Lapping shafts

WORKSHOP HINTS AND TIPS

By GEOMETER

THE lapping of shafts can be performed in a similar manner to the lapping of bores. They achieve the same ends: tne correction of slight over-all inaccuracies, improvement of surface finish and the attainment of size within very small limits. If anything, the process is simpler than in bores, for the whole of a shaft may be freely observed, while checking along its length to a high degree of accuracy demands no more than an ordinary micrometer.

As turned on a lathe, most shafts can be relied upon to exhibit faults against a high standard of criticism. Unless the rate of feed has been slow, there will almost certainly be visible a fine spiral on the surface. If the tool tip has been rounded and broadened to eliminate this, there may well be small chatter marks; or, alternatively, there may be smooth areas separated by shallow rings or slightly tom sections.

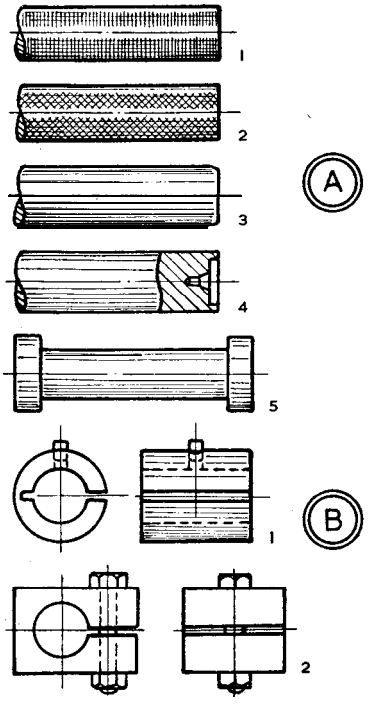
This is, perhaps, not surprising, since many factors influence the result and tax the ingenuity and skill of the machinist-for example, the construction and condition of the lathe, tool angles, shape and setting, rate of feed, material being worked, coolant or lubricant used.

Given, however, that a reasonable standard of turning is possible, finishing can be a separate process. Finishing machining while the shaft is still oversize, it can be smoothed and reduced to dimension by suitably filing-though this demands some care. A smooth finish calls for a Swiss tile, used with even strokes, and kept clean to avoid tearing the surface.

For a smooth finish, emerycloth may be used in varying grades down to very fine-and in a worn condition for polishing. Used by hand, pressed to the work with the fingers, emerycloth tends to follow the contour of the work and polish without correcting inaccuracies. Best results are obtained using a strip of emerycloth with a file as a rigid backing.

Keeping the emerycloth in one spot, or moving slowly, the result is a ringed finish *AI* ; but moving rapidly to and fro diagonal markings are produced A2, initially showing up faults in the finish, until the surface has been worked down.

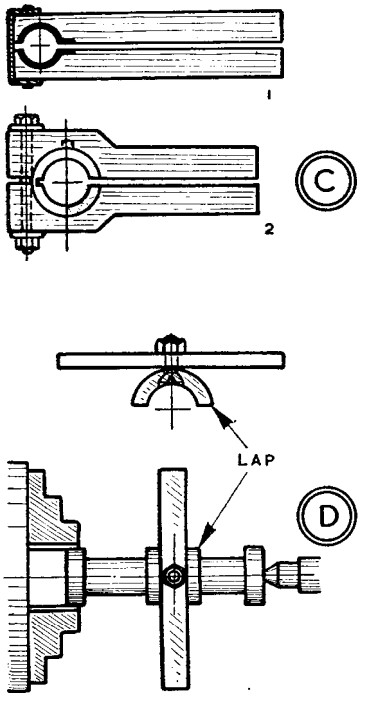
Using emerycloth by hand, care is necessary to avoid rounding the end of a shaft A3, and this is true also of the lapping process. A solution when difficulties are anticipated and a square end is important, is to leave a small portion there by slightly recessing the shaft A4, this surplus being removed afterwards.



A turned-down shaft between flanges *A5* may cause difficulty with a machined finish as it requires two cuts and right-and-left-hand tools. Thus a separate finishing operation is then virtually essential, and when performed by lappmg the lap must necessarily be a split or half type.

Materials for laps for shafts can be the same as those for bores, and the shape either as a split bush B1 or a type of clamp for adjustment B2. Both should be drilled smoothly or bored to a rather free fit on the shaft, to leave clearance for the abrasive. The bush type can be used with pliers, and to prevent spinning through the lap gripping, a screwed-in peg may be necessary to abut to the jaws of the pliers. The clamp-type lap can be used by hand and adjusted as required.

For shafts of substantial size a lap Cl can be made from two pieces of wood joined by a leather hinge and



bored to take strips of lead-held in place by a small nail or screw. Gripping the lap to the shaft shapes it fairly well, and it may then be fed with abrasive. An adaptation C2 can be made to take a bush lap Bl with a bolt instead of a leather hinge.

A half-lap for use on a shaft *A5* can be half of a bush mounted by a countersunk screw on a bar for use, as at *D,* two-handed-an alternative to the type at Cl.