

of specifications. These are published in cheap, handy volumes, and give a brief analysis of the contents of all specifications relating to a certain subject. The weak point about these is that in every class there are numerous omissions, the imperfections of the indices being repeated in them. The fact that these publications are thus not wholly trustworthy causes very large sums to be spent in employing agents to search through the volumes of specifications themselves—a tedious undertaking, but the only way of ascertaining with a certainty the novelty of an invention.

Another objection to these is that they have not, as yet, been carried down beyond 1866. In that year a rule was made that every applicant for a patent should send in with his specification an abridgment of its contents, and these abridgments were published, first in quarterly volumes, afterwards in weekly numbers. Unluckily, it turned out, as might have been expected, that the inventor is the last man to describe briefly and concisely his own invention, and, therefore, these abridgments were of very little use. They are, consequently, now to be discontinued, and the publication will cease with end of the present year. At first it was proposed to continue them and have them prepared by a competent staff; but this idea has, perhaps not very wisely, been abandoned.

To complete the list of publications, it must be added that a journal is published twice a week, giving lists of applications, grants, &c., with other information useful or interesting to intending patentees.

Such is the work of the publishing department of the Patent Office. It has been steadily increasing since the establishment of the office, as continual efforts have been made to assist inventors in obtaining the information necessary to enable them to protect their ideas. The work is now to be slightly lessened by the cessation of the weekly abridgments and the index accompanying them, which was brought down in each number to the date of its publication from the commencement of the year. The stoppage of this will be a decided loss to those engaged in searching for anticipations of their inventions. For the future it is intended to issue the specifications themselves in volumes of about fifty each, with a separate short index to each volume. The usual drawings, also, instead of being published in exact facsimile, are in future to be reduced by photo-lithography. A few such numbers have been issued, but from their appearance it is doubtful whether this plan can be carried out without great inconvenience.

Besides the publishing department, there is a part of the office devoted to a library, which, by the efforts of Mr. Woodcroft and Mr. Prossor, the library clerk, has been brought to a really high standard of excellence. It is specially rich in works illustrating the early history of invention, and is also well supplied with scientific works, foreign as well as English. It is also free to all comers, and, indeed, claims the distinction of being the first absolutely free library opened in London. The Patent Office Museum at South Kensington has been less successful. Possessed of a number of valuable relics, it is encumbered with too many models of incomplete or useless inventions, most of them quite valueless for either historical or educational purposes.

Within the past eighteen months the Patent Office has added to it the office for registering designs, and that for the registration of trade-marks. The former office was merely transferred from the Board of Trade, but the last named is a new creation entirely.

### A RAILWAY IN CHINA.

(See page 324.)

The Celestial Empire has at length become the scene of railway operations, and, although only on a small scale at present, it leads to the hope that the present may prove the precursor of many lines. The question has been agitated for some years past, the Chinese proving very difficult to be persuaded of the advantages of the railway system. We afford illustrations on page 324 of two engines constructed by Messrs. Ransomes and Rapier, Engineers, Ipswich, England, and respectively named the "Celestial Empire" and "Flowers Land." The type of engine was determined on more to suit the local circumstances than good hauling power. The length of wheel base is 7 ft. 6 in., and the wheels, 2 ft. 3 in. in diameter, are six in number, all coupled and fitted with brakes. The cylinders are 8 in. diameter by 10 in. stroke. The barrel of the boiler is 2 ft. diameter, the tubes being 1½ in. diameter and 6 ft. long. The total heating surface is 150 square feet, and the grate area ¼ square feet, the weight in working order being 9 tons. The water is carried in side tanks. The boiler and frame are throughout of Low Moor iron, and the boiler is constructed for a working pressure of 200 lbs., but it is intended

to be used only up to 120 lbs. This excess of strength of the boiler is to meet any contingencies that may arise at the hands of the Chinese firemen. The railway is fitted with double water-supply tanks at each end of the line, so as to allow the water in all cases one day to settle. In order to fully cover the liability of being short of clean water, the water tanks of the engines are made large enough to run two double trips.

The opening on the 30th ult. was highly successful, the Chinese taking readily to what in official quarters was looked upon as an innovation. They were conveyed up and down the line, free of charge, all the day following the opening, and on Monday week the line was opened for regular working. Six trains are run daily each way, and recent telegrams state that they are all crowded with passengers, and that the cash receipts are highly satisfactory. So far, then, the line appears to be a success, and as the anticipated interference on the part of the authorities has not been manifested, it is to be hoped that the Shanghai line will prove to be the first instalment of a vast system of Chinese railways. Whether regarded from a military or a commercial point of view, there can be no question that railways would prove of immense benefit to that vast and densely populated country.

### EIGHT-HORSE POWER COMBINED THRASHING MACHINE.

(See page 325.)

On page 325, we illustrate one of the various sized thrashing machines exhibited by Messrs. Nalder at the Royal Agricultural Society's Show at Birmingham this week. On referring to the engraving, it will be seen the bagging of the chaff is effected in a very easy and simple manner—in fact, nothing is added to the ordinary machine but the sliding frame having two bags hung on it, one being filled, and this, when full, is pushed out, the empty one taking its place. Hooks and eyes being on each bag, the man in charge has only to hook them together and put the bag up into a cart, or empty it into a barn as required. By taking this frame and bags away the chaff falls on the ground as usual and in its proper place. The corn is delivered into sacks at the hind part of the machine, and we find Messrs. Nalder were one of the first to adopt this now universal system, having made their first thrashing machine on this plan. The cavings are delivered under the middle of the machine, leaving the front part entirely free for nothing but the straw, which certainly appears the best arrangement, as, if the shaker at all fail in shaking all the corn out, it can be collected and again passed through the machine; but when desired, by a simple arrangement the caving can be delivered in front of the front travelling wheel, or not, at pleasure. This is in some cases desirable, as when the machine is fixed in a small barn with corn on both sides, so as to leave even hardly room to let the belts run free. This has only been added this season.

A very simple system is adopted of using the machine as a single blast, either with or without horner; as a double blast, also either with or without horner; or as a finishing machine proper. All the small brasses are the same pattern and size, thus interchangeable, and fitted with special adjusting slips, so that, as a brass wears, all that is necessary is to break a thickness off. These machines are made from 2½-horse-power, to 10-horse-power, divided into three classes, and making in all thirty different sizes manufactured by the Messrs. Nalder.

Messrs. Nalder & Nalder have introduced a very neat arrangement for lifting the drum to the top of the machine for balancing or repairs, without having to draw the spindle or take off the pulleys. This is done by taking out part of the panel of the machine where the drum is fixed, and using two of the castings as a pair of strips to balance the drum on. The great importance of having the drums of thrashing machines well balanced is such as to require no remark. Figs. 1 and 3 of the engraving show the drum, spindle, and pulleys lifted out of their ordinary place, and laid on the balancing strips B, B. Fig. 2 shows the drum in its ordinary position, the panel filled up; and the strips, being used as part of the panel, cannot be lost.

Messrs. Nalder have this year also introduced a simple method of delivering the cavings either behind the front travelling wheels or in front of them at pleasure, as sometimes it is difficult in small barns to get at the side of the machine even for oiling; but they recommend behind as the proper place, so that any corn not taken out by the shakers falls through the straw rack, and can again be put through the machine. They also dwell on the fact that, after having taken so much care to part with the machine, the corn, chaff, cavings, and straw, they should each be deposited in places so as not to be again easily mixed.—*The Engineer.*