BIRMINGHAM LOCAL SECTION.

INAUGURAL ADDRESS OF THE CHAIRMAN,

A. M. TAYLOR, Member.

(Address delivered 13th November, 1912.)

I desire to thank you for the great honour you have done me in electing me your Chairman. One of the unwritten laws of this Institution requires that your Chairman shall deliver an address on some subject of general interest. I have thought that some remarks on Patents and Inventions might be of interest to the members of this Institution.

The prosperity of the country in general, and of the electrical industry in particular, depends to a greater extent upon new inventions than perhaps is usually supposed. A country which does not provide new developments in industry, is apt to stagnate, and will certainly be unable to compete with other countries which are providing these developments.

The "commercial element" of the country may arrange for the manufacture of standard apparatus on a vast scale and so reduce costs ; but unless it is at the same time ready to seize upon the first clear step in advance in the way of producing new and useful results, or equal results by a new process at lower costs, all its commercial organization will have been in vain.

As an illustration of this, take the case of the steam turbine. It would obviously be merely courting disaster, in the long run, for the commercial element of the established industry (in this case that of the manufacture of reciprocating steam engines) to meet the advent of the steam turbine by offering to sell their engines at a cheaper and cheaper rate, and so endeavouring to keep the steam turbine out of their market.

The question then arises, whether it is not desirable, in the interests of the country at large, to give still greater stimulus to invention ; as there is the obvious temptation for large concerns having abundance of capital, and control of certain markets, to seek to use this capital to enhance their profits, and to stifle competition from any new developments.

For example, a concern having large capital at its back can afford

to keep paid agents continually on the look-out for patent developments in the same, or in contiguous directions to those which it owns, and it can afford to buy up the patent rights (very often for a mere trifle, if in the hands of individuals), solely with the object of stifling any competition that might otherwise have been set up against its own standardized articles.

To take a concrete example : Suppose it had been possible for the manufacturers of reciprocating steam engines (I hope these gentlemen will pardon my invidiousness) to have bought up and stifled all inventions in steam turbines as rapidly as they appeared ; the whole industry of the nation would have suffered, and developments in large power plants would have been retarded to an enormous extent. The destructive tendency of such a course would seem to be self-evident ; and in the abstract, probably all will agree that the right thing to do is to offer every possible facility to the inventor to develop his ideas. But when it comes to applying these principles to a concrete case, things are not quite so clear, and it seems to me that there is a distinct temptation for the concern having capital to stultify the efforts of the inventor, if these are likely to interfere with its profits.

Such a course, which the author understands has been carried on to an extreme in the United States of America, results in the establishment of huge monopolies, and cannot be altogether in the nation's interests, besides being quite counter to the objects with which the patent system was instituted.

The author understands that the original object of the granting of patents was to encourage the making public of new ways and means of effecting given results, with a view to the general prosperity of the nation as a whole rather than that of the inventor ; but at the same time to make it thoroughly worth the inventor's while to trust to a reasonable reward guaranteed by the Government rather than to the risky possibility of his making a fortune out of some process of which he could only reap the benefit by keeping it an absolute secret. Unfortunately, as the law now stands, there is almost as much risk of financial loss in patenting, or making public an invention, as in endeavouring to keep the invention a secret.

One very important reason for the apathy of the capitalist, or the manufacturer, towards the inventor is to be found in the fact that there is a profound distrust in the value of patents, and this is one of the points which it is desired to investigate in the present address.

Another point which it is desired to take up, is the inducement that should be offered by large firms to their employees to stimulate invention.

A third point is the financial assistance which, in the national interest, should be offered by independent concerns to the best class of inventors.

REASONS FOR DISTRUST OF PATENTS.

Dealing with the first point, it is perhaps not generally known by the inventor that, even when he has survived the scrutiny of the

British Patent Office, he has only secured a reasonable chance of his invention not having been anticipated at the Patent Office, and he has no guarantee whatever that interested persons may not be able to show that the invention has previously been tried in practice in a semi-public way, even though no application for a patent may have been lodged.

Neither has he any assurance that the invention will act in the manner predicted, for on this point the British Patent Office takes no responsibility.

Neither, and this is the unkindest cut of all, has he any assurance that there is real "subject matter" in his invention ; for here again the British Patent Office offers no assurance and takes no responsibility. The result of the latter defect is that, directly he gets the invention started and working successfully, his invention may be combated by interested parties in the Law Courts, and if it cannot be shown to contain "subject matter," it is disallowed.

The knowledge, in a general way, that there are difficulties of this sort to contend with, has no doubt had its influence on the capitalist, and even on the manufacturing firms which would otherwise deal with the matter.

A question, then, for careful consideration is whether the inventor gets sufficient encouragement from the State to compensate him for these uncertainties, and whether these things are not done better in other countries.

Your Chairman has found that in the United States of America they are much more careful in accepting a patent than in this country ; but it is in Germany, especially, where the investigation of a patent is carried out with a thoroughness that leaves the inventor, when he emerges successfully through the ordeal, with the confidence that, even if he were attacked in the Law Courts, his patent would almost certainly not be cancelled either on the ground of lack of "subject matter" or on that of inability to work, if made as described in the specification. Another very good feature about the German Patent is that the only fee which the inventor has to pay to obtain this excellent benefit is a matter of some 20 marks, since he does not have to pay the remaining 30 marks unless he is granted the patent, which may be as much as two years later.

The question of the "validity" of a patent, or otherwise, is one of such vital importance to the inventor, and the difference between what constitutes sufficient to obtain (in England) the grant of a patent and what constitutes "subject matter" is so little understood by the average engineer, that I trust I shall be pardoned for dealing with this matter in some detail, in view of the number of younger engineers in our Local Section to whom this matter may be of interest.

"An ounce of practice is worth a pound of theory" is a well-known and correct statement ; but people who have the experience do not always care to make it public property, for reasons which may be easily surmised. I must, on this account, content myself with giving an example which is common property, viz. that of the Ilgner case.

Here was a patent which had been granted in this country, and in the pushing of which large sums of money had been incurred, and which, at the instance of a competitor, who had no master-patent to offer in its place, is declared to be invalid.

The probability that this patent was also granted in Germany must not be taken to nullify the statement made earlier that they are more careful in that country than here about the question of "subject matter." There may be many reasons for its having been granted there; not the least of which may have been an influential and capable patent agent. My previous remarks are based on experience under identical conditions in the two countries, and form therefore a sound basis for comparison.

What, then, was the Ilgner patent, and where was the lack of "subject matter"?

The problem before Ilgner was to devise a system suitable for working reversible and rapidly-varying loads from a central station without causing tremendous shocks on the generating system. He employed a motor-generator intermediate between the prime generator and the final motor, which permitted the reversal of the latter and any change of speed required in the same; and he introduced a fly-wheel on the motor-generator to take up the shocks which would otherwise come on to the prime generator. He also arranged for the motor of the motor-generator to tend to slow up very rapidly with an increased load, and thus to draw upon the stored energy of the fly-wheel for the severe demand required from the generator of the motor-generator.

The Law Courts held that the employment of a motor-generator between the prime motor and the final motor was in essence the Ward-Leonard idea; that the essential idea of the Ilgner invention was the putting of a fly-wheel on the motor of the said motor-generator; that it was obvious to any competent engineer that a fly-wheel was necessary, in view of the nature of the load; that the difficulty of using a fly-wheel in connection with reversible loads was got over by combining it with the Ward-Leonard system; and lastly, that no act of invention was performed in arranging that the motor of the motor-generator should slow up with an increased load, as this was an obvious necessity if the fly-wheel was to perform its proper function.

The judgment in this case shows very clearly the erroneousness of the common idea, that any combination of known ideas which effects a new or improved result is subject matter for a patent. In the present instance the combination of the motor-generator idea (introduced primarily for regulating the speed of the second motor) with the fly-wheel (introduced at the right point of the chain to avoid the excessive demands being transmitted back to the generator), was undoubtedly a combination effecting "a new and improved result," and as such would be accepted by the British Patent Office. But, after a company had been formed, and capital spent on developing the scheme, with the supposed certainty of reaping a substantial reward later in royalties, the whole thing is quashed by an action in the Law Courts.

What, then, can be done for the inventor? Undoubtedly the right way is for the British Patent Office to be invested with powers to enable them to determine authoritatively whether an invention possesses "subject matter" before they issue Letters Patent.

And what, then, becomes of the army of patent agents and of lawyers and expert witnesses, whose field, it might at first appear, would be perceptibly restricted? And would the Patent Office be able to pay its way if it undertook all this extra work, unless it raised its fees? My answer to the last question is that, though the German Patent Office does all this extra work, it still pays its way. Last year its expenses were £256,000 and its receipts £534,000. And not only this, but the known value of a German patent induces foreigners of all countries to take out German patents and so bring grist to the mill. The answer to the first question is that the increased volume of home and foreign business would still support the patent agents, lawyers, and expert witnesses, besides greatly conducing to the country's prosperity by stimulating invention and re-establishing confidence in the value of patents.

It seems to your Chairman that the British inventor has for too long neglected to avail himself of the means of combination possessed by other individuals, and some powerful organization is needed in this country to defend his interests, and to state his case in Parliament, etc.

Something, in fact, akin to our own Institution is needed. The patent agents have their Institution, but their interests do not invariably coincide with those of the inventor—I refer perhaps more especially to the inventor who is deficient in capital—and the inventor should certainly have some place where he may rely upon getting disinterested advice, or have his wrongs redressed.

I am advised that such an Institution has recently been formed, but at the moment of preparing this address I am not fully informed as to the extent of which the *bona fide* inventor—and especially the best class of inventor, viz. the engineer-inventor—is represented on the Council. My personal opinion is that it should not contain the professional or legal element, except in the most dilute quantities.

Very severe divergencies of interests have, I understand, manifested themselves in the United States between inventors and patent agents; but this may, however, be peculiar to that country.

The Inventors' Guild of America is, moreover, stated to be "composed exclusively of independent and experienced inventor-patentees."

Before passing from this section of my address, I may perhaps give a hint to the inventor. If he cannot get the British Office routine amended in the desired direction, the German Patent Office is still at his disposal, and the "oracle" can be worked, if done the right way, for a sum not exceeding £3 to £4 if the patentee is his own draughtsman. How this may be done is perhaps not desirable to disclose in an address of this sort; but that it can be done is a matter of experience with the Author.

INDUCEMENT TO INVENTION OFFERED BY MANUFACTURERS.

My remarks will, of course, be understood to refer principally to electrical manufactures, as my experience lies mostly in that direction.

It is, I believe, fairly common practice for large manufacturing firms to call upon their employees to sign a document, whereby they agree to hand over absolutely to the firm all inventions they may make while in their service, and disclaiming any right whatever to participation in the profits.

The theory of this arbitrary proceeding is that the employee has got his knowledge through his employer. But, though there are occasional cases where the invention has, so to speak, been pitchforked into the employee's hands in the course of his daily work, there is the large majority of cases where the employee either comes to the employer with knowledge gained elsewhere (perhaps at his own expense, as, for instance, at college) and to the benefit of which the employer is not entitled.

Suppose, for example; that an employee has, for some reason, found it desirable to leave a particular firm immediately after he has worked out, with great labour and at considerable self-sacrifice, during his evenings at home, some important invention, the clue to which he may as likely as not have received from reading his technical paper (and there perhaps also have learnt the demand for the invention). All his labour and time has, in such an event, to be irretrievably thrown away; though it is quite conceivable that, apart from the invention itself, his employers have benefited immensely by the improved insight into certain questions (generally intricate) which he has found it necessary to investigate in connection with his patent. But the whole patent, lock, stock, and barrel, belongs to the employer, and the employee has to leave it behind him.

I had a case happen within my own knowledge, where an exceptionally brilliant engineer was positively dismissed because he refused to hand over to his employers a patent which he had taken out, and the knowledge for which he had certainly obtained before he came to the said employers.

No doubt there are many simple ideas which are the result of a happy inspiration in the course of one's daily work; but the day is gone by when anything of real value can be evolved in electrical engineering without an immense amount of brain work; and, if there is not sufficient stimulus of reward, the busy engineer can hardly be expected to spend his evenings at such problems when he can get along just as well with his employers if he does not do anything outside of his office. No doubt the difficulty is to make a proposal acceptable to the employer, and at the same time sufficiently enticing to the employee to give him every stimulus to develop his inventive powers.

There are certain improvements which might be made in present relations between employer and employee, and which are fairly obvious.

First, it should be illegal (subject, of course, to proper provision being made for the protection of the employer) for an employer to compel an employee to hand over to him his invention, on pain either of dismissal or of prejudice in any way to his advancement if he stays on with the firm employing him.

The question as to whether the employee got the idea from his employer, or whether he obtained the knowledge necessary for him to make the invention while in his employer's service, or whether his daily work was such as necessarily to provide him with the materials for the invention—all these should be left to an independent arbitrator (say, for instance, the President of the Institution of Electrical Engineers), before it is even conceded that the employer has any right to the first refusal of the employee's invention.

The employee should certainly be allowed to apply direct to the Patent Office in the first instance, if he chooses to do so. The fact that the patent fees are, under present arrangements, borne by the employer, counts for very little in the matter. In most cases, the inventor would greatly prefer to pay his own.

FINANCIAL ASSISTANCE FOR SUITABLE INVENTIONS.

Undoubtedly the engineer with a genuine bent for invention needs every encouragement. By this I do not include the casual inventor of a new button-hook, or a boot-jack, or a trousers-stretcher, who is quite sufficiently looked after by the present patent system, but I mean the engineer who, having a good training in fundamental principles, sets out with a full knowledge of what has already been accomplished in a particular direction and has a clear idea of what he wants to arrive at, and is prepared to make sacrifices in its attainment.

Mr. Dugald Clerk said recently, in a paper read before the British Association on the subject of the gas turbine: "Most of the early experimental work upon any great and difficult problem must necessarily be of the forlorn-hope type, so far as concerns the attainment of commercial success. This is shown by the history of all great inventions. Pioneers in work of this kind should be highly honoured by engineers."

I most fully endorse this; but I think we might go a step further and say that they should also be honoured by the nation. It is a matter that concerns the nation at large just as much as it concerns the engineer. However, it is not so much the "honouring" as it is the "encouraging" which I am contending for.

Could not our Institution do something in this sense? All our premiums appear to be granted on the merits of papers read before the Institution, judged on the basis of their contribution to the general fund of knowledge, or their promotion of a good discussion. But if we had a substantial premium set aside for the inventor who may read a paper descriptive of his work (even if the object of that work be not finally attained), such premium might help him to continue his experiments or developments. And, if contributions towards such

a fund were invited on the part of members generally, would there not probably be a large response from members, and thus an additional stimulus given to original work?

COMMENTS ON PATENT PROCEDURE.

A few comments, and some hints on patent procedure, may not here be out of place.

The principal adverse comment which I have to make on the patent procedure system is that the period of six months allowed between the lodging of the provisional and that of the "complete" specification is altogether too short for inventions that involve a great deal of investigation, calculation, experiment, and development.

The period is, no doubt, ample for simple inventions; and the difficulty is, I suppose, that to enlarge the present period is apt to impose a hardship on those who want to obtain Letters Patent as early as possible. But there are sundry provisions in the Patents Act which help one even here. I would suggest that it is very hard on that class of inventors who are the most likely materially to benefit their country that they should be handicapped by having either to drop their original work (and thus lose priority) or to disclose to the public an invention at such a stage that it invites development by others who have not done the really hard work on it.

Really great inventions do not come without a great deal of work having been previously performed, nor by other than an individual with a large amount of knowledge and general capacity; and such an individual is a valuable man quite apart from his inventions, and sure to be in consequence loaded up to the full in his daily work. To such a man the spare time which he could give to the invention in six months, is ridiculously small.

As a partial remedy, I would suggest that he should be allowed, under increasing penalty, to extend the time to nine months, or even a year. The present seven months' absolute limit is not fair to such a man.

And here I may give a hint. It is not, perhaps, general knowledge that the British Office gives, before the lodging of the "complete" specification, something in some measure corresponding with the "patents of addition" which it allows after the lodging of that specification.

I refer to the embodiment of two or more "provisional" specifications in one "complete" specification, under the rule relating to "cognate" applications. Suppose, for example, that during the six months succeeding the lodging of the "provisional" one finds several directions in which difficulties have to be overcome, requiring supplementary inventions, and lodges these ideas in the form of "provisionals," then when the six months is completed all these can, with the consent of the Patent Office, be embodied in the one complete application. Thus in any question of priority, one would be allowed the date of the

lodgment of any one of the provisionals as the date of that particular stage of the invention.

This is a feature that may be extremely valuable, and in my own knowledge I have come across at least one case in which, while the inventor was anticipated by others in the first early stages of the invention, his succeeding stages of the invention transformed an uncommercial idea into one that was commercially feasible.

The above rule, then, provides a way in which the inventor can sometimes actually gain a month or two. It has been already remarked that most inventions of real progress come to one in stages. Now, it often happens that the later stages turn out to be of greater importance than the earlier stages, and in some cases, as just indicated, it may be found out that the earlier stages are either of less importance, or perhaps have been anticipated. Suppose, then, that an inventor finds the date for lodging the "final" (or "complete") specification upon him while he is in the throes of developing a new and important stage of the invention, he has the option of two things. He may either lodge his "complete" specification in an avowedly incomplete form and take out a second "complete" specification immediately afterwards, which is a distinctly costly process if he is going to lodge foreign applications as well; or he may elect to "scrap" one or two of his earlier provisionals and thereby gain two or three months, or even more, before he need lodge his "final," and thus obtain the desired time in which to develop his latest stage of the invention. This method has the additional great advantage that the date of the lodging of the first foreign application is also postponed.

With regard to other comments on the British system of patents, I have already dealt rather fully with the failure of the British patent system to protect the inventor from his patent being nullified through alleged lack of novelty. It is only fair, however, to the Patent Office officials to state that they do their work, as far as authorized by the law, thoroughly and efficiently, and are equally courteous to all with whom they have to do.

A suggestion may here be made as to whether the British Patent Law should not differentiate between "inventions" in which there is held to be "subject matter" and those in which there is not.

There is a large class of very useful inventions in which two or more independent ideas are combined to produce a new and improved result. Surely such an invention deserves better of the public than to be put upon the scrap heap after a lot of time and money has been spent upon it? Take for instance, the Ilgner case; it is very easy for a Judge to be persuaded by expert witnesses that the thing was self-obvious, but the ordinary engineer may be allowed to have his doubts about this.

In any case the fact remains that the crushing of a patent in this way is a distinct discouragement to invention, and that the best class of inventor, viz. the well-informed, plodding engineer, who has a definite purpose and the best equipment for effecting it, is the one who is the most hard hit by it. I would suggest that complete protection be

granted to this class of patent, but only, however, for a limited term of years—say, 10 years instead of 14 years. This would mitigate the discouragement which is otherwise put upon the best class of inventor.

The point upon which I desire to insist, is that anything that discourages inventions which would confer a boon upon the country producing them (though they need not be in themselves of striking novelty) is actually a blow aimed at the trade of the country itself, and should therefore be remedied with the least possible delay.

CONCLUSIONS.

The following conclusions may be summarized :—

1. Reform is needed as to the investigation of patent application ; and the rigorous methods adopted by the German Office might be copied with advantage (with improvements in the facilities for appeal).
2. Inventions requiring a great deal of investigation work should be allowed much more than six months for this development.
3. The large manufacturing firms should offer greater inducements to their employees to work out inventions than they do at present.
4. Inventors should combine to protect their own interests, and exclusively their own interests, and have a mutual defence fund.
5. Some of the scientific and engineering Institutions might give more encouragement and assistance to the independent inventor than they do at present.
6. It might be considered desirable, in the best interests of the country, to have two classes of patents—one for inventions possessing “subject matter,” and another for those not possessing it, but yet possessing novelty.

In conclusion, I crave your pardon for errors of omission and commission, and trust that this address may at least be of some help to our younger engineers, even if it contains nothing of information or novelty to the older members.