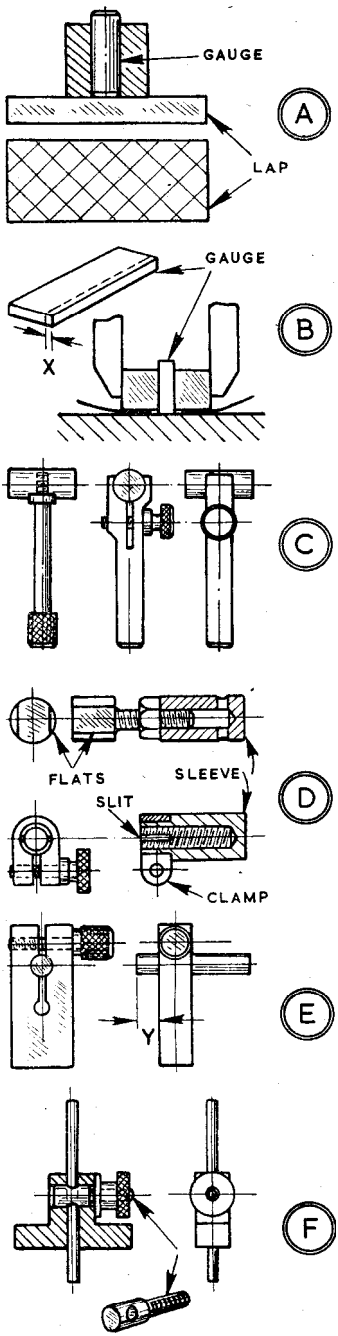
Simple gauge construction

By GEOMETER



Various types of gauge that can be readily made in the workshop

IN THE LAST article was described the principle of obtaining accurate lengths in lathe work. For the most part, the gauges suggested were standard-size objects such as drills, silver-steel rod, ground tool shanks which are convenient in the sizes they cover. Larger sizes, however, require specially-made gauges, which for simple length dimensions can be in round or flat material.

A micrometer or vernier caliper is desirable for measuring gauges, though the fact that the instrument may have a fixed limit of 1 in. does not debar its use in making longer gauges. For example, to obtain a 2 in. dimension, two 1 in. gauges can be made and placed end to end for a careful check by ordinary calipers to make a single 2 in. gauge. The same applies to fractions? such as 1 3/4 in., when one of the possible combinations would be a 1 in. gauge and a 3/4 in. one placed end to end.

In fact, with no other measuring devices than a steel rule and ordinary calipers quite accurate gauges can be made on the above principle. Several gauges are made which all measure as near as possible alike on the calipers,. and which together total a given dimension on the rule-when the total error will be divided between the gauges.

Silver steel is best

For end gauges, material 1/4in. to 3/8 in. dia. is convenient. For occasional use, it can be left soft, though hardening and tempering are desirable if permanent or durable equipment is the aim. Silver steel is ideal in this respect. Pieces to make gauges should be faced over-length in the lathe, then if they are to be hardened and tempered these processes follow.

Finishing accurately to length is by lapping, as at ***A.*** The process requires a guide bush or block for the gauge guide block -having been drilled (preferably also reamed) and faced at a single setting in the lathe, for the end to be square with the bore.

The lap is a piece of flat material, such as cast aluminium, brass or cast iron, and may have some file grooves across its face. For convenience, it is held in the vice, its face charged with fine grinding paste, then the block and gauge rubbed on it. Very small controlled amounts can be removed from gauge faces by this means, and the faces maintained or brought square. Cleaning can be in parahin.

For a plate gauge, as at B, where a few thou, X have to be removed from one edge, the principle is similar. A wide block is clamped each side with the assembly stood on a flat surface, the wide blocks being packed up by strips of paper to leave the edge of the plate gauge slightly protruding.

Clamp-type holder

In making a long end gauge from several in line, they can be placed in a piece of tubing, or joined in pairs by sleeves with grubscrews. For individual handling, either of the means at C can be employed. Using a screw-m handle for a set of gauges, each must be drilled and tapped in making before hardening and tempering. With a clamp-type. holder, however, as can be made from flat stock, the gauges are simply pushed in and gripped. As shown, the jaws should allow the side of the gauge to lie on the work, to ensure accuracy in setting tools.

Numerous gauges can be avoided by employing adjustment, as at ***D***. The screw portion is made from round stock, its thread kept square by tailstock die-holder, and flats are filed to hold in the vice. The tapped sleeve piece is drilled cross-wise for a bar and set by locknut. Alternatively the end of the sleeve can be turned down, slit lengthwise, and a clamp fitted. Accurate adjustments are then more easily made.

Diagrams ***E*** and ***F*** show how adjustable depth gauges can be furnished with plain clamping or a cross-drilled screw and nut. Depth Y is set from rule or gauge block. ❑