

BEGINNER'S WORKSHOP

Marking centres, squares and hexagons

by GEOMETER

HERE ARE THREE methods employed for the essential work of finding the centres of shafts or discs without setting them up in a lathe; 1, by the centre head of a combination square; 2, by jenny calipers-also called odd-leg or hermaphrodite calipers and 3, by surface gauge and vee blocks on a surface plate.

The first two are hand methods while the third is a shop or toolroom method. The use of a bell centre punch (a metal cone with a punch in the centre, placed on the shaft and struck with a hammer), which is a fourth way, is neither so universal nor so accurate as the others.

Hand methods

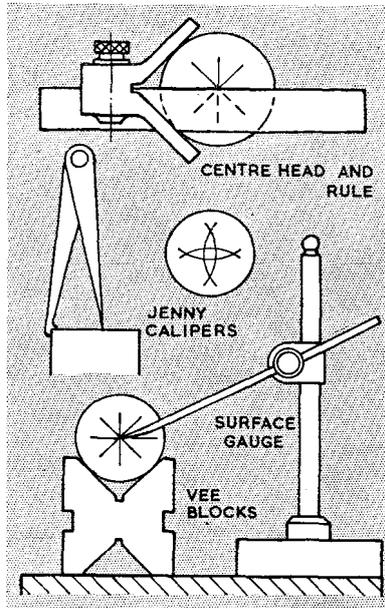
The centre head has two arms disposed at right-angles and the blade of the square, or rule, fits in centrally and is clamped by means of a groove. The edge of the blade passes centrally across the shaft. Thus, the tool has only to be held firmly and moved round the shaft for several intersecting lines to be scribed.

Jenny calipers have a leg with a scriber point and the other with a small step to rest on the edge of the shaft. The leg with the step is held firmly at one spot while the scriber leg is swung in an arc slightly beyond the actual centre of the shaft. This being done at four positions round the circumference, a tiny square is formed-in the centre of which the centre punch dot can be placed.

Surface gauge method

The surface gauge and vee blocks, normally used on a surface plate, can be employed on any flat surface like the bed of a machine. The shaft is rotated in the vee blocks for several lines to be scribed horizontally. These need not pass across the centre. If the scriber pointer is a little above or below, a small boxed in area is formed--centrally in which lies the shaft centre.

The following method is as good as any. Scribe a horizontal line, turn the shaft through 180 deg. (approx.), scribe a second line; turn the shaft



A number of methods of marking on metals. The details are explained in the text

through 90 deg. (approx.), scribe a third line, turn the shaft through 180 deg. (approx.), scribe a fourth line.

To mark a square or hexagon on a shaft, using vee blocks and surface gauge, its centre should first be found, lightly centrepunched and a horizontal line scribed through it. In marking a square, an engineer's square is employed for the vertical centre line; for a hexagon, a 60 deg. square or a combination square is used--first one way, then reversed, so producing two sloping lines.

In this and subsequent work, vee blocks having horizontal grooves are advantageous, taking clamps to hold the shaft firmly.

Marking the flats

To mark the flats, it is necessary to know the height H for the scriber pointer to be set above or below centre.

This is calculated from the diameter of the shaft and its radius R . For a square, R is multiplied by 0.707, for a hexagon by 0.866.

This dimension H is obtained on an engineer's steel rule with dividers. Then one leg of the dividers is placed in the shaft centre, and highest and lowest positions marked-to one or other of which the surface gauge pointer is adjusted.

In marking, a line is carried across the end of the shaft and along the side(s) as required. Then the shaft is unclamped, and for a square turned through 90 deg., as checked by the engineer's square, reclamped, and another flat and side line scribed--this being done for all four. For a hexagon, the procedure is similar, but either the engineer's square or the 60 deg. square can be used for the settings.

At the finish, the side lines act as guides when filing the square or hexagon in the vice.

Castings and parts can be marked off with the surface gauge, finding the centres, boxing them in with or scribing circles with dividers, then placing centre punch dots for reference when the holes are bored. @

