main tank, thus displacing more spirit. This continues until all the spirit is consumed. On a bench test of burner the " beat " of the air-bubble in tank was quite noticeable. It was, of course, essential that the tank and pipe joints be airtight ; the writer, however, experienced no trouble in that direction, using soft solder, " Fluxite," and a cheap self-blowing spirit lamp (1s. pre-war).

The construction of tank was as follows: A flat development of tank was set out on a piece of tinplate, as shown in Fig. 10, 3-16th in. for lap being allowed, as dotted at L. The sheet was clamped to a wood block, flanged to shape on same, and the end joints soldered.

The transfer pipe T, Fig. 9, was cut to length, notched, and soldered to the lower container L. The ends of latter were then driven in and soldered. A standard union was fitted at U. The pad piece E, Fig. 9 (plan shown in Fig. 11), was cut to shape from 3-32nd-in. sheet brass, fitted over transfer pipe and soldered thereto. Pad piece was secured to tank bottom by three setscrews and the joint soldered. Next the air pipe A was fitted. The top sheet of tank was cut to shape, drilled to push over airpipe, clamped in place and all joints soldered.

A length of pipe was also fitted, as at V, Fig. 9, to serve as a sleeve for the control cock spindle to pass through. The filling plug P, and aircap C require no comment, but were all home-made on the lathe previously mentioned from odd pieces of brass from the scrap box. The stopcock S, forked coupling socket F and spindle were all removed from the original tank and refitted, as Fig. 9. It was necessary to cut a hole in floor of tender so shaped as to pass the lower container L and union U. Top of tank was extended to form a flange to enable securing screws to be fitted as at D. The tank was concealed by means of a false cover plate K.

The supply pipe at front end of tender was supported by a length of brass rod R, which was tapped to receive the bogie bolt B, as per scrap sketch in Fig. 9.

Spirit Burner.

The original burner was fitted with a rectangular sump tank immediately below the engine footplate, as dotted at D, in Fig. 12 ; this was scrapped and a plain distributing pipe P fitted. The new supply pipe was secured to footplate F by means of a set-bolt S, tapped into the plugged brass tube T. The lower end of latter was also plugged and an overflow pipe fitted, as at O. This pipe was led away to engine footstep and there secured to a small bracket ; note the overflow pipe does not function if the supply tank is worked properly, but was fitted as a precaution and also acts as a side-stay, keeping the burner rigid. A length of rubber tube was fitted to supply pipe to obtain flexibility between engine and tender, a coned union being used to make the actual joint.

Readers desiring further particulars of this loco. should refer to the *M.E.* for September, 13, 20 and 27, 1917.

An Old Medallion and Rose Engine Lathe.

By Geo. Gentry.

(*Concluded from page* 570.)

IN order to explain more clearly the working of one of these old lathes, some copies of the scale drawings in the French Encyclopædia —already mentioned—are given here. Many of our readers used to the working of one, or perhaps several, of the many types of turning lathes procurable to-day, will no doubt be inclined to smile at the curious arrangement of these old tools. In one sense, however, as works of art they are far beyond anything that can be obtained to-day for turning purposes, although, of course, they would not compare, in the matter of convenience, with the simplest of modern lathes for the purposes of metal turning. In looking at the lathe in our pictures we are going back very nearly—and perhaps quite —200 years, to a period when very little metal turning was done, and when only such metal turning as had to be carried out was all done by hand tools. This was well before Maudslay developed the slide-rest, as we know it, and if any reader may feel disposed to catch the writer up on the subject of how it was possible to deal with such heavy work as ship engines, locomotives, and other heavy machines, by means of hand tools, the answer is there were no such machines, as we are dealing with a time before Watt had carried out any of his improvements, and when only such engines as were used at all were of the direct acting, atmospheric type, developed by Newcomen, and used practically only for mine pumping. These considerations only point to the fact that the lathes themselves, as pieces of accurate mechanism, are most wonderful, when one also considers the fact that there were so few convenient machine tools wherewith to construct them.

In the Encyclopædia there are as many as 40 plates, illustrating, by means of perspective and orthographic drawings—apparently wood-cuts or hand-engraved plates—the subject of " turning," of which 15 plates are devoted to the arrangement and details of a medallion and rose-turning lathe. This shows, at any rate, that at that time the greater portion of the subject of turning had to do with what we now describe as ornamental turning and that the matter of metal turning was to all intents and

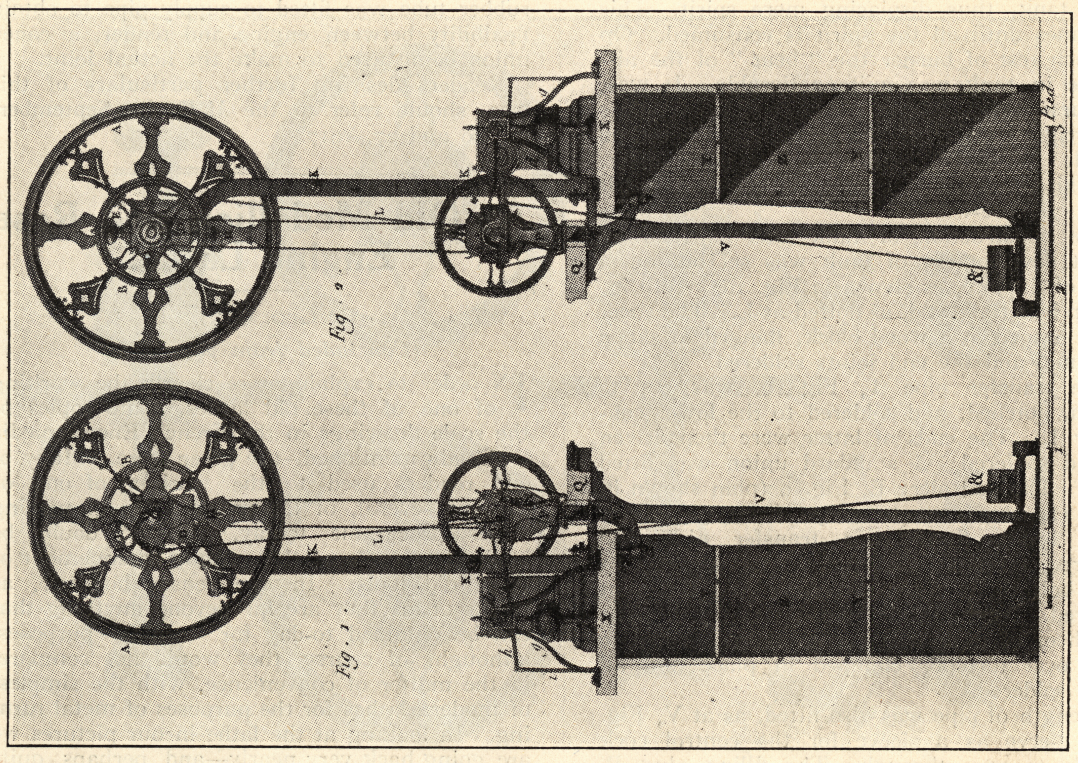

Plate II.—Head End and Tail End Sectional Elevations.

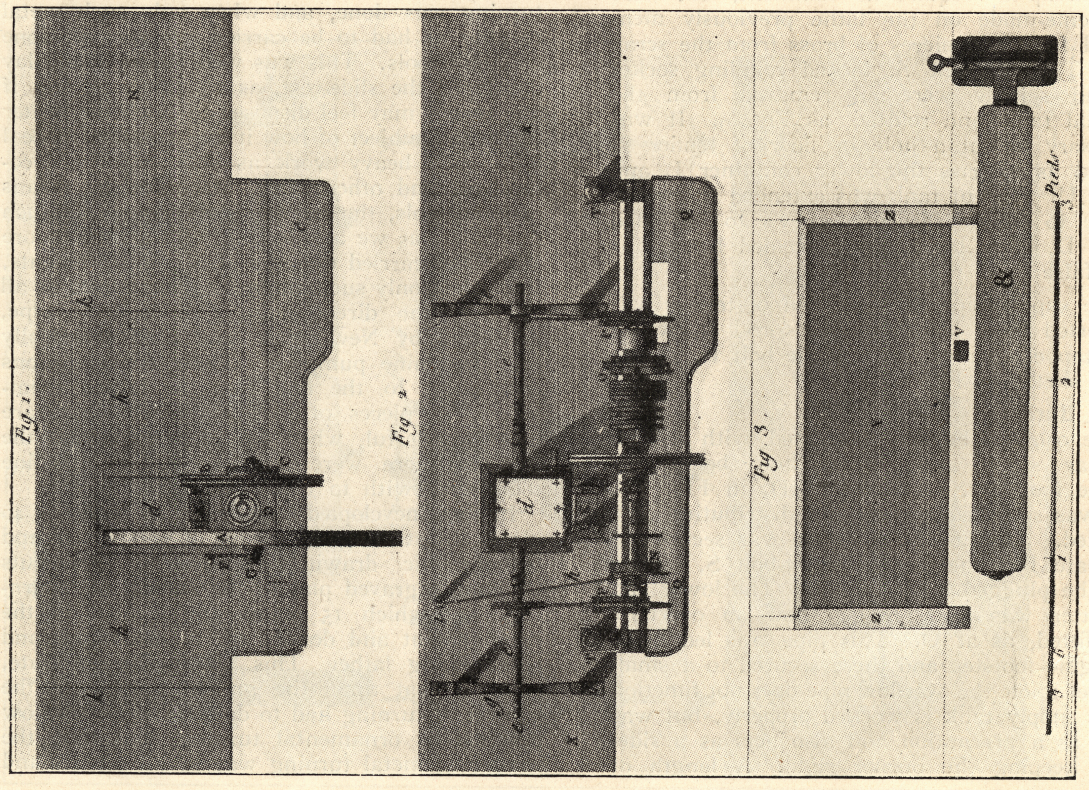

Plate I.—Three Plans of a Medallion Lathe Arrangement.

purposes an unknown and little practised art. Nevertheless, the complexity of the machines used, and in many respects the resemblance to modern methods employed, show that, in the development of the lathe, in which Maudslay, Whitworth, Holtzapffel, and others, took so prominent a part, there was quite a good deal of mechanical value already in existence upon which they had to work.

In describing the drawings, the original figure numbers will be employed as far as possible, the actual illustrations being re-numbered. Illustration I shows three separate plans. Fig. 1 is a plan looking down on the bench, and showing

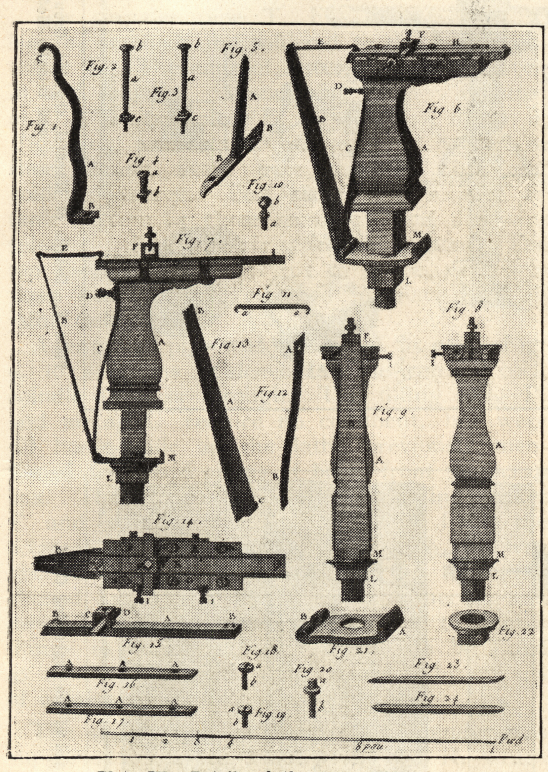

Plate IV.—Details of the Cross Slides.

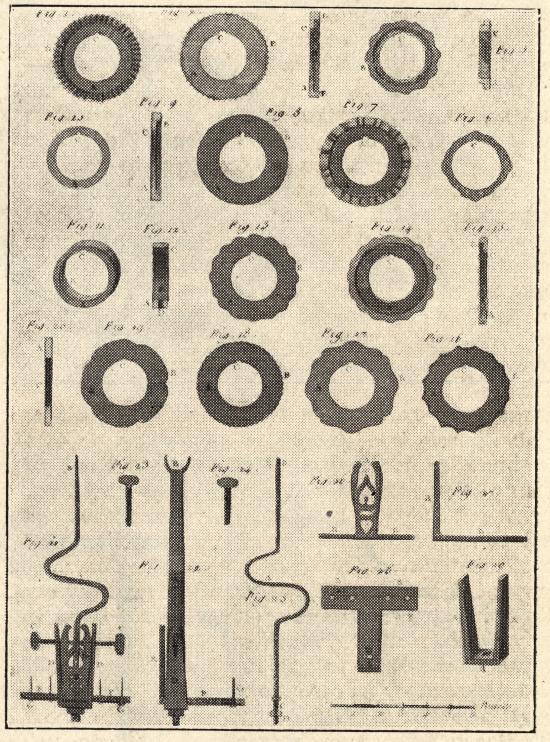

Plate VI.—Types of Rose Cams and Details of Traversing Mandrel Spring Gear.

only the overhead drive, consisting of an upright member K supporting a short shaft G in a bearing D, and with a crank F and flywheel A to the left, and vee pulleys B and C to the right. Fig. 2 is a similar view showing the lathe only, and omitting the overhead, but showing the upright K. The bed overhangs the edge of the bench, and is supported upon the brackets T.T. bolted to the bench. The bed carries its own tray Q. The mandrel extends from P to P., and has at either end the cross-slides P.P., which are actuated from the back shaft *ee* mounted on the bench. In this view *d* is the gearbox. Fig. 3 shows a section of the tool shelves Y under the bench, and shows also the treadle, which is set parallel with the lathe bed, in front, having its hinge joint to the right and driving from its left-hand end. In this view V represents the upright of an extra support, which is under the bed and tray at a point just where the cutting takes place. The foregoing will be clearer from an examination of Illustration II, which shows two end elevations, the left-hand, Fig. 1, from the head end, and the right-hand, Fig. 2, from the tail. The treadle drives from a cord on to a lever *h*, which is pivoted on to an upright *i* fixed to the bench (see also Fig. 2 of Illustration I). Upon the outer end of this lever another cord goes to the crank F of the overhead, and thus the treadle is caused to drive the overhead direct. The overhead, which is really the crankshaft, in its turn drives the lathe mandrel through the medium of its pulleys B and C. Illustration III shows at Fig. 1 the main casting of one of the cross-slides, which we will pass for the moment. Fig. 2 shows an end view of the gearbox, and Fig. 3 a detail of one of the bearing brackets supporting the back shaft. It was a pair of these that Mr. Jackson designed from the form of some of the existing lathe brackets, and had cast in iron to take the back shaft of his lathe. Figs. 4 and 5 are respectively a front elevation and plan of the gearbox and

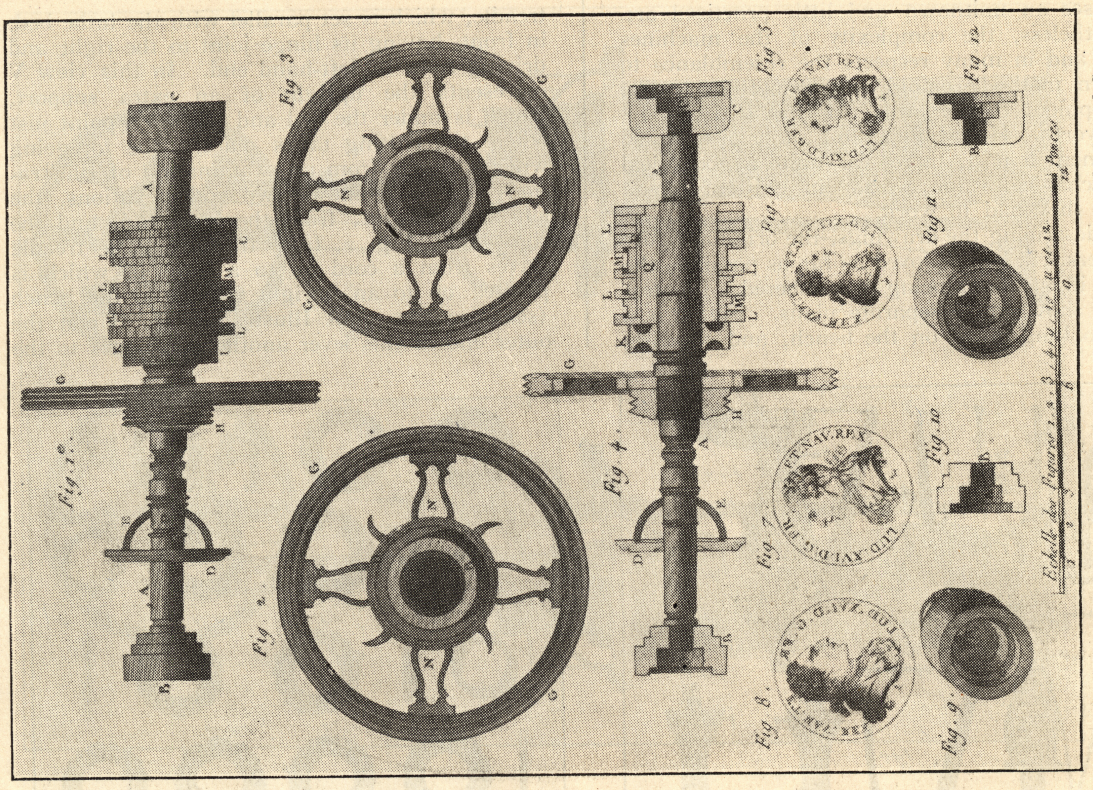

Plate V.—Details of Mandrel, showing Grouping of Rose Cams, Chucks and Cameo and Intaglio Medallions.

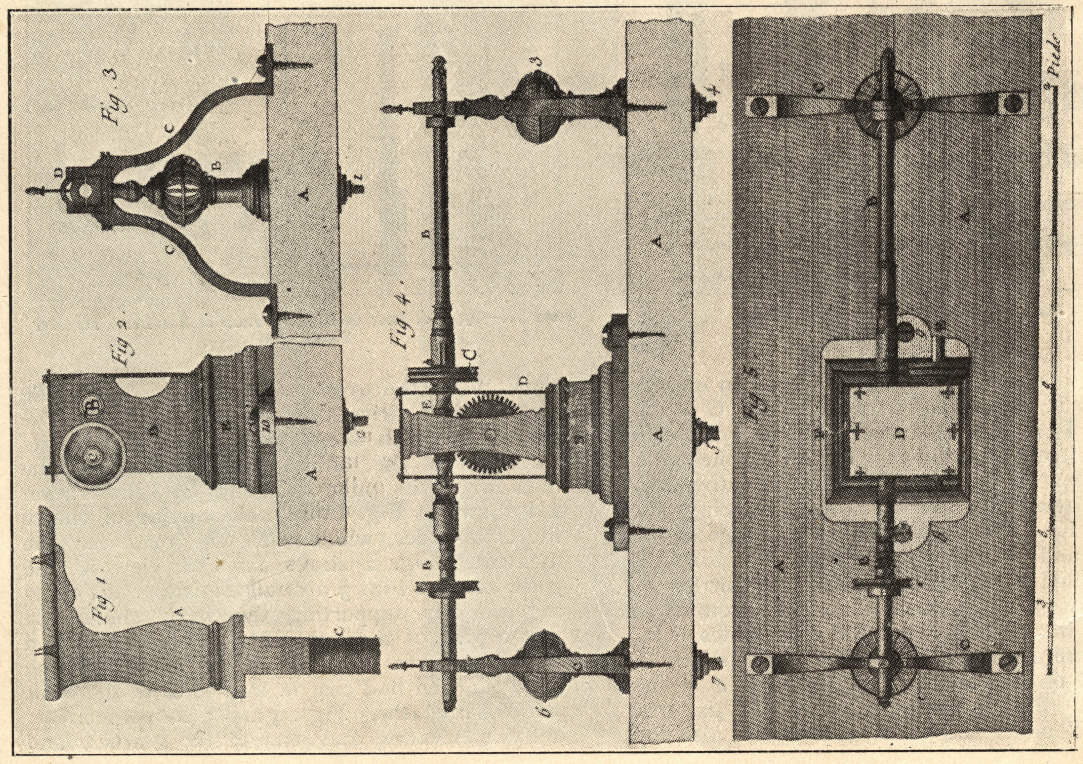

Plate III.—Details of a Cross Slide Casting and of the Traversing Gear.

its shaft. It will be seen that at C in Fig. 2 is a vee pulley upon a short worm shaft, which drives—as seen in Fig. 4—a toothed wheel on a cross-shaft below, and in the gearbox. It is not very clear here, but another worm on this shaft drives a wheel on the main shaft B, which, by means of couplings, actuates the extensions carried out each way to the bearings. The wheel C is driven from the mandrel, and therefore the drive actuates the back shaft very slowly through the two worm gears. Looking at Fig. 4 we see one of the traversing pulleys, to the left, midway of the extension of B, and the other to the right close up to the bracket bearing; and, referring this to Fig. 2, Illustration I, we see that they stand opposite the cross-slides P.P. This brings us to the details of the cross-slides, shown in Fig. 1, Illustration III, and in Illustration IV. In the latter, Fig. 6 shows a complete slide, with Figs. 7, 8, 9 and 14 giving the same in side elevation, back and front elevation and plan. The actual vee slide with toolholder is seen at Fig. 15, which slide runs between two vee strips, Figs. 16 and 17, screwed to the top of the casting, having upon one side a fixed plate, and upon the other a pair of adjusting screws passing through lugs, in order to adjust the strips a nice sliding fit for the slide. The square shank of the casting passes between the shears of the bed, and has a clamp, Fig. 21, on the underside, as shown at M in all the elevations. This clamp, at the front, has a hinge joint, to which is hinged a bar, Fig. 13, and marked B in all the elevations. The top of the bar is hooked by a double hook, Fig. 11, to the front of the slide, as indicated at E in Figs. 6, 7, and 14. The bar is kept hinged outward by a spring, Fig. 12, attached to the casting at D, and shown at C in Figs. 6 and 7. The effect of this spring is to keep the slide out towards the front of the lathe, and, against this tendency, the slide is pulled back by a flexible wire or cord attached to the pin at the other end of slide, and carried from thence to the pulleys on the back shaft, as now clearly seen in the plan view, Fig. 2, Illustration I.

Illustration V shows details of the mandrel, at each end of which, on screw noses, are mounted the cup chucks, which carry the ivory for producing the medallion, and also the intaglio, which is copied from an original medal. Fig. 5 is a medal from which the intaglio, Fig. 6, is taken, and Fig. 7 can be produced in ivory by enlargement from Fig. 6; or Fig. 8 intaglio can be taken from Fig. 7 and reduced in ivory to Fig. 5. Intaglios can, of course, be cut directly, either the same size, enlarged, or reduced, from any medal, and used again to produce a cameo similar to the original, but in ivory. The main points in this illustration are the group of rose cams shown on the mandrel to the right of the large pulley. Besides having a traversing movement, this lathe has a cross-sliding movement to its main bearing, the one to the right, and the effect of these cams, any one of which may be chosen, having a pattern cut on its face, if set running against a fixed rubber, and controlled, or kept to the rubber by a spring, as seen in Fig. 1 of Illustration IV, gives the requisite rose movement or wobble to the work held in the head end chuck to produce the scalloped edges, or an engine-turned pattern upon a face. Similarly, by using a cam having a pattern on its edge, and by means of the traversing movement of the mandrel, scalloped patterns can be cut upon a face.

Illustration VI shows various types of rose cams, with patterns on their edges and faces, and which can be put on and keyed to the mandrel in a group, as indicated in Fig. 4, Illustration V. Figs. 21 to 29 show the arrangement and details of the controlling spring, which keeps the mandrel end on up to the intaglio, or to the side face rose cams. The forked top B of the spring embraces a groove in the mandrel, and presses it either way, according to the adjustment, which is made at the bottom under the bed by means of the two screws C.C. acting on a special bracket, which is attached to the underside of the bench.

In the light of what is to be gathered from these drawings any reader should now be able to follow out the details of Mr. Jackson's lathe, as seen in Fig. 1 of this article. The main points where the two lathes differ is in the treadle gear or the original hand driving gear. Also in Mr. Jackson's lathe the whole mandrel rocks with the rose cam action, as both bearings, or poppets, as they were originally called, are on radial pivots. In respect of both the rocking and traversing actions, it should be clear that the mandrel can be locked rigid, so that it can be used as an ordinary turning lathe for soft and hard woods and light metal turning. But in respect of the latter, the type of sliding rest—which is original, and previous in design to anything that Henry Maudslay was responsible for—is hardly adapted for metal turning, as it is performed to-day, and would not be so efficient, in that respect, as the solid form of hand rest used with hand-turning tools, and which, as mentioned before, has been added at a later date than that of the machine as a whole.

There were other types of medallion lathe than the ones we illustrate, *e.g.*, those having parallel mandrels, complete specimens of which apparently exist. These we illustrate, however, are traversing mandrel lathes, and as far as can be ascertained Mr. Jackson's is the only complete one of its kind known. It will soon be on view at the Science Museum, South Kensington.

Entered as second-class matter, April 14, 1899, at the Post Office at New York, New York, under the Act of March 3, 1879 (Sec. 415, P.L. & R.).

Sole American Agents } SPON & CHAMBERLAIN. 120, Liberty Street, NEW YORK. { Single Copies, 14 cts. Annual Subs., $5.50. } Post Paid.

The MODEL ENGINEER AND ELECTRICIAN

Founded 1898

66, Farringdon St. LONDON E.C.4.

A JOURNAL OF SMALL POWER ENGINEERING

VOL. XLVII. No. 1131. THURSDAY, DECEMBER 28, 1922. (Post Free, 5½d.)

The Model Engineer

A Journal of Small Power Engineering.

Edited by Percival Marshall, C.I.Mech.E.

VOL. XLVII. No. 1,131. DECEMBER 28, 1922. PUBLISHED WEEKLY.

Our Point of View.

"Cutty Sark" at Home.

Cutty Sark has not been "at home" very long without callers—for which news we are indebted to Mr. J. N. Maskelyne, who has sent us the following note:—"With reference to some paragraphs concerning the old China clipper, *Cutty Sark*, which appeared in THE MODEL ENGINEER for October 5 and 12 last, perhaps the following somewhat scrappy notes may be of interest. I recently enjoyed a holiday at Falmouth, and while there I made my first acquaintance with the *Cutty Sark*. Arrived in Falmouth on October 14, I did not lose much time in ascertaining the whereabouts of the famous old ship. I discovered her lying in Carrick Roads, about midway between Pendennis Head and St. Mawes, which means that she was about 1¼ miles from either shore. At this distance, of course, it was not possible to judge her appearance too well. However, on October 23 I went over to St. Mawes, and, on the way, passed fairly close to the old clipper. She impressed me very much, for she is, indeed, an object of real beauty. Her pea-green, white and black paint seems to show up her graceful lines wonderfully well. On returning from St. Mawes in the evening, I noticed that the Falmouth tug *Duncan* had put out and was lying alongside the clipper, apparently preparing to take her in tow, and on arriving at Falmouth I found the proceedings being watched with lively interest by quite a little crowd of spectators on shore. That night (October 23) the *Cutty Sark* was towed to her permanent moorings in Falmouth Harbour, and long may she rest there! She lies, amid lovely surroundings, at the mouth of the Penryn River, sheltered by Trefusis Head on one side and Pendennis on the other. She has a fitting companion in the old training-ship *Foudroyant*, originally built as the *Trimcomilee* in 1813, which is lying quite close to the *Cutty Sark*. I understand that the *Cutty Sark* was to be thrown open to the public almost immediately, and I regret that I was not able to obtain a photograph of her; but, doubtless, some photographs of her will be forthcoming before long. I should imagine that, in full sail, she bore a striking resemblance to the *Crusader*, illustrated in your issue of November 16."

* * *

Is the Model Trade Advancing?

An old reader of the *M.E.*, who writes from Halifax, Nova Scotia, sends us the following "grouse," as he himself terms it:—"I say with utmost candour that there is room for the trade to 'advance,' not their prices, but the variety of their stock-in-trade—it is simply appalling to note the old-time stuff of 15 years ago still on the market whilst the prototypes have undergone all sorts of changes. England—the world's machinery centre, is NOT represented in the model trade as it should be. Certain firms have got out good lines, but appear to hang on to them as if they were 'lifelines.'" We can understand our correspondent's point of view, but we think there is a good deal to be said on the other side. We ourselves have always stood for progress, and have more than once protested against the out-of-date designs which in some quarters are still being offered to the public. This, however, is only part of the story. There are some designs which are obviously obsolete, and ought to be scrapped—both from catalogues and from stock. But there are quite a number of "old friends" in the catalogues of the model trade, which, although they are getting old, are still very good and capable of delighting many model builders for years to come. We think our