

PATENTS AND ATOMIC ENERGY*

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In the patents section of the Atomic Energy Act of 1946 (Section 11),¹ two basic concepts, each regarded as fundamental to our political system, collided head-on. These were security, as we had with some dismay begun to understand the term in the beginning of the atomic age, and the institution of private property, as expressed here in the hallowed forms of the patent system. The conflict between these irreconcilables was reflected in the debate over most of the major provisions of the Act, but nowhere was it so clearly defined and so bitter as in the struggle over the patent provisions.

The simple expedient whereby during the war private patent applications involving the national security were kept secret by the Commissioner of Patents provided only a partial solution. This action was authorized by an Act of Congress² passed during the first World War, which empowered the Commissioner to keep certain inventions secret and withhold the issuance of certain patents in *wartime*. Although this power was broadened in 1940³ to authorize the Commissioner to withhold the issuance of patents of military value for such periods as he might determine, presumably the Act of 1940 extends only to applications filed in wartime, and those filed after the end of the war would not be covered. Nor would the statute⁴ under which atomic energy inventions were handled during the war prove helpful, since that law is limited to government-owned inventions. In any event, all these techniques merely postponed issuance of the patent—none contemplated control of the patent after issuance.

The very nature of the patent system requires the disclosure in detail of the device or process to be patented. In the patent application there must be a description of the invention and its manufacture and use "in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected . . ." ⁵ to duplicate it. Thus, if a new device for producing fissionable material were patentable, the patent application would of necessity recite every relevant detail, the patent would be published, and

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¹ 60 STAT. 768, 42 U. S. C. A. §1811 (Supp. 1946).

² 40 STAT. 394 (1917), as amended, 35 U. S. C. §42 (1940).

³ 54 STAT. 710, 35 U. S. C. §42 (1940).

⁴ REV. STAT. §4894 (1875), as amended, 35 U. S. C. §37 (1940).

⁵ REV. STAT. §4888 (1875), as amended, 35 U. S. C. §33 (1940).

all information contained in it would be made public. The alternative to this procedure, vaguely advocated by those who objected to the provisions actually incorporated in the Act, was to establish a category of permanently secret patents. This concept is so obviously absurd—one need only imagine the confusion which would be generated whenever “secret” patents became the subject of litigation—that it never received serious consideration in Congress. The issue was clearly defined and could not be compromised. Congress had to decide whether to protect property rights embodied in patents at the expense of national security, or to protect national security at the expense of patent rights.

The House of Representatives was so stalwart in its defense of property rights that at one stage in its deliberations it adopted as a substitute for the patent provisions passed by the Senate a series of provisions, prepared by the ranking majority member of the Patents Committee of the House, which omitted any reference whatever to the need for secrecy in certain types of atomic energy devices, and created no machinery to provide it. This ready willingness to waive the need for secrecy where it impinged on the institution of private property provides an interesting contrast to the zeal with which the House voted the death penalty for unauthorized dissemination of “restricted data.”

The House had perhaps been impressed by the example set by the officials of the Manhattan District. Seldom have the military guardians of our national security so convincingly demonstrated their whole-hearted and uncritical loyalty to the institutions of our system as in their devoted adherence to the ritualism of patent procedures during the development of the atomic bomb. A brief but impressive demonstration of this loyalty is provided in the testimony before the Senate Special Committee of one Captain Robert A. Lavender, U.S.N., Retired, Chief Patent Adviser to the Office of Scientific Research and Development. Captain Lavender, having revealed that there were patents on file covering every detail of atomic energy development, immediately soothed the fears of the senators by assuring them that these patents had had “special handling,” that no more than a few people were acquainted with their contents, and that the patents were kept “in separate safes” in the Patent Office. The senators were particularly perturbed as to the status of the data on the atomic bomb itself. Captain Lavender reassured the Committee that the economy was safe, that infringement suits against the government need not be feared, “that the bombs are covered by applications.” But the Chairman, Senator McMahon, persisted in his puzzlement. “I wonder,” he asked, “what is the necessity for covering the bomb itself by applications for patents.” Captain Lavender replied cogently: “Well, it is very important for this reason: I knew that as soon as the bomb went off there would be a great deal of speculation among various scientists and others, engineers, who had not been connected with the project. I knew that a great many applications would be filed in the Patent Office, so I was interested in having filed in the Patent Office these applications, so that if any applications were

filed and we got into interference, the Government would not be suffering the handicap of being the second one to file, because the first to file has a great advantage from an interference procedure point of view."⁶

Neither the Chairman nor Senator Millikin felt that this entirely met the causes of their disquiet, nor did Captain Lavender's disclosure of "another special handling"—a kind of special, special handling—for atomic bomb applications convince the Committee that the secrets had been as zealously guarded as the Government's legal rights. However, there can be little doubt that any private person who built an atomic bomb would be infringing on the property of the people of the United States, and liable to a civil suit.

In the end, the Senate provisions were accepted, and the patent section as enacted emerged radical and untempered. While taking meticulous care that no property rights should be modified without adequate compensation, and that future discoveries and inventions should be suitably rewarded, Section 11 revokes all patent rights, present and future, which might endanger the security of the country or interfere in any manner with the full development of atomic energy—both in its military and non-military applications. Where the privileges of the patent system seemed to hold a threat to the national security, they were altogether abandoned. Where there was doubt that patents issued in the field of atomic energy would serve as a spur to inventive genius and contribute to development, and the possibility existed that such patents might be used to stifle development or to strengthen monopolistic practices, the system was modified. The resulting provisions make a unique pattern among American institutions. All patents are abolished in certain areas monopolized by the government, and sweeping government control is established in all other parts of the general field. The Atomic Energy Commission, under the policy directives of the Act, is required to use these powers to promote private enterprise, to develop and utilize atomic energy, and to strengthen free competition. Coupled with these policy objectives, Section 11 can be interpreted as a recognition of the fact that, as it normally operates, the patent system does not inevitably generate these results, and that at least in the field of atomic energy, if they are to be realized, powerful and continuing assistance may be required.

The atomic energy control system is complicated because the Act distinguishes sharply among the types of activities in the field, and attempts to apply to each activity a control no more drastic than its character requires. The major divisions of activity in the field of atomic energy were established as follows: transactions involving source materials; the manufacture of devices for the production of fissionable material; the production of fissionable material; the production of military weapons utilizing fissionable material or atomic energy; the utilization of fissionable material or atomic energy for medical therapy; the utilization of fissionable material or

⁶ *Hearings before Senate Special Committee on Atomic Energy on S. 1717*, 79th Cong., 2d Sess. 345-347 (1946).

- I. Production devices for fissionable material
 - I. A. Production facilities proper (probably essential devices)
 - 1. Useful solely for this purpose
 - 2. Multiple-use
 - B. Devices used in production, but not production facilities proper
 - 1. Useful solely for this purpose
 - 2. Multiple-use
- II. Military devices utilizing fissionable material or atomic energy
 - A. Military weapons (probably confined to finished weapons or essential components)
 - 1. Useful solely for this purpose
 - 2. Multiple-use
 - B. Devices used in utilization of fissionable material or atomic energy for military weapons, but not weapons proper
 - 1. Useful solely for this purpose
 - 2. Multiple-use
- III. Research
 - III. Any inventions or discoveries inside or outside field of atomic energy which are used in research or development in atomic energy
- IV. Non-military utilization devices
 - A. Non-military utilization devices proper:
 - 1. Industrial and commercial
 - (1) useful solely for this purpose
 - (2) multiple-use
 - 2. Medical therapy
 - B. Devices essential to utilization, but not utilization devices proper

- I. A. Manufacture by licensees only; use controlled by limitations on production of fissionable material
 - 2. Manufacture by licensees only; no restriction on non-atomic energy uses*
- B. 1. No restriction on manufacture; use controlled by limitations on production of fissionable material
 - 2. No restrictions on manufacture or non-atomic energy uses
- II. A. 1. Manufacture with Commission's permission only; use by government
 - 2. Manufacture with Commission's permission only
- B. 1. No restriction on manufacture; use by licensees only
 - 2. No restriction on manufacture or non-atomic energy uses
- III. No restrictions on manufacture or use
- IV. A. 1. (1) Manufacture and use by licensees only
 - (2) Manufacture by licensees only, no restriction on use for non-atomic energy purposes
 - 2. No restrictions on manufacture or use
- B. No restrictions on manufacture or use

- I. A. 1. Revoked in full §11(a)(1)
 - 2. Revoked with respect to atomic energy use† §11(a)(2)
- B. 1. Revoked in full §11(a)(1)
 - 2. Revoked with respect to atomic energy use† §11(a)(2)
- II. A. 1. Revoked in full §11(a)(1)
 - 2. Revoked with respect to atomic energy use† §11(a)(2)
- B. 1. Revoked in full §11(a)(1)
 - 2. Revoked with respect to atomic energy use† §11(a)(2)

- III. Revoked, to extent invention or discovery used in research and development in field of atomic energy §11-(b)
- IV. A. 1. Patents covering such discoveries can be declared affected with public interest, and thereby made available to any license holder under Sec. 7 of the Act (covered by column 3 of this table) to extent required for carrying out purpose of licenset §11-(c)
 - 2. No provision—undoubtedly an oversight in drafting. Medical devices can be patented, and patent rights in no way modified except that such patents are subject to the Commission's condemnation powers.
- B. (Same as (A) above)

* Considerable latitude is given the Commission in defining production facilities. In the case of multiple-use devices where no security considerations are involved and the uses outside the field of production of fissionable material are extensive or important, the Commission will probably exclude the device from the classification.

† Also subject to condemnation powers of Commission. §11(d).

atomic energy for commercial and industrial purposes; and research and development on any of the above, as well as in nuclear processes and the theory of atomic energy. The breakdown of functions for purposes of the system of patent controls is somewhat less complex; but the categories established roughly parallel those of the general control system. Together, the patent provisions and controls serve as integral parts of one general system, as will be seen in the chart on page 749, which summarizes much of the material in this paper.

I

DEVICES USED IN PRODUCTION OF FISSIONABLE MATERIAL AND MILITARY WEAPONS

A. Single-Use Devices

The Act prohibits the patenting of any invention which is "useful solely in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon."⁷ Patents of this description now in force are expressly revoked, with the proviso that "just compensation shall be made therefor."⁸ Here, as in the establishment of a production monopoly for fissionable material and of information controls, there is clearly shown the determination of Congress to preserve at any cost the safeguards deemed necessary for national security. In this instance the subject matter to be safeguarded is the data of nuclear physics and nuclear engineering. Only by removing from the normal routine of the patent system inventions and discoveries incorporating such data can the information be kept, even briefly, in a restricted status.

While the scope of this section seems extremely sweeping, its practical implications should not be exaggerated. Under other provisions of the Act the inventor of a production device could not, were he able to secure a patent, manufacture the device without a license from the Commission, or utilize the invention himself, or license its use to anyone other than the Government. Since he is assured of a reward commensurate with the novelty, utility, and importance of his invention under the compensation provisions, the denial of patent rights should for him have little more than semantic significance. This is particularly true since, under an existing statute,⁹ the inventor of a device desired by the Government for its own use can neither withhold it from the Government nor even fix the royalty, which is determined by the Court of Claims.

Similar principles hold for devices useful solely in the utilization of fissionable material or atomic energy for a military weapon: the device cannot be manufactured except with the express authorization of the Commission; the Government alone is authorized to use an atomic energy weapon; adequate compensation will be paid to the inventor for any useful military device. Under these circumstances, to deny the inventor patent rights is to deprive him of nothing of practical value.

⁷ 60 STAT. 768, 42 U. S. C. A. §1811(a)(1) (Supp. 1946).

⁸ 60 STAT. 768, 42 U. S. C. A. §1811(a)(2) (Supp. 1946).

⁹ 36 STAT. 851 (1910), as amended, 35 U. S. C. §68 (1940).

The discussion so far has been confined to the inventions and discoveries of the future. Many private patents, embracing devices and processes basic to the production and use of fissionable material, were, however, granted before the adoption of the Atomic Energy Act. According to testimony before the Senate Special Committee, all of the principal inventions for which patent applications were filed were assigned to the government.¹⁰ Whether or not the public interest in this project, financed entirely at public expense, was in fact so scrupulously served is known for certain only to the select fraternity who were made cognizant of the contents of Captain Lavender's "separate safes" at the Patent Office. In any event, all outstanding private patents are automatically revoked by this subsection, and the appearance or non-appearance of claims for compensation will constitute the best evidence on the subject.

How is a manufacturer (and patent owner) of a presently existing device for the production of fissionable material (or for its utilization in a military weapon) affected? To begin with, it should be recalled that the manufacturer of a production facility (or an atomic weapon) cannot continue such manufacture without a license from the Commission.¹¹ If he receives a license, he may continue to produce the device for the use of the Commission even though his patent rights are revoked. Revocation of the patent rights, however, permits the Commission at its discretion to license other manufacturers to produce the same device. Presumably, in determining the compensation to be awarded to the patentee the number of such licenses will be considered. In other words, the amount of royalties the inventor could have earned by licensing or otherwise, had his patent not been revoked by this subsection, is the main factor to be weighed in fixing his compensation.

B. Multiple-Use Devices

The treatment under the Act of inventions useful *solely* in the production of fissionable material or military weapons is a relatively straightforward matter. Inventions with multiple uses—*i.e.*, useful both in the field of atomic energy and in other fields—present a more difficult problem. Section 11(a)(2) revokes every patent on an invention or discovery having multiple uses "*to the extent that such invention or discovery is used in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon.*"¹² Just compensation is also required for patents partially revoked pursuant to this section.

Complicated problems will certainly arise in determining when a device is "used in" the production of fissionable material. The sub-section in question contains no qualifying language and may be construed to cover every possible tool, machine, process, etc., which is or could be used to keep the Oak Ridge or Hanford installations in operation. The device need not be "specially designed" (*cf. com-*

¹⁰ *Hearings* cited *supra*, note 6 at 342.

¹¹ 60 STAT. 759, 42 U. S. C. A. §1804(e) (Supp. 1946).

¹² 60 STAT. 768, 42 U. S. C. A. §1811(a)(2) (Supp. 1946).

ponents of production facilities—Section 18(g));¹³ it need not be “peculiarly adapted” (*cf.* utilization equipment—Section 18(f));¹⁴ it need not be “essential” for the production of fissionable material (*cf.* condemnation authority—Section 11(d)).¹⁵ Whether the patent covers a stepladder, a hammer, a pump, an electrical transformer, a cyclotron, a chemical process, or an industrial design for supporting concrete flooring; whether or not the device (or process) is peculiarly useful or essential in the production of fissionable material—all of these factors are immaterial if the device is in fact used in such production.

Here again, its scope is a poor guide to the section’s practical applications. Consider, for example, the case of high-vacuum pumps. These pumps, useful in certain phases of isotope separation, are also useful in other industrial processes. As sole producer of fissionable material, the Commission will probably buy the pumps rather than make its own. Most likely it will procure them from the patentee or one of his licensees. But since patent rights in the pump are revoked in so far as it is employed in the production of fissionable material, the Commission may purchase pumps from other manufacturers licensed by it. Research institutions in this field may also buy pumps from these other manufacturers if the Commission licenses them. Unless the Commission grants a license under Section 4(e),¹⁶ no manufacturer may take advantage of the partial patent revocation. As a matter of practice, the Commission will probably do so only when there is a real object to be served in so doing. The determination of just compensation in cases involving partial revocation is likely to prove difficult and vexatious, and the Commission will hardly undertake to buy from a manufacturer not authorized under the patent without reason.

II

DEVICES USED IN RESEARCH

In the treatment of patents there is accorded to research the same status of privilege which it enjoys throughout the Atomic Energy Act. Section 11(b) emancipates from the scope of the patent system “any invention or discovery to the extent that such invention or discovery is used in the conduct of research or development activities in the fields specified in Section 3.” This section, it will be recalled, embraces all research in nuclear science and in the many fields—medicine, engineering, chemistry—applying the knowledge gained through nuclear explorations.

Existing patents are revoked “to the extent” the inventions they cover are used in research; patents “granted hereafter” confer no rights as regards use in research; just compensation is to be made for every partial revocation of an existing patent.

The general purposes of this section are three: one, to permit the use of apparatus in the conduct of research free of patent restrictions and characteristic patent abuses;

¹³ 60 STAT. 774, 42 U. S. C. A. §1818(g) (Supp. 1946).

¹⁴ 60 STAT. 774, 42, U. S. C. A. §1818(f) (Supp. 1946).

¹⁵ 60 STAT. 768, 42 U. S. C. A. §1811(d) (Supp. 1946).

¹⁶ 60 STAT. 759, 42 U. S. C. A. §1804(e) (Supp. 1946).

two, to permit research workers to construct their own apparatus without fear of infringing on existing patents and without being forced to seek licenses or pay royalties; three, to encourage, or at least to remove obstacles to, the improvement of existing scientific apparatus by rendering less profitable the expedient of suppressing inventions.

To clarify the meaning of this subsection it will be necessary to consider two types of devices: those which fall unambiguously in the class of scientific instruments, useful solely for research; and those which are used in experimental work but serve other purposes as well.

The cyclotron may be taken as an example of the class of scientific instruments useful solely in nuclear research. Assume that *A* holds patents on a certain type of cyclotron, and manufactures it for commercial distribution. It is not to be inferred that the patents held by *A* are automatically revoked as they would be if the device which they covered were, for example, useful solely in the production of fissionable material. The patentee retains the exclusive right to make, sell or use the cyclotron for any purpose other than atomic research. But there is a partial revocation of *A*'s patents with the following consequences:

(1) It is permissible to make¹⁷ a replica of *A*'s product, for use in one's own research, without infringing *A*'s patents;

(2) It is permissible to make a replica of *A*'s product (or to purchase one of his cyclotrons) for the purpose of redesigning or improving the instrument itself. In other words, *A*'s cyclotron may be used as a subject of research, as distinguished from a tool in the course of research, and this activity also may be conducted independently of *A*'s patents rights. It should be noted that under the well-established legal doctrine of "experimental use," the reproduction of a patented device for the purpose of experimenting on the device itself is not deemed a patent infringement. But judicial decisions in such cases are neither uniform in reasoning nor consistent in result, particularly in actions for patent infringement where the defendant has been found to be experimenting with a "commercial incentive." Such crevices of uncertainty seem to be sealed by the language of the Atomic Energy Act. Since subsection 3(a)(2) provides for research on "processes" and "devices," and since the present subsection (11(b)) covers the use of inventions in the course of the research described in Section 3, there can be no doubt that the "incentives" of the research worker have no bearing on his exemption from patent restrictions.

(3) It is not permissible either to manufacture a replica of *A*'s product for, or to sell such a replica to, a person who will use it in research, even nuclear research.

There remains for examination the class of multi-use devices in the field of nuclear research. Here again, the principles noted with respect to multi-use devices in production and in military weapons apply. Consider, for example, the case of a

¹⁷ The law reads: "to the extent that such invention or discovery is used in the conduct of research." Strictly, "use" may be distinguished from "make," but the intent to free atomic research from a patent owner's unwillingness to make or sell his invention would be thwarted if this interpretation were not adopted.

manufacturer of a patented electrical transformer which, in addition to certain industrial uses, is valuable for research in the chemistry of plutonium. So far as this provision is concerned, he continues to hold his patent rights against all users except those using the transformer in the course of nuclear research.

Compensation, it will be noted, is provided only for partial revocation of *existing patents*. Future patents confer no rights with respect to inventions used in the conduct of research. Determination of such compensation is not likely to prove too troublesome. While scientists may build their own apparatus, in practice they, or the institutions with which they are affiliated, will probably continue to purchase the instruments needed for research from the manufacturer, who, in turn, is the patent owner or a licensee. With compensation dependent on "actual use,"¹⁸ neither the volume of cases nor the size of awards is likely to be substantial.

It should be remarked, however, that the term "development" is broader than research, including, as defined in the Act, the extension of investigative findings and theories "into practical application for experimental and demonstration purposes."¹⁹ The use of inventions in the conduct of research and development, free of patent rights, means something more than the use made by the occasional scientist tinkering or building his own tools in the laboratory. It means that industrial laboratories engaged in large-scale nuclear research—the production of atomic power, for example—can build all their facilities and apparatus without regard to outstanding patents. This may require substantial "partial revocation" awards to holders of patents existing at the time the Act went into effect.

III

NON-PRODUCTION AND NON-MILITARY DEVICES

In treating patents on devices of significance in the field of atomic energy, other than production or military devices, Congress sought to preserve the basic right to patent while eliminating the more glaring abuses which have come to mark the system.

Such devices may be of two sorts: (1) they may utilize fissionable material or atomic energy for industrial, commercial, therapeutic, or other purposes, or (2) they may be altogether outside the field of atomic energy but nevertheless essential to the utilization of fissionable material or atomic energy. For the sake of convenience, we shall hereafter refer to devices of the first sort as "ordinary atomic energy devices," and to those of the second as "ancillary devices."²⁰

Manufacture of the ordinary atomic energy device will require a license issued by the Commission pursuant to the provisions of Section 7 of the Act. But the Act

¹⁸ 60 STAT. 768, 42 U. S. C. A. §1811(e)(3) (Supp. 1946).

¹⁹ 60 STAT. 774, 42 U. S. C. A. §1818(e) (Supp. 1946).

²⁰ It is impossible for a layman to say with any certainty just what an ordinary atomic energy device might be. The reader is at liberty to conjure up his own private marvels, but to give aid to those whose imaginations do not respond immediately to this stimulus, we suggest as a plausible device a small reactor, burning nuclear fuel, which would be used to propel a ship.

requires of the Commission an interest in the ordinary device which extends greatly beyond the mere licensing of its production. It is charged with the carrying out of a declared policy which will assure that "the development and utilization of atomic energy shall, so far as practicable, be directed toward improving the public welfare, increasing the standard of living, strengthening free competition in private enterprise . . .";²¹ it is required to administer "a program for government production, ownership and *use* of fissionable material . . . to insure the broadest possible exploitation of the fields."²² To effect these policies, the Commission will need to maintain a firm and continuing supervision over ordinary atomic energy devices, and to make certain that patents on devices essential to the utilization of atomic energy shall not be permitted to obstruct developments.

When the patent application on the ordinary device is filed, the Patent Office will notify the Commission. In the case of ancillary devices, the probability is that the initiative in securing a declaration that a patent is affected with public interest will be taken by some licensee who finds that his operations are being hampered by his inability to use the device in question. In any case, the Patent Commissioner is required to provide the Commission access to applications filed. The Commission may, if it thinks the situation warrants, declare a patent in either category—that is, covering an ordinary atomic energy device or an ancillary device—"affected with the public interest." The making of this declaration has the following effects:²³

(1) The Commission is automatically licensed to use the device covered by the patent "in performing any of its powers under the Act";

(2) Any person to whom a license has been issued under Section 7 is authorized to use the patent declared so affected to the extent the invention it covers "is used by him in carrying on the activities authorized by his license under Section 7."

What circumstances make it the "duty of the Commission to declare any patent to be affected with the public interest?" Section 11(c)(1) sets forth these criteria: (1) "the invention or discovery covered by the patent utilizes or is essential in the utilization of atomic energy"; and (2) the licensing of the invention or discovery under this subsection "is necessary to effectuate the policies and purposes" of the Act.

Any invention which is covered by the definition of an "ordinary atomic energy device" meets the first condition. But an ancillary device which does not utilize fissionable material may also be included so long as it is "essential" in such utilization. What is "essential?" Presumably, it is a device or component indispensable to the functioning of some other device which utilizes atomic energy. In medieval times a kingdom was allegedly lost for want of a nail; in our interdependent technology a gigantic war machine almost came to a halt because of a shortage of special one-inch aircraft screws.²⁴ In the air war against Germany the planners

²¹ 60 STAT. 755, 42 U. S. C. A. §1801(a) (Supp. 1946).

²² 60 STAT. 755, 42 U. S. C. A. §1801(b)(4) (Supp. 1946).

²³ 60 STAT. 768, 42 U. S. C. A. §1811(c)(2) (Supp. 1946).

²⁴ The famous wartime bottleneck involving the product of Jack and Heinz Precision Industries, Inc., Cleveland, Ohio.

agreed that ball bearings were essential to the whole economy and that ball-bearing plants must have first priority as targets. These examples are cited to show that "essential" as used in the text is essentially undefinable. It is likely that the Commission will first decide whether the licensing of an invention "is necessary to effectuate the policies and purposes of this Act"—the second condition, to which we shall turn in a moment—and, if this is decided affirmatively, then determine whether the invention is actually "essential." On occasion it may be necessary to adopt the tactics of Procrustes.

As for the second condition—that the licensing of an invention must be found "necessary to effectuate the policies and purposes of the Act"—this seems to confer upon the Commission a very broad discretion. It is clearly designed to empower the Commission, on broad social or economic grounds, to liberate any or all devices needed in the development of atomic energy from the coils of the patent system.

This section confers on the Commission sweeping powers to avoid and remove obstacles to the positive development of atomic energy in accordance with the constructive purposes of the Act. There is, however, one gaping omission which must be attributed to a flaw in draftsmanship. This is the failure to make any provision whereby the benefits of atomic energy developments in medical therapy can be made freely available. In their anxiety to provide maximum freedom for medical use of atomic energy, the legislative draftsmen exempted this category from the licensing provisions of Section 7. In drafting subsection 11(c), they provided that all patents declared affected with the public interest might be used by any person holding a license under Section 7. This exclusion of medical therapy was nowhere else corrected. Thus we have the interesting result that the use of a patent to extort unreasonable profits in, say, the utilization of an atomic energy battery is effectively prevented, but the inventor of an atomic energy device useful in the treatment of cancer is free to patent the device, and make such charges for it as the traffic will bear. If abuses develop in this field, it may be necessary to remedy this flaw by legislative amendment.

The powers of the Commission derived from subsection 11(c) must be regarded in conjunction with its licensing powers under Section 7. Together they form a single instrument of single purpose, namely, to promote the usefulness of atomic energy in the public interest. Materials, facilities, and scientific manpower are all limited. Within the bounds of its authority the Commission must, in effect, allocate resources to meet competing requirements. A system of priorities based on a policy reflecting the principal objectives of the Act must govern the allocations. The authority to license the manufacture of atomic energy devices is an integral part of any allocation policy. The complement of this authority is the authority to compel the licensing (and to fix royalties) of patents covering devices needed for such manufacture.

Without this compulsory licensing provision, the holder of a patent on an ordinary atomic energy device or an ancillary device might be in position to prevent

altogether the manufacture of some device—or even a number of devices—duly licensed by the Commission under Section 7. For the patented device might be an essential component of the other, and if the patent holder refused to license the use of his device, or demanded excessive royalties, the manufacturer licensed under Section 7 could get no relief. Thus the owner of a patent covering a device uniquely essential to the manufacture of several types of atomic energy devices could dominate the industry by the appropriate manipulation of his licensing power.

Compulsory licensing does not represent a startling innovation in the patent system of capitalist countries. A statute incorporating such a principle has been in force in the United Kingdom since 1883,²⁵ and a similar Act has been repeatedly urged in the United States during the past half century.

Proposals for compulsory licensing in the United States, however, have always been most bitterly opposed by the beneficiaries of the present system, since to remove the power to strangle competition is considerably to diminish the economic significance of patents. In the discussions of the patent section of the Atomic Energy Act in Congress, the compulsory licensing feature was the object of the most vehement attacks—some of them bordering on hysteria. A former assistant patent commissioner, for example, warned the House Military Affairs Committee that the patent section of the Act was copied directly from the Constitution of the U.S.S.R.—with minor changes to allow for the difference in idiom. The sensation created by this revelation was only slightly mitigated by the fact that the provision had been drafted by an eleven-man blue ribbon Senate Committee and had been adopted unanimously by the United States Senate.

IV

PROCEDURES FOR REPORTING PRODUCTION DEVICES AND MILITARY WEAPONS

With certain vital areas of nuclear technology in the non-patentable zone, the Commission instead of the Patent Office becomes the central agency to which inventors operating in these areas apply. Section 11(a)(3) covers the point adequately as follows:

(1) Any inventor or discoverer of a device or process useful in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon must file with the Commission within a specified time a detailed description of the device or process;

(2) The time specified is sixty days after the enactment of the Act (September 30, 1946) in the case of inventions and discoveries previously made, and, in the case of new inventions or discoveries, not later than the sixtieth day after such invention or discovery. This completion date is unavoidably a vague concept, and the Commission will probably be required to interpret it afresh in each new case arising under this subsection. The essential consideration should be the good faith of the inventor in reporting his accomplishment as soon as he has reason to believe it

²⁵ Patents, Designs & Trade Marks Act, 46 & 47 VICT. c. 57, §22 (1883).

workable and useful. The Commission's general inspecting activities in the field of atomic energy projects, and its authority to require periodic reports, should considerably simplify the enforcement problem in this field.

Since nuclear research and engineering is a new field, largely shrouded by security regulations, it may be expected that for some time to come inventions or discoveries will be made which will have significance for the production of fissionable material or for its utilization for a military weapon, without the inventor's being aware of the fact. In order to provide for this possibility, subsection 11(a)(3)(c) authorizes the inventor unaware of the significance of his invention to file application for a patent in the usual way, or, in the event he has not made such application, to file a report within sixty days after he first discovers or has reason to believe that his invention falls into the category established by this subsection.

Great skill will be needed for the effective enforcement of the provisions of this subsection. The Commission must have prompt and detailed reports on all new developments in atomic energy, in order to conduct its production and research programs, and it cannot assume that the provisions cited will automatically produce this result. The willing cooperation of the inventor must be enlisted; otherwise he can pretend that the invention is not yet "completed," or that he is unaware of its importance to atomic energy. Everything possible must be done by the Commission to correct misapprehension, wilfully cultivated by some of the opponents of the patent section, of the effect of these provisions, and to demonstrate that the Act neither destroys the patent system nor takes away the inventor's property without compensation. The examination of reports on new inventions, and the making of compensatory awards where the usefulness of the invention justifies compensation, should be accomplished with a minimum of "bureaucratic" delay. If it becomes recognized that the efficiency of the Commission in processing reports compares favorably with analogous procedures performed by the Commissioner of Patents, and that the compensation awarded inventors is based on a fair, consistent and comprehensive policy, cooperation will be readily forthcoming. Admittedly, the determination of awards will be among the most difficult functions to be performed by the Commission; but this is merely to say that the task merits extraordinary effort.

V

COMPULSORY LICENSING AND ROYALTIES

The Commission has authority to compel the licensing of patents, and thereby it can check the growth of monopoly and encourage competition in this new field. A provision for compulsory licensing requires a provision controlling royalties to complement it, for otherwise the patent holder could peg royalties at a prohibitive rate.

The Act meets this point by providing that "the owner of the patent shall be entitled to a reasonable royalty fee" which may be agreed upon by the owner and

licensee (under Section 7). But if they are unable to reach an agreement the royalty rate is to be determined by the Commission.²⁶

Supplementary support for the compulsory licensing and royalty fixing mechanism is provided in Section 11(c)(3). The principal features of this section are as follow:

(1) No court may enjoin a licensee, under Section 7, from using a patented invention declared to be affected with the public interest under Section 11(c)(1). While the licensee is automatically entitled to use such a patented invention, it will be recalled that he may do so *only* "to the extent such invention or discovery is used by him in carrying on the activities authorized by his license. . . ." Presumably, therefore, if the patented invention is used for purposes outside the scope of the license, a court of competent jurisdiction would *not* be prohibited from issuing an injunction in an action for infringement by the patent holder;

(2) Assume the court finds that the defendant licensee is actually using the patented device, but royalties have neither been agreed upon nor determined by the Commission. This circumstance might arise either where the licensee is unaware of the existence of a patent on the device used by him, or where, in his opinion, he is not actually infringing the patent. In that case the court shall "stay the proceeding until the royalty fee is determined pursuant to this section." The measure of damages, once the royalty is determined, is the royalty fee, "together with such costs, interest, and reasonable attorney's fees as may be fixed by the Court";

(3) Where royalties have been fixed by arrangement between the parties or by the Commission, and a licensee then fails to pay, "the patentee may bring an action in any court of competent jurisdiction" for his royalty fee, costs, etc.

VI

POWER TO REQUISITION AND CONDEMN PATENTS

In addition to the patent revocation and compulsory licensing authority, the Commission, under subsection 11(d), is authorized to purchase, take, requisition or condemn any invention or discovery useful in the production of fissionable material, useful in the utilization of atomic weapons, or which "utilizes or is essential in the utilization of fissionable material or atomic energy," as well as patents or patent applications covering such inventions or discoveries.

The scope of this authority parallels that of subsections 11(a) and 11(c). Thus patents on multiple-use production devices, military weapons, and utilization devices, only partially revoked or restricted by the provisions already discussed, may be wholly taken over by the Commission in the exercise of its condemnation power. It is also worth noting that while medical patents are not subject to compulsory licensing, they are nevertheless subject to condemnation as patents on inventions utilizing fissionable material or atomic energy.

This too is an innovation in governmental powers as regards patents, but it

²⁶ 60 STAT. 768, 42 U. S. C. A. §1811(c)(2) (Supp. 1946).

forms a logical supplement to the Commission's general authority in this field. It enables the Commission to deal speedily and effectively with uncooperative patent owners. It provides an instrument which may prove useful in protecting the national security. It is possible, for example, that multiple-use inventions useful in the production of fissionable material or in certain ordinary atomic energy devices might incorporate data which it is determined on security grounds should be restricted. Under its broad acquisition authority, the Commission could take over the inventions and patents and safeguard them until the data they incorporated has been removed from the restricted category. Since just compensation must be made in every case, and all awards, as will be seen below, are subject to court review, the property rights of patent owners are adequately protected.

The Commissioner of Patents is required to notify the Commission "of all applications for patents heretofore or hereafter filed" which in his opinion disclose an invention or discovery of the type which the Commission is empowered to acquire—that is, atomic energy devices of virtually every type. The Commissioner of Patents is also required to provide the Commission access to all such applications. While this provision is essential to the Commission's discharge of its function of acquiring patents, it is of considerable importance to the performance of certain other functions of the Commission as well. It provides the Commission with an invaluable source of information as to new technological developments, information useful in its research, engineering, and production programs, and should be useful as a supplementary check on monopolistic trends and in the enforcement of security controls. At every stage of the development of the applications of atomic energy, problems will arise jointly affecting the responsibilities of the Commission and the Patent Office. It is clear that the cooperation between these two agencies must not be limited to the formalism of the reporting provision of the present section, but must be vital, close, and continuous.

VII

COMPENSATION

A. Eligibility

Applications for compensation for patents wholly or partially revoked or for the establishment of royalty rates are to be considered by a Patent Compensation Board consisting of two or more employees of the Commission. Final determinations are subject to the approval of the Commission. The draftsmen of the Act made an earnest endeavor to set forth, as guides for the Commission, a framework of standards from which a coherent compensation policy might be evolved. Nevertheless, the Commission is certain to find performance of its functions in this area difficult and vexatious.

Before examining these standards it may be useful to list the classes of applicants eligible for awards:

1. The owner of a patent for production of fissionable materials or military

weapons, or which is useful in atomic energy research, may apply for just compensation;²⁷

2. The owner of a patent declared affected with the public interest may apply for the "determination of a reasonable royalty fee" for the use of his patent, or a licensee under Section 7 may apply for the same purpose;²⁸

3. The owner of any invention or discovery, or of any patent covering such discovery, which is taken by the Commission may apply for just compensation;²⁹

4. Any person making an invention or discovery useful in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon, and whose patent rights have been limited or abolished by subsection (a), may apply for an award.³⁰

This review of eligible persons reveals that *every* inventor of a device useful in the technology of atomic energy is eligible, according to circumstance, either for an "award," "just compensation," or "reasonable royalties."

B. Standards for Determining Compensation

The categories of persons entitled to compensation under the Act having been examined, there remain for consideration the standards which are established for the guidance of the Commission in making its findings. As set forth in subsection 11(e)(3), these standards are first described for the determination of royalties, and are then applied in toto to other types of compensation cases, supplemented by consideration of the actual use of the invention or discovery in question. An analysis of the provisions of this subsection follows.

In determining a "reasonable" royalty fee, the Commission is instructed to "take into consideration any defense, general or special, that might be pleaded by a defendant in any action for infringement. . . ." This, in effect, restates a general operating principle in patent law, often invoked in determining compensation to be paid patent owners whose inventions are used by or for the government without their consent. In other words, when the Patent Compensation Board weighs a claim for royalties on a patent, it may consider such factors as would have constituted a partial or total defense to a claim for royalties and damages in a court of law, had the same patent been the subject of an action for infringement.

The Commission is further instructed to take into consideration "the extent to which, if any, such patent was developed through federally financed research." This is an apparently unassailable general principle, but one which must be regarded as something less than firmly established for the whole field of federally financed research. The struggle to determine who shall be the beneficiaries of the discoveries and inventions made possible by the expenditure of government funds during the war has already been joined, though so far it has been concealed from public

²⁷ 60 STAT. 768, 42 U. S. C. A. §§1811(a)(1), 1811(a)(2), and 1811(b) (Supp. 1946).

²⁸ 60 STAT. 768, 42 U. S. C. A. §1811(c)(2) (Supp. 1946).

²⁹ 60 STAT. 768, 42 U. S. C. A. §1811(d) (Supp. 1946).

³⁰ 60 STAT. 768, 42 U. S. C. A. §1811(e)(2) (Supp. 1946).

attention.³¹ The Department of Justice wishes the government to retain control of patents on inventions produced by the expenditure of government funds, and to use the licensing of devices covered by these patents as a weapon for combating monopoly. Opponents of this radical and possibly effective means of achieving orthodox but for the most part merely pietistic ends have been vigorously, albeit silently, at work both outside and inside the government. Their chances to achieve their purpose—given the temper of the times—seem better than good. In the Atomic Energy Act, however, the principle is explicitly established. Since the release of atomic energy and its technology were, beyond any possible argument, made possible entirely by the expenditure of public funds, this is by no means a narrow application of the principle.

Thus, it is established that an atomic energy device incorporating scientific discoveries made as a result of the expenditure of public funds, or one developed in a federally financed project, is not to be regarded as private property, requiring the payment of royalties. A manufacturer is entitled to a fair profit for making such a device, but additional compensation in the form of royalties, when there is no risk and perhaps in some cases no originality involved, cannot be justified.

The Commission is required to consider also "the degree of utility, novelty, and importance of the invention or discovery." This is the heart of the valuation problem. Unfortunately it is also the most difficult. An invention to be patentable must be "new" and "useful." Yet these are conditions which, borrowing from the apt jargon of mathematical proofs, are necessary but not sufficient. How new? How useful? Inventions incorporating no more than petty improvements or variations proliferate at an amazing rate. The Patent Office is usually swamped with this species and the Commission may expect the same deluge when the technology of atomic energy has been more fully elaborated.

It should be noted that in attempting to set a price on "novelty" and "utility" no exact analogy is to be found in a hypothetical action for infringement. In an infringement action the damages awarded the patent holder may incorporate a punitive element in addition to the loss of profits sustained by the plaintiff. In determining royalties under the Act, the punitive factor will not be present, except that where royalties were previously fixed and the licensee under Section 7 failed to pay, or where the licensee knowingly infringed on an existing patent, the licensee may be liable for damages and costs in addition. Moreover, the determination of reasonable royalties, on the basis of hypothetical profits which might be derived from the sales (if sales were permitted) of untried devices in an unknown field, presents problems which would tax the powers of a corps of clairvoyants. The Commission must undertake the task aided only by such perception as lawyers, economists, scientists, and businessmen can bring to bear. The onus of demonstrating

³¹ However, a real beginning has at last been made in the Attorney General's patent report. See U. S. DEP'T OF JUSTICE, INVESTIGATION OF GOVERNMENT PATENT PRACTICES AND POLICIES, REPORT AND RECOMMENDATIONS OF THE ATTORNEY GENERAL TO THE PRESIDENT (3 vols. 1947).

the novelty and utility of the device must fall on the applicant, and the Commission will probably maintain an attitude of open-minded and judicious skepticism. The task will be most difficult in the early stages, and will become easier with the growth of experience and a body of precedents.

The Commission "may consider the cost to the owner of the patent of developing such invention or discovery or acquiring such patent." This factor was deliberately made optional, for in developing any invention the financial investment may vary from a small sum to an amount out of all proportion to the value of the final product. In the realm of ordinary commercial affairs, where the cost of developing a device has been unduly high royalties can be fixed at a level sufficient fully to cover costs only if the device is of key importance and satisfactory substitutes are not available. Possession of such a device may enable the patent holder to gain a dominating position in the economics of an entire industry. Charged with carrying out the broad social and economic objectives of the Act, the Commission, of course, cannot permit royalties on key devices to be fixed so high that small manufacturers are excluded from the field. In some instances it may be necessary for the Commission to acquire a patent outright in order to accomplish the dual purpose of making the invention it covers widely available, and of compensating the patent holder for costs incurred. When the Commission acquires a patent on a device and makes it available for use by private persons, it may decide to charge a moderate royalty fee sufficient over a period of years to recoup its outlay. The Act does not explicitly authorize this procedure but it is reasonable to infer that it would be justified.

In addition to these provisions, which by guaranteeing fair compensation seek to encourage private invention, the Commission has authority under Section 3 to finance private research projects under appropriate financial arrangements. In consonance with the general policy objectives of the Act, it appears that the Commission should make inventions developed under this arrangement fully and freely available. If this is indeed the policy followed, it is to be expected that industry will normally prefer to finance its own projects except when these involve large expenditures coupled with tenuous prospects of success. Nevertheless, arrangements made under this authority may be very important in contributing to the work of independent inventors who are hampered in their investigations by inadequate funds.

The same considerations apply to the determination of compensation for the various types of patents wholly or partially revoked under subsections 11(a), 11(b), and 11(d), and for the granting of awards authorized by subsection 11(e)(2)(C), to persons not entitled to compensation under the subsections cited. In addition to these considerations the Commission is required to take into account "the actual use of such invention or discovery." The Commission is given discretion to pay the amount decided upon either in a lump sum or in periodic payments.

C. Judicial Review of Compensation

Any inventor or patent owner dissatisfied with the amount or terms of the award or royalty set by the Commission may obtain a judicial review of the Commission's

determination. The procedure to be followed is similar to that established in other regulatory statutes, such as the Federal Trade Commission Act, the Securities Exchange Act, and the Federal Communications Act. The aggrieved person files in the Court of Appeals for the District of Columbia a written petition asking that the determination be set aside. The Commission, upon being served with a copy of this petition, files with the Court a certified transcript of the entire record. The Commission's findings of fact are conclusive if supported by substantial evidence, and the case is decided upon this record, the Court having the authority to affirm the determination of the Commission in its entirety or to remand it to the Commission for further proceedings.

The requirement that the review proceedings be brought in the Court of Appeals for the District of Columbia follows the Federal Communications Act. The facts in these cases will usually be complex and often involve restricted data; limiting review to a single appellate court should serve the double purpose of enabling the court to develop experience in the field of atomic energy and holding to a minimum the number of judges to whom confidential material is entrusted. In reviewing the Commission's determinations the court is governed by the terms of the Administrative Procedure Act, which provides that the only ground for setting aside such an administrative determination is that it is arbitrary, capricious, or not supported by substantial evidence.³² The Court's decision is subject to further review by the United States Supreme Court if certiorari is granted upon petition of the Commission or any party to the court proceeding.

VIII

CONCLUSION

Upon analysis, this painstakingly fair and even generous section of the Act seems scarcely to merit the extravagant abuse which has been directed against it. The section takes scrupulous care that no rights are infringed without just compensation, and that no future discoveries or inventions in the field of atomic energy shall fail of adequate reward. What it does, of course, is to intrude rudely into certain sanctuaries of the patent system regarded as sacred, not by scientists and inventors, but by practitioners of the art of economic manipulation. The conclusion is difficult to escape that these were the persons offended, and that the aspect of the patent provision which outraged them most was not its failure to make adequate financial compensation for any property rights it impaired, but the simple and efficient way in which it eliminated from a whole vast area of enormous potential economic significance all possibility of manipulating patents as an instrument for achieving privileged position and monopoly control.

³² 60 STAT. 243, U. S. C. A. §1009(e) (Supp. 1946).