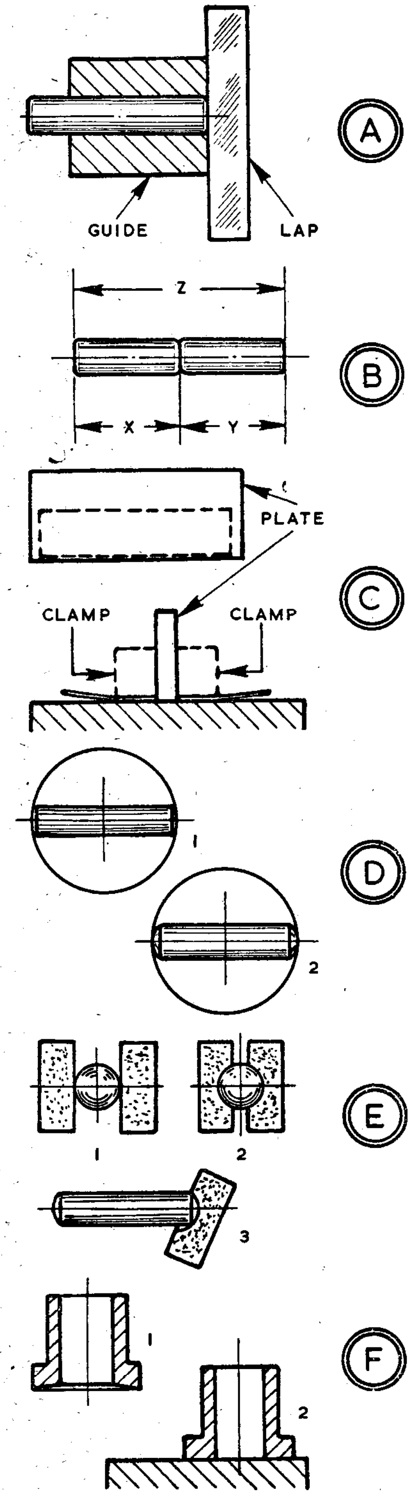
WORKSHOP HINTS AND TIPS

LAPPING ENDS and EDGES

By GEOMETER



BECAUSE of its ability to reduce surfaces by extremely small dimensions, even when they are hard, and at the same time to bring them to a high standard of accuracy, lapping is an indispensable process in various forms of tool and gauge making. Contrary to what might at first be thought, many of the principles of this are straightforward, and the methods and equipment of a very simple kind and universally applicable.

The basic principle of lapping is, perhaps, the rubbing or mating together of two surfaces with abrasive between them--or one of which is impregnated with abrasive to reduce the other. There is no " machine control " over the surfaces other than simple pressure, and the sliding or other movements required for abra'tion. This is all right where the surface of the work is large, since it can exercise control over the lap; but if the surface is small it naturally follows there is no proper guide or control, and unless some means are provided, lapping is impracticable.

In the case of a round component whose length is to be reduced while keeping the ends square--of which an end gauge is the best example-the problem of lap control and guidance is always solved through a guide with a flat end machined at the same setting as the bore. Thus, as at A, the guide of any suitable material is drilled and bored in the chuck for the gauge to slide through; then the end is faced at the same setting.

The components or gauge-it may be a piece of silver-steel rod hardened at the ends-is pushed through and held with the guide to the lap, a piece of flat cast iron or aluminium supplied with abrasive. By simple hand work but taking one's time, the gauge can thus be lapped to length, ends square with the axis.

In this manner, should it be desired, numbers of gauges can be produced to check lengths or diameters (from calliper settings) during machining on lathe!, or to adjust height gauges for marking off or inspection work on surface plates. With a micrometer of limited dimension, gauges can be made, as at *B, so* that length X plus length Y will give length Z to reasonable accuracy. Alternatively, with capacity to measure length Z, and making two gauges exactly alike, X and Y, any error in Z can be halved.

When the component or gauge is a piece of thin plate whose width is to be reduced by lapping the edge, a problem similar to that with the end gauge arises in connection with lap control and guidance. The solution is to clamp a piece of material which is square, or has a square side, to the side of the plate. The narrow edge of the plate is thus made merely an extension of the larger surface over which the lap works, and from which it gets its guidance.

Alternatively, a piece of square material may be clamped each side of the plate; and by assembling on a surface plate, as at C, with a piece of suitable shimstock under the square material, the plate edge can be left projecting for more speedy reduction --that is when there is a dimension of, say, more than 0.001 in. to remove.

Flat ends on a gauge prevent its use in a bore Dl; the difficulty is overcome through rounded ends D2. In preparation for lapping, the ends can be turned and filed to radius, using a simple drilled plate gauge. Then to produce a suitable lap, a steel ball *E1* is pressed or hammered into blocks of lead E2. With the gauge running in the chuck, the lap supplied with abrasive is wobbled about on the end E3.

Following ordinary machining, a facing fault Fl on a component can often be corrected on a lapping principle-first rubbing on a smooth file, then on a sheet of emerycloth on a surface plate or by lapping on a block F2. ❑