MICROSCOPE on the lathe — 3

I have shown how a microscope can be used to true a needle in the chuck and a punch dot on work which is held in it. These are elementary uses in which our chief concern is magnification.

Our next more is to use an optical feature of the instrument to achieve our ends. We need only a low-power microscope. In most compound microscopes, the image of the object is inverted-although I did not show this in the first and second articles. When you look at two objects, such as a punch dot and a scriber point, the very short focus of .a microscope is a disadvantage. This we now overcome for many tasks.

In a microscope, the part to which you put your eye is the eyepiece, eyeglass,. or ocular. It is made in two main types. The commoner, which was the first, is the Huyghenian, shown at ***A.*** It was designed m about 1660 by the Dutch astronomer Christiann Huyghens, and was later used on microscopes. The other was designed by Ramsden in 1782 and is called after him. Like Huyghens, it was used on telescopes first.

Focal planes

Both oculars use two lenses, each lens having a flat side and a curved. They are plano-convex. In the Huyghenian ocular, the curved sides of the lenses are downwards. In the Ramsden they face one another-the lower lens has its flat side downwards.

The Huyghenian eyepiece has a plane between the lenses where a real image is formed. In the Ramsden, a similar image is formed, but it is outside both lenses. The Huyghenian is a negative ocular, the Ramsden a positive.

The significance of this plane with its real image is that anything placed there is sharply defined. In Huyghen's eyepiece, there is a flanged ring, as sketched, with a bore X giving the circular field on YZ.

At this plane, you can place a pointer, scale or cross-wires. This was done first in 1731, for telescopes, For microscopes? there seems to have been no similar fitting until the nineteenth century. John Quekett, whose treatise on the microscope appeared in 1848, made one of metal.

Centralising methods

For modern toolroom microscopes, various devices are made to be fitted at this plane. They are called graticules, reticles, spider-webs, and so forth, and may be seen as rulings and thread forms, all functioning on the old principle.

For the Huyghenian ocular, we can take a pointer to be put at the plane of the real image and be used for many purposes. It simplifies tasks which we have already covered -truing a needle in the chuck, and centralising a punch dot. We use a clip with a pin for pointer, as at ***B.***

Strip brass or a ring from a brass tube serves for the clip. The pin is a domestic one. Bend it at right-angles so that the point does not quite reach centre. Then solder it to the clip and cut off the head. Push this pointer down to the flange in the ocular. With the eye-lens refitted, you see the pointer in the field at at C. With the eyepiece in the microscope,. you can swing it round to aid in ahgning the pointer to any object in focus.

When the microscope is used with the pin pointer for truing a needle, as at ***D, you*** bring the two points together and adjust the needle by the chuck jaws.

For marked-off work, as at ***E,*** the microscope body tube is in a holder on the topslide. The field of view is approximately at centre height. By moving the cross-slide and turning tie ocular, we can align the pin to any point in the field as we adjust a punch dot true (see F). ❑