LAPPING FLAT SURFACES

WORKSHOP HINTS AND TIPS

By. Geometer

In any workshop where metal-work of a light, precise nature is undertaken, metal blocks with flat surfaces can be put to various uses-independent of the surface plate ordinarily used for marking-off, setting-up and testing. Flat parallel blocks may be used as gauges or for packing when setting up on the lathe, and for protecting machined faces on components when these have to be gripped in what could otherwise be a damaging manner.

Blocks with flat surfaces may also be used as supports (or types of small anvil) when centre-punching parts-to prevent distortion, tipping or the undersurfaces being marked. Fed with abrasive, flat-surface blocks are normally used as laps for precise surfacing-or if covered with emery-cloth can be used in a similar manner for work of a slightly lower standard following maching operations.

In this connection can be mentioned as examples the port face and slide valve of a steam engine. Both these faces may be machined in the lathe, and the tool marks left will be circles and arcs of circles. Depending on the lathe and machining, the surfaces may not be completely flat or smooth. But, if following machining, the surfaces are rubbed on an emery-surfaced block, the machining imperfections are removed, and good results ensue with no steam leakage. Of course, greater precision would follow from lapping, but in most cases this is not necessary.

Such an emerycloth-covered block can be as at ***A,*** with a flat smooth top surface, and a plate each side for securing the cloth and preventing it rucking in use. The corners over which the cloth passes should be slightly rounded to help in drawing it tight when fitting. This is done by fixing one end of it first. holding the block in the vice and pulling at the other end on the projecting piece X, while fixing with the plate and nuts. Following this the surplus can be cut off if the block is to stand flat on the bench.

Flat-surfaced blocks for use on the bench can be produced by machining as accurately as possible in the lathe, following, if necessary, by careful cross-filing to remove the larger machining marks, and then rubbing on a sheet of emerycloth on the surface plate.

The greatest precision arrives, however, from a lapping process in which three blocks are worked on until uniformly flat. Two blocks will not necessarily ensure precision as they might incorporate complementary errors, as at Bl, where one surface is convex, the other concave. But a third block, whether its surface is concave or convex, must inevitably be at variance with one of the other two when matched, as at B2 or B3. Hence a set of three blocks can be trued and kept true on one another.

If you possess flat-surfaced blocks, lapping operations can often be effectively performed on tools and simple gauges. An example of this work is maintaining the scriber jaw of a vernier height gauge in good condition for marking off. This jaw, as at C, is a piece of hardened steel clamped on the gauge jaw so that its flat underside is a prolongation of that jaw, and can be located reading from the vernier scale of the gauge.

The end of the scriber jaw is angled to a sharp edge-and this is the edge to grind and lap to restore sharpness otherwise an error will be introduced. Setting up is done by clamping the scriber jaw to the square side of a block, and when lapping only the angled end of the jaw, not the block, is rubbed on the abrasive.

Lapping a flat surface in the lathe can be done with a revolving lap, as at ***D. The*** work can be clamped to the faceplate, and the round lap, which can be of cast iron or aluminium alloy, is pushed up by a point from the toolslide and traversed over the rotating work by cross feed.