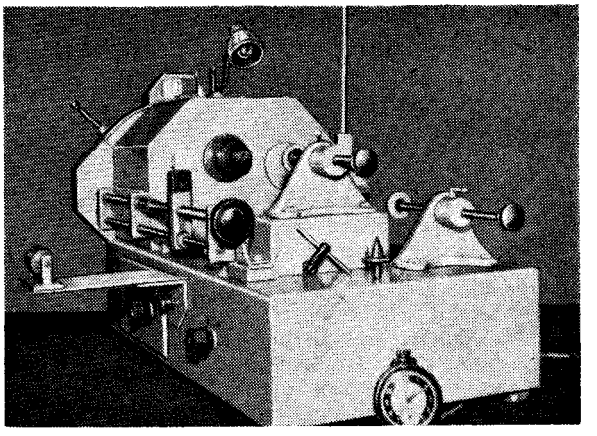
Final stage-making the auto-traverse brackets and wire guide roller



Concluded from 12 May 1960, pages 568 to 570

By H. D. **WOODWARD**

THE auto-traverse brackets were fabricated from brass and mild steel. Brass was used for the $\frac{1}{4}$ in. plate or bearing portions. These latter plates were first cut to outline, and soldered together for subsequent drilling or boring operations. The material must be true and flat before soldering. If soldering is not desired, the absolute centres of each plate can be drilled $\frac{1}{4}$ in. clearance, and clamped with a suitable bolt to an angle plate for the operations. Either way, the drilled or bored holes must be parallel from end to end.

An accurate job can be obtained if the whole of the parts can be held together and fixed to the lathe faceplate by means of an angle plate. The centres to be drilled can be brought in line with a wobble centre, and precautions must be taken when feeding the drills in. If good drills are used with sharp accurate points, and they are fed in slowly all the way through, and withdrawn when there is the least evidence of swarf packing-up, very accurate holes will be ensured.

Lathe speeds

The lathe should be run at top open speed up to a $\frac{1}{4}$ in. hole, and gradually slower speeds as the larger drills above this are used. When approaching the $\frac{3}{8}$ **in.** dia., run the lathe or drill at about **200** r.p.m., and use plenty of oil. If the holes were bored, finish with a $\frac{3}{8}$ in. reamer for the leadscrew bores. And a $\frac{5}{16}$ in. reamer for the guide bar bores. I used a $\frac{5}{16}$ in. guide bar not for preference, but because I had no larger square stock to make the carriage other than the Qin. If this had been bored out any larger for a sleeve to fit $\frac{3}{8}$ in. bar, there would have been little, if any, wall left to the sides of the carriage. Of course, $\frac{3}{8}$ in. bar can be used, if 1 in. square stock is at hand for the carriage. The $1\frac{1}{4}$ in. length sleeve is an absolute must for the trouble-free movement of the carriage to and fro, and if this measurement is kept, no jamming will occur.

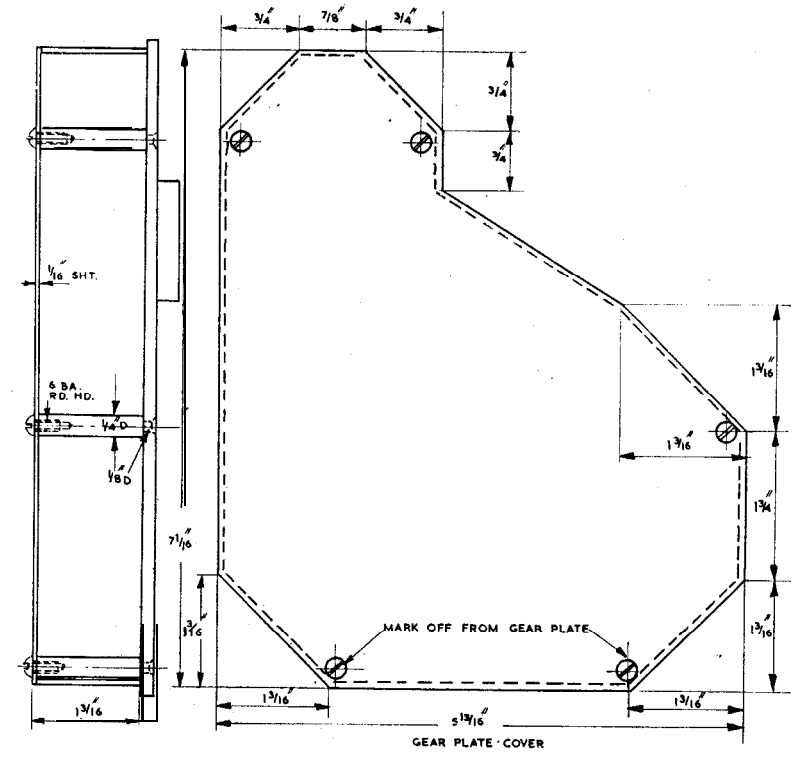
The carriage is the next item. The first operation is the marking and drilling of the lower $\frac{5}{16}$ in. guide bar hole. It can be held in the machine vice and drilled to $\frac{5}{16}$ in. dia., after which it is taken out of the vice. and placed to the brackets for spotting the position of the $\frac{3}{8}$ in. Whit. thread, to be tapped later. A piece of $\frac{5}{16}$ in. silver steel can be inserted in the bore of the brackets and through the carriage, for easy guidance and aligning. The whole is then clamped together. and the $\frac{5}{16}$ in. dia. tapping size hole can be spotted with a $\frac{3}{8}$ in. drill. Drill just enough to cause a countersink in the carriage, for later drilling operations.

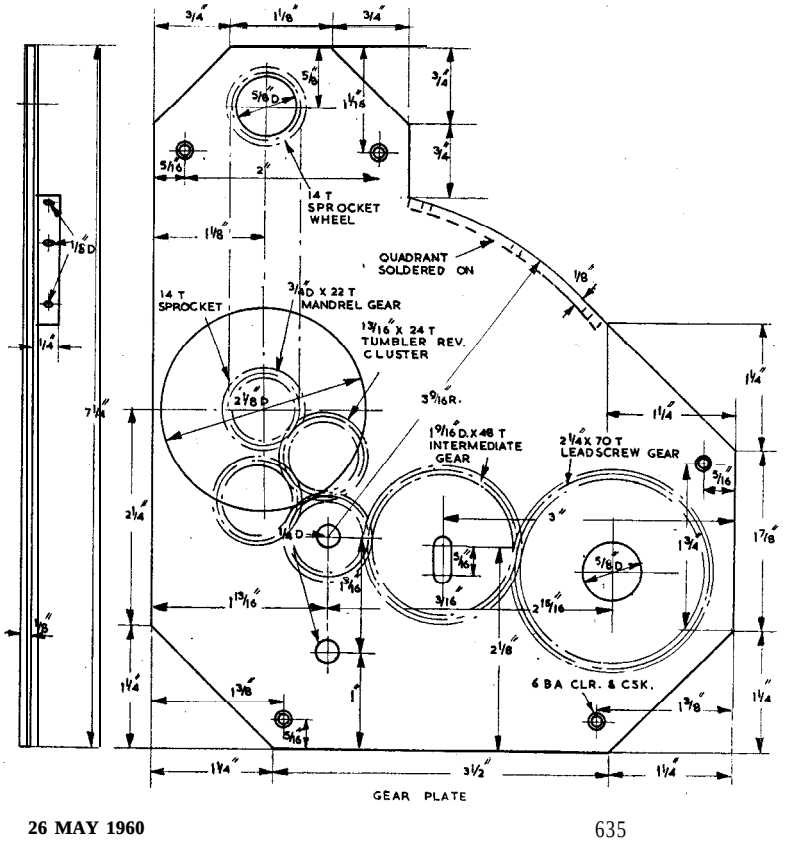
When the hole is saotted. unclamp the carriage and examine the dimple or spot hole. If satisfactory? make doubly certain by centre popping the exact centre of the dimple with a very sharp centre-punch and hammer. Place the carriage in the machine vice, drill through with a small drill, and open up with consecutive drills to $\frac{5}{16}$ in. tapping size for the $\frac{3}{8}$ in. Whitworth thread. To tap the thread, it is advisable to place the carriage in the four-jaw, and get it to run true with the aid of a piece of $\frac{5}{16}$ in. dia. round stock inserted in the bore, and a dial indicator. Alternatively, centre the $\frac{5}{16}$ in. stock,_ and use the wobble-centre once again.

When running true, put a $\frac{3}{8}$ in. Whit. taper-tap (a first) in the tailstock chuck and start the tap well in. Slacken the tailstock chuck and withdraw the tailstock leavmg the tap in the work. If the tan. has a centre in its rear, attach a tap wrench and bring the tailstock up with a centre in it to support the rear of the tap. Tap right through with the taper, second and third taps, making sure that the tailstock is supporting the taps all the way through.

Ensuring **concentricity**

While the carriage is mounted, the $\frac{5}{16}$ in. hole is opened up to $\frac{1}{2}$ in. for the insertion of the guide sleeve. The latter is $1\frac{1}{4}$ in. long $\times \frac{5}{16}$ in. bore, X $\frac{1}{2}$ in. outer diameter. If, when the whole of the leadscrew mechanism is assembled, the carriage is found to be not parallel and binding in traverse, it may be assumed that its bores are not concentric with the brackets. This can be remedied by making and fitting a new guide sleeve to the same external measurements. The $\frac{5}{16}$ in. bore for the guide bar will have to be made eccentric by about 1/32 in. This can be done by offsetting this amount in the four-jaw or in the three-jaw with a suitable piece of packing between the sleeve to be bored, and one of the jaws of the chuck. When this has been done, it should be a slide fit in the carriage, to enable it to be revolved into alignment, so bringing the eccentric-bores to concentric, or parallel. When the bores have been corrected, it will be





necessary to pin the sleeve to the carriage; or drill and tap a thread right into the bore of the sleeve, and lock it with a suitable screw. If the thread of the screw is projecting into the bore a little, pass a drill or reamer through to correct.

The other operations on the carriage are not difficult. The $\frac{5}{8}$ in. x $\frac{1}{4}$ in. slot can be endmilled or sawn away and filed accurate to dimensions. The 2 BA hole is for clamping the wire-guide, or clamp block, if a clamp is desired at this position. I have not found, in use, that there is need for a clamp at all. The plain tufnol block with its through hole for the wire has been adequate. The rollers have dealt with the slack. If a clamp is desired, one can be made and fitted to the front of the carriage, extra to the wire guide.

Additional braking

An additional help is a brake device fitted to the feed bobbin, or its revolving centre, or centres as a means of plying a drag to the feed spools, bobbins, and so forth. This should be a type that can be tensioned to the diameter of the bobbins and their associated s.w.g. size. The amount of drag can be regulated at will. Several of the tufnol or bakelite blocks can be made and their wire holes drilled to suit the different s.w.g. sizes to be used. The No 57 drill indicated will do from 23 to 28 s.w.g.

To resume the work on the leadscrew, first assemble the auto-traverse bracket using either 4BA screws through the backplate, or solder. Perfect alignment must be maintained. To do this it will be necessary to pass true rods through the respective bores, and lock them with suitable screws. The whole is kept on a true flat surface while being fixed. If the parts are soldered together, all traces of the flux must be washed away. This is best done by boiling the parts in a tin with domestic soap-powder. Keep the heat low. Afterwards, rinse with clean water, and dry the parts.

Headstock bracket

When all is ready, the bracket to be mounted on the headstock can be fixed in position. The absolute position of this can be found by the centre height of the end bracket, which is 1 in. and $\frac{7}{8}$ in. centre for the leadscrew height. The headstock bracket butts against the gear plate, and the fixing holes shown, are two in number. I found this adequate, and two suitable woodscrews passed into the headstock end members held very well indeed. The holes can be elongated a little, for alignment purposes, if needed. The end bracket can be a fabricated job, as the previous

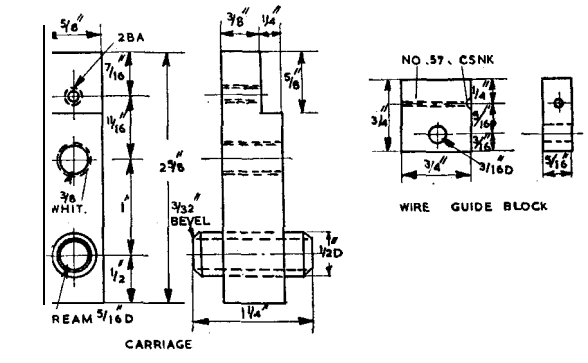
one was, or it can be cut from angle iron. If it is fabricated, assemble as for the headstock traverse bracket. Fit, and take up any end play in the leadscrew, with collars and washers. A collar can be made for the gear case end of the leadscrew also.

When the auto-traverse (the completed carriage and brackets) has been fixed into position, and is working smoothly by hand manipulation, it is as well to ensure that the leadscrew and the guide bar are parallel with the base of the machine. If there are doubts, the end bracket can be packed with metal shim, and the headstock bracket moved accordingly. Test for alignment again by traverse of the carriage, from full left to right. The leadscrew handwheel can be ma& of tufnol, bakelite, or aluminium, and will enable the last tests to be carried out by hand.

The intermediate gears can now be added between the tumbler-reverse and the leadscrew. When their centres have been found and scribed to the gear plate, remove the latter and drill through with a $\frac{1}{4}$ in. drill. It might be better to elongate these holes, and thread the spigot ends for 2BA nuts. The headstock timber can be spotted through from the gear plate spigot holes and counterbored for the spigot nuts. The counterbores should be drilled at least $\frac{3}{8}$ in. dia. in the wood, for the 2 BA nuts. These will be out of sight.

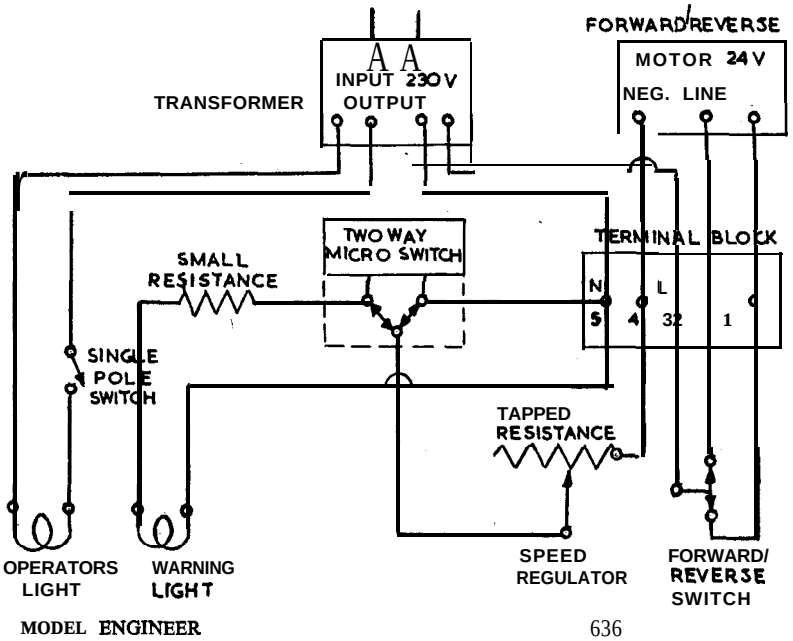
If other gear ratios are needed for a particular job, it would be easy to dismantle the gear case, and add the required gear combination, by way of a slide bar to carry the gears, or a gear-quadrant proper. The gear case cover is ma& from sheet metal. It is about $\frac{1}{8}$ in. smaller than the gear plate all round, to give it a seating. The spacers are essential or the cover will dimple in and spoil the neatness of the machine.

Part of the cover is cut away to clear the tumbler reverse lever travel from forward to reverse. Also, the inside of the cover is lined with felt to prevent gear noise being transmitted to it. To get the felt to adhere to it, first paint the inside of the cover with shelac (French polish), varnish and give it a second coat when dry. While wet, stick strips of tissue all around it, and bed down with further coats of shelac, and the aid of a brush. After drying, cut the felt for the back to shape. Stick it to the dry tissue with modelliig cement. Weights can be used to hold the felt down until it has adhered. The method will cut down gear noise.



The wire guide roller is a straightforward item, turned from brass. Its ends are centred with a Slocombe drill of small size. The end pivots are 2 BA knurled screws with their ends pointed. The latter screws are steel to run in the brass roller, and have locking nuts. The roller is situated near the auto-traverse guide bar, and is a means of preventing the wire used from fowling the carriage in traverse. The brackets for this are cut from Qin. x $\frac{5}{8}$ in. angle, and tapped 2 BA. The item is secured to the base of the machine with woodscrews and adjusted to run freely. Lubrication is light grease, packed into the centre bores or holes.

Most of the fittings were dismantled for painting. At the start, all irregularities were sanded down and two coats of priming paint applied. This too, was sanded smooth and two coats of ash-grey gloss paint were applied. El



DOLPHIN CASTINGS

With the summer season upon us some enthusiasts may be seeking an engine to power their model boats. An admirable i.c. engine for that purpose is the 10 c.c. single-cylinder o.h.v. Dolphin. This is suitable for powering a model of the size of *Gondia*, which measures 42 in. overall. We can supply a set of Dolphin castings from stock for £3, including postage. Please send remittances to the Sales Department, Percival Marshall Ltd, 19-20 Noel Street, London W1.