more brittle as the tin is increased, and at the same time decrease in strength. A slight modification of proportions often causes very great changes in the properties of the alloys, as has been noticed in No. 1, 4th series, where 0·5 per cent. of tin, added to ordinary brass, resulted in giving an alloy stronger than wrought-iron.

(To be concluded.)

“THE BRITISH PATENTS, DESIGNS, AND TRADE-MARKS ACT OF 1883,” IN ITS RELATION TO AMERICAN INVENTORS.

By G. MORGAN ELDRIDGE.

[Read at the Stated Meeting, Wednesday, December 19, 1883.]

On the first of the coming year a new enactment goes into operation in England, which to some extent modifies the present patent system of that country; and in view of the fact that many citizens of the United States have already taken out patents there, and that under the new law many more will probably do so, it is well to consider the condition of things under the new régime, especially since sundry contradictory, and some incorrect statements have appeared in the public prints in regard to it.

To commence with one very important point, it has come to be generally supposed that publication or introduction of a new invention may then be made there for six months, before applying for a patent—as they may be for two years in the United States—without injury to the application. This impression, however, is entirely erroneous, as the old law in that respect is unchanged, unless under circumstances which are very exceptional and do not affect the general rule.

This appears by section 26, which provides that “Every ground on which a patent might at the commencement of this Act be repealed by *scire facias* shall be available by way of defence to an action of infringement, and shall also be ground of revocation.”

One of the exceptions relates to an exhibition of the invention at an industrial or international exhibition, and another to patents, designs, and trademarks in such foreign States as have made mutual arrangements with England for that purpose; and the precision with which these exceptions are stated, only more clearly defines the general rule.

Section 39 provides as follows: "The exhibition of an invention at an industrial or international exhibition, certified as such by the Board of Trade, or the publication of any description of the invention during the period of the holding of the exhibition, or the use of the invention for the purpose of the exhibition in the place where the exhibition is held, or the use of the invention during the period of the holding of the exhibition by any person elsewhere without the privity or consent of the inventor, shall not prejudice the right of the inventor or his legal representative to apply for and obtain provisional protection and a patent in respect of the invention or the validity of any patent granted on the application, provided that both the following conditions are complied with, namely :

"*a.* The exhibitor must, before exhibiting his invention, give the comptroller the prescribed notice of his intention to do so ; and,

"*b.* The application for a patent must be made before or within six months from the opening of the exhibition."

To analyze this, which is strictly exceptional, and therefore goes to the extent of its letter, and no further, will show within what narrow limit even this privilege is allowed.

The right to apply for a patent, and the validity of the patent itself when granted, are not prejudiced only in the case that the exhibition is at an international or industrial exhibition, certified to be such by the Board of Trade ; that the exhibitor before exhibiting his invention, has given the comptroller the prescribed notice of his intention ; that the invention is used only for the purpose of the exhibition and in the place where the exhibition is held ; that during the holding of the exhibition any use by any person elsewhere is without the privity or consent of the inventor ; that publication of a description of the invention be made only during the period of the holding of the exhibition ; that application for a patent be made within six months from the opening of the exhibition : or, to state the converse of the proposition, if the invention be exhibited at an exhibition not so certified, or at such certified exhibition without the prescribed notice to the comptroller, or at any other place or time or for any other purpose, than at and during the holding of the exhibition, and for the purpose of the exhibition ; or if it be used by any person elsewhere during the holding of the exhibition with the privity or consent of the inventor ; or if any description of the invention be published except during the period of the holding of the exhibition ; or if application be not made within six months,

the right to a patent is lost, and the privilege of six months is practically limited to the period of the exhibition, as will plainly appear, because, the use of the invention by the inventor on any day after the close of the exhibition takes him out of the exception of this clause; the use of the invention by any person anywhere on any such day, with or without his knowledge, has the same effect; and a publication of a description of the invention, though not producing that result while the exhibition remains open, becomes thus operative the day after it has closed, and bars his rights.

The other exception is one which is not likely to become operative in the United States.

Section 103 provides, that if any arrangement is made with any foreign State for the mutual protection of inventions, designs, or trade-marks, the person who has applied for protection in such State shall have priority over other applicants, in the case of a patent for seven months, and in the case of a design or trade-mark for four months, and that publication of a description of the invention or the use thereof in England during that time shall not invalidate a patent therefor, this exception being limited to States to which it shall be declared applicable by Order in Council, which is revokable at discretion.

It is not probable that this provision will ever become applicable to the United States, because such mutual arrangement could enure only to the benefit of citizens of the United States, and not at all to subjects of England, who have now not only seven months, but two full years during which they may apply for patents without prejudice by reason of publication or use, and therefore there is nothing to be given in return for the privilege.

The only additional exception is that the communication of an invention for an improvement in instruments or munitions of war to the Secretary of State for investigation, and anything done by him in such investigation shall not prejudice the rights of the inventor.

Any person or persons, English or foreign, may apply for a patent. The Act provides (§4), that the applicant shall declare that he is in possession of an invention of which he claims to be the true and first inventor, and for which he applies for a patent. No definition is given of the word inventor, but an invention is defined to be (§46) any manner of new manufacture the subject of letters patent within Section six of Chapter three of the twenty-first year of King James the First, and is stated to include an alleged invention, which leaves the meaning

of the word inventor as under the old law in which it is synonymous with introducer. It is to be noted that while the applicant declares that he is the true and first inventor, the word original is nowhere used ; so that plainly, under the new law, as under the old, the original inventor has no rights which the introducer is bound to respect.

Amendments and disclaimers may be made, substantially as reissues and disclaimers are allowed under the American system, it being provided that no amendment shall be allowed that would make the specification substantially larger than or different from the invention originally covered, with the difference, that leave to amend is conclusive as to the right of the party to amend except in case of fraud, which takes away the question, so important in the United States, of variance between the original patent and the reissue ; that a disclaimer may be made pending a suit, the hearing on which is postponed for that purpose, and then goes on as if the disclaimer had been previously made ; and that, a very important difference (Section 20), "*Where an amendment by way of disclaimer, correction or explanation has been allowed under this act no damages shall be given in any action in respect to the use of the invention before the disclaimer, correction or explanation, unless the patentee establishes to the satisfaction of the Court that his original claim was framed in good faith and with reasonable skill and knowledge.*"

While, undoubtedly, the drift of the decisions of the Supreme Court of the United States in regard to reissues is to the public interest, it is worthy of consideration whether the exception in Section 20 might not, if introduced here, serve the ends of justice better than they are served by the present law, which sometimes works great hardship.

Compulsory licenses may be ordered by the Board of Trade on terms fixed by it in case—

- a. The patent is not being worked.
- b. The reasonable requirements of the public are not supplied.
- c. "Any person is prevented from using to the best advantage an invention of which he is possessed ;" which last opens a wide door.

It would be well to consider whether some provision of this nature might not advantageously be introduced in the United States.

A patent under the new law binds the Crown, but the invention may be used by the Government or by Government contractors on terms to be agreed upon, or, in default of an agreement, on terms to be settled by the Treasury after hearing the parties interested.

An invention may be used on a foreign ship in British ports, not-

withstanding an English patent, provided that similar privileges are allowed to British ships in the State to which such ship belongs.

Any person who, by advertisement or otherwise, threatens prosecution for infringement of a patent, and does not bring a suit, is liable to an action for damages if the thing as to which he makes the threat be not an infringement of his patent, and he may be restrained by injunction from the continuance of such threats, which provision, if in force here, would save annoyance.

A patent is to be for one invention only, but it is not ground of objection that it is for more than one. It must have a claim, and may have more than one.

Section 26 (8) provides, "Where a patent has been revoked on the ground of fraud the comptroller may, on the application of the true inventor made in accordance with the provisions of this Act, grant to him a patent in lieu of and bearing the same date as the date of revocation of the patent so revoked, but the patent so granted shall cease on the expiration of the term for which the original patent was granted."

This, to this extent, takes out of the Patent Office and into the Courts the question of conflicting claims to the same invention, and where it is there determined that the holder of the patent is not the one entitled it, not merely revokes the patent wrongly held, but practically transfers it, for the remainder of its term, to the successful litigant who is decreed to be its proper owner.

It is worthy of consideration whether some provision of this nature might not be adopted in the United States, by which proceedings in interference, now so productive of expense and fruitless of result, might be transferred from the Patent Office, which can now only give to the applicant who appears best entitled, a patent which is again newly assailed so soon as the patentee attempts to enforce it, to a Court which could bring before it all the parties claimant, decide in favor of one and grant him a patent, and by decree binding on all the world, to be noted on the patent, debar defence to that patent on any ground which would have entitled either of the others to a patent for that invention. Such parts of each application as were not in interference could proceed, and patents on them could be issued in the regular way, and only the precise question in interference would come before the Court and be the subject of its decree. The Patent Office could settle the form

of the patent to which some one of the contestants would be entitled, and in that form turn over the question to the Court.

This would probably be no less expensive than the interference or the generally consequent suit, but it would be only as expensive as one of them and would definitively and perpetually close controversy upon the subject.

Every application filed is referred to an examiner, who reports whether the nature of the invention has been fairly described, whether the papers have been prepared in the prescribed manner, whether the title sufficiently indicates the subject matter of the invention, and, in case there is on file at the same time an application bearing the same or a similar title, whether they both comprise the same invention, in which latter case, if such is found to be the fact, "the comptroller may refuse to seal a patent on the application of the second applicant."

Opposition to the grant of a patent may be made by any person on the ground of the applicant having obtained the invention from him; or on the ground that the alleged invention is covered by an existing English patent or a prior application, but on no other ground; which provisions define the limit of investigation as to the novelty of the invention, and leave in operation, with these exceptions, the present system of granting to any one a patent for anything he asks, with no approach to the advantages which are offered to the applicant for a patent in the United States by the system which is in operation here.

These advantages, great as they are, are by some not clearly understood, and therefore not fully appreciated.

It is to be borne in mind that a patent whose claim covers a thing previously known or used is inoperative and invalid. Such prior knowledge or use may be divided into two classes; a published description in some patent or other publication; and the manufacture, use or sale of the thing claimed as new, as to which there has been no published description.

As to the last, it is in its nature that it cannot with certainty be known to any person by the most careful research, for a use of a thing in a factory or shop, or by a limited number of persons outside of such place, may be so far public as to invalidate a patent for it and at the same time so far private that only by the merest accident can it be discovered by any one elsewhere.

As to such obstructions, both systems stand on an even footing, and they are to be compared only by their relation to published matter.

Considered only in such relation, if a patent claim covers matter so published the patent is void, otherwise it is valid, and that equally in both countries. The experience of every one who has taken out a patent in the United States will show him that the case is rarely exceptional in which the claims as first presented are not liable to the objection that they cover old matter, and that therefore the patent, if issued in that form, would be invalid.

In England the patent would be issued in that form, and the patentee would be left to discover, at the end of a law-suit, and after he had exhausted his means in the introduction of his invention, in which he supposed himself protected, that his patent was inoperative and his protection had failed.

In the United States the application is referred to the examiner, who has charge of that branch of that subdivision of that class of inventions, who has before him the results of the careful research, for years, of the publications relating to that special detail of the subject brought down to the latest date, and he advises the applicant as to every objection which can be found to his claims in any publication in the world, which objection, if well founded, would invalidate his patent if issued in that form, whenever and by whomsoever discovered.

If the objection be not well founded the applicant can obtain his patent regardless of it. If it be well founded and goes to the entire extent of the novelty of the supposed invention, the applicant finds that, though he was an original, he was not the first inventor, and he retires from the contest, which is the best for him; if he has nothing, the sooner and the more cheaply he learns it the better.

If, as is generally the case, he has really invented something new—but has claimed more than was new—he learns what portion of it is old, and he limits his claim to that which is really his; and he has a very good assurance that, so far as published matter is concerned, when he takes out his patent in this form, he has that which will effectually prevent any one from making, vending, or using the thing covered by his claims.

If, when the process of elimination is completed, he finds that what is left is of no value to him, he need go no further; which, again, is good for him; he knows, or can know, exactly upon what ground he stands.

All this he obtains for the preliminary fee of fifteen dollars paid into the Patent Office; a result which he could not obtain otherwise for that

sum, nor scarcely for any sum. No individual research can cover the ground so well as it is covered by the system of minute subdivision of the Patent Office, and no approach to it could be made at the price; and, in default of it, the patentee is left to obtain the information when the cost of it may be his destruction.

If the patentee supposes—as from ignorance many suppose—that he acquires by his patent a right to make the whole machine of which his claim covers a part, and proceeds upon that presumption, he may thus get into trouble. A patent authorizes a man to do nothing, but only enables him to prevent another from doing something, and no system of government protects a man against the consequences of his own ignorance or folly.

There is an impression among some that the Patent Office habitually grants patents which cover old matter and have no novelty, but it will be found that this criticism comes from those who are uninformed as to the above proper rule of construction, or who have not examined the claims of the patents they criticise, and are therefore not aware how restricted they are and how little ground they actually cover. This is not to be ascribed as a fault but to be counted as a merit to the Patent Office. Little as the thing is, it is all of which the patentee was the original and first inventor; and little as the thing appears, it is sometimes such a little thing which bridges the gap between a machine which is a failure and one which is a success, and the patentee has the assurance that—though little—it is all that he is entitled to and that he is entitled to it.

It may be said that the Patent Office examiners sometimes fail to discover matter which makes a good objection to the claim; which is true, and is partly the result of the fallibility of all human systems and partly the result of the niggardly system pursued by the government of the United States in relation to the Patent Office producing a corps of examiners insufficient in number and in quality. In number, because not enough are provided; in quality, because experience is the only thing which can give the desirable approach to perfection, and when an examiner has obtained this experience he finds that the pay of his position is not equal to what he can gain elsewhere, and he therefore leaves his place to another who has the experience to acquire.

If the government would devote to the use of inventors the money which it receives through the Patent Office from them, this state of things would not exist. A highly meritorious and hard-working class

of officers would be increased to the number required and would be paid according to their desert, and would therefore remain in their positions; the plan of subdivision of subjects would be more thoroughly and perfectly carried out; and, as a consequence, the number of errors would be greatly diminished, and the whole system would approach in practice very nearly to the perfection which it has in theory.

CAST IRON IN STEAM BOILERS.

By S. LLOYD WIEGAND.

[Read at the Stated Meeting, Wednesday, January 16, 1884.]

Public attention has been recently directed to the fact that cast iron is extensively used in the construction of boilers, and most notably in the heads of cylinder boilers. Many such boilers have flat heads, and expressions of opinions, alleging flat cast iron boiler-heads to be dangerous, have been recently made, and reiterated in terms and with a frequency calculated to excite grave alarm, not only on the part of the owners and users of such boilers, but in the minds of the public generally, and to produce an impression that such boilers are necessarily a menace to property and life.

The criticisms against such structures have not assumed any such exact expressions, as to show where safety ceases and danger begins, but they have been condemned apparently without a hearing, as dangerous and treacherous always, and under every condition.

The published engineering literature throws very little light on this subject, and no recent treatise, or for that matter, old ones either, give any rule for computing the strength, or determining the proper proportions of such boiler-heads, yet thousands of them are in daily use, and more of them are being made.

That there must be some merit in them, is a reasonable inference from their extensive use, and to open a discussion on their merits and faults, and to bring to the attention of the INSTITUTE evidence of what they are capable of enduring, is the purpose of this paper.

To bring the matter more clearly to the observation of this meeting, it is proposed to repeat an experiment recently made in this City, of testing a cylindric boiler, provided with flat cast iron heads, by hydraulic pressure, and