



1960

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Recommended Citation

Rathuel L. McCollum, Organized Scientific Research and Intellectual Property, 9 Clev.-Marshall L. Rev. 47 (1960)

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Organized Scientific Research and Intellectual Property

Rathuel L. McCollum*

ORGANIZED RESEARCH and planned invention by highly trained specialists are now fundamental parts of the American scene. Invention-to-order has become "big business" with all of its ramifications.

The purpose of this article is to analyze some of the legal problems associated with inventions and patents that come into being as a result of scientific research.

Invention and Discovery Distinguished

The Constitutional provision regarding intellectual property¹ has been treated earlier in this Symposium. The patent law² also is discussed elsewhere in this Symposium.

An *invention* differs in essence from a *discovery*. The former term applies to the creation of something that did not exist before. A discovery denotes the act of finding that which was already in existence but which was unknown. We may speak of the discovery of the electron, the neutron, the properties of light, etc., whereas the electronic tube, the automobile, the airplane and many other useful devices are inventions.

One of the important reasons for making a clear distinction between invention and discovery is to know to what extent an inventor may assert his rights. This factor is especially important to the research scientist who may make a scholarly discovery in his laboratory. For example: The first experimental proof of the existence of the neutron was provided by Chadwick³ when he bombarded the element beryllium with high-speed alpha particles. Others who had performed similar experiments had assumed that the results of their bombardment had produced gamma rays. But Chadwick deduced that the particles were of neutral charge having masses close to that of a proton. Thus, they were called neutrons. The work of Chadwick led to the "discovery" of neutrons, i.e., the particles existed in nature already, just waiting to be found. However, Szilard and Chalmers *devised a method of detecting neutrons*,⁴ and, though that was not their intention at the time, it was an "invention."

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¹ U. S. Const. Art. I, § 8.

² 35 U. S. C. A. §§ 1, et seq.

³ Chadwick, A136 Proc. Roy. Soc. London 692 (1932).

⁴ Szilard and Chalmers, 134 Nature 462 (1934).

The courts have wrestled with the distinction between invention and discovery. In the case of *Pyrene Mfg. Co. v. Boyce* the court stated:

“Invention” is a concept or thing evolved from the mind and is not a revelation of something which existed and was unknown, but the creation of something which did not exist before, and possessing elements of novelty and utility in kind and measure different from, and greater than, what the art might expect from skilled workers.⁵

For more explanation on this subject we turn to another case, where it was stated by the court that:

Quite clearly discovery is something less than invention. . . . Discovery may be the result of industry, application, or be perhaps merely fortuitous.⁶

With the foregoing explanation in mind, we turn to the extent of the patent grant. What the patentee secures from the Federal Government is a grant for a term of seventeen years of the *right to exclude others from making, using or selling his invention throughout the United States.*⁷ The term “United States” as used in the Patent Act means the United States of America, its territories and possessions.⁸

Thus we arrive at what the proper interpretation of the constitutional provision should be as it concerns inventions: *The Congress shall have the power to promote the progress of science and useful arts, by securing for limited times to inventors the exclusive right to prevent others from making, using or selling their respective inventions throughout the United States of America, its territories and possessions.*

Corporate Research Laboratories

Many large corporations maintain laboratories devoted to scientific research. Some of the work is designed to improve products of the companies, and much of it at times is directed toward pure research, *i.e.*, exploring the mysteries of nature.

A large number of patents granted are the property of corporations. Although a corporation may not apply for a patent in its own name, it may become the assignee of the rights to a patent or patent application, by an instrument in writing.⁹ Only natural persons may file applications for patents in the United

⁵ *Pyrene Mfg. Co. v. Boyce*, 292 F. 480 (3d Cir. 1923).

⁶ *A. O. Smith Corp. v. Petroleum Iron Works Co. of Ohio*, 73 F. 2d 531, 538 (6th Cir. 1934).

⁷ 35 U. S. C. A. § 154. See also *United Shoe Machinery Corp. v. U. S.*, 258 U. S. 451, 42 S. Ct. 363, 66 L. Ed. 708 (1921).

⁸ 35 U. S. C. A. § 100(c).

⁹ *Id.* § 261.

States Patent Office, but there is no limitation on assignment to corporations.¹⁰ Therefore, where a corporation hires scientists to conduct experimental research, it seems to follow that any inventions resulting therefrom must be assigned to the employer by the inventor.

It could hardly be imagined that a corporate board of directors would authorize expenditures for research without patent protection. Competitors would not need to incur these expenses if they could use freely any product developed by another company. Industrial research would not be maintained at its present pace without the protection of the patent system. This view is stated well by Judge Frank in a concurring opinion:

We may not need patents as a reward to inventors. Modern industrialism owes much to the ideas of Faraday, who cared nothing for money. . . .

But if we never needed, or do not now need, patents as a bait for inventors, we may still need them in some instances as a lure to investors. It is sometimes said that there is no need thus to coax investors, because our giant corporations, with their research laboratories will, without such bait, do the needful. The answer perhaps is that industrial history discloses that those corporations, at times and to some extent, have been prodded into undertaking such research and into developing improvements because of the threat of competition from occasional "outsiders," armed with patent monopolies, and supplied with funds by a few private enterprises. Thus, paradoxically, monopoly may evoke competition: The threat from patent monopolies in the hands of such "outsiders" may create a sort of competition—a David versus Goliath competition—which reduces the inertia of some huge industrial aggregations that might otherwise be sluggish.¹¹

What is developed in the industrial laboratory for one purpose often is useful in other fields. Research on metals for military applications may be useful in the production of automobiles, airplanes and household appliances. However, the corporation research director must strike a proper balance between that which leads to short-term profits to satisfy investors and that which makes for long-term advancement of the company's industrial position.

New incentive was given to industrial laboratory research in 1954 by making certain expenditures for experimental research tax deductible as current expenses.¹² The estimated expendi-

¹⁰ Woodling, *Inventions and Their Protection*, § 4.05 (2d ed. 1954). See also 1 Oleck, *Modern Corporation Law*, § 32 (1958).

¹¹ *Picard v. United Aircraft Corp.*, 128 F. 2d 632, 642 (2d Cir. 1942).

¹² 26 U. S. C. A. (Int. Rev. Code of 1954) § 174.

ture for research and development in the United States for the current year is ten billion dollars.¹³

Importance of Laboratory Records

One of the most important laboratory documents is the book that is used as the original record of experimental research.¹⁴ The factual information contained in the log book, along with supporting documents, serves as proof of invention. The conception of an invention is proved by a disclosure to another who understands the invention. Therefore, it is a *must* that the person who is used as a witness be one who is competent in the field of investigation from which the invention was developed.

Often the testimony of a corroborating witness is necessary in an interference proceeding in the Patent Office. The only issue in such a proceeding is the determination of priority of invention. Each of the claimants to the particular invention seeks to prove that he was the first inventor. An invention must be conceived and reduced to practice before it is complete in the Patent Law sense. The one who was first to conceive the invention and first to reduce it to practice will be awarded the patent upon presentation of adequate proof. Independent testimony of one who witnessed the use of the invention on the date claimed by the inventor goes far towards establishing priority of invention. Merely having a witness sign the record of conception is not sufficient proof of invention. The witness to a scientific invention should be a person not directly connected with the experiment but who understands the procedure that was used. He must be able to testify to the facts shown as proof of invention. Therefore, the experiment should be repeated in his presence and it is prudent to have him verify the work.

Sometimes proof of reduction to practice is extremely difficult where scientific inventions are involved. Depending on the nature of the acts involved in the research, proof of invention will vary greatly. Where certain laboratory tests are used widely in a particular industry for control purposes to ascertain that the article is acceptable, such tests may amount to reduction to practice of the invention.¹⁵

The parties in an interference proceeding will be presumed to have made their inventions in the chronological order of the filing dates of their applications.¹⁶ The burden of proof is upon the one who seeks to show that a different state of facts exist. For this reason, it is important that experimental research be

¹³ Cleveland Plain Dealer, Oct. 20, 1959, p. 27. (Syndicated column by Sylvia Porter.)

¹⁴ See generally Wise, Patent Law in the Research Laboratory (1955).

¹⁵ Corona Cord Tire Co. v. Donovan Chemical Corp., 276 U. S. 358, 48 S. Ct. 380, 72 L. Ed. 610 (1927).

¹⁶ U. S. Pat. Off. Rules of Practice, Patent Rule 257.

dated at the time when it is done, irrespective of whether or not the results are in conformity with what is deemed important by the researcher. In many instances the scientist may make an invention before he realizes that it is within the scope of patent protection.

Reports to superiors may also form important links in the chain of proof of invention. Usually the scientific investigator obtains permission to engage in a particular research project. This permission should be in written form because that is the starting point in the investigation. Purchase requests, invoices and other records form a part of the history of an invention.

Joint Research and Joint Invention

An extreme view of what constitutes invention by research scientists is that of the court in the case of *Potts v. Coe*.¹⁷ There, it was asserted that invention cannot occur as a result of group effort in organized research. The opinion stated:

. . . A step forward which, considered in connection with the highly developed condition of the art, might reasonably be expected from the research of highly trained specialists is not invention. Thus neither the result of great industry in experimental research nor the successful product of a gradual process of experimentation over a period is invention. Routinering, even by the most highly trained specialists, step by step improvements, the carrying forward of a new and more extended application of the art, are not invention. . . .¹⁸

Such a view adopts the much maligned "flash of creative genius" theory of invention.¹⁹ That theory was criticized severely in a case two years later, where the court stated:

Particularly in the field of medical science would a test of a flash of genius seem inappropriate. Take the vitamin field, insulin, aspirin, the field of anaesthetics, chloroform, ether, gases, etc., and the recent highly dangerous but valuable drug, sulfanilamide. Laboratory work of a decade is behind each discovery. No flash of genius, however brilliant it may be, can quite take the place of the inquiring mind and the many tests with rat and the guinea pig.

The test of a "flash of genius" should be rejected not only because it is incapable of acceptable definition but because it injects into the statute something not appearing therein. The Federal decisions covering a century contain many to the effect that *it is the fact of accomplishment,—*

¹⁷ *Potts v. Coe*, 140 F. 2d 470 (D. C. Cir. 1944).

¹⁸ *Id.*, at 472.

¹⁹ *Cuno Engineering Corp. v. Automatic Devices Corp.*, 314 U. S. 84, 62 S. Ct. 37, 86 L. Ed. 58 (1941); *Automatic Devices Corp. v. Sinko Tool Mfg. Co.*, 314 U. S. 94, 62 S. Ct. 42, 86 L. Ed. 65 (1941).

novelty appearing, rather than the method of accomplishment with which judicial inquiry is concerned.²⁰ (Emphasis by the court.)

Two patent provisions in the new Act laid to rest the "flash of creative genius" test of invention as follows:

Patentability shall not be negated by the manner in which the invention was made.²¹

When an invention is made by two or more persons jointly, they shall apply for patent jointly and each sign the application and make the required oath, except as otherwise provided in this title.²²

Furthermore, it is of no consequence which part each joint inventor contributed to the effort, as long as the experiment that finally succeeds was conducted by them or under their united supervision, and in accordance with theories or ideas that were contributed by both of them.²³ A joint invention, *per se*, is one in which the contributions of the individual inventors are not severable and identifiable.

The joint projects found in scientific research laboratories frequently cause a problem when an attempt is made to determine who is the inventor of a particular item. One person may conceive of an invention and another person may reduce it to practice, the latter working under the direct supervision of the former. In such an instance the one who conceived the invention would be the inventor. However, if the second person makes valuable suggestions that alter the original conception but do not supersede it, the two persons are joint inventors.

Ownership of Inventions and Patents

Scientists who work in research laboratories usually sign employment contracts that require them to assign to their employers all of their inventions that come within the scope of the employers' activities. If an inventor executes an agreement to assign an invention and then refuses to make an application for a patent, the one to whom he has agreed to make the assignment may apply for a patent on behalf of and as the agent for the inventor, upon presentation of proof that such action is necessary to protect the rights of the parties concerned.²⁴ It should be remembered that the patent application *must* be filed in the name of or on behalf of the inventor, although the rights to the patent application may be assigned by an instrument in

²⁰ *Chicago Steel Foundry Co. v. Burnside Steel Foundry Co.*, 132 F. 2d 812, 817 (7th Cir. 1943).

²¹ 35 U. S. C. A. § 103.

²² *Id.* § 116.

²³ Woodling, *op. cit. supra*, n. 10, at § 4.06.

²⁴ 35 U. S. C. A. § 118.

writing.²⁵ Therefore, if prior to the issuance of a patent, the inventor executes an assignment of his rights to it, the patent issues in his name as assignor, to his assignee.

There is a common misconception that an employee is obligated to assign to his employer the rights to all inventions made in the course of his employment and within the scope of the employer's activities. However, ownership of inventions is not determined solely on the basis of an employer-employee relationship, but it is based on a contract, either express or implied.²⁶

Another misconception is that any invention made by an employee of the United States in the course of his employment is the property of the Federal Government automatically. The answer to this view is found in another case²⁷ decided by the Supreme Court of the United States. This case²⁸ has been discussed elsewhere in this Symposium.

In a dissent in the *Dubilier* case, Justices Stone, Cardozo and Hughes were of the opinion that because of the work performed by two government physicists, the Bureau of Standards being a public enterprise, the employees had impliedly disclaimed any right to remuneration other than their salaries for any work of a scientific, technical or inventive nature.²⁹

Any employee of the United States, with the exception of Patent Office personnel, may be granted a patent without the payment of any fees upon the conditions that (1) the head of his department or agency certifies that the invention is used or likely to be used in the public interest; (2) the applicant states in his application that his invention, if patented, may be used by or for the Government for governmental purposes without the payment of royalties.³⁰ Under such circumstances, the rights of the Government would not be affected even if the employee used his own materials and time exclusively to make the invention. Under the "shop right" rule the employee may issue non-exclusive licenses to others.

Those employees of the United States who are hired to do scientific research or to supervise such work are required generally to assign to the Government the entire rights to any inventions made in the course of their employment. This requirement may be contained either in the employment contract or in the regulations of the particular agency. In either situation the

²⁵ *Id.* § 261.

²⁶ *Agawam Company v. Jordan*, 7 Wall. 583, 603, 19 L. Ed. 177 (1868). On the question of the right to inventions as between employer and employee, see the annotations in 16 A. L. R. 1177; 32 A. L. R. 1037; and 44 A. L. R. 593.

²⁷ *United States v. Dubilier Condenser Corp.*, 289 U. S. 178, 53 S. Ct. 554, 77 L. Ed. 1114, 85 A. L. R. 1488 (1933).

²⁸ *Id.*, in several articles in this Symposium.

²⁹ *Id.*, at 209.

³⁰ 35 U. S. C. A. § 266.

employee is bound by the terms of the agreement because he accepts the agency's regulations when he accepts the employment.

Even in the absence of an express agreement of any kind, one who is hired as an inventor is required to assign his inventions to his employer. Any inventions made are no more than the results of what the inventor was employed to do.³¹ This principle would seem to cover scientists who are employed to conduct experimental research. In the case of *Owens v. Sponable* the United States Court of Customs and Patent Appeals stated the following:

It is well settled law that the Patent Office tribunals and the courts will view with suspicion the evidence produced by an employee who seeks to claim an invention made during the time he is working for another and which involves the subject-matter upon which he was employed to work. The burden is upon him to clearly prove that he and not the employer was the first inventor of the subject-matter. . . .³²

Patent Limitations

No one may obtain a valid patent on a law of nature. A patent is granted for that which was created and did not exist prior to its conception by the inventor, but not for that which was in existence but unknown to man. When the scientist has utilized the laws of nature in connection with a particular device, he may obtain a patent if his invention comes within the statutory requirements of patentability. However, an inventor who uses a plurality of laws of nature in a new and useful process may obtain a patent if he claims the process in its entirety.³³

Perhaps the boldest attempt to patent a single law of nature was made by Samuel F. B. Morse,³⁴ the inventor of the telegraph method. His claim was as follows:

I do not propose to limit myself to the specific machinery, or parts of machinery, described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electromagnetism however developed, for marking or printing intelligible characters, letters or signs, at any distances, being a new application of that power, of which I claim to be the first inventor or discoverer.³⁵

³¹ *Supra*, n. 28.

³² *Owens v. Sponable*, 69 F. 2d 650 (C. C. P. A. 1934).

³³ 35 U. S. C. A. § 100(b).

³⁴ *Henry O'Reilly et al. v. Samuel F. B. Morse et al.*, 15 Howard 62, 14 L. Ed. 601 (1853).

³⁵ *Id.*, at 85.

The Supreme Court of the United States invalidated the preceding Morse claim because of his attempt to patent *the use of motive power of electric current*, a single law of nature.

Although one may not obtain a patent on a law of nature, often scientists engaged in fundamental research may invent patentable devices that are useful in studying and observing nature. They may develop patentable methods or processes for the same purposes.

The Atomic Energy Act of 1954³⁶ contains several patent limitations. It provides that no patent shall be granted for any invention that is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon.³⁷ The Atomic Energy Commission may, after complying with the statutory requirements, declare *any* patent to be affected with the public interest under certain conditions, such as the production or utilization of special nuclear materials or atomic energy.³⁸ When a patent has been declared affected with a public interest, the commission is licensed to use the invention covered by the patent in the performance of its duties,³⁹ and the owner of the patent is entitled to a reasonable royalty fee.⁴⁰

When a license has been obtained properly under the Atomic Energy Act, no court has jurisdiction to stay, restrain or enjoin the use of any invention by the patent licensee.⁴¹

If atomic research is financed by federal funds, the Commission has the right to require that patents granted on inventions, made or conceived during the course of such research, be assigned to the United States.⁴²

The National Aeronautics and Space Act of 1958,⁴³ which created the National Aeronautics and Space Administration (NASA), contains the following provision:

No patent may be issued to any applicant other than the Administrator for any invention which appears to the Commissioner of Patents to have significant utility in the conduct of aeronautical and space activities unless the applicant files with the Commissioner, with the application or within thirty days after request therefor by the Commissioner, a written statement executed under oath setting forth the full facts concerning the circumstances under which such inven-

³⁶ 42 U. S. C. A. §§ 2181 et seq. This Act amended the Atomic Energy Act of 1946, 60 Stat. 753.

³⁷ 42 U. S. C. A. § 2181(a).

³⁸ Id. § 2183(a).

³⁹ Id. § 2183(b).

⁴⁰ Id. § 2183(g).

⁴¹ Id. § 2184.

⁴² Id. § 2189.

⁴³ 72 Stat. 426.

tion was made and stating the relationship (if any) of such invention to the performance of any work under any contract of the Administration. Copies of each such statement and the application to which it relates shall be transmitted forthwith by the Commissioner to the Administrator.⁴⁴

The effect that this provision will have on patent rights is subject to many interpretations. There are numerous inventions that have no direct relationship to space research and development but that *can* be used in such activities.

Conclusions

Scientific research has become a major field of employment, emerging from its former position as an adjunct to factory production. Thus, new jobs are created for graduate scientists whose successful investigations create jobs for others.

The time lag between laboratory-conceived inventions and their practical applications is decreasing steadily. As a result the consumer is able to enjoy the better things of life sooner.

As more and more companies are organized for the specific purpose of conducting scientific experiments, a new class of investors is coming into prominence. With the protection of the Patent Laws, and Internal Revenue Laws to stimulate investments, the future of scientific research seems promising.

⁴⁴ 72 Stat. 435.