WORKSHOP HINTS and TIPS

GRINDING FLAT AND PARALLEL FACES

By GEOMETER

WHEREVER there is a constant need for pieces of accurate material, as in a machine shop to use as packing or gauges, or in a toolroom for making into jigs and fixtures, grinding is almost certain to attain some prominence from the facility with which faces can be finished flat and parallel.

Using either of two types of machine, it is a simple enough matter to clean and true material whether as plate or in bars or blocks, to reasonable basic accuracy. This by itself even in such elementary shapes, solves many practical problems. A vertical spindle surface grinder may be used, or alternatively a horizontal spindle, universal or toolroom machine. Fortunately, the principles of both can be duplicated on a lathe equipped with a vertical slide, though not the speed of production, nor as a rule the facility of setting up-neither of which, however, may be of first importance when a lathe must be used.

Vertical feed

On a vertical spindle machine, a cup type wheel is employed; and the material, clamped on the flat slide or mounted on a magnetic chuck, is moved to and fro beneath the face of the wheel which is large enough to sweep at a pass, over the whole width. Vertical feed puts on depth of cut for what is largely a forming process, though with an element of generation in the sweep of the wheel. This principle is duplicated when, as at ***A,*** a flaring cup wheel is mounted on a mandrel in the chuck, and the face of the vertical slide lies across the lathe bed, movement being applied by vertical slide or cross feed, with the saddle providing depth of cut.

On a horizontal spindle machine a straight wheel is used, and the material similarly mounted on a slide, moves under the grinding wheel. The slide, however, can be given side movement so that with a wheel of limited width, each pass represents a separate " cut " -as on a planing machine. Again, vertical feed applies depth of cut.

This generating principle is duplicated as at ***B,*** by a plain wheel on a mandrel in the chuck with the vertical slide turned so its face is parallel to the lathe axis. Movement' of the material past the wheel is given by the vertical slide feed, with saddle feed providing each separate cut 1, 2, 3, 4, and cross feed applying depth of cut.

Grinding characteristics

Both types of grinding have their characteristics. The cup wheel, because of the broad face in contact with the work, requires more power than the other to drive it. But there is the advantage that it is self-truing in working; whereas the other may need dressing straight and true before starting, and also from time to time in the course of working. On a lathe set-up, a limit may also be set on the size of the grinding wheel and the thickness of the material, owing to restricted cross slide movement.

Broad material cannot be ground on the face of a plain wheel; and narrow material can form a ridge as at C, left, tending to rounding one edge. Grinding narrow material on the periphery, it is advantageous to use the whole width of the wheel to maintain truth as in cuts 1 and 2.

Where grinding wheels, either cup or plain, can be run from a motorised head or portable grinder, material can be held in the chuck or set up on the faceplate. Then it may be convenient to bring a long strip parallel by mounting it across the faceplate as at ***D,*** clamping as at E, and employing a cup wheel. Turning the faceplate through 180 deg. and locking each time (engaging back gear to do so if necessary) any disadvantage can be overcome which might arise from limited cross slide movement.

To prevent flat material rising from its backing face when edge-clamped, a " rocking " clamp as at ***F,*** may be used. The nut on the holding bolt is left a thread or so slack while the clamp is tightened; then tightening it tilts the clamp to the back face and pulls the material firmly to it.