IN THE WORKSHOP

by "Duplex"

No. 77.—*The Small Hacksaw Machine as a Lathe Attachment

WHEN designing the power-driven bench hacksaw machine recently described, it was borne in mind that some users, to save the cost of an additional electric motor, would prefer to make use of the existing power drive fitted to the lathe; moreover, the lathe back gear will usually furnish suitable speeds for driving the machine direct, thus obviating the need of a special reduction gear. The cost of making the machine is therefore greatly reduced as the driving mechanism to provide the necessary speed reduction is dispensed with and, instead, the drive is taken directly from the lathe mandrel. Again, should it be decided later to convert the lathe-driven model to the bench type machine, this can easily be done by building the self-contained drive on the existing bedplate, for, apart from the clamping mechanism, use can be made of all but two of the parts already made, that is to say the short driving shaft and the shortened bracket that carries the beam pivot arm. The disadvantages of using the machine on the lathe are common to most additional lathe fixtures, namely: that time is occupied both in fitting and removing the attachment and, while it is in place, the lathe is not immediately usable for other operations. As to the time taken to fit the hacksaw, this can be done in a few seconds and much more quickly than, say, removing the top-slide and fixing the vertical milling slide in place on the cross-slide of the lathe; all that is necessary is to run back the lathe saddle, put the clamp-bolt in position, place the machine on the bed and slide it to the left so that the crankshaft enters the chuck jaws, then tighten the chuck and the clamp-nut. The crankshaft, shown in the photographs, forms part of the machine and always remains attached to it. The guide bar, which makes contact with the back of the lathe bed, ensures that the machine is correctly aligned, and the clamp-nut, when tightened, draws the clamp plate against the underside of both bed shears.

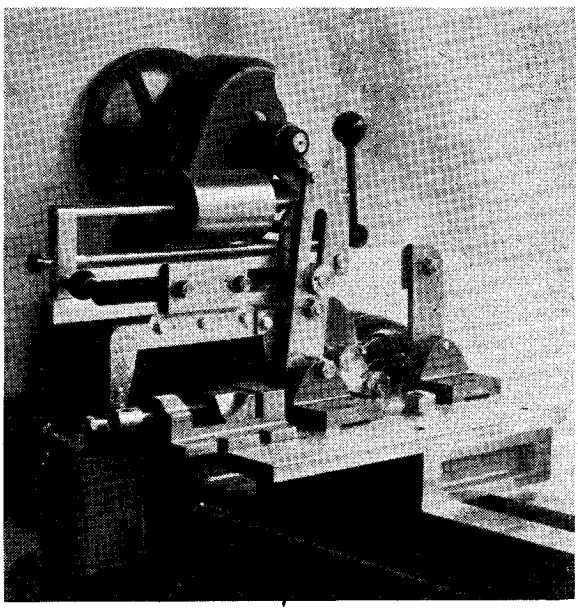

Fig. 62. The machine mounted on the lathe

The mounting illustrated has been designed for a lathe of 3½-in. centre height, and the clamping mechanism is suitable for the Myford "ML7" lathe; nevertheless, adjustment for height can be made by varying the thickness of the raising blocks attached to the underside of the baseplate, and the method of clamping the machine to the lathe bed can readily be altered to suit lathes of other types. As a guide to the most suitable clamping arrangement, the method by which the fixed steady or the tailstock is secured to the bed may be followed, but with the Drummond-Myford form of bed, for example, the position of the clamping-bolt may also have to be altered.

Construction of the Machine

The dimensions of the bedplate are similar to those specified for the bench model, but the driving mechanism consisting of a countershaft and crankshaft carried in bearing brackets is no longer required; instead, a shortened bracket is used solely for mounting the beam pivot arm, and the modified crankshaft is gripped in the lathe chuck.

The connecting-rod and all the parts which follow it, constituting the sawing mechanism, are in every way similar to those already des-

*Continued from page 753, "M.E.," November 16, 1950.

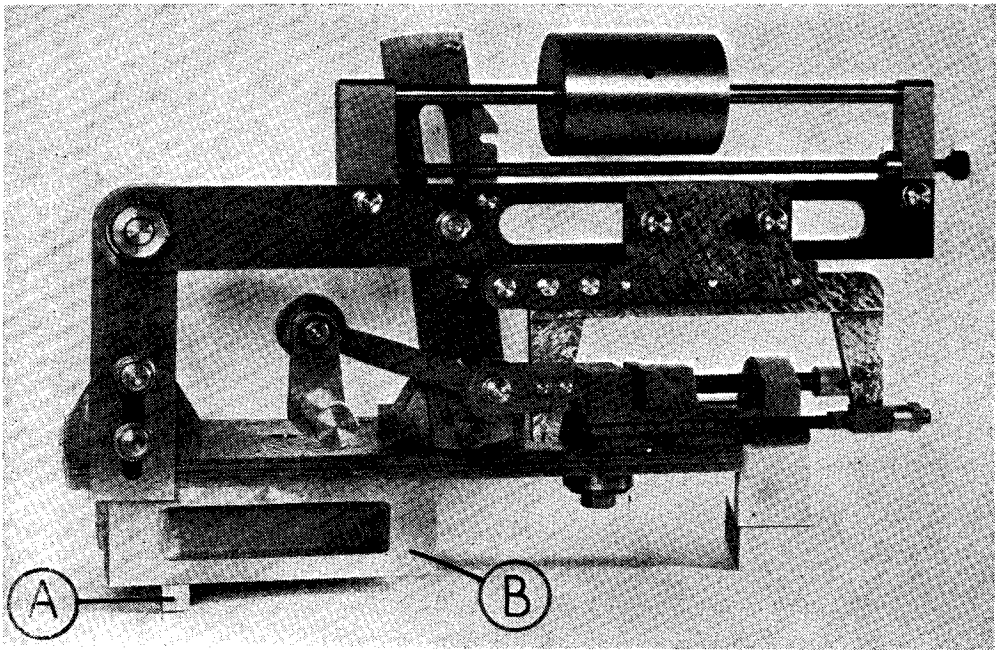

Fig. 63. Front view of the machine : " A " is the guide strip and " B " one of the two raising blocks

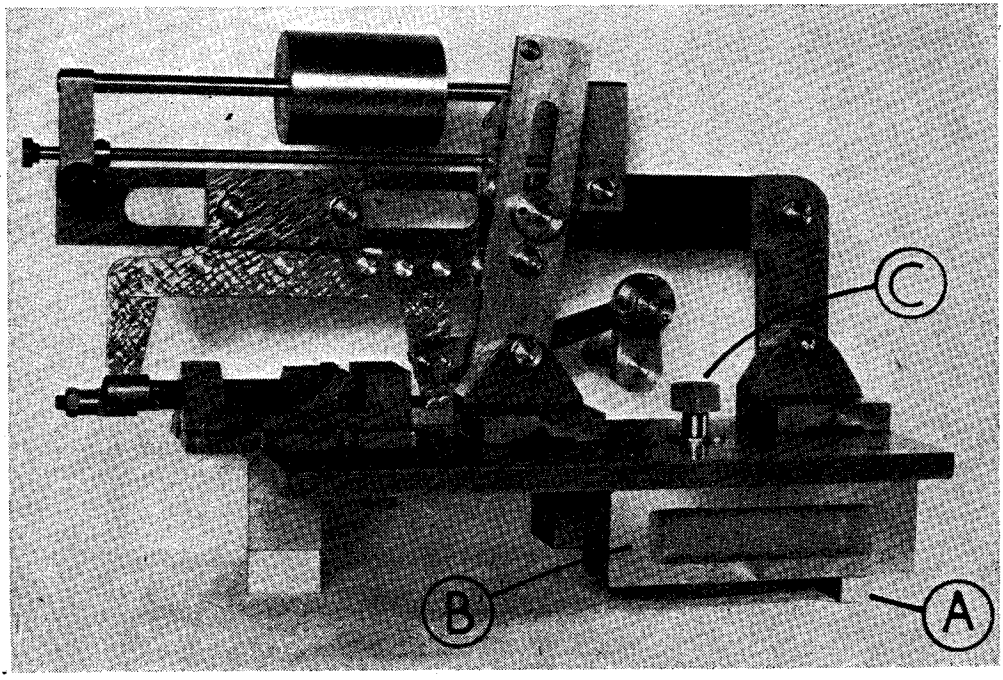

Fig. 64. The machine seen from the back : " A "—the guide strip ; " B "—a raising block " C "—the clamping-nut

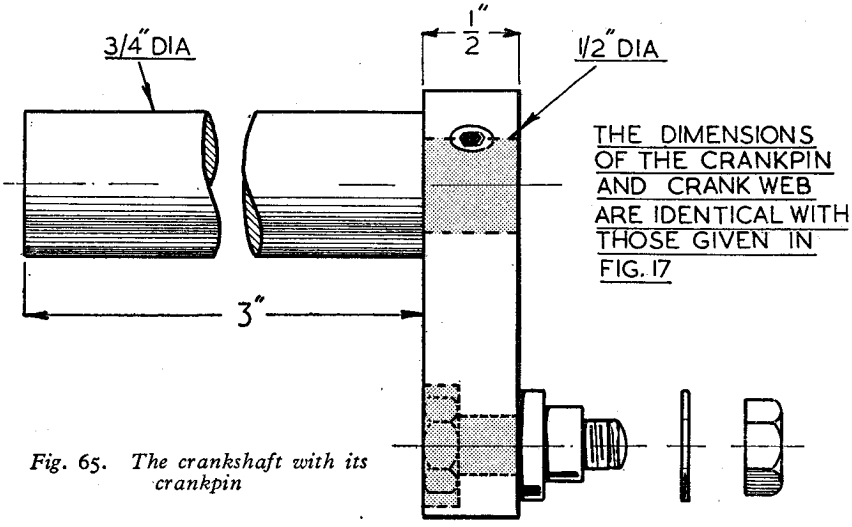

Fig. 65. The crankshaft with its crankpin

cribed for the bench machine. There is, however, no need for any electrical switchgear or wiring, as this all forms part of the lathe motor equipment. Nevertheless, if the need arises, a Burgess switch can be fitted as in the bench model to switch off the motor, at the end of the saw's travel ; but, if this addition is made, care must be taken to ensure that there is no unprotected live wiring. In view, therefore, of the account already given of the bench machine, the present description is limited to giving details of the modified crankshaft and the construction of the parts employed to secure the baseplate to the lathe bed. In addition, it should be noted that the bracket for mounting the beam pivot arm need be only half the former length, as it no longer carries a countershaft for the drive mechanism ; as will be seen in the illustrations, this bracket is attached to the baseplate with three Allen screws in the same was as the guide arm bracket.

The Crankshaft

The form of the modified crankshaft is illustrated in Fig. 65, and for the constructional details of the crankweb and the crankpin, reference should be made to Fig. 17 in a previous article of this series. As the connecting-rod is similar to that already described, there is no need to do more than recall that the big-end is fitted with a ball-bearing having a bore of ⅜ in. In addition, for the sake of uniformity, the crank itself and its crankpin are also counterparts of those previously used. The exact diameter of the crankshaft is not of importance, but it should be made sufficiently large to mount the crank securely and at the same time to afford a good gripping surface for the chuck jaws ; moreover, the shaft should be long enough to make contact with the full length of the chuck jaws, but should overhang no farther than is necessary to clear the gap in the bed and drive the machine.

The crankshaft illustrated is made ¾ in. in diameter in order to provide an adequate abutment shoulder for

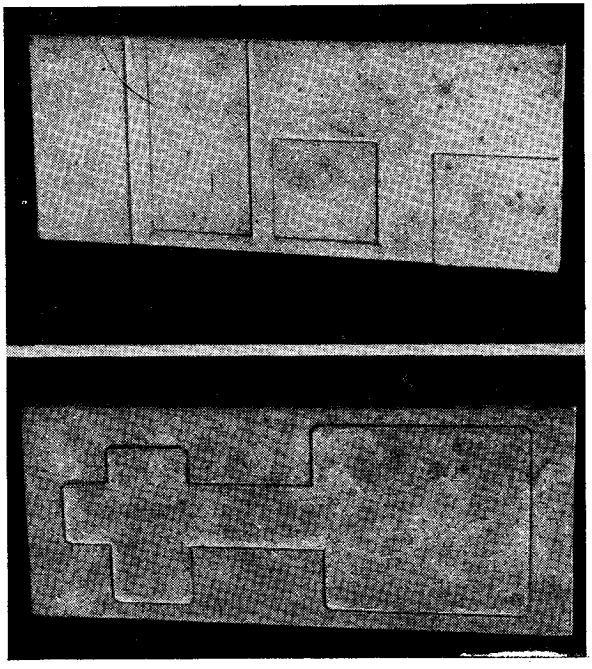

Fig. 66. The cast aluminium bedplate : Above—the upper surface ; Below—the under side of the casting

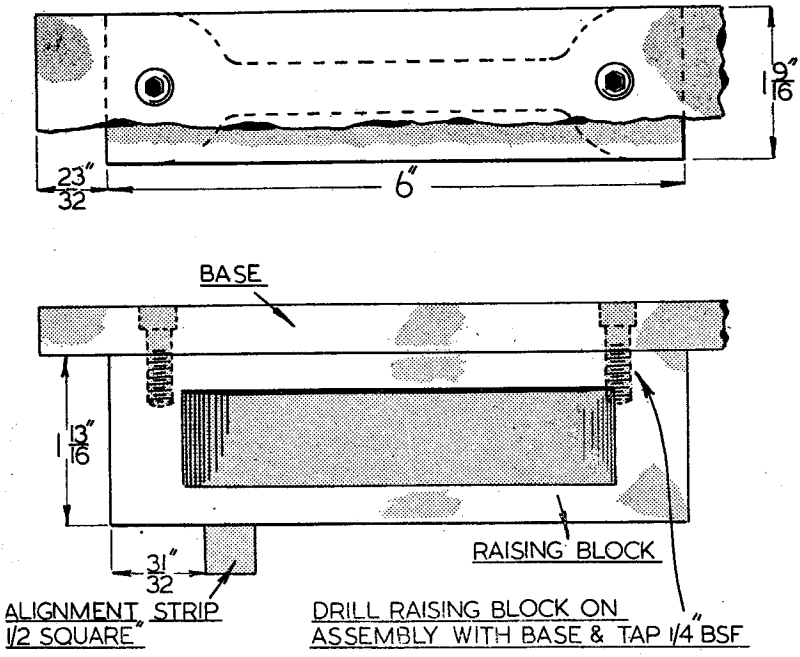

Fig. 67. The raising blocks and guide strip

The length of the seating for the big-end ball-bearing must be made a few thousandths of an inch less than the width of the bearing so that, when the retaining nut is tightened, the inner race is securely gripped and kept from turning. The power required to drive the saw is so small that there should be no need to fit a driving peg to the crankshaft to bear on one of the chuck jaws, but, if the chuck jaws are worn and do not close evenly, this fitting may be found necessary and will save further straining of the chuck due to having to overtighten the jaws

the crank. This shaft should be turned between centres to ensure that the crankweb, carrying the crankpin, lies at right-angles to the axis of the shaft and so that the crankpin itself is parallel with this axis. The crankweb is secured to the faceplate for boring the seatings for both the crankshaft and the crankpin to afford light press fits. Although a single Allen screw will probably serve to fix the crankweb in place, two screws are fitted here to afford greater security. The crankpin can be turned to size when mounted in the self-centring chuck and then reversed for turning the other end, for, although it is essential that the two register portions should be formed truly parallel with each other, an eccentricity of a few thousandths of an inch is, here, immaterial, as this will at most alter the length of the stroke by a like amount.

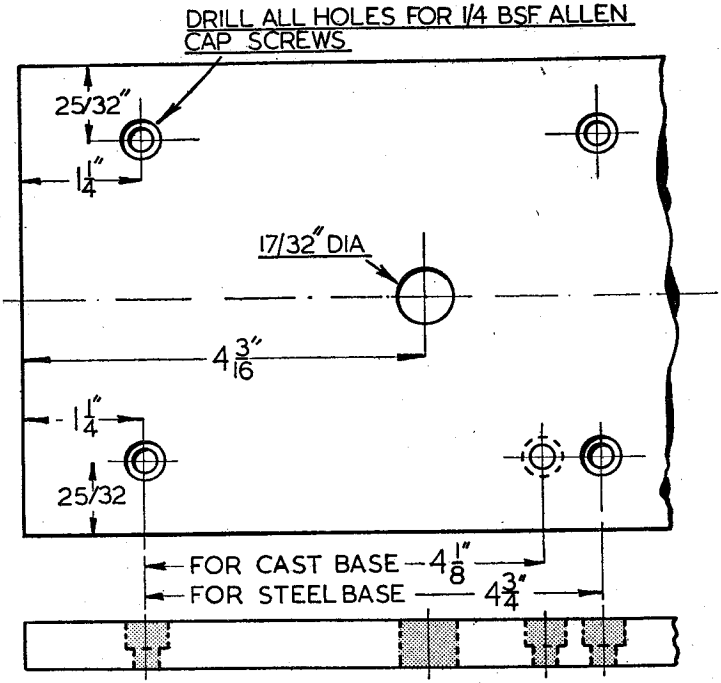

Fig. 68. Drilling centres on the baseplate for the raising blocks and clamp bolt

The Bedplate

As in the previous model, a steel bedplate is used ; however, owing, perhaps, to the uncertainty of supplies of steel, Mr. H. Haselgrove has kindly undertaken to supply bedplates, cast in aluminium alloy, of a pattern that will serve for either the bench or the lathe machine. As illustrated in Fig. 66, these castings are

The Raising Blocks

These blocks are iron castings and are attached to the underside of the baseplate by means of Allen screws inserted from above. The castings are machined in the lathe by gripping them in the four-jaw chuck, or the work can be done equally well in the shaping machine. The dimensions of these fittings are given in Fig. 67, and

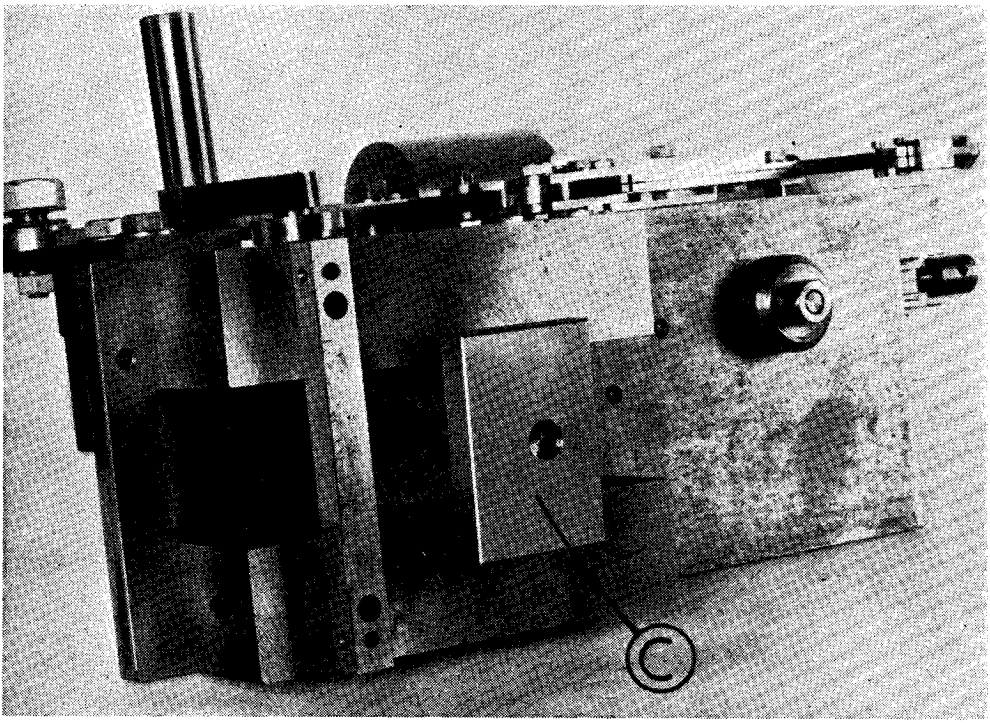

Fig. 69. Underside of the base, showing the raising blocks, the guide strip and the clamp bolt with its clamp plate, " C "

furnished with filing strips for mounting the various components in place. These filing strips greatly reduce the work of finishing the casting, for the strips alone have to be filed flat and not the whole surface of the plate ; this operation is best carried out by using a large file and plying it in the direction of the long axis of the casting. Aluminium filings are, of course, apt to form pins in the file teeth and cause scoring of the work surface, but this trouble can, in part, be overcome by exerting only light pressure on the file and applying oil or paraffin to the work. If a so-called milling file, having deep grooves between the teeth, is available, the work will be made easier and there will be no trouble from pinning. The flatness of the work surface should be tested from time to time on a surface plate, or on a sheet of plate-glass, lightly smeared with marking compound, and those who wish can finish the truing operation by using a hand scraper.

their position on the baseplate is indicated in Fig. 68, as well as in the photographs.

For lathes other than those of 3½-in. centre height, the height of the raising blocks can either be reduced, or additional packing strips can be fitted to the casting when the overall height has to be increased.

The Alignment Strip

As shown in Fig. 70, this guide bar consists of a length of ½-in. square mild-steel, attached to the under surface of the two raising blocks in the way illustrated in Fig. 67, and also in the photographs. The purpose of this strip is to align the bedplate squarely across the lathe bed, but, to allow any necessary adjustment to be made, the strip itself is furnished with setting-screws which can be locked by grub-screws.

When the machine is being clamped to the lathe bed, the bedplate is pulled towards the

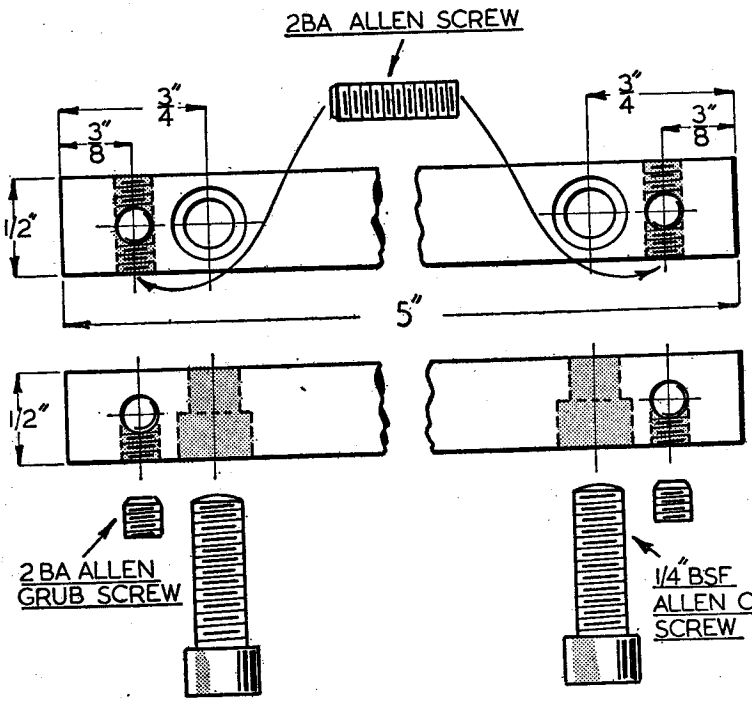

Fig. 70. The guide strip with its fixing and adjustment screws

operator and the clamping-nut is tightened while the guide strip is kept in contact with the back shear of the lathe bed.

The Baseplate Clamp

The baseplate is clamped to the lathe bed by means of a clamp-bolt consisting of a clamp plate, a long stud, and a clamp-nut and washer at the upper end. It will be noticed in Fig. 71 that the clamp plate is shown bevelled at its forward end ; this allows the plate, when placed in the bed gap, to slide into position between the bed shears even when a chuck or other fitting is mounted on the mandrel. When in this position, the clamp plate will fall for only a short distance, and there will be no difficulty in dropping the bedplate over the upstanding end of the clamp stud ; this manoeuvre is faciliatated by making the hole in the bedplate 17/32 in. in diameter or even larger.

On tightening the clamp-nut, the two pressure surfaces formed on the clamp plate bear against the underside of the bed shears ; as this pressure is transmitted directly to the raising blocks, there is no tendency to distort the lathe bed. However, if the machine is built up on the cast aluminium bedplate, it is advisable to fit a substantial plate, instead of an ordinary washer, beneath the clamp-nut ; there will then be no danger of distorting the casting when the nut is firmly tightened. This saddle plate should be of the same form as the lower clamp plate, that is to say it is relieved in the centre so that two pressure pads are formed to bear directly over the raising blocks.

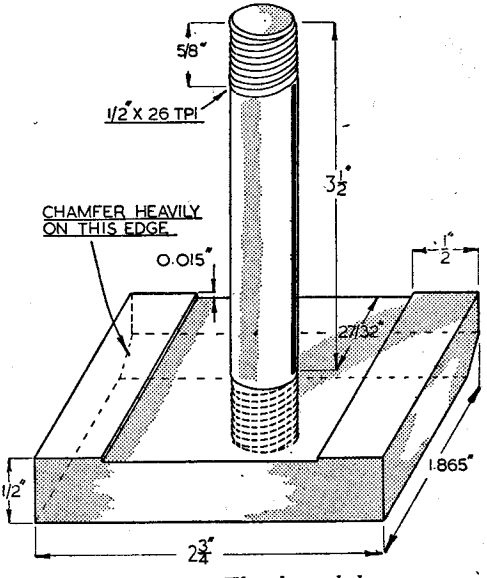

Fig. 71. The clamp bolt

In response to numerous enquiries, and to save readers unnecessary correspondence, we are able to state that Mr. H. Haselgrove has arranged to supply full sets of castings and materials for building either the bench hacksawing machine or the lathe attachment.