthetical expression indicates the number of cases inwhich there was a holding of invalidity and the number of cases decided

SOURCE: Office of Technology Assessment

patents owned by either small or large businesses were upheld more frequently than were those held by individuals. However, when the complexity of the technology involved is taken into account, there is much less of a correlation between the size of the patent owner and the validity of the patent. The analysis did not indicate any clear correlation between the relative sizes of the parties to the litigation and the validity of the patent. Tables 4-5 and 4-6 summarize the results of this study.

In summary, from analyses of adjudicated patent decisions it appears that the greatest uncertainty of the validity of patents resides with inventions in easily understood technologies. While the grounds for finding these patents invalid are likely to be lack of novelty or obviousness over the prior art, there is a significant likelihood that the court will explicitly or implicity find the claimed invention unpatentable over prior art known to the Patent and Trademark Office and the patent owner before the patent was issued. Although the owners of the adjudicated patents in the less complex technologies are likely to be individuals and small businesses, there is no clear indication from the litigation results that the size of the parties contributes significantly to the outcome of the litigation. It does likely contribute to whether a party litigates a patent dispute.

The Actors and Their Influences Over the Causes of Patent Invalidity

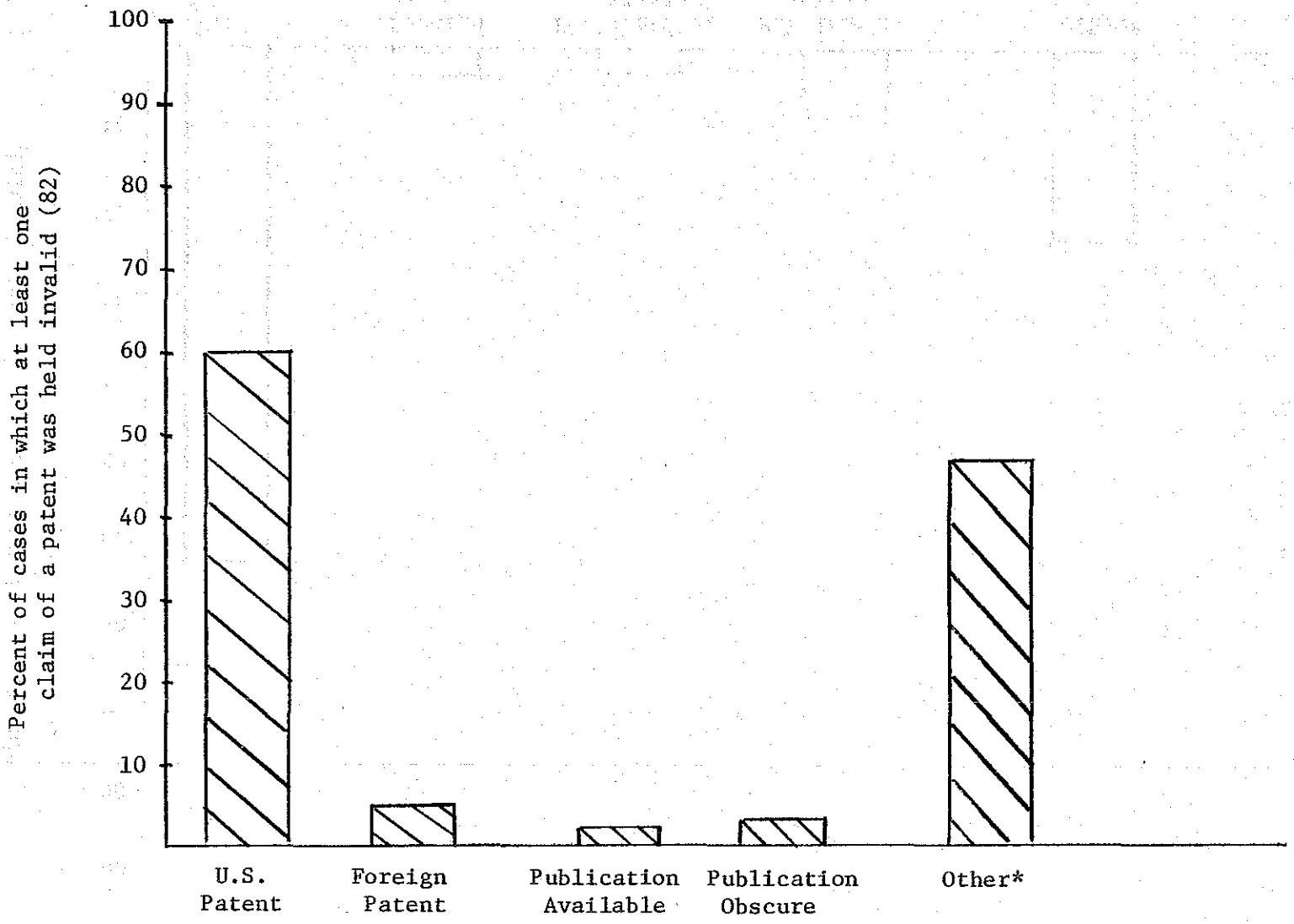
The primary actors influencing the certainty of validity of a patent are the patent applicant (patent owner), the Patent and Trademark Office, and the courts.

The Patent Applicant:

The patent applicant has the most influence over the reliability of a patent since he has exclusive control over the preparation of the patent application and its prosecution before the Patent and Trademark Office.

Figure 4-4

Invalidating Prior Art, Courts of Appeals
Decisions Reported in Years 1970, 1975 and 1980



* Includes general knowledge, prior use or sale, invention of another.
** One decision did not describe the type of prior art for the holding of invalidity.

Source: OTA

necessarily mean that the court agreed with the earlier judgments. In many cases, the new prior art appears to be less relevant or cumulative to the known prior art. Two studies have indicated that in about 40 percent of the cases in which new prior art was relied upon by a court to invalidate a patent, the new prior art was cumulative or less pertinent than the known prior art (PTO, Koenig). From these studies, OTA concludes that about one of every three patents invalidated explicitly or implicitly involves a difference in judgement as to the novelty or obviousness of a claimed invention.

New prior art appears to be involved in about 60 percent of the cases in which patents are invalidated (PTO, Federico), and as shown above, a majority of the new prior art is more relevant to the invention than the known prior art. An OTA study of reported patent decisions for the years 1970, 1975 and 1980 reveals that the new prior art that invalidates a patent is usually another U. S. patent. Tables 4-3 and 4-4 summarize the findings of the study for District Court and Circuit Courts of Appeals decisions. A significant portion of the invalidation decisions was based at least in part on prior art other than patents and printed publications. This prior art includes information of which the patent applicant was aware such as prior use and sale more than one year before filing the patent application, general knowledge within the industry, and that the invention was first made by other than the patent applicant.

The patents most often involved in patent litigation appear to be in the general and mechanical arts (81 percent), as opposed to chemical (11 percent) and electrical (8 percent) (OTA). There is no correlation between these percentages and the frequency that patents are granted in these broad areas. For example, in 1975, 52 percent of the issued patents were mechanical, 31 percent chemical, and 17 percent electrical (OTAF, 8th Report, Dec. 1977, p. 11). Nearly two-thirds of the mechanical and electrical patents adjudicated are found invalid whereas about 42 percent of the adjudicated chemical patents are found invalid (OTA). These findings suggest that mechanical patents are of the least certain validity.

problems. Several studies of court decisions have shown that in about 75 percent of the cases in which a patent is found invalid, the grounds for invalidity were the obviousness of the claimed invention over the prior art. The second most prevalent ground for invalidating patents was found to be lack of novelty over the prior art. A substantially lesser percentage of patents were found invalid due to inadequate disclosure in teaching how to make or use the invention and its best mode; vague or indefinite claims; and misrepresentations or fraud committed in securing the patents. (Staff Report, An Analysis of Patent Litigation Statistics, to the Subcommittee on Patents, Trademarks and Copyrights, the Committee on the Judiciary, (1961), p. 8; Koenig, PTO; independently conducted survey of reported patent decisions during 1970, 1975 and 1980 by OTA) Table 4-2 summarizes the relative frequency of occurrence of these grounds of invalidity.

The studies further explored the causes for patents being found invalid for lack of novelty or obviousness over the prior art. Is the cause of the invalidity the inability to ascertain the most relevant prior art prior to issuing the patent, or is it due to differences in judgement in determining whether a claimed invention is patentable over the prior art? The studies concluded that the inability to ascertain the most pertinent prior art was a substantial factor, but that differences in judgement was not an insignificant problem.

Differences in judgement are evident when the courts find patents invalid over the prior art known to the Patent and Trademark Office and the patent applicant. One study estimated that between 10 and 22 percent of the patents that are invalidated are invalidated on the basis of known prior art alone (Koenig).

This finding is confirmed by a study conducted by the Patent and Trademark Office and an independent study of reported patent decisions by OTA. But this measure understates the frequency of differences in judgement since the reliance by the court on new prior art does not

June 1982. The internal review for calendar year 1981 reviewed 2,528 allowed patent applications: 26 were believed to be clearly unpatentable based on the record before the patent examiner; 667 were believed to have incomplete prior art searches and as a result of expanding the prior art searches, 45 additional cases of clear unpatentability arose; and in about 20 percent of the allowed patent applications, the reviewer repeated the search conducted by the patent examiner, with the result that 2.4 percent were clearly unpatentable, indicating that for the total samples, 55 cases would be unpatentable.) Because the review is not as comprehensive as would be a review to determine the validity of a patent and because the "clearly unpatentable" standard excludes many patents that would likely have invalid claims, the percentage of patents of doubtful validity is probably higher. By including instances in which the reviewer found more pertinent prior art, even though it might not render the application clearly unpatentable, the internal review data indicate that slightly over 10 percent are clearly unpatentable or have questionable validities. (Derived from calendar year 1981 data provided by PTO) One Commissioner of Patents has estimated that between 5 and 10 percent of the patents issued by the Patent and Trademark Office involve questions of patentability with which reasonable men would disagree (Brenner 58JPOS 306-315, 312, May 1976). A further group of patents is subject to questions of patentability based on information not available to or retrievable in the context of the patent examination by the Patent and Trademark Office. In view of these indicators, it is not unreasonable to assume that 10 to 20 percent of patents have questionable validity.

Another technique is to examine foreign patent systems that have procedures to uncover invalid patents after they have been examined by the patent examiner. In West Germany and Japan patent applications are examined and if they appear patentable, they are published. Thereafter, any member of the public may submit evidence and arguments as to why a patent should not be issued. About 20 percent of the allowed patent applications are opposed in West Germany and about 10 percent are opposed in Japan. Ultimately about one-half the challenges in each country are successful. (Lever, DOE, p. 86, 135)

Table 4-1
Patent Validity Holdings in Appellate Courts
1876 to 1972

Years	Percent of decisions in which patent was held valid: Courts of Appeals	Supreme Court*
1876 - 80	--	28
1881 - 85	--	14
1886 - 90	--	11
1891 - 95	48 (1890-94)**	15
1896 - 99	45	
1900 - 04	50	
1905 - 09	52	23 (1896-1915)
1910 - 14	53	
1915 - 24	n.a.	18 (1915-1925)
1925 - 29	37*	29
1930 - 34	31	11
1935 - 39	27	12
1940 - 44	16	15
1945 - 49	21	15
1950 - 54	17	***
1955 - 59	27	
1960 - 64	32	
1965 - 69	26	
1970 - 72	31	

* The reported percentage is for those cases in which the patent is held valid and infringed. The percentage is based on total cases, regardless of whether the validity of the patent was passed on by the court.

** The reported percentage is the percentage of patents held valid based on only those cases in which validity was rule on by the court.

*** From 1950 on, the sample of Supreme Court cases is relatively small and hence not reported.

n.a. = not available

1977 the District Courts rendered 357 decisions on validity (48 percent invalid) and 321 decisions of infringement. The Patent and Trademark Office cautions that often the information received from the courts is sketchy and inconclusive. (The Official Gazette, vol. 989, p. 2-4 (December 4, 1979))

The Certainty of Patent Validity: Perceptions and Facts

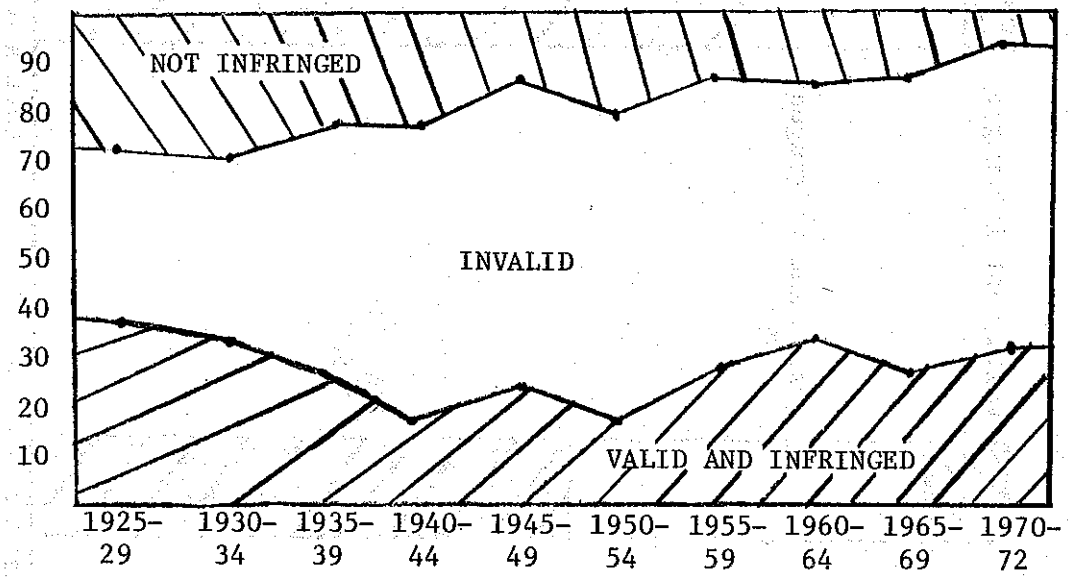
There are no widely accepted methodologies for determining the frequency with which patents are issued of uncertain validity. Many of the measures that have been used, such as litigated patents, only sample a select portion of the patent population. While these measures can indicate the types of problems that can exist with patents, they provide no direct evidence as to the prevalence of those problems outside of the population sampled.

Despite the imperfections of court statistics, they have been the most widely used indicator of the certainty of validity of patents. There is controversy, however, over the interpretation of those statistics. Some state that the statistics demonstrate a deterioration of the patent system while others believe that because so few patents are involved in litigation, the certainty of validity of the average patent must be relatively good.

Court statistics cannot be dismissed as a measurement of the certainty of patent validity. They are the most visible, if not the most objective, indicator of the performance of the patent system and are familiar to many users of patents, as well as to the Congress, the Courts and the Patent and Trademark Office whose actions affect the patent system. In the past court statistics have been a significant factor in developing perceptions about the patent system and their influence is not likely to diminish in the future.

Figure 4-2

Patent Appeal Holdings for the Courts of Appeals, 1925-1972



Source: OTA, derived from (see attached)

Chapter 4

Patent Reliability: The Magnitude of the Problem and Its Causes

Patent Reliability: Certainty of Patent Validity is the Key

In its broadest sense, patent reliability pertains to the degree of certainty that the patent will secure an exclusive market position for the patent owner. Thus, patent reliability reflects the validity of the patent, the adequacy of the scope of its claims, and the respect given to the patent by potential competitors.

The predominant factor affecting the reliability of patents, however, is the uncertainty of patent validity. Where uncertainties exist, they are likely to be reflected in court challenges. The major issues in patent litigations have pertained to the validity of patents and generally not the question of infringement. Figure 4-1 graphically depicts the decisions of the District Courts (155 cases affecting 218 patents) and the Courts of Appeal (109 cases affecting 138 patents) that were reported in the years 1970, 1975, and 1980. As can be seen, the predominant issue was whether the patent was valid. If the patent is valid, the relative infrequency that it is found not to be infringed (less than 20 percent of the patents that were found to be valid) is indicative that questions of infringement are not generally the major areas of uncertainty for which court resolutions are sought.

A decrease in the percent of litigated cases in which the patent is held valid but not infringed can be observed with the more recent court decisions. Figure 4-2 illustrates the apparent trend since 1925 based on reputed Courts of Appeals decisions. A substantial number of court opinions, particularly at the District Court level, are not published. A study conducted by the Patent and Trademark Office included notifications of decisions rendered that are required by law to be submitted by the courts (35 USC, Sec. 290) This study showed that for the period 1973 to

Policing a patent can pose difficulties. For example, if the patent relates to a process which can be conducted in secret, the patent owner may have no basis for determining whether a third party is using the process. The patent may have the anomalous result of providing a disclosure of the new technology to the world with no effective protection for the patent owner.

Besides being difficult to police, process patents can present other difficulties to a patent owner seeking to exercise his patent rights. When a product is made abroad using a patented process, it can be imported into the U.S. without providing an actionable infringement of the patent. The patent owner, however, does have recourse against the importing infringer through the International Trade Commission but must prove that the importation of the product made by the process results in substantial economic harm to a domestic industry and that the process infringes the patent. Proving either of these points can be difficult.

The Transfer of Patent Rights:

A patent is personal property, and, as such, can be **assigned** (sold); a patent can also be **licensed**, that is, the patent owner may permit another party to make or use the claimed invention. Patent licenses can be granted on an **exclusive** basis whereby the licensee has the exclusive right to make or use the invention for at least a portion of the patent term, or on a **non-exclusive** basis, whereby more than one party can be granted a license. Non-exclusive licenses are simply promises by the licensor that he will not sue the licensee for patent infringement. An exclusive licensee has the right to enforce the patent whereas the non-exclusive licensee does not. Frequently the compensation to the patent owner for granting the license is a **royalty**, that is, an assessment based on the frequency of use of the claimed invention or the sales of products enbodying the claimed invention. Estimates of annual patent royalties are in the range of several billion dollars per year. (The income from patent royalties is not specifically compiled by the Federal government. The Internal Revenue Service reported

refuse to conduct the reexamination on the basis that no substantial new question of patentability affecting any claim of the patent is raised by the request or the prior art. At the conclusion of the reexamination, the Patent and Trademark Office issues a certificate setting forth the results of the proceedings. For the first eleven months of operation, 216 requests for reexamination had been filed. (July 1, 1981 to June 6, 1982)

The Patent Rights and Their Enforcement:

The right granted by the patent is the right to exclude others from making, using or selling the invention in the U.S. The patent owner, cannot, however, stop the making or using of the invention for the Federal government, but he can seek reasonable compensation.

A patent does not provide the patent owner with the right to practice the invention. There may, for instance, be other patents which can prevent the patent owner from using the invention. For example, inventor A obtains a patent claiming a stool having three-legs. Inventor B finds that by adding another leg to A's stool, increased stability is achieved. For B's invention a patent is granted which claims a stool having four legs. A's patent claim prevents B from making, using or selling a four-legged stool since the four-legged stool still uses A's three legs. On the other hand, B's patent claim will prevent A from making, using, or selling a four-legged stool. When A's patent has expired, B can make, use, and sell the four-legged stool and can prevent any one, including A, from making, using or selling a four-legged stool.

The enforcement of patent rights is a private action and occurs through the courts. The patent owner must bear his own litigation costs. The Federal District Courts have jurisdiction over patent litigation (in FY 1981, 462 suits were filed in the Federal District Courts), except when the alleged infringer is the Federal government, in such cases the Court of Claims has exclusive jurisdiction (in FY 1981, 9 suits were filed in the Court of Claims).

literature; however, only the U.S. patent collection is relatively complete.

Currently between 600,000 and 700,000 new documents are introduced into the examiners' search files per year. The responsibility for directing these new documents into appropriate subclasses rests with the patent examiners. Periodically, because of the growth in the number of documents in the subclasses, portions of the examiners' search files will be reclassified, that is, the documents will be regrouped in more subclasses with each subclass having fewer patents, so that the retrieval of relevant prior art is facilitated.

The patent examiner informs the patent applicant of his findings regarding patentability thrqugh a letter called an action. The patent examiner can reject one or more of the claims or object to the specification if he believes that the patent application does not meet the statutory or regulatory requirements for granting a patent. The patent applicant has an opportunity to refute the patent examiner's positions or amend his specification or claims to overcome the rejection or objection. Most patent applications are initially rejected by the patent examiner.

If the patent examiner finds that the patent application meets the statutory and regulatory requirements, the patent application is allowed. If any rejections or objections were made, all must be withdrawn before the patent application can be allowed. Once the patent applicant has paid a fee, the patent is printed and issued. The patent rights extend 17 years from the date on which the patent is issued. During fiscal year 1981, 66,617 patents were granted (PTO Annual Report Fiscal Year 1981, p. 35). About 40 percent of the issued patents are foreign owned. Individuals appear to own about 16 percent of the patents; the Federal government about 3 percent; and U.S. companies having less than 500 employees, about 20 percent.

TABLE 3-3

SUMMARY OF STATUTORILY DEFINED PRIOR ART

* knowledge or use of invention by others in the U.S. prior to the making of the invention by the patent applicant

* patents or printed publications throughout the world either (1) prior to the making of the invention by the patent applicant or (2) prior to one year before filing the patent application

* public use or sale of the invention in the U.S. more than one year before filing the patent application

* U.S. patents granted on patent applications filed before the making of the invention by the patent applicant

* Other U.S. patent applications based on inventions by others in the U.S. earlier than the making of the invention by the patent applicant in the U.S. wherein the others did not abandon, suppress or conceal the invention.

SOURCE: Office of Technology Assessment, derived from Title 35, United Sates Code, Section 102.

Table 3.2
Examples of Patent Claims for Important Inventions

The Wright Brothers' Airplane, U. S., Patent No 821,393

"In a flying machine, a normally flat aeroplane having lateral marginal portions capable of movement to different positions above or below the normal plan of the body of the aeroplane, such movement being about an axis transverse to the line of flight, whereby said lateral marginal portions may be moved to different angles relatively to the normal plane of the body of the aeroplane, so as to present to the atmosphere different angles of incidence, and means for so moving said lateral marginal portions, substantially as described."

Oral Contraceptives (C. Djerassi), U. S. Patent No. 2,744,122

" Δ^4 - 19-nor-17α - ethinylandrosten - 17β - ol - 3 - one"

Lasers (C. Gould), U. S. Patent No 4,053,845

"Apparatus for light amplification comprising a bounded volume containing an excitable medium, the atoms, ions or molecules of said medium having well defined energy states including a lowest state, a lower state above said lowest state, and a higher state above said lower state, and a bright pumping light source composed of a radative substance different from said meidum which substance emits energy in a spectral range which can be absorbed by said medium, the major portion of the energy absorbed by said medium, causing transition of the atoms, ions or molecules thereof to populate the higher state, said bright pumping light source being arranged to direct light into said medium to excite said atoms, ions or molecules to emit light photos in the bounded volume when stimulated to do so by the presence of stimulating light at a frequency substantially corresponding to the emitted light due to transitions from the higher state to the lower state, said emitted light having substantially the same phase, frequency, polarization and wave front shape as the stimulating light, thus adding coherently to the amplitude of the stimulating light."

- A patent term runs for 17 years.

The Congressionally-established principles of patents are only a framework upon which the patent system takes form. The patent system, in its broadest sense, comprises the Constitution, laws, regulations, administrative procedures, court decisions, practices, and perceptions (including misconceptions) pertaining directly or indirectly to patents. In this broad context, the patent system is shaped by the government and the public through the users, as well as the non-users, of patents. Moreover, each of the legislative, judicial and executive branches of the Federal government exert an influence on the patent system ranging from the direct effects, such as the enactment and implementation of laws directly related to patents, to indirect effects such as antitrust and Federal procurement policies.

The Patent Document:

The cornerstone of the patent system is the patent document. By law, this document must (1) provide a teaching of the invention such that others can make and use the invention and (2) contain claims that define the boundary of the invention.

The portion of the patent document that teaches the invention is commonly termed the **specification**. The specification serves several functions. It describes the invention. It discloses the utility of the invention since patents are only granted for useful inventions. It also discloses how to make and use the invention and includes a description of the best mode known to the inventor for making and using the invention. The specification concludes with one or more claims. An example of a patent is provided in Appendix II.

The **claims** are the most important aspect of the patent document in establishing the rights of the patent owner. The claims serve much the same purpose as a deed to a piece of land. Several examples of claims

any alternative within the framework of a capitalist economy superior to the patent system for commercial innovation generally." (p. 336)

The General Legal Principles of Patents

Patents, as most commonly perceived, pertain to product and process inventions and are termed utility patents, but Congress has established other types of patents, as well. Design patents protect ornamental designs and plant patents cover asexually reproduced plants other than tubers (e.g., potatoes) or a plant found in an uncultivated state. Congress has also established plant variety protection certificates which provide patent-type protection to sexually reproduced plants. Table 3-1 provides a brief description of the four types of protection. However, because utility patents are the type of patent most frequently associated with new-technology enterprises they are the focus of this study, and the term "patent" as used throughout the report, refers to utility patents.

The general principles of utility patents have been established by Congress:

- An invention, to be patentable, must be useful and must be a process, machine, manufacture, or composition of matter;
- A patent can be granted only to the inventor or joint inventors of the invention;
- A patent can be granted only for an invention that is "novel" and "unobvious";
- A patent gives the owner the right to exclude others from making, using, or selling the invention in the U.S.; and

> "No economist, on the basis of present knowledge, could possibly state with certainty that the patent system, as it now operates, confers a net benefit or a net loss upon society. The best he can do is to state assumptions and make guesses about the extent to which reality corresponds to these assumptions." (Fritz Machlup, An Economic Review of the Patent System, Study No. 15, Subcommittee on Patents, Trademarks and Copyrights of the Senate Committee on the Judiciary, 1958)

Even though conclusive evidence may be lacking, most economists generally believe that, despite the undesirable aspects of monopolies, the net effect of patents on society is positive. (See, for instance, Friedrich-Karl Beier, The Significance of the Patent System for Technical, Economic and Social Progress, IIC, vol. 11, no. 5, 1980, pp. 563-584) Their endorsements of the patent system may be lukewarm, as when Dr. Machlup concludes that:

> "If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of present knowledge, to recommend abolishing it." (Machlup, p. 80)

Another study prepared for the Department of Commerce stated more positively:

> "There is reasonable evidence indicating that the monetary benefits of the domestic patent system probably lie in the range of $2 to $15 billion annually

As noted earlier, the patent system has several attributes which warrant its consideration as a mechanism for stimulating innovation. The effects of the patent system, however, are not all positive.

In theory, patents, like other monopolies, can yield greater profits (extraordinary profits) to patent owners than would be possible without a monopoly and under ideally competitive market conditions; the patent owner can demand higher than normal prices for his products and control the quantity of products produced to maintain those prices. The pricing and control of output of the monopoly product can also affect the pricing and production of other products in the economy. For instance, goods similar to the monopoly product or raw materials used to make the monopoly product may be able to command higher prices because the monopoly product is priced at greater than normal profit levels or is in limited supply.

Even if the technology encompassed by a patent is not commercially used, the patent can have an effect on the price and supply of other goods on the market. For example, a company may have several patents covering different products to accomplish the same objective, only one of which is being marketed. By not commercializing the other patented products, the patent owner avoids creating competition for his existing product, while the patents prevent others from commercializing competitive products.

The patent monopoly is, however, the compensation given to the patent owner by society and is the economic mechanism through with patents stimulate innovation. Patents are an essentially unregulated monopoly and, hence, overrewards, underrewards and abuses can occur. For many innovations, patent incentives may be unnecessary. The reward provided by the patent may be disproportionate to the incentive needed to undertake the innovation and unrelated to a fair return on investment by the innovator. Patents are subject to being abused to extend the monopoly. For example, by cumulating patents, or "piling patents on patents", a broader and longer patent monopoly can be gained. Moreover, the patent monopoly can enable a company to gain such a position that monopoly powers continue substantially beyond the expiration of the patent.

- The patent system is a stable mechanism having had few significant changes since 1836.

- The patent system requires relatively little government funding to operate and provides an inducement for private investment in innovative activities.

An attribute of the patent system that warrants further discussion is the plurality of effects that it can have on the innovative process. For example, the inventor is given public recognition of his achievement through the grant of a patent. The promise of a limited monopoly can assist in generating interest in conducting innovative activities and in securing resources (e.g., through venture capital or licensing the patent) for those activities. The marketing of the product can be influenced by patents, both because a monopoly permits greater flexibility in price structure and because the uniqueness of the product influences demand. Patents owned by others can provide technical and commercial information of value to the innovator. Patents can even provide prestige and reputation to a new technology enterprise as being a technological leader. As will be discussed in the next section and in chapter 7, the patent system can have other positive as well as negative implications for innovation and new technology enterprises.

The attributes of the patent system, such as its wide-range of effects, reliance on the market for financial gain, and neutrality toward technology, would appear to restrict the ability of the government to use it to encourage only certain types of innovation or innovators. That is, the patent laws make no distinction between a fundamental invention that generates a new industry and one that slightly improves an existing product. Nor do the patent laws distinguish among the different classes of innovators; the statutory and regulatory requirements are the same for new and existing, and for large and small businesses. Although the patent laws do not provide a direct means to selectively encourage certain types of innovation or innovators, some selectivity is exerted indirectly. For

Some other government activities may be specifically targeted to the technology or the innovator; for example, direct funding and assistance programs, purchases of innovative products, and publicity about the innovation or the innovator. Other more general policies, for example, anti-trust policies, economic policies, regulatory policies, tax policies, general assistance policies (including disseminating technical information), and policies concerning property rights in information also affect innovation.

Patents represent one of several kinds of property rights assigned to information, or intellectual property. Four basic types of property rights have been established: patents, trade secrets, trademarks, and copyrights. Briefly, patents provide a right to exclude others from using inventive concepts during the patent term. Trade secrets have traditionally been matters of State, not Federal, law and give the the owner of a technical or commercial secret the right to prevent someone having access to the secret from disclosing it or using it for personal gain. The owner of a trade secret has no recourse against another if that individual independently discovers the secret or learns the secret by legitimate means. If a secret cannot be maintained, for example, if it can be learned from an analysis of the product, trade secrets provide no meaningful protection. Trademarks identify the origin of goods and services. Trademarks are based on common law principles giving the right to a merchant to stop others from using his mark to benefit from his reputation. The Federal registration of trademarks used in interstate commerce gives the owner of the trademark certain legal presumptions to assist in enforcing his commmon law right. Copyrights give their owners the right to exclude others from copying the form of a work of art or a writing, but they provide no exclusive right to the ideas expressed in the copyrighted work. A copyright owner does not have the right to stop another who has independently created the same, or similar, work of art or writing, nor the right to prevent others from using the ideas expressed in the copyrighted work.

litigating a patent. (Report of the President's Commission on the Patent System, "To Promote the Progress of...Useful Arts" (1966) p. 3.)

For most parties to the debate, the discussion focuses not on the effect of weaknesses in patent reliability and enforcement on innovation, which is generally agreed to be adverse, but rather on the magnitude and causes of these defects. The debate reveals the complexities in understanding the weaknesses, and therefore the difficulties in prescribing remedies that will enhance innovation.

The Existing Views of the Major Fundamental Problems with Patents: Patent Reliability and Practicalities of Enforcement

Many commentators point out that the receipt of a patent does not assure the patent owner a monopoly on the technology, i.e., the very heart of the patent incentive. There are many grounds upon which to challenge the validity of a patent and thereby undermine the patent owner's limited monopoly. It is the patent owner who has the exclusive responsibility for policing and enforcing his patent rights and his ability to carry out these functions affects the value of his patent. Commentators note that the cost of enforcing patents in courts is high and, therefore, unless the patent owner has the financial resources for litigation and the value of the monopoly rights warrants significant litigation expenditures, the patent is for all practical purposes worthless. These commentators conclude that the uncertainties of patent validity and the expense of patent enforcement seriously detract from the patent incentives for undertaking new technology enterprises.

Recent studies of the patent system support these observations and concerns. The first goal of the Advisory Subcommittee on Patent and Information Policy of the 1978 Domestic Policy Review was to enhance the "reliability of the patent grant to the inventor," and the second was to reduce "the cost -- both in time and money -- of judicial enforcement of the rights derived from the patent." (p. 153) The other major goals were to permit patenting of technologies not currently patentable and to transfer the patent rights for government supported research and development to the private sector. The ad-hoc committee of small-business members of the Domestic Policy Review reported two major weaknesses of the patent system that it saw as "damaging incentives for innovation, patentability by small science and technology businesses." The first weakness is the number of patents being declared invalid by the courts, and the second is the high costs of patent litigation. According to the committee, these weaknesses in the patent system may discourage its use, thus more new technology will be maintained as trade secrets and not

Table 2-1

The Innovation Process--Activities and Functions, Personnel, Resources, and Results

STAGE	INVENTION The Idea	DEVELOPMENT Refinement	COMMERCIALIZATION Use
ACTIVITIES AND FUNCTIONS	-basic research -idea generation -idea evaluation -business/technical feasibility analysis	-applied research -research and development (R&D) -prototype development -market research, analysis and testing -manufacturing design and pilot production -production planning and production	-licensing -market introduction -advertising -demonstrations -market acceptance
PERSONNEL	-individuals or entrepreneurs -research teams	-research teams -marketing, financial, and production specialists -entrepreneurs (or support from an organization)	-entrepreneurs -retail and other outlets -sales representative -maintenance staff -production engineers -labor force
RESOURCES	-basic experimental equipment -modest amount of raw materials (chemicals, wire, metal, etc.) -minimum work space -time for experimenting -modest financial resources	-more sophisticated research equipment -sufficient quality of raw materials -experimental and testing facility -capital facilities for manufacturing -financial backing	-markets -plant and equipment -inventories -financial backing
RESULTS	-a technically viable idea with perceived market potential -new knowledge (nonapplied)	-an operating product or process that has been proven workable and with an identified market -new knowledge (applied)	-new product or process in use by a number of "satisfied customers"

Source: Consistent criteria are needed to assess small-business innovation initiative, U. S. General Accounting Office (July 7, 1981) p. 9.

The approach taken in this report is to focus on the functioning of the patent system as it relates to patent reliability and patent enforcement, to determine areas of functional weakness and their underlying causes (Chapers 3, 4, 5 and 6), and to ascertain what effects, if any, these functional weaknesses have on the creation and operation of new technology enterprises (Chapter 7). This is followed by an analysis of recent recommendations of promised governmental and private groups for strengthening patents (Chapter 8). The report is concluded in Chapter 9. A background paper that accompanies this report addresses many important concerns about the patent system and innovation. The background paper has three sections: the first, The Economy of the Patent System; the second, Selected Issues in Patent Law; and the third, Patents and Assistance for Innovation. The report does not make recommendations nor does it attempt to resolve conflicts. Rather, it clarifies the bases for making judgments.

An Orientation to Patents, Innovation and New Technology Enterprise1

The following discussion is provided to establish a common understanding of some fundamental concepts referred to in this report.

Patents are legal grants from the Federal government which, for limited periods of times, enable the patent owner to establish a property right in an invention. This property right can be used by the patent owner to exclude others from making, using or selling the invention. In essence, patents provide monopolities of limited terms, and the patent owner can gain rewards through the exercise of the monopoly power. Patents have been viewed in several ways. For example, they have been considered to be compensation for the disclosure of an invention, a natural property right of an inventor, and as incentives for invention and innovation. The last is the primary focal point of this report. However, as noted throughout the report, there is no consensus as to which view is exclusive or primary, and this leads to different positions on many patent issues.

CHAPTER 2
THE ISSUES

Introduction to the Report

The United States Constitution grants to Congress the power to "promote the progress of science and useful arts, by securing for limited times to...inventors the exclusive right to their...discoveries". Congress exercised this power in 1790 and thereby enabled the patent system to be established.

"Science and useful arts" have undergone unforeseen progress since the 18th century as the United States developed from an agrarian society to the most technologically advanced country in the world. With technological progress came a dynamic and growing economy. Although numerous factors have been involved, many credit the patent system, and the incentives that it provides, with an important role in fostering this technological development and economic growth.

Many of the innovations (the practical implementation of inventions) in the past that provided new industries and jobs and enhanced our standard of living had patent protection that provided the innovator with a monopoly position for a limited period of time. Industries which have had their start with patented technology include the aircraft, telecommunication, instant photography, xerographic copier, synthetic fiber, structural polymers, computer and solid-state electronics industries. Some commentators believe that a significant portion of these innovations would not have been developed (or developed as rapidly) by the private sector had patents not existed to provide an incentive to undertake the risks involved to innovate. (Fritz Machlup, An Economic Review of the Patent System, Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary (1958) p.63)

be considered are limited.

Binding arbitration has been proposed as an alternative forum for resolving patent disputes but several courts have found that the public has an interest in the validity of patents and have therefore held that binding arbitration is inappropriate.

Binding arbitration offers the potential for, but does not guarantee, less expensive and more expeditious resolution of patent diputes. The only patents that will be involved in arbitration are those in which the parties can come to an agreement to arbitrate.

Congress could accommodate public interest concerns by requiring that the arbitrator refer issues of patent validity to the Patent and Trademark Office or by requiring that the decision of the arbitrator be made a part of the public record of the patent. Arbitration may thus serve the public interest better than the alternative of a wholly private resolution of patent validity issues.

Another proposal for a quasi-judicial forum is an administrative law panel established within the Executive Branch through which the parties could voluntarily seek a resolution of all issues involved in a patent validity and infringement dispute. The major advantage of the panels over voluntary arbitration is that the procedures and judges already exist; however, the costs of establishing and maintaining the panels can offset the advantages, and there is no basis to expect that administrative law panels would be used appreciably more frequently than arbitration.

Because of the economic advantages that can be exerted through court litigation, it is not clear that the parties to a dispute will agree to less expensive alternatives to litigation.

The award of attorney fees and the granting of preliminary injunctions (that is, the court ordering the alleged infringer to stop pending the

examiners' search files. The failure of the search files as an accessible data base will occur in the rapidly growing technologies which are the most important for innovation.

d. Public Involvement in Granting Patents

The courts frequently criticize the patenting procedure because of its ex parte nature, that is, there is no interested party countering the patent applicant's arguments to the patent examiner.

Proposals to give the public a role in Patent and Trademark Office decisions to grant a patent have not been enacted by Congress primarily because of concerns that such procedures would significantly delay the issuance of patents and facilitiate the harassment of small business and independent inventors. There is also some concern that the public may have little incentive to use such proceedings.

From a practical standpoint, reexamination can provide an indication of how effective a pre-issuance public involvement proceeding could be and how it might be implemented.

Lesser Patents:

Congress could establish a system of lesser patents that can be granted for inventions that do not meet the patentability standards for utility (regular) patents. Lesser patents offer the potential of providing marginal inventions with less expensive and more reliable patent-type protection and of being more practical to enforce than utility patents. But, as a tradeoff, the lesser patent owner would be given less protection for his invention. Also, the existence of a lesser class of patents can enhance the status of utility patents by offering an alternative to the granting of full, 17-year protection for a marginal invention.

There is a wide range of possibilities in fashioning a lesser patent

Increasing resources:

Increasing the resources devoted to patent examination does not necessarily result in significant improvements in patent examination quality. The effectiveness of increased resource allocation depends on the activities that are undertaken with the additional resources. However, four ways have been suggested to improve the quality of patent examination: establish an internal review of all allowed patent applications; increase examiner time for prior art searching; improve access to prior art; and permit public involvement in the granting of patents.

Any increasing of resources for patent examination will require more funding per patent application examined. How that funding is obtained can have implications, particularly now when patent applicants are being asked to pay the entire cost of the patenting process. The resources for patent examination can be applied selectively by not undertaking a full examination of all patent applications. One way to do this is to defer examination until the patent applicant requests it. While deferred examination enables examination resources to be allocated to the most important patent applications, other changes in the patent laws are required to provide an operable system, such as the publication of patent applications to advise the public that a patent might issue in the future. Uncertainties would exist as to whether a patent will issue and what it will cover and these uncertainties can discourage innovation. It is not clear that deferred examination would provide an overall benefit.

a. Internal review

The experience with the Patent and Trademark Office quality review program suggests that an internal review of all allowed patent applications will improve patent quality, but the improvement cannot be firmly predicted. Even with internal review, patents of questionable validity will be granted because they involve issues of patentability over which reasonable men can disagree and because uncovering the relevant information

OPTION 1: Maintain the status quo

Until the full effects of recent legislation and Patent and Trademark Office initiatives can be seen, it may be premature to undertake additional changes. Experience with the practical effects of reexamination and a single patent appeals court will help to identify and address the remaining problems with greater certainty.

On the other hand, there is a risk that problems not directly addressed by recent legislative and Patent and Trademark Office initiatives will continue to reduce the value of patents in creating and nurturing new technology enterprises. Moreover, the complex nature of the link between patents and innovation makes it difficult to assess with any precision the effects of these initiatives. Hence, the ability to gain from the experience with recent legislative initiatives may be restricted. To assist Congress in its own analysis an advisory commission could be established to monitor and periodically report on the effects of recent legislative and Patent and Trademark Office activities and to identify future needs.

OPTION 2: Major Revamping of Patent Laws

The modifications that have occurred in U.S. patent laws have amounted to discrete changes designed to improve the overall patent system by overcoming the shortcomings in particular problem areas. This patchwork approach can produce inconsistencies that have adverse effects on patent owners and innovation.

There is no clear evidence of a current need for major revisions in the patent laws. However, it is conceivable that the continuing pressure of a rapidly expanding prior art data base, the increasing complexity of patent law and new technology, and the continuing potential for abuses in court litigation, will threaten the viability of the patent system in the future.

December 2, 1982, "a plan to identify, and if necessary develop or have developed, computerized data and retrieval systems equivalent to the latest state of the art which can be supplied ... to a patent search file..." and "...the classification system...: The report is to specify the cost of implementing the plan, without regard to funding.

The 97th Congress, in P.L. 97-164, established a single Court of Appeals for the Federal Circuit with exclusive jurisdiction over appeals from patent validity and infringement decisions of the District Courts. Previously, appeals in these cases went to the eleven Circuit Courts of Appeals. By providing a single Court of Appeals having the jurisdiction over patent cases, the Congress hoped to provide nationwide uniformity in patent law and to make patent litigation more predictable, encourage contestants to avoid litigation, and facilitate business planning as more stable and predictable patent law is introduced.

Thus, the patent system is presently undergoing major changes. These changes can affect the reliability of patents and the practicalities of their enforcement, but the actual effect of these changes on innovation and society in general are unlikely to be observable in the short term.

Policy Options

It is logical, even if unprovable, to argue that enhanced patent reliability and easier patent enforcement will increase the short and long-term value of patents to their owners. However, any change in patent reliability or the practicalities of enforcement will have repercussions throughout the patent system, influencing the way it affects innovation, due to the complex and intertwined relationships of its various elements. Moreover, a change in any one aspect of the patent system may have one effect on incentives to innovate, another on the operation of technology enterprises, and a third on the degree of equity which the system accords to inventors, innovators, and the public interest.

infringer in a civil action in the Federal District Courts to obtain an injunction to stop the infringing activities and seek damages for past infringement. Patent litigation is both expensive and time consuming and there is legitimate concern that the expense in time and money acts as a barrier to prevent patent owners from fully enjoying their patent rights.

The expenses of patent litigation vary widely and these costs, regardless of whether the suit is settled or litigated through a trial court, can be significant. Pursuing patent litigation from the pre-suit investigative stage, through the motion and discovery period, to trial and ultimately an appeal frequently costs from $50,000 to $1,500,000 or more and takes several years. The high costs of patent litigation can be attributed to the many areas in which the validity and enforceability of a patent can be challenged, the complexities of the patent law and technology, and the high stakes that are often involved. Patent litigation, however, is not unique; other high-stake actions such as antitrust and securities litigations are typically expensive and time consuming.

The American judicial procedure favors broad pre-trial discovery and puts few limits on motions and appeals. This has contributed heavily to the expense of litigation. Thus, the ability of one party to the litigation to prevent the costs from escalating or to secure a rapid resolution of the dispute is limited. There is little to prevent or discourage the more economically powerful litigant from exerting economic leverage against a weaker opponent.

The expense of litigation provides an incentive to many parties to resolve their disputes over patent validity and infringement privately. Indeed, private resolution of patent disputes is the primary mechanism used to resolve such disputes. There is no definitive data, but OTA estimates that between 5,000 and 15,000 patent disputes are resolved privately each year. The patent disputes resolved by the courts number between 300 and 400 per year. Other mechanisms for resolving patent disputes involve

administrative tasks he must perform, often without clerical assistance. These demands can adversely affect the quality of the training and review of his staff.

Oversight is also provided by the Patent and Trademark Office quality review program that reviews a randomly selected 4 percent sample of allowed patent applications. Since the adoption of the program in 1974, the percentage of patent applications in the review sample which have been found by the review to have at least one clearly unpatentable claim has dropped from 7 to under 3 percent. While this drop evidences some improvement in patent examination quality and, perhaps, the effectiveness of the quality review program, the magnitude of the drop is also affected by other factors including changes in the quality review program and its standards.

The search file resource is critical to an examination of patent applications. Presently there are over 24 million documents in examiners' search files, and the files have tripled in size since 1960. The documents are grouped in 350 broad subject matter categories, or classes, each of which is broken down into subclasses. The search files suffer from two major problems, poor integrity and rapid growth. The Patent and Trademark Office estimates that at any given time about 8 percent of the documents are missing from the files. Since 1978, about 12 percent of the search file has been reviewed for integrity and over 200,000 documents have been incorporated to replace those that are missing or mutilated. The search file, which increases by 600,000 to 700,000 documents each year, requires regrouping (reclassifying) of the documents contained in existing subclasses to form a greater number of subclasses. This reduces the number of documents per subclass, thereby reducing the time required to conduct a search, and permits new subclass groupings to reflect the current needs of patent examiners. The Patent and Trademark Office estimates that about 10 percent of the files require, or will require, reclassification in the immediate future. In fiscal year 1981, about 2 percent of the files were reclassified.

for inventions of simple complexity. Although the data are inclusive, small businesses seemed to fare as well as large businesses with inventions of similar complexity.

What Is the Quality of Patent Examination?

Realistically, the Patent and Trademark Office must strike a balance between the desired quality of patent examination and the costs of obtaining the quality. This balance is established by the coaction of Congressional policy and implementation of that policy by the Executive Branch. Concerns from the standpoint of implementation have been raised from time to time about the guidance and support accorded the Patent and Trademark Office, both from the Department of Commerce to which it reports, and from its leadership which has often had little continuity of service.

Reliable methods to measure the quality of examination performance of the Patent and Trademark Office do not exist. Accordingly, OTA has concentrated on the factors that affect overall performance: the quality of judgement exercised in making patentability determinations (standards of patentability); the quality of the search of the prior art; and the resources available to the Patent and Trademark Office.

The quality of patentability judgement exercised by patent examiners has been the subject of controversy and a source of dissension between the courts and the Patent and Trademark Office. The Supreme Court has stated that a "notorious difference" exists between the standards of patentability applied by the Patent and Trademark Office and by the courts. To some extent differences in standards of patentability may be perceived to exist since courts tend to see only those patents that are of marginal validity.

The quality of the prior art search by the patent examiner appears to be significantly brought into question by court decision statistics. Furthermore, the Patent and Trademark Office internal quality review program seems to confirm that prior art searching is one of the weakest

The Patent and Trademark Office issues about 70,000 patents each year of which a certain number are subsequently found to be invalid. There are no generally accepted methodologies for determining the frequency with which patents of uncertain validity are issued but court statistics, because of their availability and prominence, are the most widely used indicator of overall patent validity. However, the conclusions to be drawn from court statistics are often disputed.

Slightly over 50 percent of adjudicated patents (where a court rendered a decision on the merits) are found invalid but only a small fraction of patents (less than 0.5 percent) are tested and the sample of patents in litigation is not representative of all patents.

In addition to court statistics, several other techniques have been used to develop estimates of the percentage of patents that have questionable validity. An internal review by the Patent and Trademark Office of randomly selected patent applications allowed by patent examiners indicates that about 5 percent of the patents issued have at least one "clearly unpatentable" claim. While these patents are clearly defective, others are borderline. One former Commissioner of Patents has estimated that between 5 and 10 percent of patents issued involved questions of patentability with which reasonable men could disagree. A further group of patents is subject to question based on information not available to or retrievable in the context of a patent examination by the Patent and Trademark Office. In view of these indicators and others, OTA believes that it is not unreasonable to assume that 10 to 20 percent of U.S. patents have questionable validity.

Studies of reported U.S. court decisions have shown that in about 75 percent of the cases in which a patent is found invalid, the ground for invalidity was that the claimed invention was obvious over the prior art and hence did not meet the statutory standard for patentability. The second most prevalent ground for invalidating patents was lack of novelty over the prior art.

benefit from innovations at the expense of some of the social benefits but there is little available data to indicate the levels of private returns to innovators attributable to patents.

The uncertain reliability and practicalities of enforcement of patents tend to diminish the value of the patent to the patent owner if he is to enforce the patent against a suspected infringer. Moreover, the patent owner can generally expect that if he prevails in an infringement litigation he will recover no more than reasonable royalties as damages and must pay his own attorneys' fees. Thus, the patent owner often has an incentive to license his patents rather than bring an infringement action. While licensing can adversely affect the private benefits to the patent owner, it does have broader policy implications. The practical effect is that the patent owner frequently foregoes a monopoly position.

The balance between private and public interests is further influenced by judicially established policies removing disincentives for challenging patents. For example, the licensee cannot be bound by an agreement to not challenge the validity of the patent; generally the licensee need not pay royalties during the court litigation; and, the licensor is prohibited from terminating the license because the patent was challenged. While this policy facilitates patents being challenged in court, there are anecdotal accounts of a patent owner being threatened with a suit by a licensee challenging the validity of his patent in order to secure more favorable licensing terms. Moreover, since the licensee risks only his attorney fees, an attractive business strategy is to negotiate a license under the most favorable terms possible and then challenge the patent.

Sometimes, however, the private benefits to the patent owner can be achieved regardless of the validity of the patent. The Temporary National Economic Committee reported in 1941 that litigation was being used by some patent owners as a weapon of business aggression. Even the weakest of patents can offer a threat to potential defendants because of the expense and disruption of patent litigation, and the patent owner may be able to

for not obtaining patents were cost related; either the expense of obtaining the patent or of having to defend it. A number of small companies that responded to the survey indicated that patents were not sought because they were not sufficiently reliable and there was too great a chance that they would be ruled invalid in court.

These studies are not necessarily representative and they do not specifically explore the nexus between (1) patent reliability and enforcement costs and (2) innovation or types of innovation undertaken. They do not reveal, for example, whether any of the firms in the National Science Foundation study that listed patenting and licensing as a "major problem" decided not to undertake innovative activities in, or to direct their research activities away from, areas in which patents are important.

For individuals and small firms, patents can be important for securing financing for undertaking innovative activities. One study, based on a survey of small businesses, concluded that the existence of patent protection is frequently a vital link in connecting technology with the funds necessary to achieve successful commercialization of inventions. OTA interviewed 8 venture capitalists who invest in high technology companies. In general, the venture capitalists did not believe that greater patent reliability or lesser costs of enforcement would significantly increase the value of patents in their investment decisions. But the prospect of involvement in litigation is a significant deterrent to these investors. The investment selection methodology of many venture capitalists may account for their general lack of concern for patent reliability and enforcement. Frequently, this methodology relies on the management team and rapid advances in technology to provide protection from competition, and stresses short-term payouts on investments. However, for technologies that require a long research and development period, the venture capitalists agreed that patents become almost a prerequisite for investment.

The value of patents in the decision to undertake innovative

with patent reliability and the practicalities of enforcement are not affecting the majority of decisions to innovate. This is not unexpected because for many types of innovation, patents are not primary considerations, and often alternatives such as trade secrets are relied upon to protect inventions. But where patents are an essential element, the concerns over reliability and enforcement have more significant implications.

- Many small businesses consider patents vitally important to obtaining outside funding. Venture capitalists, however, appear to believe that greater patent reliability and lesser costs for enforcement would have little effect on many of their investment decisions, but for some technologies they deem reliable patents to be critical.

- The present circumstances regarding patent reliability and the practicalities of enforcing patents encourage private settlement of patent disputes and licensing of patents. While this tends to reduce the value of patents to their owners, it also reduces the likelihood that a patent owned by another will hinder innovation.

- The patent system, while not perfect, is providing a meaningful incentive for innovation and is being relied upon by many innovators. Potential exists for increasing the value of patents to patent owners but there is a practical limit as to how much improvement can be achieved.

- Recent changes have been made in the patent laws (particularly those establishing reexamination, creating the Court of Appeals for the Federal Circuit that will have exclusive jurisdiction over appeals in patent suits, and mandating the Patent and Trademark Office to develop a plan for computerization). While these changes are intended to improve patent reliability and the practicalities of patent enforcement, and, therefore, enhance the

that is, does not meet the statutory standards for patentability. If the patent is held valid and infringed by the court, the court can order the infringer to cease the infringing activities and award damages to the patent owner.

Unless the patent owner has reasonable assurance that, once granted, his patent is (1) reliable (that is, is valid, protects the invention, and is respected by others) and (2) practical to enforce, then the rights conveyed by a patent provide little incentive to undertake risks. If patent owners lack confidence in the patent system, patents will only be useful as mechanisms to maximize private gain for innovations that would occur in their absence.

Summary of Major Findings

The following lists the major findings of this OTA study concerning patent reliability and the practicalities of enforcement. These findings will be discussed in more detail in the later sections.

- Over one-half of the patents which are litigated are found invalid by the courts; however, only about 0.5 percent of all patents are litigated and, therefore, litigation statistics are not representative of the reliability of patents as a whole. Litigation statistics, however, are virtually the only available measure of patent reliability and receive widespread attention. Litigation statistics can therefore influence perceptions of the value of patents and affect the degree of confidence that an innovator or inventor will place in a patent.

- Although there are no conclusive measures for determining how many invalid patents are issued, a number of indicators suggest that 10 to 20 percent of patents have questionable validities. This estimate, however, must be viewed with caution.

useful arts." Congress exercised this authority in 1790 and set forth the basic principles of the patent system which are, in essence, a bargain between the inventor, who must disclose his invention, and the public, which gives the inventor a limited monopoly in the invention. A patent is issued only if the invention is fully disclosed and is useful, and meets a certain standard for patentability, that is, the invention is not known or "obvious" from the "prior art" that preceded it. In general, prior art constitutes all patents and printed publications in the world and public use or knowledge of the invention in the United States. The patent grant gives the right for 17 years to its owner to exclude others from making, using or selling the invention in the United States.

Granting patents, of course, is only one of a variety of activities available to the Federal government to encourage innovation. Some other government activities may be specifically targeted at a particular technology or innovator; for example, direct funding and assistance programs, purchases of innovative products, and publicity about the innovation or the innovator. Other more general policies also affect innovation; for example, anti-trust policies, economic policies, regulatory policies, tax policies, general assistance policies (including the dissemination of technical information), and policies concerning property rights in information. Some of these activities may have a greater and more immediate effect on innovation than do patents, but patents by the very nature of the rights granted, are unique as incentives.

Patents can promote the progress of science and the useful arts in the following ways: They encourage research by providing a mechanism for protecting research results from commercial use by others; they encourage the development of new products and processes by giving the patent owner the right for a period of time to exclude others form making, using, or selling an invention; they provide a mechanism for transfering technology to those who may put the technology to practical use; and they provide the public with technical information that can lead to further technological advances, which information might not have been disclosed if no patent