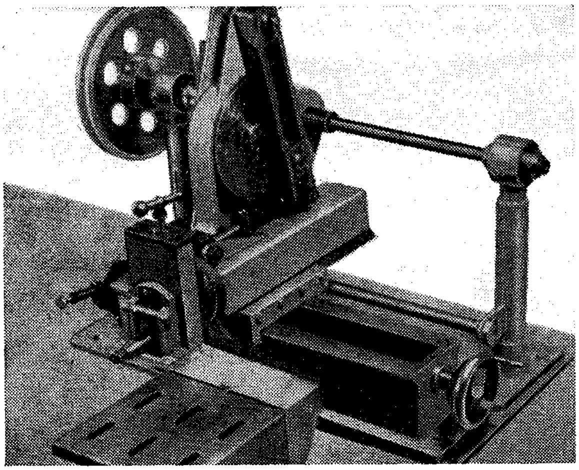
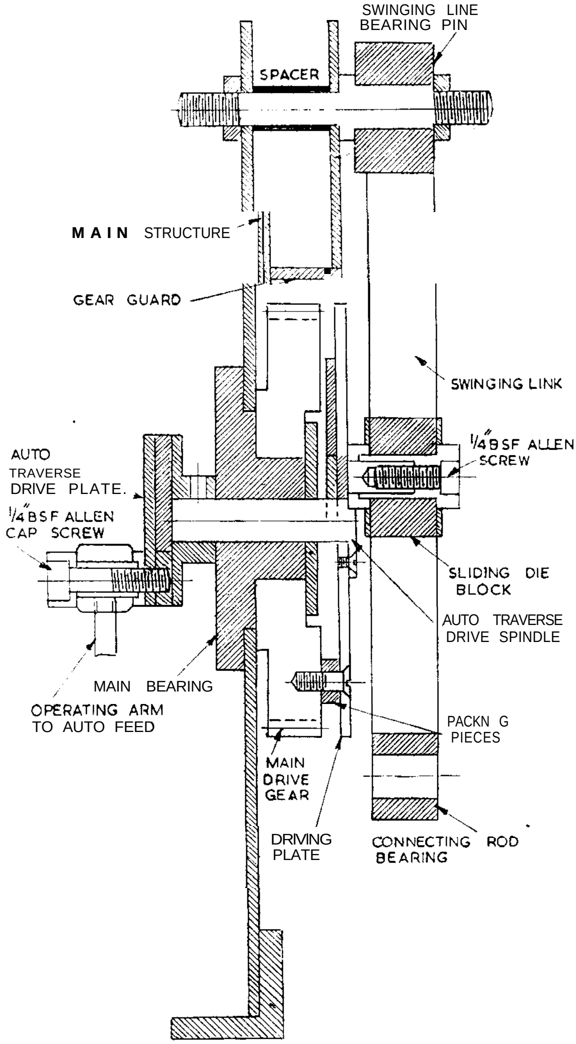


MOTORISING . A PERFECTO HAND SHAPER



. . . as carried out by W. H. PERRETT

A FEW years ago I bought from the Perfecto Engineering Company a set of part-machined castings of their 5 in. shaping machine. This firm had kindly machined the bed and the ram as this, with only a 3-1/2in. lathe at my disposal, was beyond me.

I quickly determined to install some sort of motor power. This, I might add, was before the Perfecto company produced a power edition. However, I felt I could only be fully satisfied if it were to operate on similar lines to the larger machines, i.e. automatic traverse, adjustment of stroke, both in length and position, and quick return. The result is illustrated ; after much use-some of it rather heavy work-the machine is still showing no sign of distress.

Now for the general outline of construction, as applied to this particular machine:

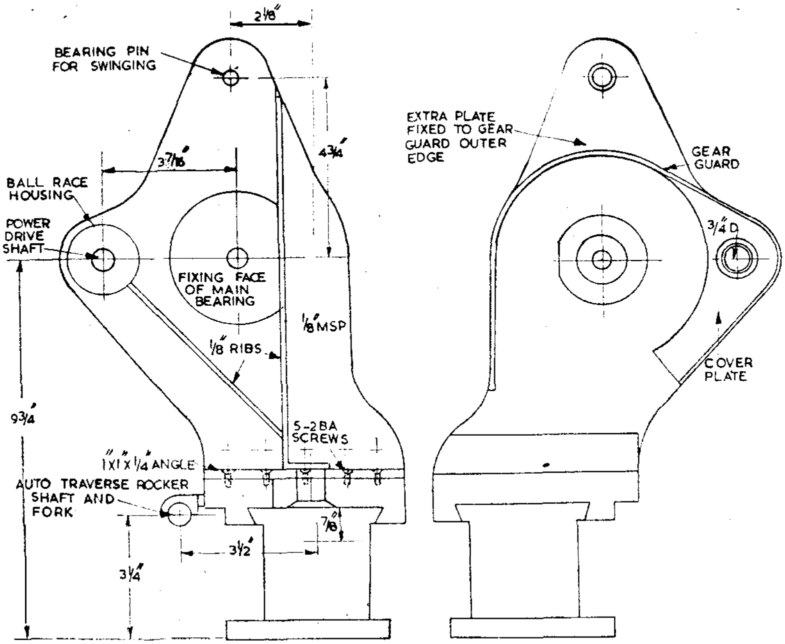
A pair of matching reduction gears were first obtained. The size of these was 5/8in. wide with a pitch diameter of 4-7/8 in. and 2 in, The larger had a bore of 1-3/8in., the other 7/8in.And it is around these gears that the whole idea was worked out; the position of the various centres is shown in Fig. 2.

To carry this main structure a piece of 1 in. x 1 in. x 1/4in. steel angle was screwed to the saddle of the shaper by five 2 BA screws, the upper surface of the saddle having previously been machined dead flat. The inner face of' the angle (nearest the ram) was kept approximately 1/8 in. from the edge of the V along which the ram works, to give clearance, and also kept exactly parallel to line of ram. For appearance' sake the angle was filed on its lower edges to the shape of the saddle.

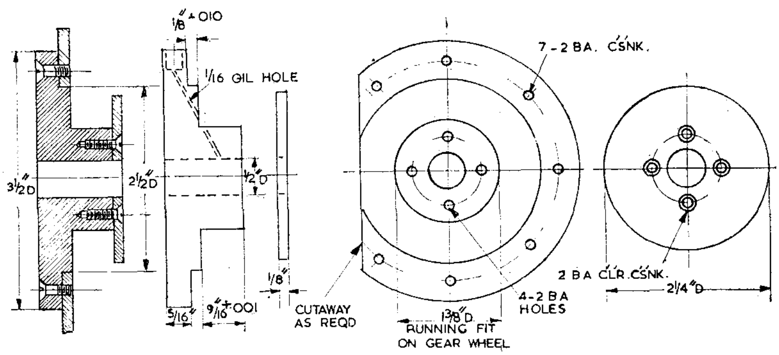
The main structure was made out of 1/8 in. mild steel, with two stiffeners sifbronze welded on the outer side, the lower end of which is angled (see drawing). This angled piece rests on the position which normally would be taken by the hand operating lever.

When finally erected, the angle is bolted to this arm, via the pivot hole. On the inner side of the structure a wheel guard, which follows the shape of the two gear wheels, was Sifbronzed on, as was also an extra piece (the same shape of the structure) fitted on the outer side and above the wheel guard. All this was made of 1/8in. mild steel, and was found to be very rigid. This was now fitted to the angle previously fixed to the saddle, by another five 2 BA screws, and by means of packing between the hand-operating lever pivot bracket and the outer angle at the base of the stiffener, the main structure can be checked to 90 deg. to the saddle surface.

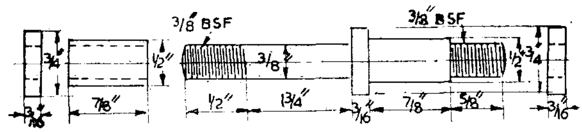
A piece of cast iron was next obtained from which the main bearing for the larger wheel was turned (Fig. 4). It was turned to the sizes shown for my wheels, and very important was the boring of the 1/2in. hole through the centre, at the same setting as the 1-3/8 in. dia., so that they were concentric with each other.



*Figs 2 and 3 : General details **of** the main structure as viewed from the front and inside*



Above, Fig. 4: The main bearing and keep-plate Right, Fig. 5: Swinging link bearing pin, spacing tube and washers



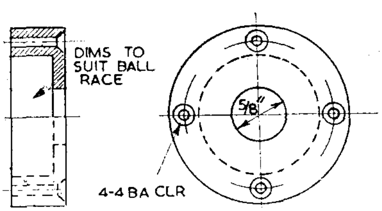


Fig. 6: The thrust bearing housing

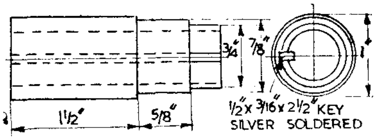


Fig. 7: The small gear centre

This 1/2 in. hole was for the self-act spindle. I must point out here that the 9/16 in. width at the 1-3/8 in. dia. is the width of the bore of my gear wheel, and this measurement should only be 0.001 in. over the length of the bore of the wheel in use, as with a keep-plate on the end it would add to the rigidness of the wheel.

A 1/16 in. oil hole is drilled in this bearing to supply oil to both the inner and outer bearing surfaces. In all possible cases I fitted on this machine a cycle-type flush oil cap.

This bearing had to be cut away on the outer flange and slightly on the inner face, to clear the stiffener when fitted through a hole cut in the main structure. Seven 2 BA screws were used for fixing, these being tapped into the 1/8in plate

A spindle 'to carry the upper end of the swinging link was next made-from mild steel. Two washers and a spacing piece had also to be made with this item. To fit the spindle two 3/8 in. holes were drilled in the apex of the main structure, at the centre previously marked, these being through the two thicknesses of metal.

Between the two thicknesses of metal the spacer was fitted and with a washer fitted over the end it was bolted up tight. Care was taken to ensure that this spindle was square in all directions with the main structure.

To take the main driving shaft through the structure a ball race of 5/8in. bore was used, and a housing was next constructed to carry this.

The bore of this bearing should slide along a 5/8 in. dia. mild steel shaft, and a 3/4in.clear hole was made through the main structure at the predetermined centre. With the ball race in place the housing was fitted concentric with this hole-on the outer side of the structure-using 4 BA screws, tapped into the plate.

For the smaller of the two gear wheels a centre was next made out of mild steel with a silver steel key fitted (Fig. 7).

With the larger gear on its centre a measurement was taken from the

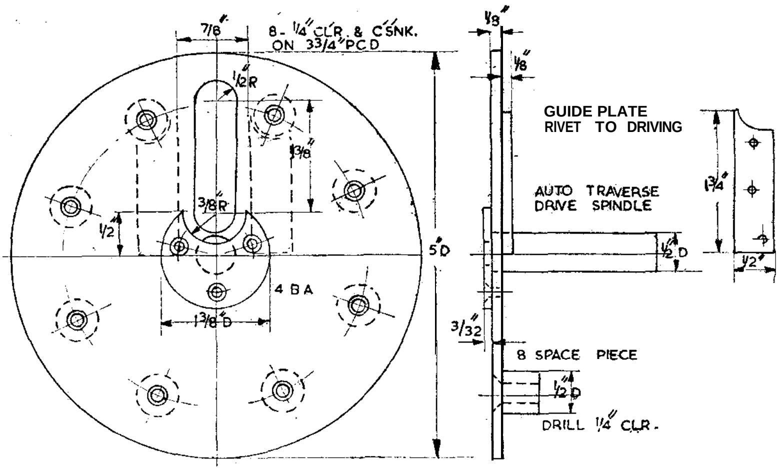
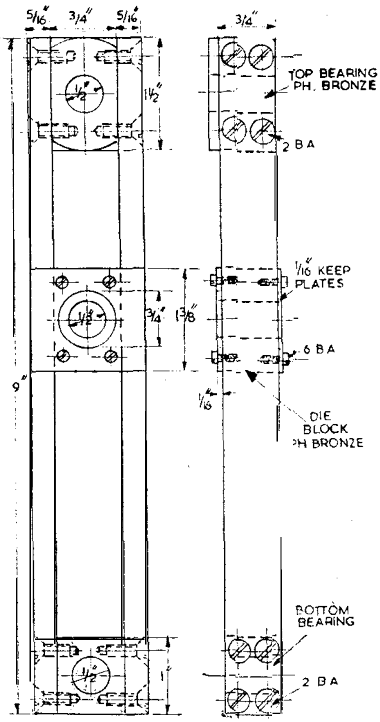
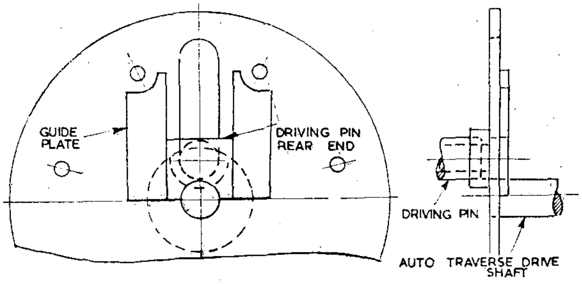


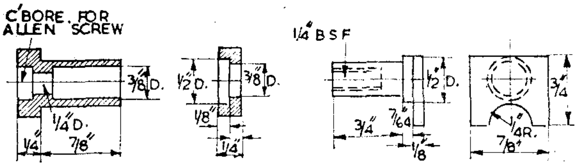
Fig. 8: The driving plate, auto traverse drive spindle, spacing pieces and guide plates for the driving pin



Right, Fig. 9: The swinging link



Left, Fig. 10: General detail of the drive pin fitting as seen from the rear and side of the drive plate



Left, Fig. 11: Details of the driving pin giving stroke adjustment

Pari 3 *Part 2* *Part I*

face of the ball race, via the 3/4in. hole, to the inner face of the gear wheel to determine the measurement not shown in the drawing.

While still in the lathe, I cut the way which was to take the key by means of a 1/8 in. wide tool bit in a boring tool, racking the saddle back and forth.

This was cut to a depth of 3/32in. and although it broke through the 3/4 in. dia., this did no harm. A key, 2-1/2in. long x 1/8in. x 3/16in. was then made and fitted, as was also the small gear. In my case I silver soldered both these items into position, although the gear could possibly have been a force fit.

The next job was the driving plate for the swinging link. This plate gives adjustment of the stroke and also carries the end of the automatic traverse spindle. Details of this can be seen in Fig. 8 and the cutaway section in Fig. 1 shows attachment to the main gear.

The m.s. plate was first cut out of a slightly larger piece of 1/8 in. plate, by clamping to the faceplate with thick card packing between. A tool similar to a parting tool was used to cut the 5 in. dia. circle out of this plate.

After fixing again to the faceplate and setting to run true, the 1/2 in. hole through the centre was drilled and bored true. At the same setting a p.d.c. of 3-3/4in.was marked and divided into eight. The eight positions were drilled and countersunk to take 1/4 in. BSF screws. Also in this plate a 1/2 in. wide slot was made to take the driving pin (Figs 10 and 11).

To determine the length of the spacing pieces that were to be fitted between the gear and driving plate, it was decided at this stage to make the driving pin and dieblock. The dieblock was a piece of phosphor bronze,. 1-3/8 in. long X 3/4 in. wide X 3/4 in. thick, and through the centre of the 3/4in. thickness a &in. hole was reamed.

While working on the dieblock I also made the keep-plates of brass, these being opened out to 3/4 in. in the centre. These plates ensure that the dieblock runs true with the link at all times and are fixed to the block with eight 6 BA cheesehead screws.

The driving pin was next made (Fig. 11). It is so made that by loosening a 1/4in. BSF Allen screw it can be positioned anywhere in the slot in the driving plate and give a variety of lengths of stroke. The 1/4 in. radius cutaway shown on part 1 is to clear the auto traverse drive spindle and allow the very minimum of stroke, and it is shown in this position in Fig. 10.

To assemble this pin, part 1 is passed through the adjustment slot on the drive plate, followed by the placing of part 2. Then with the dieblock in position, part 3 is slipped over part 1 and mto part 2. To complete assembly a 1/4 in. Allen cap screw is fitted.

While this driving pin was in position the guide plates were fitted with 1/8in. rivets to the rear of the plate, these being to prevent the driving pin from turning when making adjustment.

● To *be continued*