

# IN THE WORKSHOP

by "Duplex"

No. 74.—\*A Small Power-driven Hacksaw Machine

**N**EXT to be made and fitted is the saw carriage, together with the saw frame or bow in which the saw blade is mounted.

The layout of these parts can be seen in previous photographs, which also show the subsidiary fittings connected with the saw frame.

## The Carriage

The parts forming the saw carriage are shown

present case, however, the provision of ball-bearings should eliminate wear and, moreover, the applied cutting pressure is unidirectional. The method of mounting the beam slot bearings is to make them a light press fit on the two cross-bolts fitted to the carriage, and metal or thin card shims are fitted so that, when the bolts are tightened, the parts are correctly adjusted to afford a close but free sliding fit for the carriage.

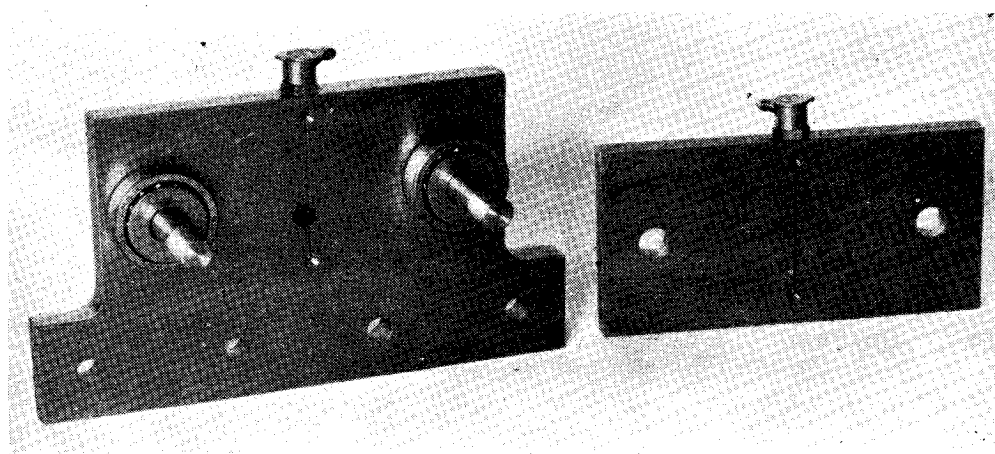


Fig. 35A. The parts of the carriage, showing the bearings in position and the lubrication system

in the photographs Figs. 35A and 36 and also in the exploded drawing, Fig. 37; in addition, all the necessary dimensions are given in the working drawings, Fig. 38. It will be seen that the carriage runs on two ball-bearings which travel in the slot machined in the beam; but as this slot is necessarily of restricted length, a third ball-bearing is fitted in a bracket attached to the saw frame itself and bearing on the underside of the beam.

The latter bearing is adjusted so that the two outer ball-bearings are maintained in contact with the sliding surfaces, and thus prevent tipping of the carriage when the direction of the connecting-rod thrust is reversed as the crankshaft rotates.

Were the guidance of the carriage entrusted to the two bearings working in the beam slot, the position would be equivalent to that of a petrol engine having the gudgeon-pin located at a point outside the lower end of the piston skirt, and in these circumstances rapid wear and piston slap would inevitably occur. In the

It will be noticed that double-coil spring washers are fitted under the nuts; this serves to maintain the carriage members in contact with the beam, but at the same time a relief of a few thousandths of an inch is afforded to allow for any irregularity of the sliding surfaces, present in the first instance or arising later as a result of localised wear.

The photograph, Fig. 35A, shows that oil-ways have been cut on the inner surfaces of the two carriage members; these connect with drilled passages surmounted by a small cycle-type lubricator. In this way oil is fed to all the sliding surfaces of the beam, and it has been found in practice that a few drops of oil, given at starting, will maintain adequate lubrication of the parts for a considerable time; moreover, the fact that the oil has but little tendency to become discoloured indicates that the oil film prevents metal to metal contact and so largely eliminates wear. The oil channels illustrated were actually cut in the shaping machine, but they can quite easily be formed by hand with a small V-pointed cold chisel or cut with a V-tool by a shaping operation in the lathe.

The bow is cut out from a strip of mild-steel,  $\frac{1}{4}$  in. in thickness. When attaching the frame to

\*Continued from page 530, "M.E.," October 5, 1930.

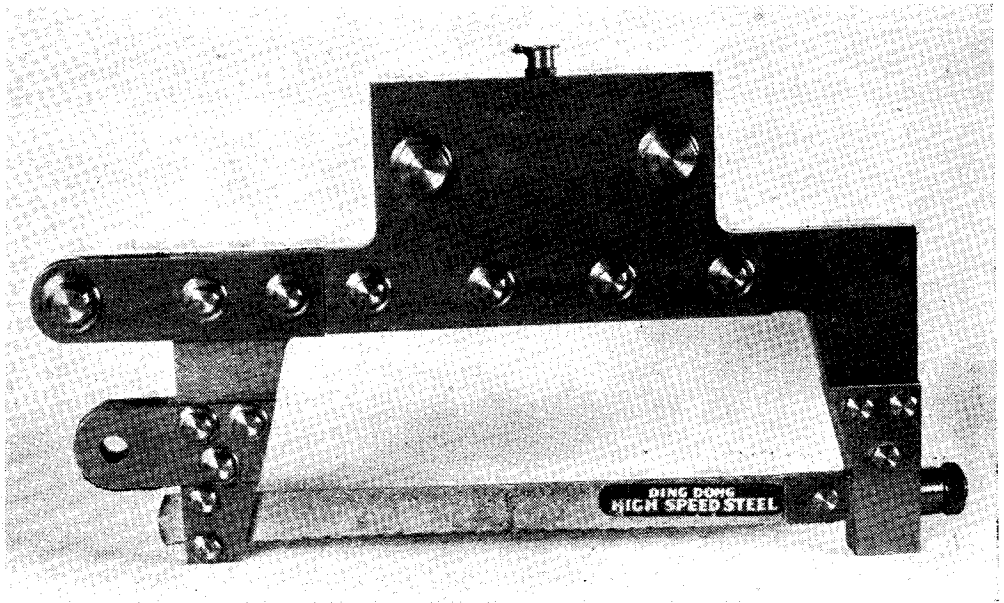


Fig. 36. The carriage with the saw frame and its attachments

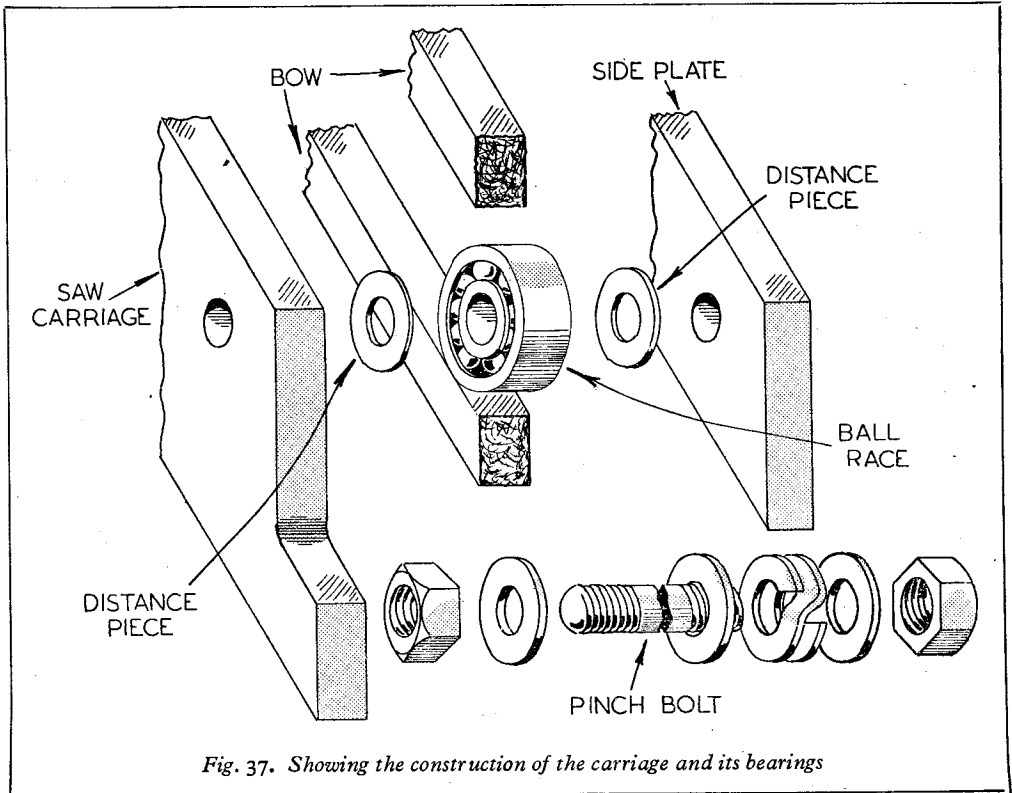


Fig. 37. Showing the construction of the carriage and its bearings

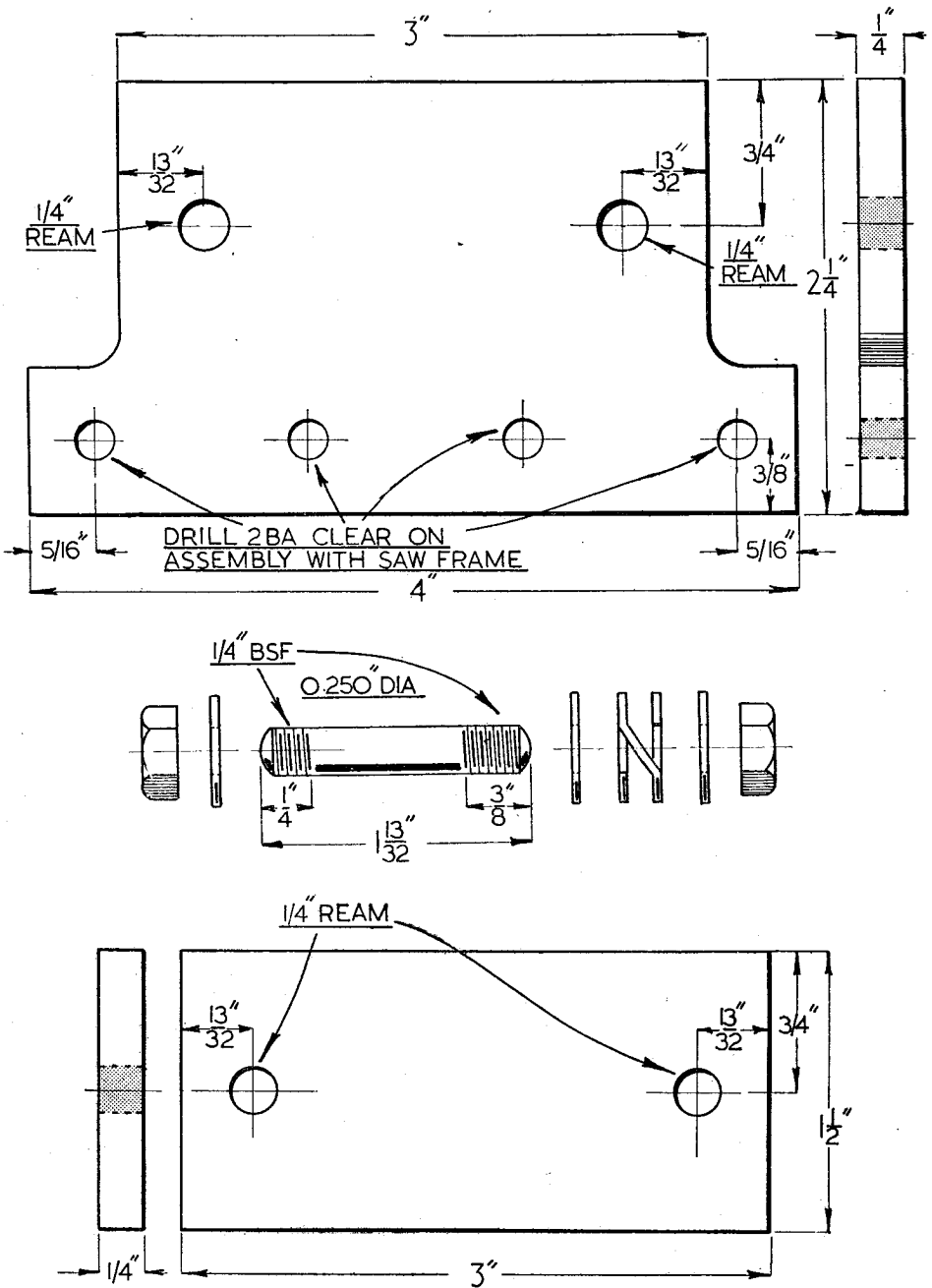


Fig. 38. The carriage side-members and the bearing pivot-bolts

the carriage, a slip of paper is inserted between the upper surface of the frame and the lower edge of the beam, so that the parts are slightly separated when clamped together with tool-makers' clamps for drilling the holes for the

attachment screws. This clearance is given to ensure that the sliding pressure is taken on the ball-bearings themselves and not on the narrow, plain surfaces which are quite unsuited for this purpose.

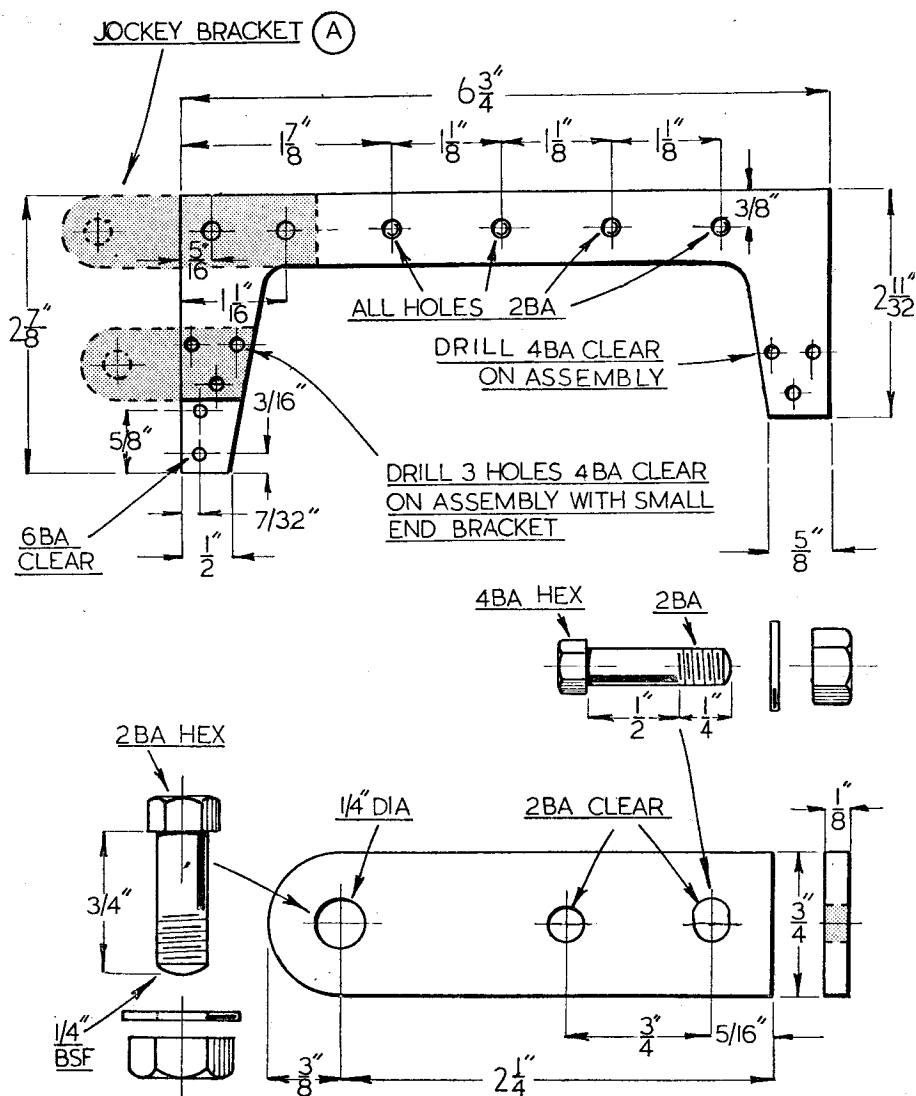


Fig. 39. The saw frame and its jockey bearing-bracket

**The Jockey Bearing**

The position of the jockey bearing and its bracket attached to the saw frame is shown in Fig. 36, and the details of the construction are given in Fig. 39. It will be seen that one bolt hole formed in the bracket members is slotted; this allows the position of the bearing to be adjusted to take up any play in the slides. A shim is fitted on either side of the inner race of the ball-bearing so that, when the pivot bolt is tightened, this race is securely clamped and at the same time the outer race is left free to revolve. The bracket side-members also serve to enclose the bearing and prevent the entry of swarf.

The saw frame is drilled for the attachment of

both the jockey bearing-bracket and the small-end bracket by clamping one side member of these brackets to the frame, and then using it as a drilling jig to ensure accurate spacing of the bolt holes. When the carriage has been assembled on the beam and the saw frame attached to the carriage, the jockey bearing-bracket is swung upwards so that the outer race of its ball-bearing is brought into contact with the under side of the beam; this will restrain the carriage from tipping in either an upward or downward direction. With this arrangement, the point at which the cutting pressure is applied to the saw blade will always lie between the two outer ball-bearings.

(To be continued)