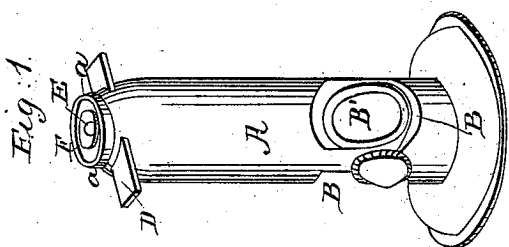
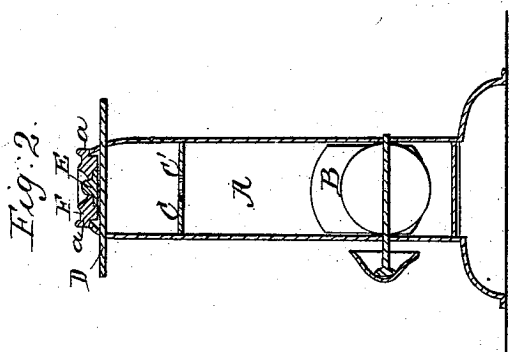
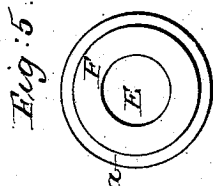
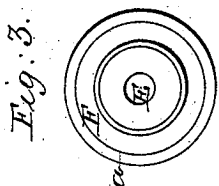
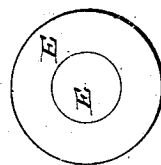
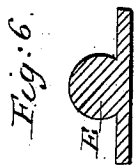


H. CRAIG.  
Microscope.

No. 34,409.

Patented Feb. 18, 1862.



Witnesses.  
J. Brainerd  
W. A. Burdick

Inventor  
Henry Craig

# UNITED STATES PATENT OFFICE.

HENRY CRAIG, OF CLEVELAND, OHIO.

## IMPROVEMENT IN MICROSCOPES.

Specification forming part of Letters Patent No. 34,409, dated February 18, 1862.

### *To all whom it may concern:*

Be it known that I, HENRY CRAIG, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Microscopes; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view. Fig. 2 is a vertical section; and Figs. 3, 4, 5, 6, and 7 are detached and enlarged views representing the lens.

The nature of my invention relates to the construction of the lens.

A, Figs. 1 and 2, is the body of the instrument. This consists of a tube of thin sheet-brass about five or six inches in length and about one and one-quarter inch in diameter. The base is dilated so as to give the instrument a steady support.

Just above the foot the tube is cut away upon each side, as seen at B, in which opening is placed a mirror, which turns upon a horizontal axis to reflect the light upward through the tube to the lens. The mirror is shown at B'.

C is a diaphragm placed about an inch below the lens to cut off the straggling rays of light.

D is a slip of glass, upon which objects are placed for examination.

E is the lens, Figs. 2, 4, and 6 being vertical sections, of which 4 and 6 are enlarged views.

F is the setting for the lens, the projecting rim of which (seen at *a*) rests upon the contracted top of the tube A, and being so fitted that the under and flat surface of the lens will when the setting F rests upon the top of the tube, as in Fig. 2, just form a contact with the upper surface of the slip of plain glass D, the lens being so formed, as hereinafter stated, that the focus is permanently fixed at its under and plane surface.

The lens E is constructed as follows: I take a rod of clear flint-glass, as free as possible from striæ or other imperfections, and reduce it in size to about one-eighth of an inch in diameter by heating and drawing in a spirit-lamp flame, leaving the end round and

smooth. I then take a piece of crown-glass about half an inch in diameter and free from imperfections, and with a pair of forceps hold it in the flame of the spirit-lamp till the glass begins to soften. I then hold the rod of flint-glass, prepared as above, in the flame of the lamp until it nearly reaches the melting-point, (the flint-glass melting at a lower temperature than the crown,) and both pieces being now brought to a red heat I attach the end of the rod of flint-glass to the center of one side of the disk of crown-glass and fuse them together, being careful to preserve the flat surface of the under side of the crown-glass disk. I then increase the heat upon the flint-glass rod about the tenth of an inch above its point of adhesion to the crown-glass disk, and by a gentle extension separate it, leaving a sufficient quantity of flint-glass adhering to the crown-disk to form a globe of about one-eighth of an inch in diameter; and now by a skillful manipulation—*i. e.*, turning the disk in various directions in the flame till the semi-fluid globe of flint-glass assumes by its cohesive attraction and gravity a spherical figure, which is formed symmetrically and attached to one side of the crown-disk, as shown in Figs. 4 and 5, which has its focus in the plane surface of the crown-glass disk. The lens thus formed is placed in the setting F, as before described.

The manner of using this instrument is as follows: The object to be examined is placed either upon the under side of the lens or upon the upper surface of the slip of glass D, and the lens placed upon the top of the tube, as seen in Fig. 1, and the mirror B' is so turned that the light will be reflected through the small opening C' in the diaphragm upon the focal point of the lens, when the object upon the lens or slip of glass can be examined. No adjustment is needed, for the lens has a fixed focus, as before described.

What I claim as my improvement, and desire to secure by Letters Patent, is—

The lens E, when constructed as herein set forth.

HENRY CRAIG.

Witnesses:

J. BRAINERD,  
W. H. BURRIDGE.