SCIENTIFIC APPARATUS AND LABORATORY METHODS

A CHIN-OPERATED FOCUS ADJUSTMENT FOR THE DISSECTING MICROSCOPE

WHEN performing an operation under a standard dissecting microscope, it is necessary to use the hand adjustment in order to bring the instrument into focus at a new level. The frequency with which these adjustments must be made when working at a high magnification is sometimes very annoying. Furthermore, when both hands are required for the manipulation of the object it becomes necessary to interrupt the operation each time the focus of the instrument must be corrected and this may seriously affect the quality of the work.

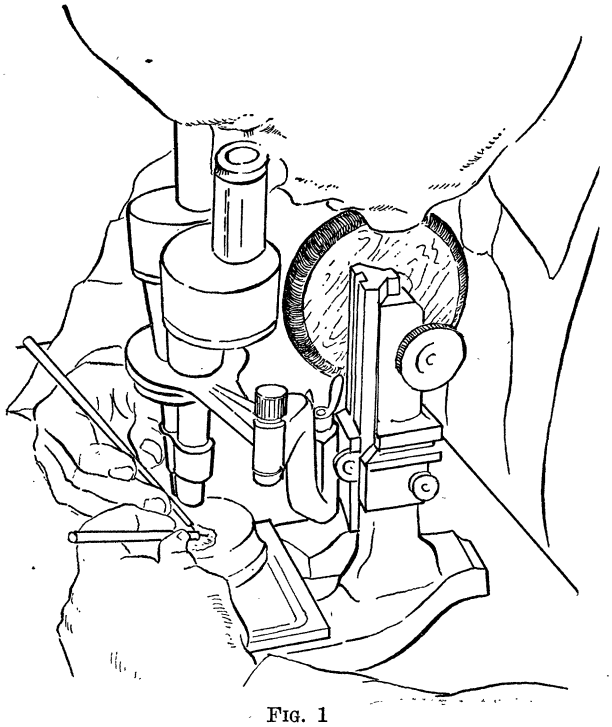

FIG. 1

To eliminate this difficulty an accessory focus adjustment has been developed. By means of this device the correct focus can be maintained by movements of the chin and without in any way interfering with the progress of the work. This feature lends to an operation a factor of continuity which is often essential. The convenience with which the operative field can be kept in focus encourages a more critical observation and helps to conserve time, effort and patience.

The accompanying figures show how chin-operated focus adjustments have been designed for microscopes of two different models.

Fig. 1 shows a most satisfactory arrangement for a microscope which has its body supported by a jointed arm and swivel. The body of the microscope is simply shifted laterally to a position in front of one of the hand-adjustment controls. A wooden disc of appropriate diameter (about 9 centimeters) is then attached to the corresponding control and serves to transmit the movements of the chin to the mechanism.

Fig. 2 shows a chin-operated adjustment adapted to a microscope of a model more commonly used. The apparatus is designed to permit an intermittent engagement with the hand-adjustment mechanism so that by its use the focus of the microscope can be raised or lowered through any required distance.

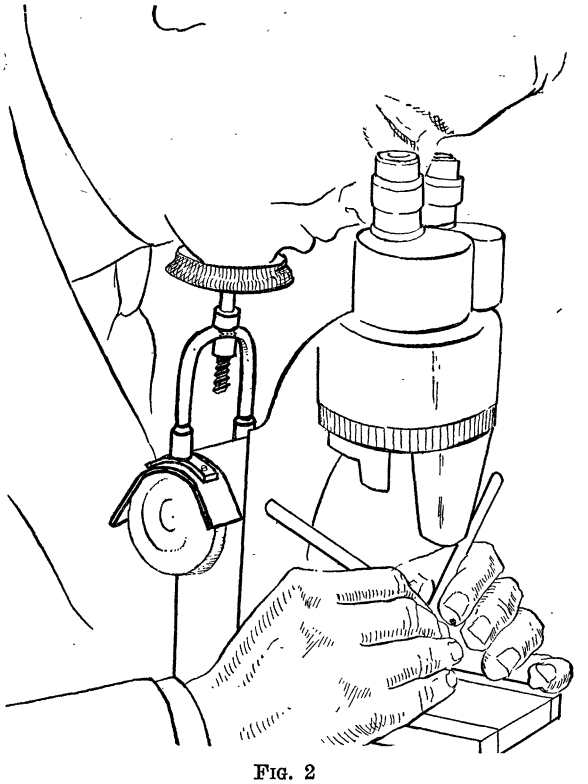

FIG. 2

The device is essentially a double-armed lever operated by movements of a central chin rest. Each arm of the lever is provided with a flexible metal band which is adapted to fit over the corresponding control of the hand adjustment, as is shown from a lateral view in Fig. 3. Each band is reinforced in the region of its attachment to the lever arm by an additional strip of metal and is lined with a friction-producing material over a corresponding extent of its inner curvature. On either side of the reinforced portion the

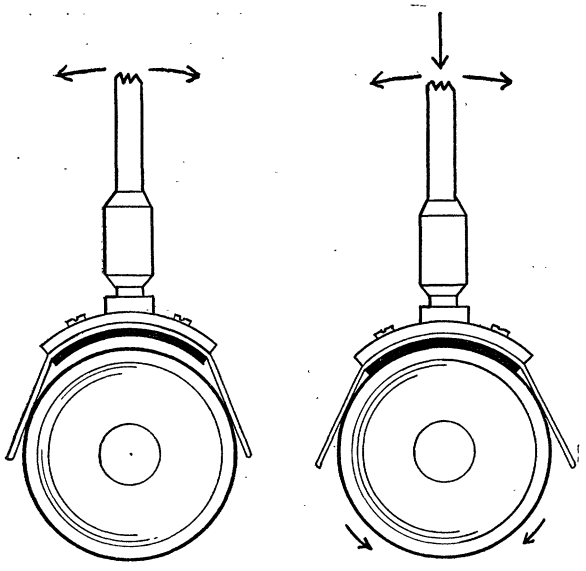

FIG. 3

band retains its flexibility and is tangent to the hand-adjustment control upon which it rests (Fig. 3, left). When the apparatus is in this position the friction between it and the hand adjustment is not sufficient to cause an active engagement, provided the tension on the pinion of the hand adjustment is properly regulated.

The apparatus is brought into use by first exerting a slight downward pressure on the chin rest. The lining of each band is thus brought into effective contact with the hand adjustment mechanism. The focus is then corrected by a second movement of the chin in the proper direction (Fig. 3, right). By a succession of such movements the focus of the microscope can be raised or lowered rapidly through any required amplitude. When not in use the lever may either be pushed forward to rest against the body of the microscope or lifted off the instrument.

For assembling the apparatus illustrated two lens holders of a brass construction furnished the greater part of the material. Their handles were soldered together end to end and bent to form an arched lever arm spanning the hand-adjustment controls. An ordinary rubber furniture coaster was then mounted on a metal plate and attached to this arm by means of an adjustable screw (Fig. 2). The flexible metal band forming the body or lens receptacle of each holder was adapted to fit over the hand adjustment in the manner described (Fig. 3).

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AN EXPERIMENTAL MICRO-DRILL

A PERFECTED technique of working on polished surfaces under the microscope is acquired only with practice, but even the experienced worker often has difficulty in scratching, or obtaining material for a microchemical test from some of the harder minerals such as arsenopyrite (hardness 5.5–6) or others in the group listed as hard minerals by Short.[1]

During the past two years of work with polished surfaces, the writer has been experimenting with a small, electrically powered drill for use on polished surfaces. Some practice is necessary to become a skilful operator of the instrument, but in the writer's opinion, the results obtained are well worth the time spent in developing the proper technique.

When a particularly small area of hard mineral surface is under observation, a sewing needle ordinarily is used as a scoring medium. However, a needle strong enough to score the mineral without breaking usually is so large that it is cumbersome and can not be readily controlled. The problem of obtaining a portion of the hard mineral for microchemical purposes can be overcome by use of the micro-drill which is herein described.

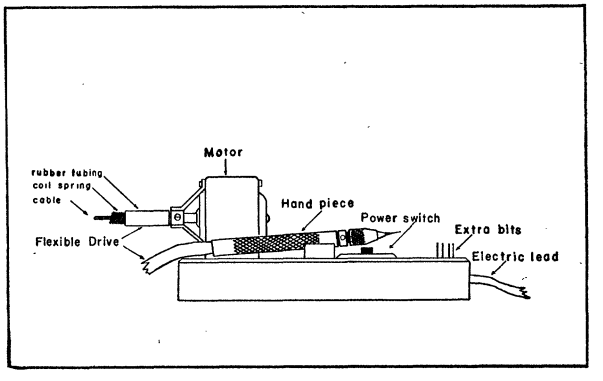

FIG. 1. Micro-drill. The flexible drive assembly interrupted to show construction.

The micro-drill (Fig. 1) consists of a motor mounted on a wooden base $9\frac{1}{2}'' \times 5\frac{1}{2}'' \times 1\frac{1}{2}''$, a flexible shaft connected to the motor at one end and to a handpiece and chuck-drive arrangement at the other, and a chuck to hold the cutting tool. The base also contains the power switch, clamp for the drill and space for a variety of drill bits.

The motor is small, similar to the type used on electric fans. It is manufactured by the F. H. Smith Mfg. Co., New York City, and is rated at 40 watts with speed of 3,400 r.p.m.

[1] N. M. Short, "Microchemical Determination of the Ore Minerals," *U.S.G.S. Bulletin* 914, 2nd ed., pp. 110–111, 1940.