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WHAT CONSTITUTES A PATENTABLE SUBJECT MATTER.

AN ADDRESS DELIVERED BEFORE THE CONGRESS OF PATENTS AND TRADE-MARKS OF THE WORLD'S COLUMBIAN EXPOSITION OF 1893.

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In connection with any attempt that may be made to establish an International Patent Law or to extend the protection given to inventors by means of treaties, it becomes a matter of the first importance to understand clearly what constitutes a patentable subject matter.

The tests of patentability, from the very nature of the question, would be the same in every country, if the subject should ever come to be thoroughly understood.

It will be our aim to show that the doctrine laid down by the courts of this country in recent years upon this subject is not as sound and salutary as that which prevailed in former days, and that if tests of international application are to be adopted, they should not be borrowed from the existing jurisprudence of this country without essential modification.

We shall endeavor to exhibit the present state of the law upon this subject as laid down by the Supreme Court of the United States, by a review of a few leading cases. As the Supreme Court will soon practically relinquish its jurisdiction in patent cases and leave the law to be moulded by the nine new Circuit Courts of Appeals, it is important for the American lawyer to know what is the doctrine that the Supreme Court has left us, as it is not likely that the new tribunals will ever consider themselves authorized to disturb it, however much they might be inclined to do so.*

* All of the patent cases taken by appeal or writ of error to the Supreme Court of the United States under the old law, will probably be disposed of during the October Term, 1894.

THE ORIGIN OF THE PATENT LAW IN ENGLAND.

At common law an inventor had no right to prevent others from copying his invention. If, after years of thought, experiment and toil, and at great expense, he constructed a new and useful machine, any one who wished could avail himself of the results of his labors and experience, and enter upon the business of producing similar machines. The tendency of this state of the law was to encourage secrecy as to manufacturing methods.

From an early day the English crown claimed the prerogative of granting monopolies by Letters Patent, whereby special privileges, such as the right of supplying particular commodities to the king's subjects, were granted to individuals to the exclusion of all others. The oppression thus produced led to the enactment of the statute 21 Jac. 1, c. 3, by which monopolies were declared to be illegal and void. The statute contained a proviso which excepted from its prohibitions letters patent granted by the Crown for "the sole working or making of any manner of new *manufactures* within this realm to the first and true inventor or inventors of such *manufactures*, which others at the time of the making of such Letters Patent and grants did not use, so they be not contrary to the law and mischievous to the State."

Webster in his work on the English Law of Patents (1841), speaking of the word "manufactures" used in this statute, says:

"The various attempts made to suggest other terms and to classify all the subject matters of letters patent show the inadequacy of language to express all the minute distinctions that present themselves, and afford some color of truth for the sentiment of M. Renouard, that this branch of jurisprudence may be aptly denominated 'the metaphysics of the law.' The difficulty which undoubtedly exists arises in a great measure from the fact of the arts and manufactures of a country being in a continual state of progression, whereby objects of skill never before contemplated suddenly present themselves, and *changes most*

minute constitute the whole difference between a useful and a useless invention."

PATENT LAW UNDER THE CONSTITUTION AND LAWS OF THE UNITED STATES.

The Constitution of the United States provided (Art. I., Sec. 8) that Congress shall have power "to promote the progress of science and useful arts by securing for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries."

It is in pursuance of this authority that the several patent acts have been passed by Congress. The subject is now regulated by the U. S. Rev. Statutes, §§ 4883–4928.

It is provided by § 4886 of the Revised Statutes of the United States that:

"Any person who has invented or discovered any new and useful *art, machine, manufacture* or *composition of matter*, or any new and useful *improvement thereof*, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."

It will be observed that by the English statute the subject matter of a patent must be a *new manufacture*, while under our statute the subject matter is any "new and useful *art, machine, manufacture* or *composition of matter*, or any new and useful improvement thereof." The meaning of the term "new manufacture" has in former years been the subject of much discussion in the English courts, and the English system of patents for inventions has depended upon the construction given to that term. It is obvious that the word "manufacture" may be used in different senses—it may mean something made by the hand of man, and it may also be used to designate the

practice of making a thing or producing a result. The English courts have given a most comprehensive meaning to the term, so that, without dwelling upon the subject, it may be said that the word "manufacture" is held to include all that is designated in the American statute by the words "art, machine, manufacture or composition of matter, or any new and useful improvement thereof." According to our statute it is frequently necessary to distinguish between the several kinds of inventions mentioned in the statute.

In our statute the word "art" means substantially the same thing as process. The word "machine" has its ordinary popular meaning. The word "manufacture" has a much narrower meaning than it has under the English law, and means a product or thing made, while the term "composition of matter" also requires no particular definition. Medicinal compounds, artificial ivory and artificial stone would be instances of "compositions of matter."

INVENTION AND DISCOVERY.

It will be observed that the statute does not merely require that the subject matter of a patent should be new, but it must be *invented* or *discovered*. Invention implies the exercise of a creative faculty in the mind, as distinguished from the exercise of a judgment supposed to be possessed by persons skilled in the particular art to which the subject matter relates. By far the greater portion of patents are granted for inventions, and not for discoveries. Some writers and judges maintain that for the purposes of the law "invention" and "discovery" are synonymous terms. (Simonds on Patents, § 14; Walker on Patents, § 2.)

In Merwin's very instructive work, the words "invention" and "discovery" are considered to have different meanings, which are well contrasted. (Merwin on Patentability of Inventions, p. 2.) The author states that the word "invention" may signify (1) the mental act of inventing; (2) the thing invented; (3) the fact that an

invention has been made; and (4) the faculty or quality of invention. And so of the word "discovery," except that it has not the fourth meaning.

He draws a distinction between inventions and discoveries in the objective, that is, the second, sense of those words. A discovery takes place where the patentee has found out a new principle, and has made some practical application thereof. In the case of a discovery it is not necessary to inquire into the mental process by which the patentee found out the principle. It is sufficient that it remained unknown until the patentee revealed it. The question as to whether the patentee was the person who first revealed it is a question of fact.

A good instance usually cited as one of a discovery is found in the well-known English case of Neilson *vs.* Harford, 1 Webster's Patent Cases, 273. The patentee had discovered that a hot blast of air thrown into a furnance was more effective than the cold blast previously used. It had been supposed that the colder the blast the hotter the fire, because the furnace fires were observed to burn better in winter than in summer. In reality the fires burned better in winter because the air is drier then, not because it is colder. Neilson therefore discovered the law or truth that a hot blast is more effective than a cold blast in a furnace, and he described an apparatus for making use of this discovery by heating the air blast before it is directed into the furnace.

The mere principle itself is not patentable. It must be accompanied by an apparatus for making use of the discovery. The apparatus considered by itself may be so simple, and may be so well known, that, considered alone, it could not involve invention, and therefore could not be the subject matter of a patent; but a patent for the discovery of the principle and the use of this apparatus, however simple, for the purpose of carrying out the principle, forms a proper subject matter for a patent. The whole constitutes a process, or in the language of the statute, an art.

Another instructive case upon the subject is that of Colgate *vs.* Western Union Telegraph Co., decided by Judge Blatchford in the Southern District of New York (15 Blatch., 365). That invention was a very simple one. It consisted in coating telegraph wire with gutta-percha. Wires had been coated with various substances from time immemorial, and the mere mode of coating could not involve an invention; nor could a coated wire possibly have been the subject of invention. But it appeared that the inventor had discovered the fact that gutta-percha was a very perfect non-conductor of electricity, and therefore that wires coated with that substance would be effectually insulated, even when they passed under water. The Court said:

"The gist of the invention is the discovery of the fact that gutta-percha is a non-conductor of electricity, and the application of that fact to practical use.

* * * * * *

The claim is valid, *even though a metallic wire covered with gutta-percha existed before the plaintiff's invention, if it was not known that gutta-percha was a non-conductor of electricity, and could be used to insulate the wire.*"

The telegraph wire insulated by gutta-percha constituted a new manufacture.

It will not be found to be of great practical importance whether we adopt the view that there is a clear distinction between invention and discovery, or whether we adopt the opposite view, which is forcibly stated in Walker on Patents, § 2, as follows:

"The word 'discovery' does not have, either in the constitution or the statute, its broadest signification. It means invention in those documents, and in them it means nothing else. The 'discoveries' of inventors are inventions. The same man may invent a machine, and may discover an island or a law of nature. For doing the first of these things, the patent laws may reward him, because he is an inventor, in doing it; but those laws cannot reward

him for doing either of the others, because he is not an inventor in doing either. The statute provides that patents may be granted for four classes of things. These are arts, machines, manufactures and compositions of matter. None of these things can be originally made known by discovery, as our continent was. They are not found, but are created. They are results of original thought. They are inventions. Laws of nature, on the other hand, can never be invented by man, though they may be discovered by him. When discovered they may be utilized by means of an art, a machine, a manufacture, or a composition of matter. It is the invention of one or more of these, for the purpose of utilizing a law of nature, and not the discovery of that law, that may be rewarded with a patent."

NO AFFIRMATIVE TEST AS TO INVENTION.

Declining, therefore, to enter further upon the discussion as to whether "invention" and "discovery" are synonymous terms, we will proceed to consider more in detail what constitutes a patentable subject matter.

In order to be patentable the subject matter must involve that mental process which is termed invention. No affirmative rule can be laid down by which to test the presence or absence of invention, and cases involving this question often present great difficulties.

THE OLD RULE AS TO WHAT CONSTITUTES A PATENTABLE INVENTION.

In early days the courts laid down a rule on this subject simple, practical and easily understood. It was clearly stated in 1825 by Mr. Justice Story, in Earle *vs.* Sawyer, 4 Mason, 5. Reviewing the contrary doctrine contended for by the defendant, he says:

"The whole argument upon which this doctrine is attempted to be sustained is, if I rightly comprehend it, to this effect:

"'It is not sufficient that a thing is new and useful, to

entitle the author of it to a patent. He must do more. He must find it out by mental labor and intellectual creation. If the result of accident, it must be what would not occur to all persons skilled in the art who wished to produce the same result. There must be some addition to the common stock of knowledge, and not merely the first use of what was known before. The Patent Act gives a reward for the communication of that which might be otherwise withholden. An invention is the finding out by some effort of the understanding. The mere putting of two things together, although never done before, is no invention.'

"It did not appear to me at the trial, and does not appear to me now, that this mode of reasoning upon the metaphysical nature, or the abstract definition of an invention, can justly be applied to cases under the Patent Act. That act proceeds upon the language of *common sense and common life* and has nothing mysterious or equivocal in it. The first section enacts that when any person, etc., shall allege that he 'has invented any *new* and *useful* art, *machine*, manufacture or composition of matter, or any *new* and *useful improvement* on any art, *machine*, manufacture or composition of matter, *not known* or *used* before the application, etc., it shall be lawful for the Secretary of State to cause Letters Patent to be made out, etc., granting the exclusive right and liberty of making, constructing, using, and vending to others to be used, the said invention or discovery,' etc. The thing to be patented is not a mere elementary principle or intellectual discovery, but a principle put in practice and applied to some art, machine, manufacture, or composition of matter. It must be *new* and not *known* or *used* before the application; that is, the party must have found out, created or constructed some art, machine, etc., or improvement on some art, machine, etc., which had not been previously found out, created or constructed by any other person. It is of no consequence whether the thing be simple or complicated; whether it be by accident, or by long, laborious

thought, or by an instantaneous flash of mind that it is first done. *The law looks to the fact*, and not to the process by which it is accomplished. It gives the first inventor or discoverer of the thing the exclusive right, anp asks nothing as to the mode or extent of the application of his genius to conceive or execute it. It must also be useful, that is, it must not be noxious or mischievous, but capable of being applied to good purposes; and perhaps it may also be a just interpretation of the law, that it meant to exclude things absolutely frivolous and foolish. But the degree of positive utility is less important in the eye of the law than some other things, though in regard to the inventor, as a measure of the value of the invention, it is of the highest importance.

"The first question, then, to be asked in cases of this nature is whether the thing has been done before. In case of a machine, whether it has been substantially constructed before; in case of an improvement of a machine, whether that improvement has ever been applied to such a machine before, or whether it is substantially a new combination. If it is *new*, if it is *useful*, if it has *not been known* or *used* before, it constitutes an invention within the very terms of the act, and, in my judgment, within the very sense and intendment of the Legislature. I am utterly at a loss to give any other interpretation of the act; and, indeed, in the very attempt to make that more clear which is expressed in unambiguous terms in the law itself, there is danger of creating an artificial obscurity."

Webster in his treatise on Subject Matter of Patents (p. 36), published in 1841, states the substance of the English cases as to the amount of invention requisite to support a patent as follows:

"The general conclusion from them is, *that any change, however minute, if leading to a beneficial result in the arts and manufactures, is sufficient to support a patent.*"

THE MODERN RULE AS TO WHAT CONSTITUTES A PATENTABLE INVENTION.

After a while, however, the United States courts showed a tendency to depart from this rule and to make inquiry in each case as to the nature of the mental process required to produce the subject matter, and if, in any case, the Court came to the conclusion that it could be produced by the mere exercise of skill, it would be said not to involve invention and would be held not patentable.

This tendency culminated in the doctrine laid down in the leading case of Pearce *vs.* Mulford, 102 U. S. 112 (1880), and reiterated in numerous other cases.

This case arose upon Cottle's patent for improvement in chains and chain links for necklaces, etc. The chain in question was composed of round closed links and open spiral links formed of coils of jewelers' tubing, which consists of a simple tube of gold originally formed around a copper wire by causing the wire to be eaten out by the action of acids. The seam or line of junction along the wire in the spiral coil link was left open instead of being soldered together, and by that means a peculiar elasticity was given to it. The chain was formed by taking a closed link and then springing into it a spiral link, and so on alternately until a chain of the desired length was produced. This peculiar construction effected a very considerable saving in the cost of manufacture, and at the same time enabled the wearer to put the chain to a variety of uses, owing to the ease with which the parts could be detached, as, for instance, a necklace could be converted into bracelets, etc.

One of the claims of the patent was as follows:

"An ornamental chain for necklaces, etc., formed of alternate closed links *A* and open spiral links *B*, substantially as shown and described."

There was evidence showing that a structure like the open spiral link itself was old, a bracelet having been made which might be considered as being of itself one large open spiral link. We will now quote the language

of the Court in reference to this state of facts. It will be seen that the doctrine laid down is a great departure from the principle above quoted from Mr. Justice Story, which had been followed for many years:

"Leaving the links open after they have been sprung into closed links, there being no novelty in the links themselves, cannot be patentable. It is nothing more than the exercise of ordinary mechanical skill. If in one of the complainant's chains, after the links had been joined, a person should solder the spirals together or to the closed rings, it could hardly be maintained that a new chain had been invented. Or if, when thus soldered, the soldering should be removed, the change would not deserve to be regarded as a product of invention. Yet this is subtantially what the patentee has done. His chain *may have been an improvement* on the chains that preceded it. In some particulars *it doubtless was.* It left the elasticity of the spiral gold tubing more free by releasing the links from the attachment of the soldering, and it enabled the chain to be freely taken in pieces without injury to its structure. *But all improvement is not invention*, and entitled to protection as such. Thus to entitle it, it *must be the product of some exercise of the inventive faculties*, and it must involve something more than what is obvious to persons skilled in the art to which it relates."

The Circuit Court had sustained the patent (13 Blatch. 173), and its decree was accordingly reversed.

The doctrine of this case was reiterated in Thompson *vs.* Boisselier (114 U. S. 11), where a number of cases are collected. In this case also the decree of the Circuit Court (19 Blatch. 73) sustaining the patent was reversed. See also Grant *vs.* Walter, 148 U. S. 547; Duer *vs.* Corbin Cabinet Lock Co., 149 U. S. 217.)

NEGATIVE TESTS OF INVENTION.

While we can lay down no affirmative rule to test the presence or absence of invention, there are a number of

negative rules which will serve as a sufficient test in the great majority of cases.

PRODUCT OF MERE MECHANICAL SKILL IS NOT INVENTION.

If the subject matter is such that it could be produced whenever required by any skillful chemist or mechanic skilled in the art to which it relates, it does not involve invention, and it is not patentable.

The case of Pearce *vs.* Mulford may be cited in support of this proposition.

The case of Atlantic Works *vs.* Brady, 107 U. S. 192, is peculiarly in point. In that case also the decree of the Circuit Court sustaining the patent was reversed. Brady had a patent for an improved dredge-boat for excavating rivers. The invention consisted mainly in attaching a screw (which the patentee called a mud fan) to the forward end of a propeller dredge-boat provided with tanks for settling her in the water. It was operated by sinking the boat until the screw or mud fan came in contact with the mud or sand, which, by the revolution of the screw, was thrown up and mingled with the current. Boats with screws in their sterns, and having similar tanks, had previously been used for dredging, by running them stern foremost. Mr. Justice Bradley, delivering the opinion of the Court, uses the following language:

"The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head workmen and engineers is generally adequate to devise, and which, indeed, are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made; except where the exercise of invention, somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences.

"The design of the patent laws is to reward those who

make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favor. It was never the object of those laws to grant a monopoly 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. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax upon the industry of the country, without contributing anything to the real advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith."

A RESULT OBTAINED BY SIMPLE MEANS MAY, HOWEVER, BE AN INVENTION.

Where a particular result, long desired and sought, but never attained, has at last been achieved by means of great simplicity, the simplicity of the means will not prevent the subject matter from being patentable. After the problem is solved it may seem that it could have been done by any one possessing technical skill, but the fact that it had been often previously sought without avail will go to prove almost conclusively that invention was involved. Smith *vs.* The Goodyear Dental Vulcanite Co., 93 U. S. 486, is a leading case in support of this proposition. In that case the Court says (p. 495):

"Undoubtedly the results or consequences of a process or manufacture may in some cases be regarded as of importance when the inquiry is whether the process or manufacture, exhibits invention, thought, and ingenuity. Webster, on the subject matter of patents, p. 30, says:

'The utility of the change, as ascertained by its consequences, is the real practical test of the sufficiency of an invention; and since the one cannot exist without the other, the existence of the one may be presumed on proof of the existence of the other. Where the utility is proved to exist in any degree, a sufficiency of invention to support the patent must be presumed.'"

Another leading case on this subject is Loom Co. *vs.* Higgins, 105 U. S. 580. This suit was founded upon Webster's patent for "improvement in looms," especially adapted for the weaving of carpets. Mr. Justice Bradley, in delivering the opinion of the Court, says:

"It is further argued, however, that, supposing the devices to be sufficiently described, they do not show any invention; and that the combination set forth in the fifth claim is a mere aggregation of old devices, already well known; and therefore it is not patentable. This argument would be sound if the combination claimed by Webster was an obvious one for attaining the advantages proposed —one which would occur to any mechanic skilled in the art. But it is plain from the evidence, and from the very fact that it was not sooner adopted and used, that *it did* not, for years, occur in this light to even the most skillful persons. It may have been under their very eyes, they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. Who *was* the first to see it, to understand its value, to give it shape and form, to bring it into notice and urge its adoption, is a question to which we shall shortly give our attention. At this point we are constrained to say that we cannot yield our assent to the argument that the combination of the different parts or elements for attaining the object in view was so obvious as to merit no title to invention. Now that it has succeeded, it may seem very plain to any one that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new com-

bination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention. It was certainly a new and useful result to make a loom produce fifty yards a day, when it never before had produced more than forty; and we think that the combination of elements by which this was effected, even if those elements were separately known before, was invention sufficient to form the basis of a patent."

The case of Consolidated Valve Co. *vs.* Crosby Valve Co., 113 U. S. 157, is also in point. Richardson, the patentee, had a patent for an improvement in steam safety valves. Numerous prior existing steam safety valves were put in evidence for the purpose of invalidating the patent, and the decree of the Circuit Court was against the inventor; but the Supreme Court, reversing the decree of the Circuit Court, held that the fact that the prior valves were not used, and the speedy and extensive adoption of Richardson's valve, supported the conclusion that the latter was novel and patentable. Mr. Justice Blatchford, delivering the opinion of the Court, says (p. 179):

"Richardson's invention brought to success what prior inventors had essayed and partly accomplished. He used some things which had been used before, but he added just that which was necessary to make the whole a practically valuable and economical apparatus. The fact that the known valves were not used and the speedy and extensive adoption of Richardson's valve, are facts in harmony with the evidence that his valve contains just what the prior valves lack, and go to support the conclusion at which we have arrived on the question of novelty."

(See also Krementz *vs.* S. Cottle Co., 148 U. S. 556.)

SUBSTITUTION OF MATERIALS.

The substitution of one material for another is not *usually* the exercise of invention, although the substituted material may be better adapted to the purpose.

The principal cases on this subject are Hotchkiss *vs.* Greenwood, 11 How. 248; Hicks *vs.* Kelsey, 18 Wall.

670; and Smith *vs.* The Goodyear Dental Vulcanite Co., 93 U. S. 486. In the last case former cases are reviewed, and the law upon the subject is very clearly stated by Mr. Justice Strong, as follows (p. 492):

"Among these (defences) the one perhaps most earnestly urged is the averment that the device described in the specification was not a patentable invention, but that it was a mere substitution of vulcanite for other materials, which had previously been employed as a base for artificial sets of teeth—a change of one material for another in the formation of a product. If this is in truth all that the thing described and patented was; if the device was merely the employment of hard rubber for the same use, in substantially the same manner, and with the same effect that other substances had been used for in the manufacture of the same articles, it may be conceded that it constituted no invention. So much is decided in Hotchkiss *vs.* Greenwood, 11 How. 248. But such is not our understanding of the device described and claimed. * * *

"We have, therefore, considered this branch of the case without particular reference to Hotchkiss *vs.* Greenwood, 11 How. 248. The patent in that case was for an improvement in making door and other knobs for doors, locks and furniture, and the improvement consisted in making them of clay or porcelain, in the same manner in which knobs of iron, brass, wood or glass had been previously made. Neither the clay knob nor the described method of attaching it to the shank was novel. The improvement, therefore, was nothing more than the substitution of one material for another in constructing an article. The clay or porcelain door-knob had no properties or functions which other door-knobs made of different materials had not. It was cheaper and perhaps more durable; but it could be applied to no new use; and it remedied no defects which existed in other knobs. Hence it was ruled that the alleged improvement was not a patentable invention. The case does decide that employing

one known material in place of another is not invention, if the result be only greater cheapness and durability of the product. But this is all. It does not decide that no use of one material in lieu of another in the formation of a manufacture can, in any case, amount to invention, or be the subject of a patent. If such a substitution involves a new mode of construction, or develops new uses and properties of the article formed, it may amount to invention. The substitution may be something more than formal. It may require contrivance, in which case the mode of making it would be patentable; or the result may be the production of an analogous but substantially different manufacture. This was intimated very clearly in the case of Hicks *vs.* Kelsey, 18 Wall. 670, where it was said, 'The use of one material instead of another in constructing a known machine is, in most cases, so obviously a matter of mere mechanical judgment, and not of invention, that it cannot be called an invention, unless some new and useful result, as increase of efficiency, or a decided saving in the operation, be obtained.' But where there is some such new and useful result, where a machine has acquired new functions and useful properties, it may be patentable as an invention, though the only change made in the machine has been supplanting one of its materials by another. This is true of all combinations, whether they be of materials or processes. In Crane *vs.* Price, 1 Webster Patent Cas. 393, where the whole invention consisted in the substitution of anthracite for bituminous coal in combination with a hot-air blast for smelting iron ore, a patent for it was sustained. The doctrine asserted was that if the result of the substitution was a new, a better, or a cheaper article, the introduction of the substituted material into an old process was patentable as an invention. This case has been doubted, but it has not been overruled; and the doubts have arisen from the uncertainty whether any new result was obtained by the use of anthracite. In Kneass *vs.* Schuylkill Bank (4 Wash. 9), the use of steel plates instead of copper for

engraving was held patentable. So has been the flame of gas instead of the flame of oil to finish cloth. These cases rest on the fact that a superior product has been the result of the substitution—a product that has new capabilities and that performs new functions."

PERFECTION OF WORKMANSHIP AND FORM.

Where the thing patented differs from what preceded it only in its greater perfection of workmanship or in its being a larger and stronger machine, or in its being put into a more convenient form, its production does not involve invention.

Glue Co. *vs.* Upton, 97 U. S. 3, illustrates this general subject. The patentee had taken ordinary glue and reduced it to small particles, so that its solution was accelerated and it was rendered more ready for immediate use, convenient for handling, and by its improved appearance more merchantable. But the Court held that these facts did not make it a new manufacture within the meaning of the statute. Mr. Justice Field, delivering the opinion of the Court, says (p. 6):

"A distinction must be observed between a new article of commerce and a new article which, as such, is patentable. Any change in form from a previous condition may render the article new in commerce, as powdered sugar is a different article in commerce from loaf sugar, and ground coffee is a different article in commerce from coffee in the berry. But to render the article new in the sense of the patent law, it must be more or less efficacious, or possess new properties by a combination with other ingredients, not from a mere change of form produced by a mechanical division. It is only where one of these results follows that the product of the compound can be treated as the result of invention or discovery, and be regarded as a new and useful article. The three advantages attributed to comminuted glue over the flake glue were, previous to the alleged invention of Goddard, recognized as following from a division of soluble objects into small particles, in the treatment of a great variety of articles in constant

use in the kitchens of families, and in pharmacy. Where certain properties are known to belong generally to classes of articles, there can be no invention in putting a new species of the class in a condition for the development of its properties similar to that in which other species of the same class have been placed for similar development, nor can the changed form of the article from its condition in bulk to small particles, by breaking or bruising or slicing or rasping or filing or grinding or sifting, or other similar mechanical means, make it a new article in the sense of the patent law."

To all such cases the language of Mr. Justice Matthews in Hollister *vs.* Benedict Manufacturing Co., 113 U. S. 73, is applicable. The thing patented in that case was an improvement in revenue stamps used for sealing liquor casks. Speaking of the advance made by the patentee, which had remedied some of the defects in the mode of stamping formerly used, the Court says:

"As soon as the mischief became apparent, and the remedy was seriously and systematically studied by those competent to deal with the subject, the present regulation was promptly suggested and adopted, just as a skilled mechanic, witnessing the performance of a machine, inadequate, by reason of some defect, to accomplish the object for which it had been designed, by the application of his common knowledge and experience, perceives the reason of the failure, and supplies what is obviously wanting. It is but the display of the expected skill of the calling, and involves only the exercise of the ordinary faculties of reasoning upon the materials supplied by a special knowledge, and the facility of manipulation which results from its habitual and intelligent practice, and is in no sense the creative work of that inventive faculty which it is the purpose of the Constitution and the patent laws to encourage and reward."

AGGREGATION AS DISTINGUISHED FROM COMBINATION.

The mere aggregation of parts does not involve invention. The parts brought together must co-operate to pro-

duce a joint result, although the several parts need not produce their respective effects simultaneously.

Hailes *vs.* Van Wormer, 20 Wall. 353, is the case most frequently cited in this connection. In that case the patentee had assembled together in a stove a number of useful devices, all of them old, the only novelty being that the same things had never before been placed together in a single stove. The devices so aggregated were claimed in combination with each other. They did not act jointly so as to produce a new result, but each device performed its own function in the old way without modification by the presence of the others. The doctrine of this case is summed up as follows:

A new combination, if it produces new and useful results, is patentable, though all the constituents of the combination were well known and in common use before the combination was made. But the result must be a product of the combination, and not a mere aggregate of several results, each the complete product of one of the combined elements.

Merely bringing old devices into juxtaposition, and there allowing each to work out its own effect without the production of something novel, is not invention. No one, by bringing together several old devices without producing a new and useful result, the joint product of the elements of the combination, and something more than an aggregate of old results, can acquire a right to prevent others from using the same devices, either singly or in other combinations, or, even if a new and useful result is obtained, can prevent others from using some of the devices, omitting others, in combination.

The case of Reckendorfer *vs.* Faber, 92 U. S. 347, is a peculiarly instructive case upon this point. The patentee was the inventor of an article now familiar, that proved very popular, and was commercially a great success, consisting of a pencil, into one end of which was inserted a piece of india rubber, so that one end of the pencil could be used for writing and the other as an eraser. The pat-

entee had certainly given to the public an article of great convenience and utility; but the Supreme Court held (three of the Justices dissenting) that, because there was no joint operation performed by the lead and rubber, it was a mere aggregation, and not a combination, and was therefore void for want of invention.

In Pickering *vs.* McCullough, 104 U. S., 310, Mr. Justice Matthews states this doctrine as follows (p. 318):

"In a patentable combination of old elements, all the constituents must so enter into it as that each qualifies every other; to draw an illustration from another branch of the law, they must be joint tenants of the domain of invention, seized each of every part, *per my et per tout*, and not mere tenants in common, with separate interests and estates. It must form either a new machine of a distinct character and function, or produce a result due to the joint and co-operating action of all the elements, and which is not the mere adding together of separate contributions. Otherwise it is only a mechanical juxtaposition, and not a vital union."

DUPLICATION OF PARTS.

The duplication of one or more of the parts of a machine is not invention.

Dunbar *vs.* Myers, 94 U. S. 187, is the case best illustrative of this proposition. The subject matter was a circular saw mill having two deflector plates behind the saw, one on each side of it, to spread the two parts of the lumber behind the saw so as to prevent the lumber from binding against the faces of the saw and impeding its progress. It was old to have one such deflector plate placed behind the saw for the same purpose. It was shown that in some cases benefit accrued from the use of the two deflector plates, and the Circuit Court sustained the patent (8 Blatchford, 446). But the Supreme Court reversed the decree and held that the use of two deflector plates where only one had been used before did not in-

volve invention, although it might in some cases produce a better result.

OMISSION OF PARTS.

The omission of one or more parts of an old thing where the omission causes no new operation of the parts retained, will usually not be invention.

Suppose in the case of a patent for a saw mill of the general character spoken of in Dunbar *vs.* Myers, that the state of the art was such that a saw combined with two deflector plates was old, and the inventor merely dispensed with one of the deflector plates and claimed the use of one plate only, such a claim would be invalid. In Stow *vs.* The City of Chicago, 3 Banning & Arden, 92, the Circuit Court says:

"A reconstruction of a machine, so that a less number of parts will perform all of the functions of the greater, may be invention of a high order; but the omission of a part, with a corresponding omission in function, so that the retained parts do just what they did before in the combination, cannot be other than a mere matter of judgment, depending upon whether it is desirable to have the machine do all, or less than it did before."

SUBSTITUTION OF MECHANICAL OR CHEMICAL EQUIVALENTS.

It is usually not invention to substitute in an old device one or more mechanical equivalents for one or more of its parts.

The question of equivalency usually arises in considering the question of infringement. Thus, suppose a machine using clock-work is driven by a weight, the weight being claimed as part of the combination, and some one substitutes a spring to perform the functions of the weight. He would be an infringer. Suppose, also, that he had obtained a patent for a spring in that combination. His patent would probably be void for want of invention under the above proposition; but if he could show that by the

substitution of a spring for the weight in the combination an important new and useful result had been produced, he would have made a new and patentable invention. His patent would be valid, but he would be none the less an infringer of the first named patent.

The same is true in chemical cases where a chemical equivalent is substituted.

CHANGE OF SHAPE.

Mere change of shape is not usually invention.

Where, however, the change of shape produces a new and useful result, it may be patentable.

In Winans *vs.* Denmead, 15 How. 330, the invention consisted in making the body of a car for the transportation of coal, etc., in the form of a frustrum of a cone, whereby the force exerted by the weight of the load pressed equally in all directions, and did not tend to change the form of the body, so that every part resisted its equal proportion, and by which also the lower part was so reduced as to pass down within the truck frame and between the axles, to lower the centre of gravity of the load without diminishing the capacity of the car. The Supreme Court not only sustained the patent, but held a different geometrical form of car body, involving the same mechanical principles, to be an infringement.

In Eppinger *vs.* Richey, 14 Blatch. 307, the Circuit Court sustained a patent for a peculiar form of plug tobacco that was shown to possess great advantages.

DOUBLE USE.

The use of an old art, machine, manufacture or composition of matter for a new purpose, is usually not invention. Cases of this kind come under the head of what is called "double use," and this is to be distinguished from what is called "new use."

Merwin, in his work on "Patentability of Inventions" (§ 63), says:

"Strictly speaking, a 'new use' is a use different from

that with which it is compared—different in the sense that invention was required to reach it, and therefore it is patentable; whereas a 'double use,' as it is called, is a second employment of some process or contrivance so like to the previous employment of it, that, given the first, inventive genius was not needed to attain the second—the skill of the workman was sufficient for that purpose. The second use, therefore, is not patentable."

An important distinction is to be regarded in this connection between an analogous use and a non-analogous use. Where a thing has been found useful for one purpose, it certainly involves no invention on the part of one who perceives its utility for a similar or analogous purpose. But where the use is not analogous, but is of a totally different nature, and one which would not naturally suggest itself to a person skilled in the art to which the subject matter relates, then the new use would involve invention. A non-analogous use which is referable to inventive genius is a "new use," and is patentable. An analogous use referable to the skill of the workman is a "double use," and is not patentable. The following summary is instructive:

"We may sum up the principles which govern this class of cases, as follows: (1) A non-analogous; in other words, a non-inferable or deducible use is patentable; (2) invention may be shown in the means whereby the old contrivance is adapted to the new use, and the new use may be patentable on that account; (3) such means of adaptation, though not implying invention, may tend to show that the new use is a non-analogous use; (4) experiments made to ascertain the practicability of the new use are strong evidence to prove that invention was required to conceive of it; in other words, that it is a non-analogous, and therefore patentable, use." (Merwin on Patentability of Inventions, § 92.)

The cases upon this most interesting subject are very numerous. They will be found collected down to 1883 in Mr. Merwin's work above referred to (pages 281 to 393).

A most important case on this subject was decided in 1884 by the Supreme Court of the United States (Pennsylvania Railroad *vs.* Locomotive Truck Co., 110 U. S. 490).

This case arose upon Smith's patent for "an improvement in trucks for locomotive engines." Long prior to Smith's invention trucks for railroad cars had been constructed with an ingenious mechanical device, containing laterally moving trucks and pendant links, the details of which it will not be necessary to consider, whereby the weight of the car was made to counteract the tendency of the car to fly off on a tangent and jump the track in passing around a curve, the body of the car being allowed lateral motion on the truck and being slightly drawn toward the inside of the curve. Prior to the patentee's invention these trucks had been applied to both ends of an ordinary railroad car. The patentee applied this peculiar truck and mode of attachment to the forward end of a locomotive. By reason of the fixed position of the driving wheels, no similar contrivance could be attached to the rear end of the locomotive, and it was claimed that this modified the action of the mechanism so as to involve invention. The patentee stated his claim as follows:

"I do not claim the laterally moving trucks, nor pendant links, separately considered; but what I claim and desire to secure by letters patent is the employment, in a locomotive engine, of a truck or pilot wheels fitted with the pendant links, to allow of lateral motion to the engine, as specified, whereby the drivers of said engine are allowed to remain correctly on the track, in consequence of the lateral motion of the truck, allowed for by said pendant links when running on a curve, as set forth."

The first adjudication upon this patent was in 1872, in the Circuit Court in New York (Locomotive Engine Safety Truck Co. *vs.* Erie Railway Co., 10 Blatch. 292), before Judge Blatchford, who sustained the patent. We will quote his views upon the particular point now under consideration, as it will be instructive to contrast them with those of the Supreme Court upon the same patent.

After describing the pre-existing truck mechanism as applied to railroad cars, and stating that it had been described in a previous patent granted to Kipple & Bullock, the Court says (p. 297):

"But, although the mode of operation of a Kipple & Bullock truck, *per se*, in a car having a like truck at its other end, is the same, for all the purposes of the truck itself, that it is in a structure which has driving wheels at the other end; yet the moment the truck swivelling on a king-bolt is taken out of the other end of the structure, and driving wheels take its place, the mode of operation of the structure as a whole becomes different from the mode of operation of the structure with the two swivelling trucks."

The next adjudication upon this patent was in the Circuit Court in Pennsylvania, by Mr. Justice Strong, in 1874 (Locomotive Engine Safety Truck Co. *vs.* Pennsylvania R.R. Co., 1 Banning & Arden, 470), who sustained it, and said (after first describing the mechanism of the truck):

"It had been used under eight-wheeled passenger cars, and, perhaps, under eight-wheeled freight cars; but, in all those, both trucks were allowed to swivel freely on their centres around a king-bolt. When applied to a locomotive engine or a car, the hindmost wheels of which are rigid and cannot swivel, while the operation of the truck is precisely like its operation when under a passenger car, a new effect upon the movement of the engine is produced. The drivers, or rear wheels, move on a curved track with less grinding or sliding, and the friction is greatly diminished. It is not, then, the case of a mere double use, nor the aggregation of two devices acting independent of each other, but the production of a new and useful result."

This case was appealed to the Supreme Court of the United States, which reversed the judgment of the Court below, and held that the patent did not cover a patentable subject matter.

Mr. Justice Gray, delivering the opinion of the Court, says:

"The question, therefore, is whether employing, as the forward truck of a locomotive engine with fixed driving wheels, a truck already in use on railroad cars, has the novelty requisite to sustain a patent."

The Court refers to the opinions of the Circuit Courts above referred to, sustaining the patent, and then says:

"This Court finds itself unable to escape from the conclusion that the application of the old truck to a locomotive engine neither is a new use, nor does it produce a new result.

"In both engine and car, the increased friction against the rails and the danger of being thrown off the track, in entering upon or passing along a curve, are due to the impulse of forward motion in a direction tangential to the curve, and to the influence of centrifugal force. In the engine, as in the car, the object and the effect of the transverse slot, allowing a slight lateral motion, and of the divergent pendant links, by means of which the weight of the engine or car itself helps to keep it upon the track, are to secure steadiness and safety by lessening the friction against the rails and the danger of being thrown off the track. The only difference is that by reason of the fixed position of the driving wheels of the engine, the truck, which has before been applied at each end of the car, can only be applied at the forward end of the engine, and therefore the accommodation of the movement of the engine to the curve of the track may be less complete than in the case of the car. The effect of the invention upon the engine, as compared with its effect upon the car, is the same in kind, though perhaps less in degree.

"It is settled by many decisions of this Court, which it is unnecessary to quote from or refer to in detail, that the application of an old process or machine to a similar or analogous subject, with no change in the manner of application, and no result substantially distinct in its nature, will not sustain a patent, even if the new form of result

has not before been contemplated. Hotchkiss *vs.* Greenwood, 11 How. 248; Phillips *vs.* Page, 24 How. 164, 167; Jones *vs.* Morehead, 1 Wall. 155, overruling S. C. nom. Livingston *vs.* Jones, 1 Fisher Pat. Cases, 521; Hicks *vs.* Kelsey, 18 Wall. 670; Smith *vs.* Nichols, 21 Wall. 112; Brown *vs.* Piper, 91 U. S. 37; Roberts *vs.* Ryer, 91 U. S. 150; Keystone Bridge Co. *vs.* Phœnix Iron Co., 95 U. S. 274, 276; Planing Machine Co. *vs.* Keith, 101 U. S. 479, 491; Pearce *vs.* Mulford, 102 U. S. 112; Heald *vs.* Rice, 104 U. S. 737, 754–756; Atlantic Works *vs.* Brady, 107 U. S. 192."

The Court reviews a number of cases, English and American, which established the proposition of law that the mere application of an old contrivance in an old way to an analogous subject without any novelty in the mode of applying such old contrivance to the new purpose, is not a valid subject matter of a patent. Bush *vs.* Fox, 9 Exch. 651; 5 H. L. Cas. 707; Brook *vs.* Aston, 27 L. J. (N. S.) Q. B. 145; 4 Jur. (N. S.) 279; 8 E. & B. 478; 28 L. J. (N. S.) C. P. 22, 24; 5 C. B. (N. S.) 164, 173; 28 L. J. (N. S.) Q. B. 175, 176; 5 Jur. (N. S.) 1025, 1027; Harwood *vs.* Great Northern Railway Co., 2 B. & S. 194, 222, and 11 H. L. Cas. 654.

In concluding, the Court says:

"In the case at bar the old contrivance of a railroad truck, swivelling upon the king-bolt, with transverse slot, and pendant divergent links, already in use under railroad cars, is applied in the old way, without any novelty in the mode of applying it, to the analogous purpose of forming the forward truck of a locomotive engine. This application is not a new invention, and therefore not a valid subject of a patent."

(See also Lovell Manufacturing Co. *vs.* Cary, 147 U. S. 623.)

INVENTION A QUESTION OF FACT.

The question as to whether a subject matter involves invention has been held to be a question of fact (Shuter *vs.*

Davis, 16 Fed. Rep. 564); but it must be solved by the jury or by the Court, in accordance with the rules of law above given.

PRACTICAL UTILITY AND PUBLIC USE A TEST AS TO INVENTION.

The principles which we have laid down will in most cases enable one to detect want of invention; but frequently the question as to the existence or non-existence of invention is most difficult and perplexing.

In many cases where the question is still uncertain of solution by any of the methods above set forth, the doubt may be solved in favor of the patent, by showing the fact that the device has gone into general use. The leading case on this point is Smith *vs.* Goodyear Dental Vulcanite Co., where it is said: "We do not say the single fact that a device has gone into general use, and has displaced other devices which had previously been employed for analogous uses establishes in all cases that the latter device involves a patentable invention. It may, however, always be considered, and when the other facts in the case leave the question in doubt, it is sufficient to turn the scale" (93 U. S. 495–6).

STATE OF THE ART.

In considering whether a subject matter involves invention we must bear in mind that every inventor is presumed to know all that preceded his invention in the way of prior patents and publications, whether domestic or foreign, and all use within the United States, and every patent is construed in reference to the "state of the art" so ascertained.

THE OLD AND NEW RULES ON THE SUBJECT OF PATENTABILITY.

Having now gone over the various rules of law that have been applied in recent cases for the purpose of ascertaining whether a subject matter, patented or proposed to be patented, involves invention, it will be seen that in

many cases great difficulty and doubt will arise upon the point.

In the recent case of McClain *vs.* Ortmayer (141 U. S. 419, November, 1891), the Supreme Court of the United States substantially admits its failure fully to grapple with the problem. Mr. Justice Brown, delivering the opinion of the Court, says (pp. 426–7):

"What shall be construed as invention within the meaning of the patent laws has been made the subject of a great amount of discussion in the authorities, and a large number of cases, particularly in the more recent volumes of reports, turn solely upon the question of novelty. By some, invention is described as the contriving or constructing of that which had not before existed; and by another, giving a construction to the patent law, as 'the finding out, contriving, devising, or creating something new and useful, which did not exist before, by an operation of the intellect.' 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, since the question of what is new as distinguished from that which is a colorable variation of what is old, is usually the very question in issue. 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. Courts, adopting fixed principles as a guide, have by a process of exclusion determined that certain variations in old devices do or do not involve invention; but whether the variation relied

upon in a particular case is anything more than ordinary mechanical skill is a question which cannot be answered by applying the test of any general definition."

It is greatly to be lamented that the courts have seen fit to depart from the simple rule of law laid down in 1825 by Mr. Justice Story in Earle *vs.* Sawyer (4 Mason, 5), quoted in the early part of this paper, which is substantially to the same effect as that laid down by the eminent English author Webster in 1841, heretofore quoted. The rule in that case had at least the merit of certainty, and only in rare cases could its application involve injustice or inconvenience to the public. The rule now adopted by the Supreme Court amounts to this: that a separate inquiry must be made in each case to ascertain whether a certain creative process must have gone on in the mind of him who originated the thing patented, or whether it could have been produced by a person skilled in the art without the exercise of such creative faculty, and this is to be determined as a question of fact, with certain rules of law to guide the investigation. Patent cases in equity are heard before one or two judges of the Circuit Court (usually one), who decide all questions both of law and fact; subject to review by the appellate court, both as to the law and the facts. Cases at law are tried before a jury, who have absolute power to determine the facts and who take their instructions as to the law from the court, subject to review, as to the law only, by the appellate court. It will be readily seen that it must often happen that an invention which would appear so simple and obvious to a particular judge or to a particular jury as not to involve anything more than mechanical skill, would appear to another judge or to another jury to involve great ingenuity. A patent, therefore, might frequently be held void by a particular judge or a particular jury, when it would have been held valid by another judge or jury having a different appreciation of the mechanical or chemical matters involved. To a tribunal of different temperament the device might appear marvellous

and clearly patentable, and it might be difficult to convince such a tribunal that mere mechanical skill was required to produce that which at first sight appeared so abstruse. It is thus impossible in many cases for a lawyer to give an opinion upon which a client can safely rely on the question of patentability. This uncertainty has been the origin of a vast crop of litigation.

Another element of uncertainty arises from the application of the test laid down in Smith *vs.* Goodyear Dental Vulcanite Co., as to whether the device has gone into general public use. It frequently happens, when an invention is made and introduced to the public, that it is wholly unappreciated for a number of years, and finally its merits become understood, and it becomes an indispensable article in the calling to which it relates. Let us suppose a close case involving a nice question of invention, and the suit to have been brought against an infringer during the first two or three years of the life of the patent, when the device was still struggling to obtain a foothold in the market. It will be seen that the rule of Smith *vs.* Goodyear Dental Vulcanite Co. would not aid the inventor, and his patent might be held invalid. Suppose, however, that he had deferred suing infringers until his device had been on the market five or six years and had become popular and indispensable and had gone into universal use, then the patent would undoubtedly be sustained under the rule that we are now considering.

It is almost certain that under the doctrine of the recent decisions of the Supreme Court, the inventor of the art of printing could not have sustained a patent covering it, during the first few years after the invention became known, and before it went into general use; for after all, the inventor only introduced the use of movable types containing single letters in place of types containing words and devices of various kinds, and seals for the purpose of making impressions had long been well known. While such a patent might not have been sus-

tained in its early years, before the great value of the invention was understood, it is certain that the court would have held the device to be patentable as soon as it had gone into such general public use as to demonstrate the greatness of the step made in the arts. As a matter of strict justice, however, the person who originated this art would have been just as much entitled to protection during the first year or two of the life of his patent as at any subsequent period.

Conclusion.

We consider that the rule above quoted, laid down by Mr. Justice Story in Earle *vs.* Sawyer, is a safe and satisfactory one. Where a device is *new* and *useful*, it is always possible that it may have been the result of thought and design, and great injustice is done to an inventor under the present rule of law, which leaves the whole question of patentability open for consideration by a judge or a jury. The only qualification that perhaps might be allowed can be aptly expressed by a supposed charge to a jury in the following words: "If you find that this device is new and if you find that it is useful, you are to find in favor of the patentee and against the infringer, unless you also find that the change and the consequences of the change are so inconsiderable and unimportant as to make it impossible that the device could have been the result of thought and design."