

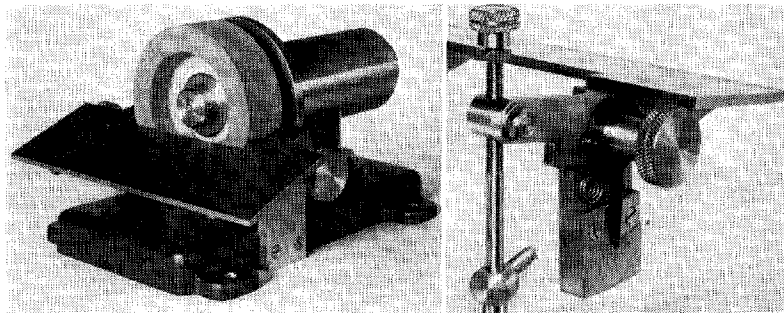
Industrially a wheel of this type is used for rough grinding, and is followed by a diamond impregnated wheel to impart the fine edge necessary for some work. Nevertheless, the green grit wheel, if well lubricated with a thin mineral oil, will provide a sufficiently keen edge for dealing with work in the small workshop.

When grinding tungsten carbide tools one should remember that the material itself has little mechanical strength. Therefore on no account should these tools be ground on the rim of the wheel since grinding in this way produces undercutting that weakens the cutting edge.

The friability of the carbide material makes a special grinding technique essential, in which the direction of the wheel is downwards toward the cutting edge and NOT away from it. To achieve this requirement a cup wheel needs to be used, with a hinged tool rest set across the face of the wheel and a driving motor that can be reversed. In this way the tool can be presented in such a way that the wheel always cuts downwards. A typical grinder used for servicing carbide tools is illustrated in Fig. 6.

Fig. 6 Grinder for Carbide Tools

Fig. 6A Showing the Angular Adjustment for the Grinding Rest



CHAPTER 7

Installing the Machine

WHETHER THE SHAPER is hand or machine powered, it is essential that the stand prepared for it is strong and capable of holding the machine firmly. This requirement is particularly important in the case of hand-powered machines where a firm foundation will make all the difference between being able to take a heavy cut and being reduced to light working only.

When Drummond Brothers were in production with their shaping machine it was possible to obtain a heavy cast iron stand for it. This stand was so designed that the column supporting the machine was set well back on a footing of quite large area. In this way the stand itself could cope with all the forces normally acting in a shaping operation, and the foundation bolts, if used, merely served to retain the machine in place. The Drummond pedestal could be obtained in two heights, one for working standing up the other for operating the machine sitting down.

This was an important alternative provision, and one that had a profound bearing on the installation generally. Before mounting the shaper then, one must first decide if it is to be used with the operator standing or, alternatively, with him sitting. For the first position a mounting on a work bench of normal height is, for the most part, quite satisfactory. To obtain a comfortable working height when sitting however, it is possible to make a "dummy run" with the machine set up on a wooden box and packed up till the situation is satisfactory. A firm mounting can then be constructed to suit the conditions so found. Wooden benching to support machines should at all times be amply strong and well braced. If the bench is free standing the legs should be made from 4-in. square material and the top from 9 in. by 2 in. deal planking. The framing, tenoned into the leg mortices, should be from 1 $\frac{3}{4}$ in. to 2 in. thick to allow ample room for the wooden keys that hold the frame together, as depicted in the illustration Fig. 1.

The upper members of the bench can be made deeper with advantage. They should be set flush with the top of the legs to allow

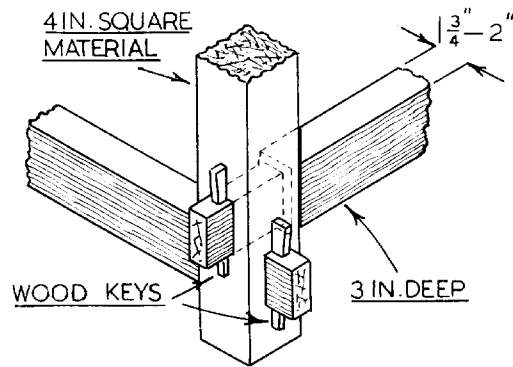


Fig. 1 Detail of Bench Lower Members

the bench top to be screwed to them. The arrangement is illustrated in Fig. 2.

If all horizontal members are to be tenoned these will need to be staggered as depicted at "A" and "B" in Fig. 2. It is probably best to peg the cross members in a short tenon and to confine detachable tenons to the longitudinal members only.

Ferro Concrete as a Mounting for the Shaper

The heading for this part of the chapter may come as a surprise to

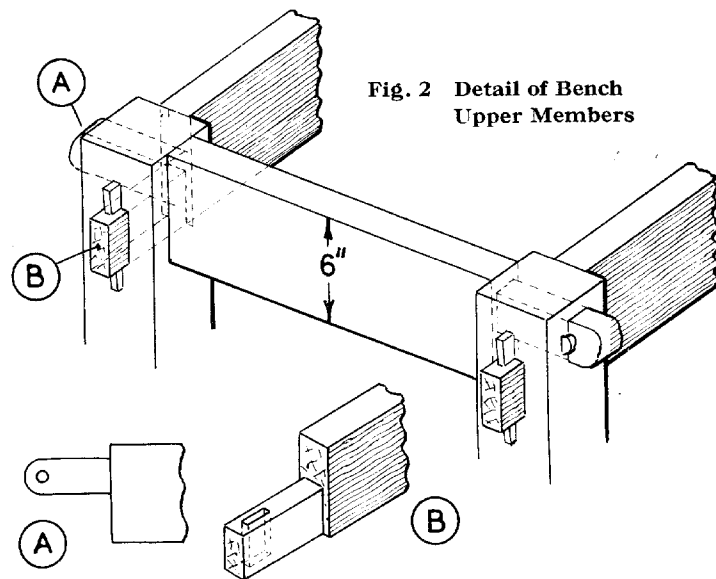


Fig. 2 Detail of Bench Upper Members

many readers. The author can assure them, however, that it is a very practical solution to the problem of providing adequate support for a shaping machine, having been used by him to mount the shaper illustrated in Chapter I, Fig. 1. Obviously a ferro-concrete stand can only be used when the floor of the workshop itself is also made of concrete, or one is prepared to construct a special foundation for the stand. Assuming that the floor is made of concrete then the surface needs first to be broken up by chipping with a cold chisel, this will provide a key for the new concrete. Next a simple re-inforced structure of iron pipe or old angle iron will have to be set up and shuttering assembled to hold the newly poured concrete. The method is depicted in the illustration Fig. 3.

The stand can be tapered as shown in the sketch, or parallel sided according to taste. A simple template must be prepared to hold the machine fixing bolts. This is nailed to the top of the shuttering but need not be put in place till the last few inches of concrete are to be poured and tamped down. The template will, of course, have provision for doing so.

The fixing bolts should have square plates about 2 in. by 2 in. welded or brazed to them; these will prevent the bolts turning or lifting when the shaping machine itself is set in place.

If care is taken to see that the top of the shuttering is square and level it can be used for trowelling off. This will save a deal of subsequent work in setting the shaper itself level.

Do not on any account be in a hurry to mount the machine, but

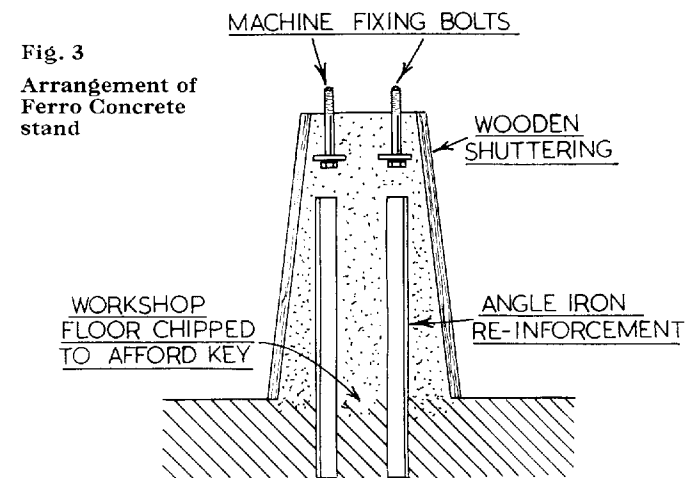


Fig. 3
Arrangement of
Ferro Concrete
stand

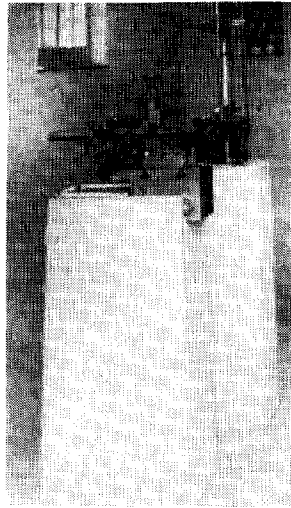


Fig. 3A Ferro Concrete stands in the author's workshop

allow the cement to dry thoroughly before doing so. The shuttering can then be taken away and the column rendered with fine concrete (cement and sharp sand only in the ratio of three of sand to one of cement) if this is thought desirable.

Two ferro concrete stands in a workshop owned by the author some 40 years ago are seen in the illustration Fig. 3A. These stands were constructed by the methods just described and must be considered both neat and effective.

Levelling the Machine

It is always advisable to make sure that the shaping machine is set perfectly level on whatever mounting is provided for it. Industry always takes great pains to make sure that the machine tools in their possession are installed in a level condition; with this proviso satisfied it is then possible to set work true on the selected machine by means of a spirit level only.

A shaping machine is the type of tool that can usefully be operated in this way, so the small workshop would do well to see that any shaper installed in the shop is perfectly level. Accordingly the work table of the machine needs to be tested in the manner depicted diagrammatically in Fig. 4.

Packing can then be placed under the machine at any points necessary to render it level. The holding down bolts can then be tightened and a further check made to see if the work table remains

level; if not, further remedial methods and checks will have to be made until the machine is found to be accurately mounted.

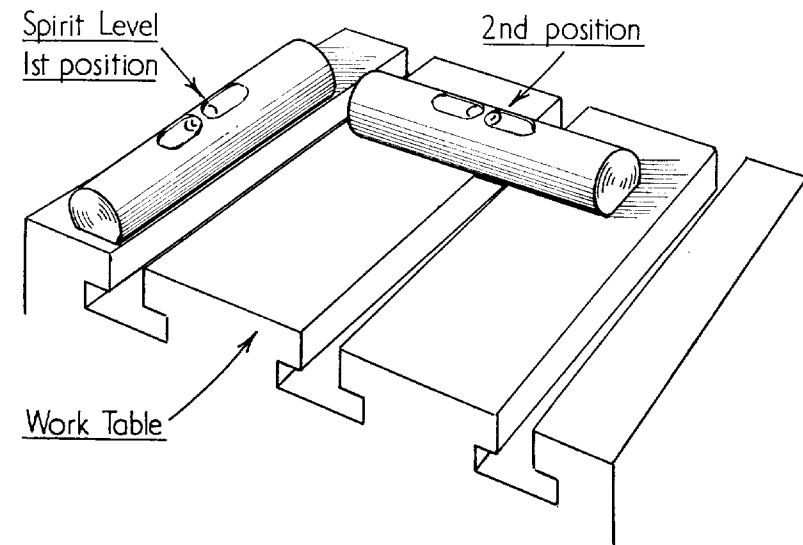
Electrical Installation

While hand-powered shapers, perhaps, need only a local lighting system for their comfortable working, an electrically-powered machine requires a shock proof wiring system for safety. Modern self-contained shaping machines, such as those already described, have their driving motors and the attendant switch gear built into or made part of the main framework as a whole. Accordingly the machine itself needs to be properly earthed so that it can be operated in complete safety.

In the small workshop, where at most two or three tools are in use at any one time, the electrical supply for the most part will be single phase alternating current at 230-240 volts. This can be fed to any machine involved through a system of plugs and sockets placed strategically under the benches supporting the machines themselves.

In the past there has, unfortunately, been some confusion in the colour marking of electrical cables, particularly those fitted to equipment coming from abroad. In a bid to end the disparity, agreement has been reached with the European countries to standardise colours for the live, neutral and earth wires comprising the flex

Fig. 4 Levelling the Shaping Machine



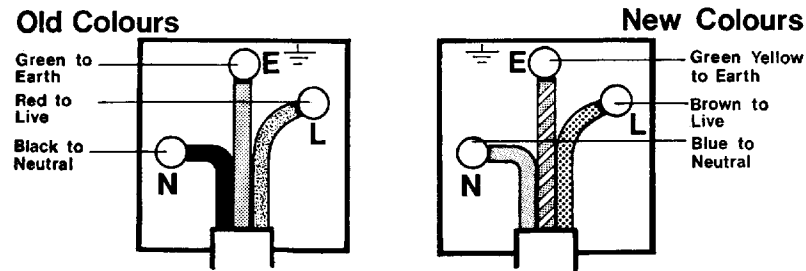


Fig. 5 Diagram of old and new wiring colours and plug connections

cables available for use with portable equipment such as household appliances. As an aid to the recognition of the identification colouring of the individual wires themselves, a leaflet has been issued by the British Government showing the correct cable connections to any plugs to be used. It is assumed of course that the wiring to the sockets themselves will, as they should be, have been made by a qualified electrician.

In Fig. 5, the diagram issued by the Government is reproduced. Here the old colouring is given together with the alternative markings on the plugs themselves. By comparison the new cable colours are shown and also the new simplified marking for the plug connecting pins.

Connecting Plugs Correctly

The following directions should be followed when making connections from electrical apparatus:

- (1) Make any connections in accordance with Fig. 5 and see all connecting screws are tight.
- (2) If any other colours appear in the cable connected to the apparatus, consult a qualified electrician before attaching a plug.
- (3) Never use a two-pin plug to connect to a three-way flex.
- (4) Do not use the earth terminal when connecting a two-wire flex to a three-pin plug.
- (5) If the apparatus is metal-cased, or has a motor built into it in accordance with some light machine tools, a three-wire flex should be used connected to a three-pin plug. The only exception to this requirement is when the apparatus is marked \square which denotes that it is double insulated and so does not require to be earthed.

CHAPTER 8

Mounting the Work

EXPERIENCE IN USING a shaping machine will very soon reveal that it is a tool of much versatility, and that some work, which at first sight might be thought unsuitable to its abilities, is well within the scope of the performance of any well-designed shaper.

So much can be done with the tool that it is manifestly impossible, in a short space, to list and describe in some detail all the varying operations of which the machine is capable. However, in dealing with some of the standard jobs, with perhaps in addition, a few of the more unconventional ones, it is hoped that the reader, when he comes to use his shaping machine, will be in a better position to exploit its potential more fully. But first of all the subject of holding the work on the machine must be considered.

Holding the Work

As, for the most part, many of the jobs undertaken in the shaping machine by amateurs involve small components, holding them is usually a matter of gripping the parts in an accurate machine vice. Makers of power-driven shapers appear to consider that the provision of an accurate vice is an essential prerequisite to the satisfactory working of their tools, so take steps to see that the equipment includes an accurate vice designed specifically to fit their particular machine.

A very good example of a purpose-made vice is that fitted to the shaper in the author's workshop. This is depicted in the illustration Fig. 1. The vice itself is mounted on a base plate (18) that can be secured to the work table by means of four T-slot bolts. A key (20) is secured to the underside of the base engaging a keyway machined in it as well as registering with the middle T-slot of the table itself. In this way the vice has a datum that will ensure accurate replacement when for any reason, the vice is removed from the table.

The standing jaw of the vice (16) swivels on the base and is secured to it by bolts (22) set in a circular T-slot machined in the base.