Standard and special DIVIDING METHODS

By GEOMETER

UNLESS a lathe is equipped with a division plate or a dividing head, the standard method of dividing is to use a change gear with the number of teeth the same as, or divisible by, the number of divisions required on the work. Common exceptions, of course, are two, three and four divisions, which can be obtained using a block between the lathe bed and the jaws of three-jaw and four-jaw chucks, bringing each jaw down in turn.

Neither a division plate nor a change gear suffices, however, in the case of special numbers of divisions, consisting of large prime numbers, such as 29, 31, 37,41, for which there is no change gear large enough in the normal range of gears, rising by units of five teeth. For these special equipment must be made, though it can be very simple when the work is light and the problem of providing &finite location against heavy cutting forces does not arise.

For the standard method of dividing-when definite location against cutting forces is as often as not required-the change gear and workpiece can be mounted together on a suitable mandrel, which is held in the chuck, with the free end supported by the tailstock centre. Alternatively, the bar or rod from which the workpiece is being made can be machined to take the gear. Definite location against 'quite heavy cutting forces is obtained, as at ***A,*** using a shaped jaw, slotted for movement, and mounted on a block to engage the space between two teeth at centre height. A stiff flat bar, bolted across the lathe bed beneath the gear, carries the block, and can be fitted in a few moments.

For special numbers of divisions, the basic problem is to -make a disc or drum on which they are accurately located. The easiest method, which involves nothing tricky like trigonometry, is to use a flat divided strip, wrapped round a disc or drum, and clamped with the ends butting up. Whatever the number of divisions, their linear spacing can be some simple fraction of an inch, obtained directly or through dividers from a steel rule.

Having decided the spacing, we multiply it by the divisions to obtain the circumference of the strip as a circle. Then the diameter follows, dividing by 3.1416, and from this we subtract twice the thickness of the strip, for the diameter of the disc or drum.

For a large number of divisions, a disc of considerable size is advisable. It can be mounted overhanging the end of the lathe bed, as at ***B, on*** a bar supported by the regular fixed steady or one made up from metal or wood blocks. The disc can be of plywood, set to a pointer of flat strip metal, and held by tightening the screw or bolts of the steady.

Attachment can be made to the workpiece in various ways, one of which is as at C. The chuck end of the bar carrying the disc has a turned-down diameter, and a similar diameter is machined on the workpiece for the two to be joined by a sleeve.

In preparing the bar for the disc, it may be advisable for it to be over-length, so that one end can be held in the chuck, the other supported by the fixed steady. Then the end can be turned down, and a thread screw-cut, as at ***D,*** for holding the drilled plywood disc-a large washer each side of it-up to the shoulder by a nut.

Turning a large disc, previously prepared by cutting roughly to size, is an operation which is performed as at ***E,*** on a small lathe. A long tool reaches at an angle to the periphery of the disc, whose diameter is checked initially by calipers, and fmally by placing round it the divided strip.

Tensioning and securing the strip are done as at with two clips from flat metal each side, soft-soldered or silver-soldered on, to take small screws or bolts. As the disc nears size, reducing its periphery with a sandpaper block rather than by the tool gives better control of size and finish-though if a mistake should be ma&, and the strip is loose, a strip of paper can be placed under it. ❑