breaking waves, children playing on the summer sands, animals and pets feeding or momentarily at rest. No great rapidity being required for such subjects, the full opening of the shutter may be used without any band; the more full the exposure, the less difficult the after-task of "bringing out" the negative.

A step further consists in taking ships in motion. If the position of the camera be at the end of a slippery pier, the spikes of the tripod are liable to slip; and if a stiff breeze be blowing, care has to be taken lest a sudden puff should catch the focussing cloth, and the whole machine take a header into the sea. The focussing, insertion of stop, placing the back containing the plate in position, putting on the shutter, and drawing the dark slide, must be done before the vessel passes the field of the lens.

A guess is therefore made for the distance at which it is likely to pass, the waves, or a buoy, or a passing boat in the centre of the "field" (where the light is always strongest) being focussed, and then, when the vessel has just reached the right spot the exposure is made, and as she slips by, it is devoutly hoped that she leaves a good likeness behind. If the rising front of the camera has not been used to cut off the very near foreground, or if the vessel has come rather too close, part of the topsail may be cut off, as seen in the print. Also, if the light be brilliant, the reflection from the water (always very great, and to be taken into consideration in regulating exposure) may cause diffused light enough to "fog" the image and spoil it, unless a small stop has been used; and, on the other hand, if a small stop *has* been used, perhaps the plate will be found so hopelessly under-exposed, that no satisfactory result is possible. A better position is the committee-boat at a Channel regatta, where yachts in racing trim will pass close by, in every variety of picturesque attitude. But the best way of all is, not to wait till the vessels come to us, but to go to them; to lash an upright plank to the bulwarks of a yacht, fasten the camera thereto, and when any suitable object presents itself, sail by at the right distance, and take it passing, the exposure being so rapid that the movement of *both* vessels going in contrary directions will not even be observed in the negative.

But the quickest subject of all is a train at full speed. To obtain it perfectly "sharp" (*i.e.*, not at all blurred through movement), not end-on, but nearly broadside, requires not only most favourable conditions of light, a rapid lens, and a rapid plate, but almost as much command over camera and chemicals as the driver has over the "regulator." Slow trains may with advantage be first attempted, then quicker ones; and when experience warrants it, the wish will not be wanting to catch the fastest express as it rushes at full speed through some way-side station.

A good day with clear atmosphere is selected, brightened by full sunshine. Every precaution is taken to insure success in the way of reducing aperture of shutter, putting on it extra bands, polishing glasses of the lens, and choosing a position in which the sun will shine most effectively on the train. Every facility will willingly be afforded, for the "Flying Dutchman" is the pride of the line. The station-master sees that no goods-trucks are in the way; the signal-man reports from his box where the train is, and when to expect it; the porters are fired with a thirsting ambition to do something to further the project; and if the driver has been seen beforehand, he will have clouds of steam coming both from the safety-valve and funnel; and the thought of the enjoyment they will derive from receiving a picture materially increases the pleasure of creating it. The distant signal falls, the roar increases, the ground vibrates, and at the exact instant that the engine passes the spot focussed the click of the shutter is heard, and the driver, who observes everything (as express drivers must, and do), raises his spare arm in salute, only too proud to have his iron steed photographed; supposing the picture to be already finished, and visible; little surmising that the most critical part of the matter has yet to come, when the dark room is at length reached—developing the latent image.

HOW TO TAKE OUT A PATENT.

BY J. MUNRO, C.E.

BEFORE the passing of the new Patent Act it was acknowledged on all hands that the expense of a patent in this country was a heavy tax upon invention, and that many an excellent idea was lost to us as a nation because it occurred to some person who was too poor to turn it to account by protecting it with a patent, and subsequently working it out. The total cost of the Government stamps in Great Britain was £25 for three years' protection, £75 for seven years, and £175 for fourteen years. Provisional protection for six months, to allow the inventor to test his idea and frame the final patent, cost £5. The professional patent agent's fees too, were commonly from £12 to £20 or more, and thus the British protection for a new invention during a period of three years actually cost the patentee some £50, a sum far beyond the pockets of an ordinary workman, and too much to be lightly risked by any one of modest means. By the new law, however, the provisional protection for nine

months costs only £1, and complete protection only £3 more, or a total of £4. The protection will be extended to fourteen years from its date if £50 be paid before the end of the fourth year, and £100 before the end of the eighth year; or, in lieu thereof, if certain annual renewal fees of £10, £15, and £20 be paid, commencing before the expiration of the fourth year, and extending to and inclusive of the thirteenth year. These conditions are much more favourable to the poor inventor, since the heavier fees only fall due after he has had time to profit by his patent.

If it is essential to the making of hare soup (according to the cookery book) that you must first "catch your hare," it is as necessary in taking out a patent that you must have something to patent. One must first catch his idea. Either this idea must be original with the patentee, or it may be imported from another country. By the term *first and true* inventor is intended the person who first applies for a patent for his idea in these realms, unless, indeed, the invention has been *publicly*, not privately, employed by some other person before the patent is applied for. Letters patent may also be obtained in Great Britain for the invention of another person residing abroad; and this either with or without the sanction of the true inventor. Hence we find the ideas of foreign inventors pilfered, and patented at home by persons who get an early knowledge of them.

The new idea or invention which is patentable is defined by the statute as "any manner of new manufacture," a term which includes all kinds of machines, tools, and instruments, or mechanical, chemical, and electrical processes. The machines and processes, or the products of the processes, may be either entirely new and for a new purpose, or they may be a new combination of known things for a known purpose. One cannot, however, patent the application of an old tool or process to a new purpose, unless the new purpose is very different from the old, and could not have been thought of without distinct invention. The substitution of a new material in the construction of a known tool or article cannot be patented, as a general rule; nor can the discovery of an improved way of carrying out a known process, or using a known machine, unless it shows inventive talent. A slight addition to a known machine can, however, be patented if the result is important; but the improvement can only be used with the licence of the person owning the patent rights of the machine.

A mere principle or an idea cannot be patented, however valuable in itself. The patent is for a thing, an application of the principle, or a realisation of the idea. If the principle is a new one, the discoverer who patents one mode of utilising that principle can claim not merely the mode in question, but all other modes of carrying it out usefully; and if a second person finds a new mode of doing so, he will not be allowed to employ it without a licence from the first. Distinct modes of applying an old principle are, however, quite patentable in themselves.

The principal qualities which justify a patent are its novelty and usefulness. An invention is held to be novel if it has not been publicly used in this country, or published in the journals or in books prior to the date of application for letters patent. This published account must, however, be so full and complete that any ordinary competent person might have arrived at the same result as the patentee, by simply following the description given in the paper, without any need of further invention or discovery. If the description there is vague and imperfect it will not invalidate a subsequent patent; but it may limit the scope of that patent, and prevent the patentee from setting up a broad claim.

We are speaking now of books and journals printed in the English language; but the case is different if the journal is foreign and printed in a strange language. Such a publication, though it be proved to have been in England, may have lain untouched in a library, seen only by a few. This has sometimes been held in courts of law not to amount to publication in this country, but in other cases it has. If, however, it can be proved that the description in question has actually been read and understood by a competent person, the publication would probably be admitted.

The *public use* of an invention consists in its use in public, its sale, or manufacture for sale. Secret use, unless it approximates to public use, does not, as we have seen, invalidate a patent; neither does tentative experiment to see how the thing will work, but at the same time it is better to secure provisional protection before carrying out many experiments.

The utility of an invention is another recommendation for a patent. It should be useful for the *general* purpose to which it is applied, not merely for some *special* service. It is not necessary, however, that all the utility claimed for it should be realised, provided *some* advantage is gained, without a corresponding disadvantage. A device which is *essentially* wrong and impracticable in a patent will invalidate the whole; but though some *immaterial* part is useless, the patent will hold good, if there has been no evident intention to deceive. Moreover, it is not necessary that every part should have been actually tried, if it can be shown to answer.

Supposing the inventor to have something worth patenting, the first thing to be done is to take out Provisional Protection for nine months. This secures his priority, as the completed patent which he takes out subsequently dates from the day of his application for provisional protection.

The application consists in a petition bearing a £1 stamp, a declaration of the nature of the invention, and a Provisional Specification or concise description of the invention, with or without drawings, and a copy of the same.

The paper forms for writing these can be bought for a few pence at the Inland Revenue Office, Royal Courts of Justice, London, and at the leading post offices in the chief towns. It is a petition for the patent required, coupled with a declaration that the petitioner is the first and true inventor. It must

be signed by the applicant or applicants in presence of a witness, who also signs the document. All the other communications on the subject may be made through duly accredited patent agents if the patentee wishes it. This petition and declaration is accompanied by a "Provisional Specification" in duplicate, describing the nature of the invention on a special form supplied by the Department, and both are signed by the applicants as before. These documents are then left at, or sent by post to, the Great Seal Patent Office, Chancery Lane.

The specifications and all other documents must be written or printed in large and legible characters upon strong wide-ruled foolscap paper of a size of 13 inches by 8 inches, and on one side only, leaving a margin of two inches on the left-hand part thereof; and the signatures of the applicants or agents thereto must be written in a large and legible hand.

The drawings accompanying Provisional or Complete Specifications must be made upon either half-sheets or sheets of imperial drawing paper, to be within a border line of 19 inches by 12 inches, or 27 inches by 19 inches, with a margin of half an inch all round.

A copy of the drawings will be required upon *rolled* imperial drawing paper or upon thin Bristol board of the same dimensions as the original drawing or drawings. All the lines must be absolutely black, Indian ink of the best quality to be used, and the same strength or colour of the ink maintained throughout the drawing. Any shading must be in lines clearly and distinctly drawn and as open as is consistent with the required effect. Section lines should not be too closely drawn. No colour must be used for any purpose upon the copy of the drawings. All letters and figures of reference must be bold and distinct. The border line should be one fine line only. The drawings must not be folded, but must be delivered at the Patent Office either in a perfectly flat state or rolled upon a roller, so as to be free from creases or breaks.

With the view of preparing an illustrated journal of patented inventions as directed by the Act, every applicant must, after his application has been accepted, also furnish the Patent Office with the drawing and concise explanatory statement required by Rule 31.

Copies of the Patent Rules (price, prepaid, 7d., including postage within the United Kingdom) can be obtained from the Patent Office Sale Branch, 38, Cursitor Street, Chancery Lane, E.C.

Each application should be limited to a single definite invention, but this may include several variations of the same. It must not, however, include anything which does not properly come within the scope of the title. The latter should be well chosen, not too restricted or too vague, but just between. The specification should be so worded as to cover all the essential parts of the invention, while leaving the inventor free to claim any future developments of it. On the other hand, it must distinctly indicate what the invention is, and at least one mode of carrying it out. Little details need not be given, unless the invention is for a point of detail. If the law officer of the Crown passes the Provisional Specification, he grants the protection for six months, and the fact is announced in the *Journal* of the *Commissioners of Patents*, but an official certificate is given on application at the Patent Office. Should the law officer raise objections, the patentee is communicated with to have these removed if possible, which can generally be done, unless the protection is refused altogether.

The nine months' protection dates from the day of application, but it may not be officially granted for a week or two after. The patentee should keep his invention secret at least till then; but he may afterwards, if he chooses, publish and use his invention. No one can learn what his invention is if he does not make it known himself, as the Provisional Specification remains a sealed document at the Patent Office.

The patentee should next examine carefully the past patents and publications, to see how far his invention is truly original, for though £1 for the Provisional Specification may be a slight loss, the additional £3 required to get the three years' protection might be worth saving. These past patents can be seen at the Patent Office Library, Southampton Street, E.C.

An application for provisional protection continues in force for nine months from the date of application, but unless a "Complete" Specification is left at the Patent Office within this period the application will be deemed to be abandoned, and the full patent will not be granted.

The Complete Specification must give a clear and full description of the devices covered by the provisional protection, and no more. Nothing extraneous to the title and scope of the Provisional Specification can be imported into it, except mere details of construction and varieties of method for effecting the purpose on the principles therein laid down. The description must be such as will enable an ordinary workman, skilled in such matters, to understand and make the machine; but the patentee may put in a saving clause not binding himself rigidly to the forms therein described.

The particular parts of the invention held to be new, and which the patentee wishes to protect, are set forth in numbered "claims," which should be as few as possible. Great care is necessary in wording them, so as to adequately embrace the new invention without setting up a claim for a known machine or process, A claim is invalid if it can be construed to mean what was in public use, or had been published, before the date of the patent. New parts should be claimed separately, and also new combinations of new or old parts. New materials for old parts should not, as a rule, be claimed.

Sometimes a patent can be "amended" by taking the proper steps to procure leave to do so as the Comptroller directs. Opposition to grants of patents may also be made; and an enlargement of the time of payment granted, if the proper forms are adhered to, and the reasons found adequate.