California Law Review

MEMBER NATIONAL AND WESTERN CONFERENCES OF LAW REVIEWS

Published Five Times Yearly by Students of the School of Law of the
University of California, Berkeley, California. Indexed in Index to Legal
Periodicals and Public Affairs Information Service.

Subscription Price, \$5.00

Current Single Copies, \$1.50

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Comment

CAN ARTIFICIALLY CREATED ISOTOPES OF CHEMICAL ELEMENTS BE PATENTED?

The continuing achievements of scientists in creating new chemical elements and isotopes¹ portend a unique problem in the field of patent law. 91 chemical elements² and over 325 isotopes thereof have been discovered

¹ The definition of an "isotope" should be precisely comprehended by the reader. An atom is a physical unit of matter; formerly believed to be indivisible, it is now known to be comprised of particles such as protons, neutrons, electrons and mesons. By varying the number of these ingredient particles, different atoms obviously are produced. The number of protons and neutrons in an atom primarily determines its chemical and physical properties; all atoms having the same number of protons comprise one chemical element. Thus, tin is a chemical element comprised of all those different atoms (18 in number) having 50 protons. The various tin atoms, like atoms of any element, are basically different from one another only in the number of neutrons contained by each. Each such different kind of tin atom is termed an isotope of tin. Nature provides 10 isotopes of tin; scientists have created 8 more. Since the nuclear properties of different isotopes, even those of the same element, differ widely, each artificial isotope represents a unique physical unit and a unique patent problem.

² Including plutonium.

to occur naturally on the earth. Through the efforts of scientists during the past 20 years, 9 artificial elements and more than 750 artificial isotopes have been produced and identified. Many of these artificial isotopes have various nuclear properties which man has already utilized, such as for military weapons, for "tracing" in industrial processes or in medicine, or for controlled energy production, to name but a few; they all exhibit nuclear properties which result in their eventual transmutation into the naturally occurring isotopes over periods of time ranging from microseconds to millenniums. Since both the military and commercial usages of these artificial isotopes may be reasonably expected to undergo rapid and appreciable expansion, it seems inevitable that a decision must eventually be made as to whether an artificial chemical isotope can be made the subject of a product patent. A formulation of this decision will involve the questions of whether such artificial isotopes can meet the statutory requirements of a patentable product³ and, for some of the isotopes, whether the Atomic Energy Act of 1954⁴ specifically precludes or affects their patentability.

³ 66 STAT. 797 (1952), 35 U.S.C. § 101 (1952):

"Inventions patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

66 STAT. 797 (1952), 35 U.S.C. § 102 (1952):

"Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless —

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other."

66 STAT. 798 (1952), 35 U.S.C. § 103 (1952):

"Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, 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. Patentability shall not be negated by the manner in which the invention was made."

⁴ Pub. L. No. 703, 83d Cong., 2d Sess. (Aug. 30, 1954). The Statutes at Large citation will be 68 STAT. 919-961 (1954).

Statutory Requirements of a Product Patent

It now seems settled that a patent may be issued to cover a product, independently of the means of its creation and comprehending all its usages.⁵ If an artificial isotope is to be deemed a patentable product, it must first qualify either as a *composition of matter* or as a *manufacture*.

The unanimous conclusion of the courts has been that

[a] patentable composition of matter may well result or be formed by the intermixture of two or more ingredients, which develop a different or additional property or properties which the several ingredients individually do not possess in common.⁶

Accordingly, the courts have upheld patents on "mixtures" of chemical compounds or elements⁷ and they have also recognized patents on chemical compounds per se⁸ although with less than unanimous agreement.⁹

Since the chemical compound or molecule is simply a combination of

⁵ "A machine may be new and the product or manufacture proceeding from it may be old. In that case the former would be patentable and the latter not. The machine may be substantially old and the product new. In that event the latter, and not the former, would be patentable. Both may be new, or both may be old. In the former case, both would be patentable; in the latter, neither." *Rubber Company v. Goodyear*, 9 Wall. 788, 796 (U.S. 1869).

"Certain it is, in view of the weight of authority and the latest decisions, that the inventor of a new and useful product or article of manufacture may have a patent which covers it and gives a monopoly upon it regardless of great variations in the method of making. . . ." *Dunn Wire-Cut Lug Brick Co. v. Toronto Fire Clay Co.*, 259 Fed. 258, 261 (6th Cir. 1919).

⁶ *P. E. Sharpless Co. v. Crawford Farms*, 287 Fed. 655, 658 (2d Cir. 1923).

"There can be no description of a composition of matter without some designation of its ingredients." *Holland Fur. Co. v. Perkins Glue Co.*, 277 U.S. 245, 255 (1928).

⁷ *Application of Levin*, 178 F.2d 945 (C.C.P.A. 1949) (various food product patents listed); *United States Industrial Chemical Co. v. Theroz Co.*, 25 F.2d 387 (4th Cir. 1928) (canned fuel).

⁸ *Smith, Kline & French Laboratories v. Clark & Clark*, 157 F.2d 725 (3rd Cir. 1946) (1-phenyl-2-aminopropane); *Kuehnmsted v. Farbenfabriken of Elberfeld Co.*, 179 Fed. 701 (7th Cir. 1910) (acetyl salicylic acid, commonly referred to as aspirin); *Maurer v. Dickerson*, 113 Fed. 870 (3rd Cir. 1902) (phenacetine). See 1 WALKER, PATENTS 55 (7th ed., Deller, 1937).

"We agree with the solicitor that a chemical compound obviously is a product and of course such product must belong in one of the statutory classes of invention. . . ." *Application of Norris*, 179 F.2d 970, 972 (C.C.P.A. 1950).

"They say that this new and useful composition of matter is not patentable because Claim 2 covers a new molecule and that a molecule is the inevitable result of the action of so-called laws of nature which . . . remain free for the use of all unrestrained by patent law. . . . Obviously, such an advanced position cannot be maintained in the face of the patent statute and the multitude of authoritative decisions to the contrary." *Schering Corporation v. Gilbert*, 153 F.2d 428, 432 (2d Cir. 1946).

⁹ "Although there are statements in some decisions to the effect that a claim for a product may be valid, entirely apart from the process by which it is made, most of those statements, on careful examination of the opinions, turn out to be dicta. . . .

"A claim for a mere product, regardless of the process for producing it, is, I think, virtually a claim to what has sometimes been described as a 'principle' or 'idea,' held not to be patentable. . . . Particularly in the field of chemistry, it would seem most unlikely that Congress intended that blanket claims to mere products should be held valid. If the statutory provision authorizing the issuance of a patent for a 'composition of matter' were interpreted to validate such claims, then that statutory provision might well be unconstitutional, since it would authorize the creation of monopolies which 'would discourage arts and manufactures.' . . .

"For the foregoing reasons I think Claim 2 is invalid, being on its face, as my colleagues concede, 'nothing but a chemical formula.'" *Schering Corporation v. Gilbert*, 153 F.2d 428, 434 (2d Cir. 1946) (dissenting opinion by Judge Frank).

atoms, a patent on such a compound as a composition necessarily implies that the statutory matter can be a physical unit at least as elementary as the atom or isotope. In the light of modern science, the chemical isotope itself must unquestionably be technically regarded as a composition of still more fundamental matter. Particles such as protons, neutrons, electrons and mesons of which the atom or isotope is comprised, at least in part, are capable of controlled and independent existence in the laboratory (albeit under stringent conditions) and they are frequently employed individually in the course of experimentation. A judicial objection to this scientifically accurate conclusion may be that the statutory matter was not intended to follow the progress of knowledge so closely; certain moral, if not Constitutional, considerations might be advocated in support of this view.¹⁰ Whether the patent office and the courts will progress with the technical advance of science and recognize the isotope as itself a composition of still more fundamental matter is probably a question to be answered primarily from the standpoint of policy.

In the policy vein, courts have refused to uphold patents on "laws or phenomena of nature."

[P]atents cannot issue for the discovery of the phenomena of nature. . . . If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.¹¹

It seems quite plausible to view the isotope as an assemblage of particles existing as a unit under the laws of nature. This argument can best be countered by merely pointing out the analogy between those physical forces which unite atoms into compounds and those which unite protons, neutrons and the rest into isotopes. Since the former do not present a law of nature obstacle to patentability,¹² then neither should the latter. In *General Electric Co. v. DeForest Radio Co.*,¹³ the court stated that a chemical element could not be the subject of a product patent.¹⁴ However, the statement was intended as an illustration of the admitted doctrine that products and principles of nature could not be patented.¹⁵ Manifestly, the reasoning is not applicable to man-made isotopes.

¹⁰ *Ibid.*

¹¹ *Funk Bros. Seed Co. v. Kalo Co.*, 333 U.S. 127, 130 (1948).

"It only confuses the issue, however, to introduce such terms as 'the work of nature' and the 'laws of nature.' . . . Everything that happens may be deemed 'the work of nature.' . . . Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent." *Id.* at 134-135 (concurring opinion by Justice Frankfurter).

¹² See note 8 *supra*.

¹³ 28 F.2d 641 (3rd Cir. 1928).

¹⁴ "[T]here is drawn a sharp issue as to precisely what is the subject matter of the patent, namely: Whether the tungsten of which the patent speaks is the tungsten of nature . . . or is a new metal produced by Coolidge which is wholly different from anything that nature produces. If it is a natural thing then clearly, even if Coolidge was the first to uncover it and bring it into view, he cannot have a patent for it because a patent cannot be awarded for a discovery or for a product of nature, or for a chemical element." *Id.* at 642.

¹⁵ *Funk Bros. Seed Co. v. Kalo Co.*, 333 U.S. 127 (1948).

"Uranium is a product of nature, and the appellant is not entitled to a patent on the same, or upon any of the inherent natural qualities of that metal." *In re Marden*, 47 F.2d 957 (C.C.P.A. 1931).

If the isotope does not qualify as a composition of matter, it is possible that it might do so as a *manufacture*.

The term "manufacture," as used in the patent law, has a very comprehensive sense, embracing whatever is made by the art or industry of man, not being a machine, a composition of matter, or a design.¹⁶

However, a manufacture has been traditionally regarded by the courts as the appropriate category for products which are too complex to qualify as compositions of matter, generally constituting patentable physical forms of well known materials which could not themselves be patented as compositions of matter.¹⁷ A decision that the manufacture category could embrace man-made matter too elementary to qualify as a composition of matter would be a possible but thoroughly novel approach.

If the artificial isotopes are regarded as proper subjects for product patents, then they must meet the additional statutory standards of *novelty* and *utility*.

In accordance with the patent statutes, an article or composition of matter, in order to be patentable, must not only be useful and involve invention, but it must also be *new*.¹⁸

The patent definition of novelty is a technical one and it has been made subject to a detailed definition in the new patent act.¹⁹ Only subsections (a) and (b) of Section 102 are appreciably relevant to the patenting of an artificial isotope; they state the established rules of patentable novelty that a product must differ materially from what was previously known, used or on sale in this country, from that which exists in nature²⁰ and from that which has been previously described in a printed publication.

It is presumed by scientists that at the earth's creation all possible isotopes existed in nature in comparable abundance. The absence of so many isotopes from occurrence in nature today is readily explained by the relatively rapid rates of natural transmutation observed in these isotopes after their recent production in the modern laboratory. Hence, such laboratory production represented the first concurrent existence of mankind and these isotopes. Within the sense of the patent law, then, these isotopes were new at the time of their initial laboratory creation.

¹⁶ Johnson v. Johnston, 60 Fed. 618, 620 (C.C.W.D. Pa. 1894). See the definition of manufacture in Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11 (1931).

¹⁷ "The first question which arises with respect to the product claims in suit is whether such a product was patentable, not being a 'combination of matter,' but being composed of pure carbon black. We think that it was. It was patentable as a 'manufacture.'" Binney & Smith Co. v. United Carbon Co., 125 F.2d 255, 258 (4th Cir. 1942) (this patent was later held to be void for indefiniteness in United Carbon Co. v. Binney Co., 317 U.S. 228 (1942)); Union Carbide Co. v. American Carbide Co., 181 Fed. 104 (2d Cir. 1910) (a well known compound, Ca_2C , held patentable when put into a new crystalline form).

¹⁸ Application of Haller, 161 F.2d 280, 281 (C.C.P.A. 1947).

¹⁹ 66 STAT. 797 (1952), 35 U.S.C. § 102 (1952). See note 3 *supra*.

²⁰ In re Marden, 47 F.2d 957 (C.C.P.A. 1931); General Electric Co. v. DeForest Radio Co., 28 F.2d 641 (3rd Cir. 1928).

The knowledge has been lost for ages. Yet it would hardly be doubted, if anyone now discovered an art thus lost, . . . he would be entitled to a patent. Yet he would not literally be the first and original inventor. But he would be the first to confer upon the public the benefit of the invention. He would discover what is unknown, and communicate knowledge which the public had not the means of obtaining without his invention.²¹

Divestment of novelty by a published description of an invention,²² even by the inventor himself,²³ more than one year prior to the date of the application for patent may arise to preclude isotope patents for which applications were not timely made.²⁴ It is traditional in the field of science that discoveries are reported as soon as possible in scientific journals. Since a method of production and the known properties of virtually every isotope produced have been so reported, applications for a product patent must have been made within a year following such publication. Although information on pending patent applications is unavailable, it is highly probable that some have already been filed.

Ability of the invention to render a modicum of beneficial utility has always been held sufficient to satisfy the statute, from the earliest cases²⁵ to the present.²⁶ The innumerable uses to which so many artificial isotopes have already been put assure that a qualifying utility could be found for most, if not all, isotopes.

The most difficult patentability requirement which the artificial isotope must meet, be it composition of matter or manufacture,²⁷ is the standard of *invention or discovery* demanded by the statute.²⁸ Invention within the meaning of the patent law is a word of art and it stands entirely separate from, and supplementary to, the standards of novelty and utility.

So, it is not enough that a thing shall be new, in the sense that in the shape or form in which it is produced it shall not have been before known, and that it shall be useful, but it must, under the Constitution and the statute, amount to an invention or discovery.²⁹

²¹ Gayler v. Wilder, 10 How. 477, 496 (U.S. 1850).

²² "[T]his court is committed to the doctrine that where a product is clearly disclosed in a publication, . . . the disclosure of the composition is sufficient to anticipate a claim therefor." In re Crosley, 159 F.2d 735, 736 (C.C.P.A. 1947).

Truman v. Carvill Mfg. Co., 87 Fed. 470 (C.C.N.D. Cal. 1898) (trade magazines, published and copyrighted, in general circulation, are publications in the sense of the patent law).

²³ Wagner v. Meccano Limited, 246 Fed. 603 (6th Cir. 1918).

²⁴ 66 STAT. 797 (1952), 35 U.S.C. § 102(b) (1952). See note 3 *supra*.

²⁵ "If it was useful in any degree, no matter how infinitesimal, the court would not be justified in declaring the patent void." Gibbs v. Hoefner, 19 Fed. 323, 324 (C.C.N.D. N.Y. 1884). See similar statements in Seymour v. Osborne, 11 Wall. 516, 549 (U.S. 1870); Crouch v. Speer, 6 Fed. Cas. 897, 898, No. 3438 (C.C.D.N.J. 1874).

²⁶ "It is not the extent of the utility that governs, but the existence of *some* utility." National Slug Rejectors v. A.B.T. Mfg. Corporation, 164 F.2d 333, 335 (7th Cir. 1947).

²⁷ "Nothing short of invention or discovery will support a patent for a manufacture any more than for [a] . . . composition of matter, for which proposition there is abundant authority in the decisions of this court." Collar Company v. Van Dusen, 23 Wall. 530, 563 (U.S. 1874).

²⁸ 66 STAT. 797 (1952), 35 U.S.C. § 101 (1952). See note 3 *supra*.

²⁹ Thompson v. Boisselier, 114 U.S. 1, 11 (1885).

"Under the statute . . . the device must not only be 'new and useful,' it must also be an 'invention' or 'discovery.'" Cuno Corp. v. Automatic Devices Corp., 314 U.S. 84, 90 (1941).

It has never been the purpose of the patent law to grant a monopoly for each and every development that is new and useful, "for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures."³⁰ Until the passage of the most recent patent code in 1952, however, no statutory definition of invention was attempted; accordingly, the standard of invention was necessarily provided by the Supreme Court.³¹

Invention has been described as having two components; a mental concept of an idea accompanied by a physical reduction to practice.³² In *Hotchkiss v. Greenwood*,³³ the Supreme Court stated that the creation of an invention must have involved the exercise of "... more ingenuity and skill ... than were possessed by an ordinary mechanic acquainted with the business. ..." Obviously, drawing such a distinction between invention and the "day to day capacity of the ordinary artisan"³⁴ skilled in the art requires a subjective finding of fact³⁵ which must be resolved favorably to the inventor by both the patent office and the courts if protection is to be given him.³⁶

However, a further complication in the ascertainment of invention was subsequently introduced by the Supreme Court when it proceeded to adopt³⁷ and repeatedly refer to a requirement of inventive³⁸ or creative

³⁰ *Atlantic Works v. Brady*, 107 U.S. 192, 200 (1882).

³¹ "The statute does not define the words 'invention or discovery.' The proper application of this phrase is therefore necessarily left for judicial construction." *Martin v. Wyeth Inc.*, 96 F. Supp. 689, 694 (D. Md. 1951).

³² *U.S. v. Dubilier Condenser Corp.*, 289 U.S. 178, 188 (1933).

³³ 11 How. 248, 267 (U.S. 1850).

³⁴ *Kirsch Mfg. Co. v. Gould Mersereau Co.*, 6 F.2d 793, 794 (2d Cir. 1925).

³⁵ "The question whether an improvement requires mere mechanical skill or the exercise of the faculty of invention, is one of fact. ..." *Thomson Co. v. Ford Motor Co.*, 265 U.S. 445, 446 (1924).

"[T]he line between invention and mechanical skill is oftentimes a close one, almost impossible to discern." *Tropic-Aire v. Sears, Roebuck & Co.*, 44 F.2d 580, 588 (8th Cir. 1930).

"Courts, made up of laymen as they must be, are likely either to underrate, or to overrate, the difficulties in making new and profitable discoveries in fields with which they cannot be familiar. ..." *Safety Car Heating & Lighting Co. v. General Elec. Co.*, 155 F.2d 937, 939 (2d Cir. 1946).

³⁶ The new patent code provides that a patent is to be presumed valid. 66 STAT. 812 (1952), 35 U.S.C. § 282 (1952). For a comprehensive survey of changes wrought by the new patent act, see Riesenfeld, *The New United States Patent Act in the Light of Comparative Law*, 102 U. OF PA. L. REV. 291, 102 U. OF PA. L. REV. 723 (1954).

³⁷ "The distinction between mechanical skill, ... and inventive genius, is recognized in all the cases." *Reckendorfer v. Faber*, 92 U.S. 347, 357 (1875).

³⁸ "The Congress does not have free rein, for example, to decide that patents should be easily or freely given. The Congress acts under the restraint imposed by the statement of purpose in Art. I, § 8. ...

"... The Framers plainly did not want those monopolies freely granted. The invention, to justify a patent, had to serve the ends of science — to push back the frontiers of chemistry, physics and the like; to make a distinctive contribution to scientific knowledge. That is why through the years the opinions of the Court commonly have taken 'inventive genius' as the test. ... Patents serve a higher end — the advancement of science." *A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 154-155 (1950) (concurring opinion by Justice Douglas).

genius³⁹ on the part of the inventor. The opinions of federal courts as to the significance of the term genius were diverse, some considering that the standard of invention was thereby being made more strict⁴⁰ while others looked to the origin of the term and continued to regard the genius standard as merely another phrase distinguishing invention from those accomplishments that were to be expected from a "workman skilled in his line of work."⁴¹ The haze surrounding any accurate definition of invention was appropriately described by the court in *McClain v. Ortmyer*:⁴²

To say that the act of invention is the production of something new and useful does not solve the difficulty of giving an accurate definition. . . . To say that it involves an operation of the intellect, is a product of intuition, or of something akin to genius, as distinguished from mere mechanical skill, draws one somewhat nearer to an appreciation of the true distinction, but it does not adequately express the idea. The truth is the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not. In a given case we may be able to say that there is present invention of a very high order. In another we can see that there is lacking that impalpable something which distinguishes invention from simple mechanical skill.

In the current patent code, Section 103⁴³ expresses the intent of Congress that invention shall not be found when 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. Patentability shall not be negatived by the manner in which the invention was made.

To this, the Reviser's Note adds:

There is no provision corresponding to the first sentence explicitly stated in the present statutes, but the refusal of patents by the Patent Office,

³⁹ "[T]he new device . . . must reveal the flash of creative genius, not merely the skill of the calling." *Cuno Corp. v. Automatic Devices Corp.*, 314 U.S. 84, 91 (1941).

⁴⁰ "[T]he most recent authoritative judicial decisions have emphasized the necessity of applying a more rigid test as to the required standard of invention. . . ." *Martin v. Wyeth, Inc.*, 96 F. Supp. 689, 694 (D. Md. 1951).

"We cannot, moreover, ignore the fact that the Supreme Court, whose word is final, has for a decade or more shown an increasing disposition to raise the standard of originality necessary for a patent." *Picard v. United Aircraft Corp.*, 128 F.2d 632, 636 (2d Cir. 1942).

"[T]he only patent that is valid is one which this Court has not been able to get its hands on." *Jungerson v. Ostby & Barton Co.*, 335 U.S. 560, 572 (1949) (dissenting opinion by Justice Jackson).

⁴¹ "[W]e reject the flash of genius test. We shall concentrate our scrutiny on whether, in the claimed invention, [the patent applicant] displayed more ingenuity than a workman skilled in his line of work." *Falkenberg v. Bernard Edward Co.*, 175 F.2d 427, 428-429 (7th Cir. 1949).

"[W]e are of the opinion that the use of the term 'flash of creative genius,' . . . was intended to mean nothing more than that the thing patented must involve more than the skill of the art to which it relates." *In re Shortell*, 142 F.2d 292, 295 (C.C.P.A. 1944).

⁴² 141 U.S. 419, 426-427 (1891).

⁴³ See note 3 *supra*.

and the holding of patents invalid by the courts, on the ground of lack of invention or lack of patentable novelty has been followed since at least as early as 1850. This paragraph is added with the view that an explicit statement in the statute may have some stabilizing effect, and also to serve as a basis for the addition at a later time of some criteria which may be worked out.

The second sentence states that patentability as to this requirement is not to be negated by the manner in which the invention was made, that is, it is immaterial whether it resulted from long toil and experimentation or from a flash of genius.

Furthermore, the unique bias of the United States Court of Appeals for the District of Columbia against systematic, organized research as a source of invention⁴⁴ seems definitely disapproved.⁴⁵

Thus, Congress has expressed its intent that invention can reside in that which is not obvious to the person having ordinary skill in the particular field. Whether this does⁴⁶ or does not⁴⁷ change the previous judicial standard of invention now becomes merely a reflection of a court's prior attitude.

The Supreme Court in *Cuno Engineering Corp. v. Automatic Devices Corp.*, 1941, 314 U.S. 84, 91 . . . set forth the following tests for a patentable device:

" . . . the new device . . . must reveal the flash of creative genius, not merely the skill of the calling. . . ."

However, . . . Congress enacted § 103. . . .

The Reviser's Note interprets this sentence. . . . That is, as we understand it, the Congress by enacting § 103 showed its fear that the meaning of the

⁴⁴ "We have held that a step forward which . . . might reasonably be expected from the research of highly trained specialists is not invention. . . ."

" . . . [P]atents are not intended as a reward for the collective achievement of a corporate research organization. . . . [S]uch contributions to industrial art are more often than not the step by step progress of an entire group, not the achievement of an individual. Such an advance is the product not of inventive ability but of the financial resources and organizing ability of those who operate the laboratories. . . ."

"To give patents for such routine experimentation on a vast scale is to use the patent law to reward capital investment, and create monopolies for corporate organizers instead of men of inventive genius."

" . . . Organized invention has changed the entire process. Each man is given a section of the hay to search. The man who finds the needle shows no more 'genius' and no more ability than the others who are searching different portions of the haystack." *Potts v. Coe*, 140 F.2d 470, 473-475 (D.C. Cir. 1944).

⁴⁵ See Galston, *Invention and the "Obvious,"* 13 F.R.D. 463 (1953).

⁴⁶ "Attention is also directed to this clause in Section 103: 'Patentability shall not be negated by the manner in which the invention was made.'"

"This, we must admit is new. . . . This wording officially . . . rejects the 'flash of genius' test. . . ." *Gagnier Fibre Products Co. v. Fourslides, Inc.*, 112 F. Supp. 926, 929 (E.D. Mich. 1953).

⁴⁷ "The Patent Act of 1952, 35 U.S.C. § 103, which took effect January 1, 1953, has apparently neither raised nor lowered the standard of invention. . . ." Application of O'Keefe, 202 F.2d 767, 771 (C.C.P.A. 1953).

" . . . Congress here has clearly indicated that it did not intend to lower the standard of invention which obtained before the new codification" *Thys Co. v. Oeste*, 111 F. Supp. 665, 674 (N.D. Cal. 1953).

phrase "flash of creative genius" . . . would result in excluding from patentability most if not all mechanical advances derived from study and experimentation. We do not think the phrase "flash of creative genius" implies, or was intended to imply, that patents or patentability spring from inspiration at the cost of reason. The phrase was used more for emphasis than as patent dogma, and the Supreme Court was emphasizing the principle that patentability implies more than mere mechanical skill and that a phase of discovery is necessary. The opinion in which the phrase is used did not change the law. . . . Thus, the phrase "flash of creative genius," as Congress understood it, was emasculated as to the validity of existing unexpired patents and made wholly ineffective as to future patents.⁴⁸

It is to be hoped that the Supreme Court will concur in this legislative definition of invention as satisfying the requirements of the Constitution.⁴⁹

To evaluate the inventiveness involved in the production of new isotopes, it seems worthwhile to briefly trace the progress of science which constitutes the background for present day isotope creation. Artificial transmutation was first accomplished by Rutherford in 1919, when he bombarded nitrogen atoms with alpha particles (ions of a helium isotope) emitted by a natural source (Po^{214}) and thereby changed the nitrogen atoms to oxygen atoms. Following this momentous discovery that artificial transmutation could be performed by bombarding one isotope with another, other transmutations were accomplished in rapid succession. Initially, the bombarding isotope used was an alpha particle emitted by a natural source; however, the need for a variety of bombarding isotopes with increased energies was widely recognized and has been met, beginning in 1932 by Cockroft and Walton, with a succession of man-made instruments capable of accelerating numerous isotopes to staggering energies. Thus, although better accelerators are continually being devised and employed, this basic method of artificial isotope production, that of bombarding one isotope with another, has been known for over 35 years.

The alternate basic method of creating artificial isotopes is the irradiation of one isotope with neutrons, thus accomplishing neutron capture by the original isotope and thereby producing new and different isotopes. This method was first discovered accidentally by Joliot-Curie and Joliot and reported in 1934. Hence, like the bombardment method, although the devices for employing the neutron capture principle are being constantly improved, the basic method has been known for over 20 years.

In view of this background, can it be found that the scientist who utilizes well known methods, but who thereby foreseeably will create a product having properties beyond accurate prediction, has shown inventiveness?⁵⁰ The federal courts have stated that creation of a product hav-

⁴⁸ *Pacific Contact Laboratories v. Solex Laboratories*, 209 F.2d 529, 532, 533 (9th Cir. 1953) (emphasis added).

⁴⁹ "The standard of patentability is a constitutional standard. . . ." *A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 155 (1950) (concurring opinion by Justice Douglas).

⁵⁰ "[In a previous case] the Board of Appeals . . . said, 'where there is no real reason to suppose that the result would not be produced there is no invention in trying it and finding out that the process is successful.' This we quoted with approval." *Application of Finley*, 174 F.2d 130, 134 (C.C.P.A. 1949).

ing new and unobvious properties different from those of its components need not necessarily constitute invention.⁵¹ Ultimately, in view of the existing statutory standard of invention, the test seemingly must be whether the scientist has accomplished anything more than would be obvious to the person having ordinary skill in the art.⁵² A product never before made or anticipated may still lack invention if an ordinary chemist skilled in the art could produce it in view of the prior art;⁵³ "[t]hat which seems to the ordinary layman to involve the exercise of extraordinary mental power is to [chemists] nothing but the everyday work of laboratory routine."⁵⁴

It seems necessary to concede that there have been other contemporaneous scientists, in addition to those who actually did so, fully cognizant and capable of creating, isolating and identifying artificial isotopes in view of their knowledge and skill in the prior art but who did not do so for lack of incentive or for lack of facilities. Even so, it might very logically be proposed that these highly educated and skilled individuals, as well as the patent applicant, are themselves appreciably above the statutory standard of the chemist having "ordinary skill" in the art. Accordingly, milestones of scientific accomplishment such as artificial isotope creation could easily embody invention by being beyond the capability of any ordinary chemist.

However, it may also be contended that as the level of skill found among those in the science rises, so must the standard for invention rise.⁵⁵ According to the latter view, even though these contemporaneous scientists skilled in nuclear science could have duplicated the isotope productions, it must still be conceded that none of them, any more than the prospective patentee, could accurately foretell the qualities of the product which was certain to result. If it is the level of obviousness to highly able contemporary nuclear scientists which must be surpassed, it appears that negation of invention, which could result if the "subject matter as a whole would have been obvious," will depend primarily upon the scope of this phrase. If the phrase refers only to the methods to be employed to create an artificial isotope under the realization that something unpredictable was certain to result, then it cannot be said that invention exists; however, if the term also encompasses a knowledge of the properties to be found in

⁵¹ "Obviously appellant construes our holding in those cases to mean that if a new and useful product does show unobvious or unexpected properties it follows that such a product is patentable. We did not affirmatively, or even by implication, so state in our decisions there. Our statement meant merely that unless a product does show the defined characteristics it is not patentable. Even if they be shown, the consideration of other factors may be required." *Ibid.*

⁵² 66 STAT. 798 (1952), 35 U.S.C. § 103 (1952). See note 3 *supra*.

⁵³ *Donner v. Sheer Pharmacal Corporation*, 64 F.2d 217 (8th Cir. 1933); *Application of Jones*, 149 F.2d 501 (C.C.P.A. 1945); *Dow Chemical Co. v. Coe*, 132 F.2d 577 (D.C. Cir. 1942).

⁵⁴ *Badische Anilin & Soda Fabrik v. Kalle*, 94 Fed. 163, 173 (C.C.S.D. N.Y. 1899).

⁵⁵ "[T]he research laboratory has gradually raised the level of industrial art until discoveries by ordinary skilled men, which would have seemed miraculous in the last century, are definitely predictable if money is available for organized research. The laboratory level of the art has become the level which the discovery must surpass in order to rise to the dignity of invention." *Potts v. Coe*, 145 F.2d 27, 30 (D.C. Cir. 1944).

the isotopes so produced, then certainly these are not obvious and invention is present. The more rational contention would appear to be that even the foreseeable production of an isotope having unpredictable properties leaves a substantial portion that is unobvious in the "subject matter as a whole."

Rarely, it would seem, does a prospective patentable invention come so close to meeting the extremely stringent requirements suggested in *A. & P. Tea Co. v. Supermarket Corp.*,⁵⁶ in a concurring opinion by Justice Douglas:

The invention, to justify a patent, had to serve the ends of science — to push back the frontiers of chemistry, physics and the like; to make a distinctive contribution to scientific knowledge.

From the standpoint of the patent code alone, it seems highly probable that artificial isotopes do represent the invention of new and useful compositions of matter and that the qualifications for patent protection have been met accordingly.

The vast majority of artificial isotopes have been produced by scientists working with the AEC under an arrangement whereby all patent rights of the individual inventors have been assigned to the government. Considering the high amount of government funds which have been expended in the research from which the isotopes have evolved, isotope patents in public hands seem most fair. This is especially so in view of the availability of use patents under the new patent code; under the code, private individuals finding methods of utilizing the artificial isotopes can patent such uses.⁵⁷ "Dominant" patents on the isotopes themselves, in public hands, might be instrumental in counteracting any tendency on the part of private individuals to abuse a monopoly given them concerning the use of materials developed at public expense.⁵⁸

Does the Atomic Energy Act of 1954 Affect the Patentability of Artificial Isotopes?

The recent Atomic Energy Act of 1954,⁵⁹ approved August 30, 1954, is the successor to the original Atomic Energy Act of 1946.⁶⁰ The earlier act severed a significant portion of potentially patentable invention from the protection of patent laws. The provisions of the act were commented upon in numerous publications⁶¹ but the patent restrictions imposed were

⁵⁶ 340 U.S. 147, 154 (1950).

⁵⁷ 66 STAT. 797 (1952), 35 U.S.C. § 100(b) (1952).

⁵⁸ Because of the recent innovation of the "use" patent, the exact relationship between the patentee of a product and the patentee of one of its uses is not immediately clear. An analogy to the familiar patent concept of dominant and subordinate patents is perhaps suggested. See Wachsner, *Patentability of New Uses*, 34 J. PAT. OFF. SOC'Y 397, 400 (1952).

⁵⁹ Pub. L. No. 703, 83d Cong., 2d Sess. (Aug. 30, 1954). See note 4 *supra*.

⁶⁰ 60 STAT. 755-775 (1946), 42 U.S.C. §§ 1801-1819 (1952).

⁶¹ Hafner, *Atomic Energy and Patent Law*, 33 J. PAT. OFF. SOC'Y 35 (1951); Ooms, *The Patent Provisions of the Atomic Energy Act*, 15 U. OF CHI. L. REV. 822 (1948); Newman and Miller, *Patents and Atomic Energy*, 12 LAW & CONTEMP. PROB. 746 (1947); Notes, 36 CORNELL L.Q. 580 (1951), 25 ST. JOHN'S L. REV. 60 (1950), 97 U. OF PA. L. REV. 389 (1949).

accepted virtually without litigation, leaving little more to be gleaned as to their scope than that available from a literal interpretation of the statute. Accordingly, only a literal interpretation is available at present to ascertain the effect of the act of 1954 upon the patentability of artificial isotopes.⁶²

The first patent limitation is that:⁶³

No patent shall hereafter be granted for any invention or discovery which is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon.

The potential multiplicity of uses for radioactive isotopes should preclude any such isotope from being trapped within the narrow limits of this absolute proscription.

The further limitation is then made that:⁶⁴

No patent hereafter granted shall confer any rights with respect to any invention or discovery to the extent that such invention or discovery is used in the utilization of special nuclear material or atomic energy in atomic weapons.

Unquestionably, uses of some isotopes of thorium and heavier elements, which are either themselves utilized in atomic weapons or used as raw material in the course of production of fissionable isotopes so utilized, are within the scope of this proscription. However, even for these isotopes, the proscription of patentability extends only to certain uses; seemingly, product patents for these isotopes should not be precluded thereby even though certain specified uses are excepted from the patentee's monopoly. Alternatively, it might be regarded that the exclusion of these uses precludes a product patent, leaving only the possibility of "use" patents for remaining, non-restricted uses of these particular isotopes.

The final limitation of the act affecting patentability permits the patent applicant to be charged with knowledge of prior art which was, in fact, unavailable to him because of the "... secrecy within the atomic energy program of the United States."⁶⁵

The act of 1954 has numerous other sections governing or concerning patents, but none of them affects the actual granting of product patents on artificial isotopes.⁶⁶ Therefore, it would appear that artificial isotopes

⁶² All pending patent applications will be controlled by the act of 1954. Any application previously denied under the act of 1946 may be reinstated under Section 160 of the act of 1954 if patentability is not precluded by the latter act.

⁶³ Pub. L. No. 703, 83d Cong., 2d Sess. § 151(a) (Aug. 30, 1954). Section 11(c) reads: "The term 'atomic energy' means all forms of energy released in the course of nuclear fission or nuclear transformation." Hence, any sections of the act of 1954 which concern inventions utilizing atomic energy must be regarded as referring to artificial isotopes.

⁶⁴ Pub. L. No. 703, 83d Cong., 2d Sess. § 151(b) (Aug. 30, 1954).

⁶⁵ Pub. L. No. 703, 83d Cong., 2d Sess. § 155 (Aug. 30, 1954).

⁶⁶ Pub. L. No. 703, 83d Cong., 2d Sess. § 151(c) (Aug. 30, 1954) provides that any person whose invention is "... useful ... in the ... utilization of ... atomic energy. ..." must file either a patent application or a report to the Atomic Energy Commission within a set time limit; artificial isotopes would be among such inventions. Section 152 provides that any invention "... useful in the ... utilization of ... atomic energy, [which is] made or conceived

are entitled to patent protection under the patent code and that this protection is not precluded under the Atomic Energy Act of 1954, although some qualifications would be placed upon such patents by the latter act.

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under any . . . relationship with the Commission, . . . shall be deemed to have been made or conceived by the Commission. . . ." Section 159 provides that the Commission may require that ". . . patents granted on inventions, made or conceived during the course of federally financed research or operations, be assigned to the United States." These two sections encompass most, if not all, artificial isotopes and would leave patents thereon in the Commission's hands as agent for the government (see Section 241).

Also of interest are Section 52 making ". . . [a]ll rights, title, and interest in or to any special nuclear material within or under the jurisdiction of the United States . . . the property of the United States. . . ." and Section 11(t) which reads: "The term 'special nuclear material' means (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission . . . determines to be special nuclear material, but does not include source material. . . ." Sections 62 *et seq.* and 81 *et seq.* restrict private party dealings in "source material" and "by-product material"; Section 11(s) defines source material to mean ". . . uranium, thorium, or any other material which is determined by the Commission . . . to be source material. . . ." and Section 11(e) defines by-product material to mean ". . . any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material."

By Section 153, the Commission is given power to declare patents, ". . . the application for which shall have been filed before September 1, 1959," to be ". . . affected with the public interest if . . . the invention or discovery covered by the patent is of primary importance in the . . . utilization of . . . atomic energy. . . ." Following such declaration, the patent may be compulsorily licensed by the Commission to any person ". . . on terms deemed equitable by the Commission. . . ." The sting of such provisions would be lost for isotope patents since these patents would presumably already be the property of the government.