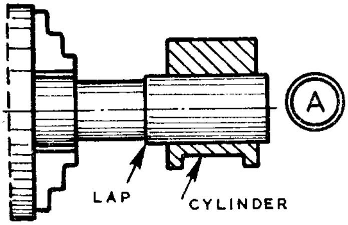
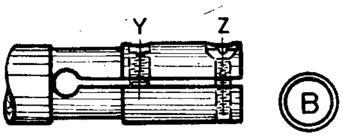
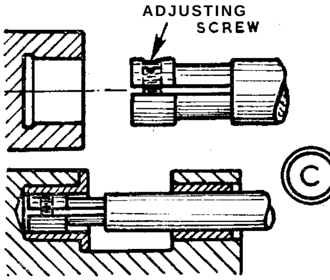
WORKSHOP HINTS and TIPS




## LAPPING

# bores and shafts

by *GEOMETER*

OF all mechanical production processes, lapping is perhaps the most fundamental and therefore the most important. Nowadays, of course, with modern equipment, much can be done without it, so that it may be only occasionally that we are thrown back on lapping, for some special or unusual job.

How were the first surface plates produced ? They were made, if not by scraping, then by lapping-matching three surfaces (in pairs) through a fine abrasive. And how will lenses be produced in the future ? The method will be by lapping-because of the geometrical precision required.

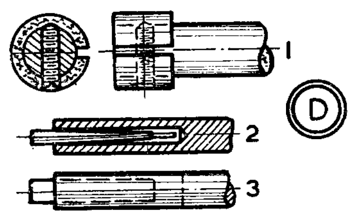
Geometrical precision is what lapping essentially provides, though it has great merits, too, in its slowness and its capacity to deal with the hardest materials. Because of the slowness, it is difficult suddenly to make a bad mistake in lapping, as can easily be made in turning. Fractions of a thou can be removed without difficulty-in making gauges, for example; and components and tools that have been hardened and cannot be touched by other means (except grinding) can still be lapped.

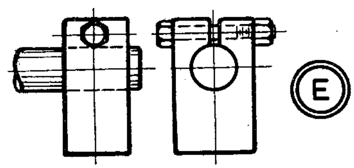
For model engineers, the process is particularly advantageous for finishing the bores of cylinders when they have been bored as accurately as possible on the lathe. It is true that they could be reamed. But large reamers are expensive tools; whereas lapping, at very small cost, can make a better job than the best of reamers.

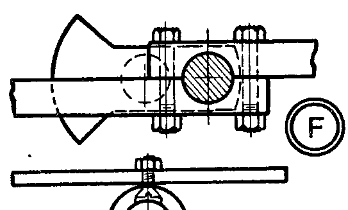
A great many materials can be used for laps, and all the softer metals and alloys found in a workshop. Depending on the type of lap, lead, copper, brass, aluminium alloy, cast iron and mild steel are all smtable. For most purposes, we need look no further than the last four.

Similarly, there is a large variety of special lapping compounds, but two are sufficient for general use; the fine grade compound used by garages for grinding in (lapping) valves, and the sludge to be found in the bottom of Brasso tins. The one can be used for stock removal, the other for finishing.

For lapping a bore on the lathe, it is usually better to run the lap in the chuck, *A,* and hold the cylinder than to run it in the chuck and hold the lap. With the lap chucked, abrasive is kept away from the chuck, and it is possible to plug the chuck with rag for additional security. If possible, this should be done when, for any reason, the set-up must be reversed and a cylinder lapped in the chuck.




While the cylinder is still gripped, the chuck can be removed and plugged from the back. The bed of the lathe should always be well covered with several sheets of newspaper.

The lap should be turned almost to size, and then smoothed by filing and tapered at the end for the cylinder to push on. With abrasive smeared on the lap, it may be too large, so that further filing is necessary to get the initial fit. Back gear may be used for a start, followed by normal drive as the bore enlarges. Paraffin and thin oil help to speed and regulate cutting; and final smoothing can be done with thin oil.

Since a lap wears in use, adjustment is usually necessary. On a cylinder lap, B, it can be done by slitting with a hacksaw and fitting two screws, one Y to expand the lap, the other Z to keep it parallel. A short lap for a blind bore, C, can be adjusted by a single screw. Such a lap, used in a drilling machine, is extremely useful for sizing the inner end of a bore which cannot be reached by a reamer owing to the taper.

Other laps can be made and adjusted as at ***D.*** A short bush (1) can be slit and used on a rod; a small lap can be drilled, slit, and then expanded by a taper pin (2), or slit and expanded by a flat wedge (3).

A shaft lap can be made by drilling and reaming a single piece of flat stock, E, and drilling and slitting for a bolt. For a crankpin, a lap can be made by bolting up two pieces of flat stock and drilling and reaming, ***F.*** A very simple type consists of a half bush on a bar. El