

Patents and Their Purpose

Notes of Historic Interest

By Jeremiah Lee MacAuliffe

THE history of industrial arts is the history of patents. The patent laws exist because of the cold fact that in no other practical way can public knowledge of new inventions be obtained. An invention, being at first possessed by the inventor alone, may remain his secret. If the nature of the invention permits, it may be made profitable to him by remaining his secret, and without advancing the public interests, or increasing the sum total of man's knowledge. The grant of patents, therefore, has this all-sufficient justification—it is a means by which the inventor can be induced to impart his secrets to the world at large.

INDUSTRIAL GRANTS AND PATENTS FOR INVENTION.

Originally, patents granting exclusive manufacturing privileges were not confined to inventors. They were granted to those introducing a new industry into a country, and especially is this true of England, though patents of the kind had previously been granted to some limited extent at least, on the continent of Europe. Earlier monopolies by Greek and Roman merchants, without authority from government, are referred to by Robinson in his very comprehensive and scholarly work on patents.

INVENTION.

By a comparison with the earlier grants, the character of letters patent of to-day is more clearly seen, as well as the gradual approach to the requirement of "invention" which now is universally a condition precedent to the grant of a valid patent.

Very early the importance of industrial development was realized. We are told by Schlosser that Alexander the Great made a determined effort to gather a knowledge of the inventions of all nations, and to disseminate this knowledge among his own people and those subjugated by him, *with a view to promote contentment and prosperity*. Other interesting examples abound in antiquity and in the middle ages.

INSTANCES OF DISCOURAGEMENT.

Exceptions to the general encouragement of inventors are recorded, noteworthy being the refusal by Queen Elizabeth (1589) to grant a patent for the knitting machine to its inventor, William Lee, M.A., of Cambridge (Knight's Mechanical Dictionary). More modern instances of a hostile attitude will be readily recalled in the doubts originally expressed as to the benefits, to labor and to society at large, to be obtained from the sewing machine. Another instance is that of the riotous actions of wood sawyers and carpenters, whose obliquity of vision led them to violent opposition to the introduction of the power sawmill and planer in the United States, and in Great Britain and Ireland, and made them feel contentment with even the lot of the "bottom sawyer," rather than to accept the promised improvement in conditions to be brought about by the new machines.

Industrial corporations flourished in Flanders, in France, Germany and in England, probably reaching their greatest power in Germany, where many of the free cities were formed into the Hanseatic League, in the thirteenth century. In these "free cities," which date from about the tenth century, it had been the custom to class the citizens in companies according to their occupations. The Hanseatic League enjoyed special privileges in return for services to the monarchs in whose realms it operated. The manufacturing corporations of Flanders at this period are also thought to have been at least temporarily dependent on the encouragement of the ruling sovereigns.

PATENTS FOR INVENTIONS ALONE SURVIVE.

For a long period the industrial development on the continent of Europe was far in advance of that found in England, and the latter exported little of manufactured goods except woollens. The industries of the continent, however, showed little indication of original investigation, and no marked progress in mechanics. England, awakening eventually to her backwardness, took steps looking to the establishment of new industries within her borders. She early invited foreigners, skilled in the different arts, to locate and establish manufacturing in England; and finally she particularly recognized inventors as proper recipients of patents. Some of the grants recorded were mere letters of protection to foreigners settling in England. Others, even some of those to inventors, are to be noted as including only the exclusive right to manufacture, thus leaving open the right of importation and sale. It is worth mention that this medieval form of grant was substantially retained in the patent grants of Denmark as late as 1894, when a new law went into effect.

The issue of *Engineering* for June 22nd, 1894, calls attention to the fact that a vital feature of the modern patent, to wit, the general prohibition against the public other than the patentee, characterized grants of Elizabeth, and apparently the issue of the general prohibition was in response to a petition by an Italian inventor, one Acontius, in 1559, who urged this as a necessary part of the reward to the inventor. It has been suggested that Acontius was perhaps acquainted with the existence of similar monopolies on the continent. Another essential of the modern patent, the specification disclosing the invention, also characterized patents issued under Elizabeth, such a patent having been granted as early as 1561 for the manufacture of salt-peter. The first patent specification *accompanied by drawings* appears to be the British patent, No. 169, of 1673.

PURPOSE OF INSTRUCTING THE PEOPLE.

To revert to the early forms of grants, the letters of protection granted by Edward III, in 1331, to Johannes Kempe, of Flanders, to establish the manufacture of textiles in England, are perhaps notable in that they are granted avowedly for the purpose of *instructing the people* in a new industry. (Flanders at this time made higher grades of woollens than the English). The grantee obligated himself to teach all seeking a knowledge of his calling.

Almost in exact line with the purpose of this grant are the modern patent rights of all nations, as will later appear. The Kempe grant is not otherwise notable, however, since an industrial patent or grant, earlier by nearly two centuries, was given, according to Hallam, to the Weavers Company by Henry II.

The first systematic effort to establish manufactories in England by granting patents, was made in 1337 (*Law Quarterly Review* for April, 1896), when a general statute was passed, placing under the King's protection the cloth workers of other lands who came to dwell in England, "to the intent that said cloth workers shall have the greater will to come and dwell here, our Sovereign Lord the King will grant them franchises as *many and such as may suffice them*."

If we are still interested in comparing forms of governmental encouragement of industry, we may take note of a significant incident having some relevancy to the subject, as related by Hume, who explains that an attempt to foster commerce and trade by encouragement from the Crown, was made in England by Athelstan (925-941): "He passed a remarkable law which was calculated for the encouragement of commerce, and which required some liberality of mind in that age to have devised; that a merchant who made three voyages beyond the sea on his own account should be known as a *thane or gentleman*."

What appears to have been the first patent for an alleged *new invention*, was granted in 1440 in England for new process of making salt. In a patent given to one George Bobham for an improved dredging machine, the object of the grant is made clear. It expressed the wish of Elizabeth that the favor thus accorded the patentee "will give courage to her subjects to study and seek for the knowledge of like new engines and devices." The granting of few patents in England, and the absence of material results, prior to the Elizabethan era, are accounted for by two causes, to wit: internecine wars, and the practical nullification of the patent statute during several successive reigns, when the skilled foreigners were invited *into the service of the Crown* instead of receiving franchises for the benefit of public manufactures.

INVENTORS ALONE ENTITLED TO PATENTS.

From 1600 the abuse of the privileges enjoyed by the holders of industrial monopolies resulted in the unmistakable public call for confining the grant of patents to inventors only, but promises of reform by Elizabeth quieted for a time the agitation against public monopolies. Finally, the dissatisfaction aroused by the gross abuses of the companies who controlled trade, culminated in 1623 under James I, and the noted statute against monopolies was passed. The English public, even when thus aroused over the wrongs suffered under the general monopolies, did not lose sight of the benefits to be derived by the public from encouraging inventors, and the very statute of repeal of monopolies specially recognized the propriety of granting exclusive rights to the inventors of new manufactures to enjoy their inventions *for a limited period of time*.

Much confusion exists among students of the patent laws regarding the statute of James I. This did not

create any rights for inventors, nor grant them anything which they did not previously enjoy, but merely was in keeping with the decisions of the English courts, which, whenever occasion had arisen, had endorsed the validity of grants to inventors, while condemning industrial monopolies granted to others.

The patents granted under the statute of James did not as a rule *afford a disclosure of the invention*, and some British patents as late as 1750 contained merely the title. Moreover, under this statute of James, an invention was held to be patentable if it were not previously known in England; and it was of no moment that the invention was known and published in other countries.

The patent grant to-day the world over is like the Kempe grant of six centuries ago, in that one obligation is inexorably imposed and one condition exacted, the instruction of the public. The law requires a *bona fide* disclosure; and proof of a violation by the withholding of essential particulars invalidates the patent, as a contract void for the absence of a valuable consideration.

EARLIEST AMERICAN PATENTS.

The first patent issued in this country was granted by the General Court of Massachusetts Bay Colony, in October, 1641, to one Samuel Winslow, for a new method of manufacturing salt. In recurring to this Winslow patent, and to the first patent ever issued for a new invention (1440), both for the manufacture of salt, we are strikingly reminded that patents for inventions are dictated by no mere sentiment, but by considerations of public welfare—even public necessity—which originally prompted in England, and later in this country, the granting of patents for new inventions in order to encourage and increase the production of this most important article. The term of the Winslow patent was ten years, and the grant was conditional upon Winslow's setting up works within one year. Several other patents were granted by the Bay Colony and other colonies in the same century. It appears that Massachusetts, Connecticut, and Pennsylvania were the principal members of the original colonies which granted patents.

The articles of confederation, adopted July 12th, 1776, contained no authority to grant patents; but the States issued them independently, as the three colonies above mentioned had done. Thus, in 1785, James Rumsey obtained special grants or patents from the States of Maryland, Virginia, Pennsylvania, and New York, for a "newly invented boat," which was practically tested on the "Potowmack" (Potomac) in September, 1784, in the presence of George Washington, who gave the inventor a letter highly commending the boat as "of vast importance in inland navigation." John Fitch, Rumsey's more successful rival and contestant, also received, at about the same time, similar patents, or exclusive privileges, from New York, Virginia, and Pennsylvania.

RECOGNITION OF INVENTORS RIGHTS—OBLIGATION OF GOVERNMENT.

The Constitution of the United States made provision for the encouragement of inventors, and in 1790 a patent statute was passed by the Congress. To the constitutional convention belongs the credit of, for the first time, embodying in the law of a nation the fundamental doctrine that an invention belongs by inherent right to the inventor, *and that to secure this right to him, with due regard to public interests, is an obligation of Government*. In 1836 the Patent Office was established, and provision made for the examination of inventions to determine their novelty, this being the first instance of such a provision in patent laws. The present laws are substantially those passed in 1870, which extended the term of the patent from fourteen to seventeen years, and prohibited extensions except by special act of Congress.

The proposition to give cash awards to inventors and throw the inventions at once open to the public gained some favor in Great Britain in 1869, but the proponents were silenced when reminded that the experiment had actually been tried more than a century before, and with ill success. A rather diverting item, showing some of the results of this experiment appeared in the *SCIENTIFIC AMERICAN* for September 18th, 1869. Inventions of real merit seemed, for some reason, to remain a secret under this cash plan.

Cash grants are not unknown in the United States. Thus Joshua Shaw, who in 1814 invented the percussion cap, was debarred from receiving a patent because he was an alien, but later the Government awarded him

\$25,000 (SCIENTIFIC AMERICAN, August 7th, 1869). Also, in France, Daguerre and Niepce, in 1839, were granted annuities in recognition of their invention of photography, that could not adequately be protected by patent (Tissandier's History of Photography).

PROPOSITIONS TO REPEAL PATENT LAWS.

During the sessions of the sixty-third Congress, discussion of the patent laws became widespread, attention having been focussed on the subject by the introduction of the "Oldfield Bill," which proposed compulsory licenses. There were those who, not content with the suggestion of compulsory licenses, advocated the complete repeal of the patent laws. The reader may consult a report issued by the Cleveland, Ohio, Chamber of Commerce, 1913, for an admirable, critical study of the Oldfield bill, with a discussion of the patent system of the United States.

Bearing on the suggestions of repeal, the reader will be interested in an illuminating incident involving a similar proposal. In 1869 it was actually proposed in England to repeal the patent laws (see issues of SCIENTIFIC AMERICAN during September, 1869). The agitation to this end had its origin in an attempt by the millers to avoid payment of royalty to the inventor of an improvement which prevented the wasteful and unhealthy clouds of dust that theretofore were incidental to the use of millstones. The repeal was opposed by various bodies, including the Workingmen's Technical Education Committee, The Foremen Engineers' Association, The Workingmen's Club and Institute Union, The Public Museums and Free Libraries Association, and various workingmen's organizations. These not only opposed repeal, but demanded a more liberal patent law, which would give a patent as a matter of right, and for a reasonable fee. The patent laws of England at that time made patents very costly, and were productive of outrageous delays. An excerpt from an argument at this time is instructive:

"Mr. C. W. Siemens, F.R.S., a native of Prussia, left that country and came to reside in England, because practically no encouragement was accorded to inventors in Prussia. Mr. Siemens' regenerative furnaces and improvements in telegraphy had augmented our national wealth to the extent of several million pounds sterling, all of which was lost to Prussia through it having practically no patent laws." This policy has been reversed by the Germany of to-day. Siemens himself later delivered an address (SCIENTIFIC AMERICAN, October 16th, 1869) in which he said: "If we review the progress of the technical arts of our time we may trace important inventions almost without exception to the Patent Office. In cases where the inventor of a machine or process happened to belong to a nation without an efficient patent law, we find that he readily transferred the scene of his activity to the country offering him the greatest encouragement, there to swell the ranks of intelligent workers."

WHAT OF THE PATENT OFFICE?

Dickens, in his scathing exposure of the circumlocution office, with its staff from the ancient family of Barnacles, has shown that a very bad patent law can be made infinitely worse when administered with the purpose, How not to do it. In "Little Dorrit" we see the inventor, Daniel Doyce, of the firm of Doyce & Clennam, iron works.

"As an ingenious man, he had necessarily to encounter every discouragement that the ruling powers for a length of time had been able by any means to put in the way of this class of culprits; but that was only reasonable self-defense in the powers, since How to do it must obviously be regarded as the natural and mortal enemy of How not to do it. In this was to be found the basis of the wise system, by tooth and nail upheld by the circumlocution office, of warning every ingenious British subject to be ingenious at his peril; of harassing him, obstructing him, inviting robbers (by making his remedy uncertain, difficult and expensive), to plunder him, and at the best, of confiscating his property after a short term of enjoyment, as though invention were on a parallel with felony."

If a bad law can thus be made worse, so also, a good law can be made better, by officials motivated by How to do it. The United States Patent Office organization is dominated by the commissioner, the examination of applications being done by a corps of examiners separately in charge of approximately fifty different divisions. The corps includes first, second and third assistant examiners. Official actions of the examiners are checked up (when appealed) by the Board of Examiners in Chief, and the Commissioner.

When, in the war of 1812, the keeper of patents in Washington placed himself in front of the British guns trained upon his office, determined himself to be destroyed if the threatened destruction of his precious records was to be carried out, he established the standard by which Commissioners of Patents have generally chosen to be measured, so that we see men of national repute as patent lawyers exchange a very lucrative pri-

vate law practice, for the honors of the commissioner-ship.

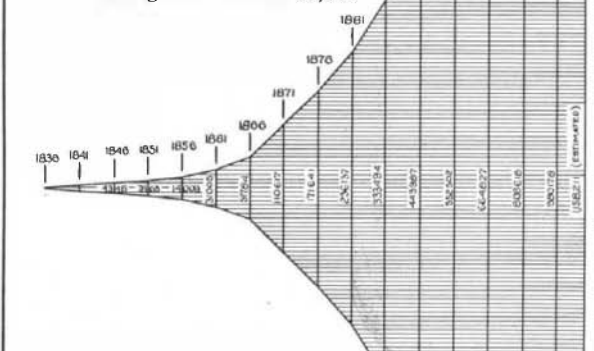
The successive commissioners find at their service a body of examiners whose duties and jurisdiction are strictly defined by the statute and the official rules, but wherein, owing to the nature of the task, the personal equation may nevertheless become a factor beyond the power of law or rule to determine. Skilled in the sciences and in mechanics, learned in the law and practiced in its impartial application, the examiners judge and rule upon (subject to appeal) the questions, largely controversial, arising as to patentability and related matters, in the tens of thousands of cases annually presented—cases not infrequently calling for what, by any applied test, must be regarded as learning of a high order.

GUARDING PUBLIC INTERESTS IN THE PATENT OFFICE.

When Doyce became disheartened, after twelve years' effort to obtain a patent at the Circumlocution Office, and his junior member took up the unequal struggle, no vaticination could have foretold the voluntary action of American applicants in holding applications pending for twelve years and half of twelve more, by dilatory

THE MOST FERTILE FIELDS OF INVENTION.

	Patents.
Carriages and Wagons.....	37,728
Clasps, Buckles, Buttons...	18,772
Harvesters	15,006
Plows	15,907
Mills	18,803
Machine Elements.....	15,062
Builders' Hardware.....	15,826
Games and Toys.....	12,164
Locks and Latches.....	11,930
Mills, Grinding, etc.....	18,803
Railways	11,347
Railway Rolling Stock.....	15,462
Seeders and Planters.....	11,059
Water Distribution—Mains and Pipes, Cocks and Faucets, Pipe Couplings, etc.	21,592
Wood Working.....	10,060



	Patents.
Locks and Latches.....	11,930
Washing Machines and Other Laundry Appliances.....	11,385
Buckles, Buttons and Clasps	18,772
Steam Engines.....	11,907

SOME OF THE MOST PROLIFIC INVENTORS.

	Patents.
Edison	977
Elhu Thomson.....	617
Francis H. Richards.....	847
Edward Weston.....	299
Charles E. Scribner.....	437
George Westinghouse.....	340

Diagram showing ratio of increase of United States patents for each five years.

tactics, until it suited their purpose to have the patent issue. This wrongful practice has been effectively eliminated by a forceful commissioner, and we have, in his action, but one instance only of many, wherein the officials guard the public interests while handing out even justice to inventors.

A practitioner of forty years before the Patent Office recently said to the writer, that amid the mass of mechanical, scientific and legal technique, by statute bound up with the daily activities of the Patent Office, quite generally he has found there, splendidly exemplified, the human element and the spirit of helpfulness.

As a striking example of efficiency and sturdy integrity in free government, the service modestly rendered each workday in the United States Patent Office, should be known and be heartening to earnest men everywhere.

RESULTS EXPRESSED IN NUMBERS.

As perhaps a not inappropriate conclusion, a diagram is appended, showing graphically the increasing number of patents granted, and consequently inventions dis-

closed in the Patent Office, during what must ever remain a wonderfully interesting epoch in our industrial development. This diagram covers the eighty years from the establishment of the Patent Office, 1836 to 1915.

A public disclosure of nearly one and one quarter million new inventions in eighty years will be conceded a fair return made by inventors for the very limited rights which they have enjoyed. Besides, there is a surplus of many millions of dollars accumulated in the United States Treasury, for the credit of the Patent Office, from fees paid in by applicants for patents.

Engineers' Difficulties With Tropical Telephones

TELEPHONE troubles are far from rare in England, says *The London Daily Telegraph*, but they are mild in comparison with those that occur in the tropics. British users of the 'phone should be thankful that the engineers of the home system have only an occasional gale or snowstorm to contend with; their plight would be very sad if instead of these comparatively rare disturbances, they had frequently to meet such obstacles to the satisfactory working of the telephone as are enumerated by Mr. W. Llewellyn Preece in his most interesting paper read recently before the Institution of Electrical Engineers on "Telephone Troubles in the Tropics."

It appears that the troubles in the tropics arise from such causes as damp, vegetation, animals and insects, and inefficient native labor. The heat is in itself not responsible for much trouble, but when this is combined with an atmospheric humidity varying between 80 and 90 per cent it is possible to appreciate the reasons for the telephone engineer's complaints. When, in addition, it is realized that this damp heat produces a marvelous growth of vegetation—so thick that along the sides of the country roads there are actual walls of green leaves, perhaps 80 feet to 100 feet in height, so dense that it is impossible to pierce through without getting one's clothes torn off the body, and growing so rapidly that it may be cut back one day and grow as high again in the ensuing twenty-four hours; when again it is learned that insect life is as prolific as the vegetation, and sometimes even more trying, then one is in a position to understand the difficulties and to sympathize with the tropical engineers.

As a matter of fact, these are not the only troubles. Lightning has a virulence unknown there. The electrical state of the atmosphere has an effect on the human nerves which seriously disturbs one's temper. Even wild animals do their best in some places to increase the engineer's labors. For instance, in some parts it is not unusual to have a mile or two of lines wrecked by giraffes, elephants, or monkeys.

As regard insects, Mr. Preece has some remarkable facts to bring forward. These creatures will attack both instruments and lines. The spider is a real pest all over the tropics; it delights to retreat into the telephone case, and there build for itself a nest, so that it is no uncommon experience to find instruments entirely put out of action owing to the diligent work of this insect.

To circumvent the insect plague it is essential that these telephone cases should be sealed up as closely as possible. The switch-hook should carry a brass plate which keeps the slot in which the arm works entirely covered. It is also desirable to have no terminals above the instruments, but to take the conductors through holes into the case and seal up these holes.

The prevalence of white ants makes it hopeless to use wood poles to carry the lines, as in a very few years the insects demolish the whole of the interior of such poles. The arms, on the other hand, are often made of this material, for the white ant will not work its way up fifteen or more feet of iron tube to reach these arms, and in some countries most excellent hard wood is obtainable locally. The normal type of overhead construction now employed in most tropical countries is fairly well standardized. The poles used are either of a type with wrought-iron taper tubes and cast-iron bases, or of the Hamilton type, which are built up of tubes of riveted sheet steel.

Overhead line troubles would, of course, be abolished if underground cables were used, but when it is a frequent occurrence for some subscribers to be situated as far as twenty-five miles from the exchange this system would call for such a high subscription as to make the proposal entirely prohibitive.

Thus the use of overhead lines must be continued and means devised to make them less likely to be attacked by insects. It has been discovered that whereas insects will nest in porcelain insulators—which are dark inside—they refuse to inhabit the transparent glass insulators, which, if made of the oil type, should, it is suggested by Mr. Preece, bring about considerable improvement in the insulation. Unfortunately, such insulators are not at present commercially obtainable.