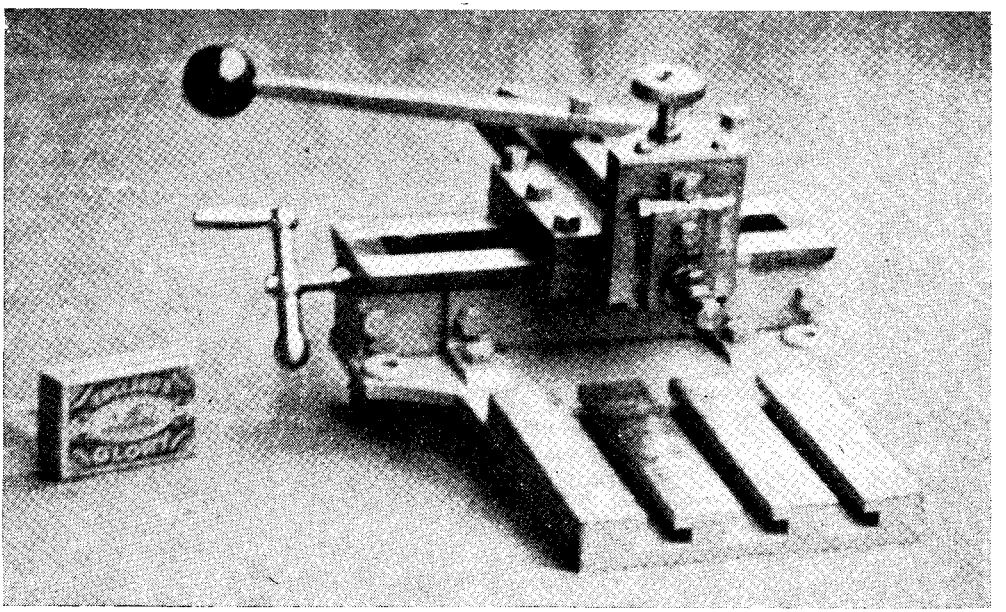
A SMALL SHAPING MACHINE

by E. H. Knight

THE following description of the making of a shaping machine may be of interest to quite a few persons similarly placed to myself. I trust it will also interest other readers of THE MODEL ENGINEER.

For quite a long time I have found that hack-



General view of the shaping machine

sawing and filing can become very tiresome, especially if there is quite a lot of it to do, and I thought that by using both tools in a big effort to make a tool that would to a certain extent eliminate an arm-aching job, I should at least achieve something beneficial.

It will be noticed from the drawings and photographs that the shaper is designed for a left-handed person. In fact, there was no alternative ; I lost my right arm many years ago.

The materials used in the construction of this machine are wrought iron and mild-steel, mostly scrap, as is usual these days.

Measurements are as follows : table 4¾ in. by 4-1/4 in. ; stroke, 3 in. ; depth of feed, 1/2 in.; cross-feed, 4 in.

Vee-slides and guides are fitted to all working parts and the fitting such that no gib-strips are required for the time being.

The baseplate is of mild-steel plate and the T-slotted table was formed by inserting 1/4 in. strips between the baseplate and wider 1/4 in. strips which form the table top.

The box bed carrying the traverse slide is built from two wrought-iron strips each 7 in. by 1-1/2 in., the ends being closed by two pieces of the same material-1-1/2 in. by I in. Both pieces are drilled through their centres and are bolted into position between the wrought-iron strips with two 1/4 in. Whitworth bolts and nuts. These hex. bolts and nuts, together with all the other bolts, nuts and set-screws, were made on a lathe I made 30 years ago and a little while after I sustained my physical disability.

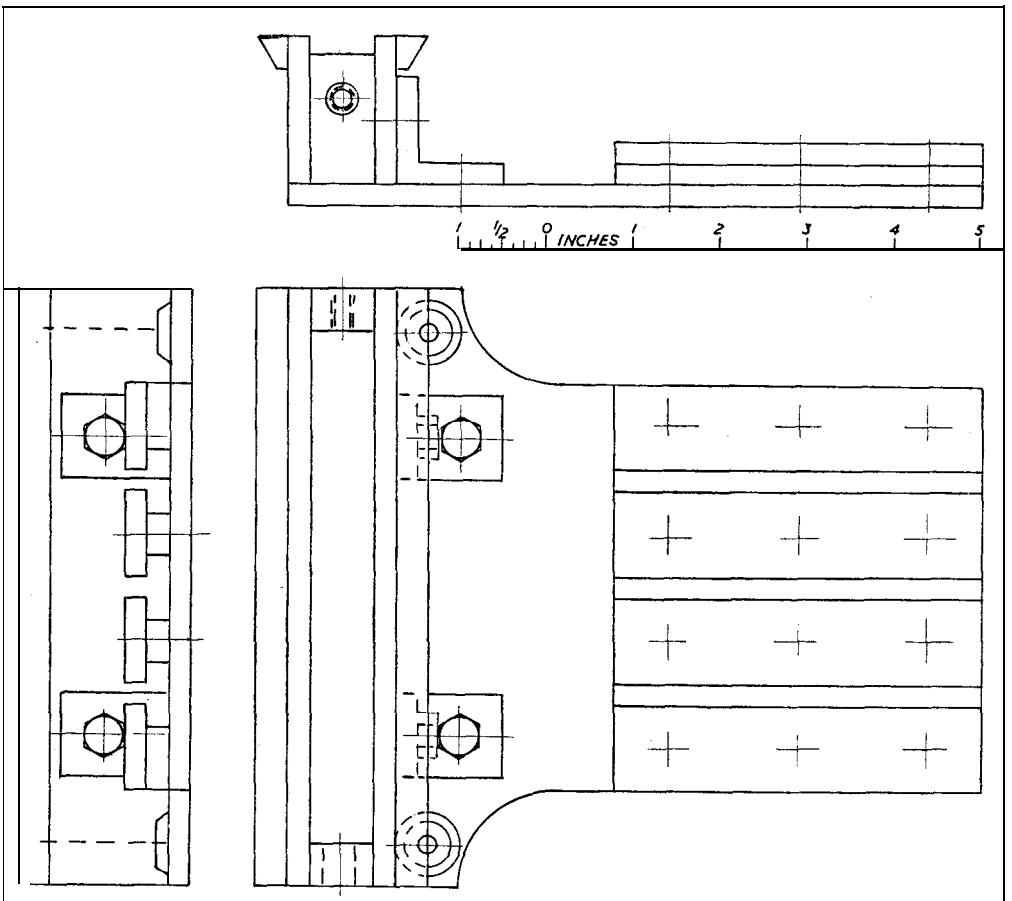
The end pieces were then drilled, one to accommodate the journal of the traversing screw and the other to receive the adjusting cone. The vee-slides were hacksawn, filed and scraped from a piece of 3/8 in. wrought-iron bar and screwed to the box by 1/4 in. set-screws. After lining up, this part was fixed to the baseplate by set-screws and further secured by angle brackets.

I then tackled the ram ; this is also a bar of wrought-iron. More sawing, filing and scraping to form the slides. After being passed as satisfactory, a bracket was made and riveted to one end to accommodate the ram-head. A shaped strengthening strip was riveted to the slide, which also adds to the appearance.

The lever which operates the ram is another piece of wrought-iron 8 in. by 1/2in. by 1/4 in. It is furnished with a ball grip screwed to the

tapered end. It was turned from wood and painted black.

Now for the tool or clapper box-more scrap wrought-iron. The front plate is 1/4 in. thick and a vee-strip is riveted to *this* on either side. The tool-holder was made from an old 5/8 in. diameter mild-steel bolt. It accommodates a square tool-spigot. For a back plate the same section of hexagon nut. The knurled handwheel was made bits of 3/16 in. section and is fixed to the clapper plate by means of a screwed and shouldered from a short bar end, the centre hole being squared after drilling to fit the square machined on the feed spindle. A 3/32 in. hexagon Whitworth set-screw and washer holds the wheel in place.



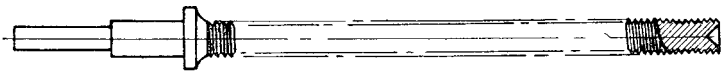
Details of the baseplate and table

material is used, being shaped to slide‘ fairly tightly between the strips on the front plate. To this back plate another plate is riveted, being drilled and tapped to accommodate the 1/4 in. Whitworth feed screw which I turned from a short length of 1/2 in. diameter mild-steel bar, starting the thread by means of a tailstock die-holder, and afterwards finishing the thread with hand tackle in the vice.

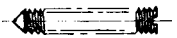
After providing a top plate for the tool box and securing this to the ends of the vee-strips with 1/8 in. Whitworth set-screws, the whole unit was fixed to the ram head with a 1/4 in. Whitworth screwed and collared spigot and tightened by a

The clapper box was by far the most interesting part to make and, incidentally, took the longest to make. Great care was taken to fit the parts together to permit a good sliding fit of the guides. I nearly forgot to mention that the clapper plate is hinged to the front plate with a 5/32 in. pin. This is kept in position by a hexagon nut. The other end of the pin is formed as a cheese-head.

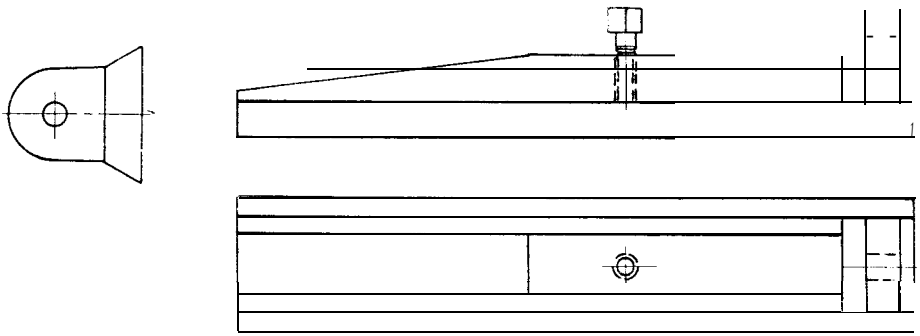
The next consideration was the making of the saddle. This was a fairly straightforward job, and consists of a plate and four vee-strips, the latter being fixed to the former with 1/4 in. hexagon bolts and nuts. The top pair of vee-strips house the ram and the bottom pair actuates on the ways,



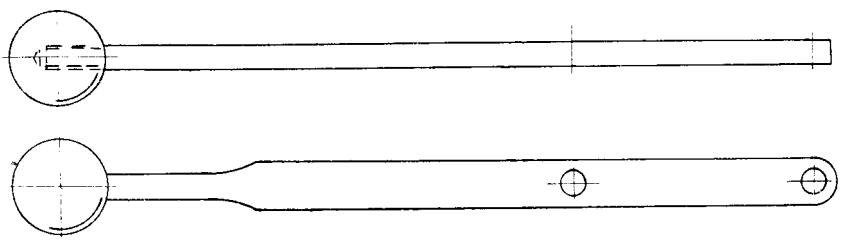
Traverse feed-screw



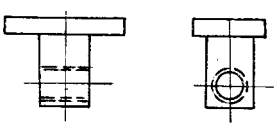
Coned centre



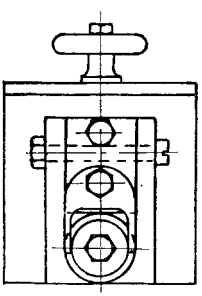
Details of the ram

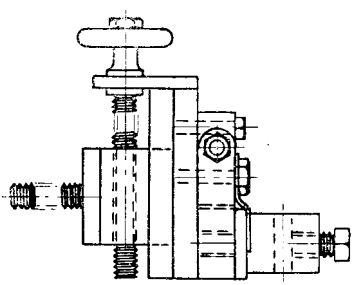


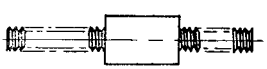
Lever and ball grip



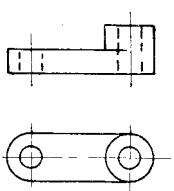
Traverse nut



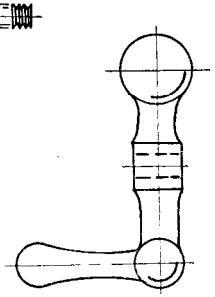




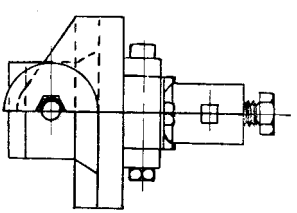
Hinge pin



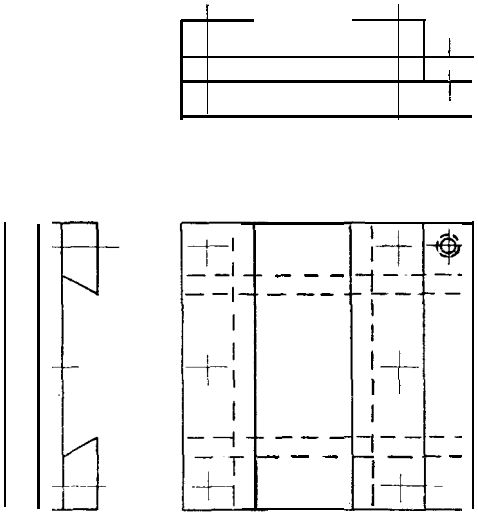
Toggle lever



Handle



Detail.7 of ram head (half size)



Details of saddle

which are mounted on the box bed. A brass nut, shaped as shown, was made and fixed to the underside of the plate with two set-screws, and all that remained to be done was to make the traverse feed-screw. I turned this in the lathe between the centres and wondered awhile how I was going to screw-cut the greater part of its length, as my lathe was not fitted with screw-cutting gear. Obviously, a tailstock die-holder was useless here and I could not see how I could get a true thread (other than by chance) by using a circular die on this occasion. So I thought of another way. I borrowed and old-time two-part die and holder from a friend, the die parts being in good cutting condition. I mounted the spindle in the vice and opened the pair of dies to just clear *over* the end of the spindle, tightened up and chased a thread for about 1-1/2 in. The dies were then brought to the top of the spindle and re-adjusted. A further cut was taken, this time almost to the bottom. The tool was then removed from the work and finished by using a circular die. The resultant combination of screw and nut works very satisfactorily.

The traverse screw is furnished with a balanced type of handle. This, too, was turned from an old 5/8 in. bolt. It is fixed to the spindle by drilling through the handle centre and inserting a tapered pin. To take up the thrust on the traverse screw a coned centre is used, being locked into position with lock-nuts.

The Toggle Lever

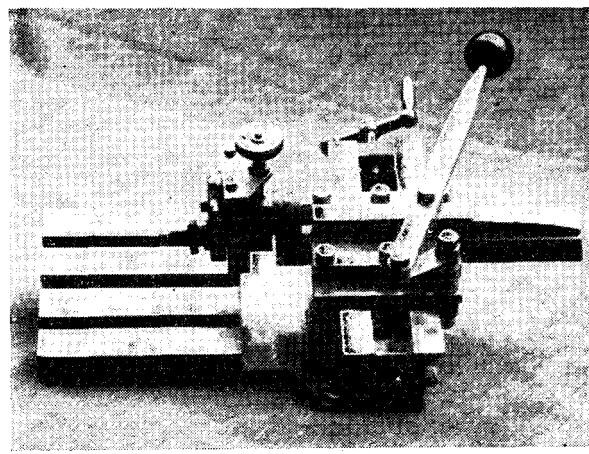
This is shaped from a piece of mild-steel. A specially-made bolt secures the handle to the ram slide and reaches through the strengthening-piece into the ram slide proper. I then turned a few more hexagon set-screws. These were needed to assemble all of the parts together. When this was accomplished, a trial was given to the machine. It dealt with brass and phosphor-bronze quite readily, taking a 1/16 in. cut without trouble

Next came the finishing. My own idea for the livery of a machine tool is black enamel, the working parts being polished and kept bright. However, the slogan now is Brighter Britain, so I decided to paint the body turquoise.

The table top is rose finished, the result being brought about by pressing a small square of emery-cloth on to the work and working with a half circular movement, pressure being applied by the thumb.

At Work Again

After its return from the " M.E." Exhibition the machine was put through its paces again. Brass and bronze were dealt with as before but the tool tended to ride when dealing with steel and wrought-iron. This trouble was soon overcome, however, by using a short length of spring-steel, the one end fixed under the nut that holds the hinge pin bracket in position, the other end exerting pressure on the tool holder. This prevents the tool leaving the work at point of contact and permits an even cut along the whole length.



End view of shaping machine

A machine vice, opening to 1-1/2 in., has since been made to work in conjunction with the shaper. It is painted to match the colour of the latter. Later on I intend to make an ang!e-plate to enable me to machine gear wheels. It will be provided with division plates.

No drilling machine was used to build the shaper. I drilled each hole with a 3/32 in. pilot drill using a breast drill. The holes were then opened out to the required sizes by using a suitable drill held in a carpenter's brace.

In conclusion I feel there may be many more readers of THE MODEL ENGINEER similarly placed as myself who do work of this description for recreation. If so, I would like very much to hear of their activities.