

# PARTING-OFF AND GROOVING

By GEOMETER

**F**EW professional turners include parting-off and grooving among the interesting operations on a lathe, for most regard them as operations which are done in the ordinary course of machining. It is true enough.

Many concentric components are separated from the parent bar-material by parting-off operations. Many others have grooves, either as essential features, or to facilitate later operations-like screwcutting.

A forward-looking turner may give but little thought to either operation if he is considering the component which is to follow the one being parted off, or if his mind is concerned with the screwcutting which is to follow the grooving.

Yet in both operations success depends on knowledge of the lathe, careful preparation of the set-up, and suitable technique in using the tools. Without all of these, you are almost certain, sooner or later, to encounter difficulties or to make mistakes.

For parting-off, the lathe must be in good adjustment, unless the job is of moderate size, for the normal rather broad parting-off tool puts heavy stress on the spindle and slides. You should check both if you think that they need adjustment. In any event, it should take only a few minutes to eliminate shake from the spindle and to make saddle and slides comfortably firm to operate.

As for the set-up, there must be minimum overhang at the position of parting-off. This condition is usually satisfied by keeping the parent bar back in the chuck with just enough projecting to work the parting tool easily. But in parting-off from a long bar, you should bring the fixed steady into use, with jaws well-adjusted to support the overhanging end. Never, of course, attempt to part-off a piece from a job which is running between centres. Mount the tool firmly with its edge at centre height, as this reduces the tendency which is sometimes apparent halfway through the operation, for the work to lift on the tool. The centre height setting ensures too, that you cut the job off cleanly.

If you are parting-off tough steel, a correct setting for the tool and careful

feed near the finish, in conjunction with a firmly-adjusted slide, will prevent the tool edge from running under the small remaining neck of metal. Should this happen, you may have to resharpen the tool, as the edge is usually damaged.

The technique to adopt is shown in stages at diagram A, where the job is marked *W*. For stage 1, start back from the job and cut down while the swarf clears easily. For stage 2, move the tool near the job-but not to the final cutting position. Then cut down again, withdraw the tool, and return to the first position for stage 3. For stage 4, cut down carefully at the correct position. You need more stages for larger diameters.

For a final parting-facing cut, it is sometimes helpful to set the tool at a slight angle, *B1*; for most materials, the tool can be ground with a small radius near its cutting edge, *B2*. This either rolls the swarf or curves it into chips.

When a tool must have a large

overhang from its holder, a support can sometimes be arranged as at *C*. Make it from flat bar and thick strip metal, grooving the latter at the top, and veeing the tool underneath to hold them together. You should file or pack the support as necessary where it stands on the slide.

Grooves in jobs which must be threaded facilitate these operations, as you can see from *D* and *E*. On an outside diameter, the full thread of a die runs clear at the second pass. For screwcutting, the tool 1 clears in the groove. You merely disengage the leadscrew at the end of the cut. The groove is made with a square-ended tool 2, or a round one 3. It is similar for an inside thread; but for screwcutting, mark the tool and ensure that there is clearance at *X* and *Y*.

For machining a ring groove, work as at *F*. Cut down to depth and face one side of the groove. Then, to face the other side, allow for the width of the tool and move it a distance *Z*.

