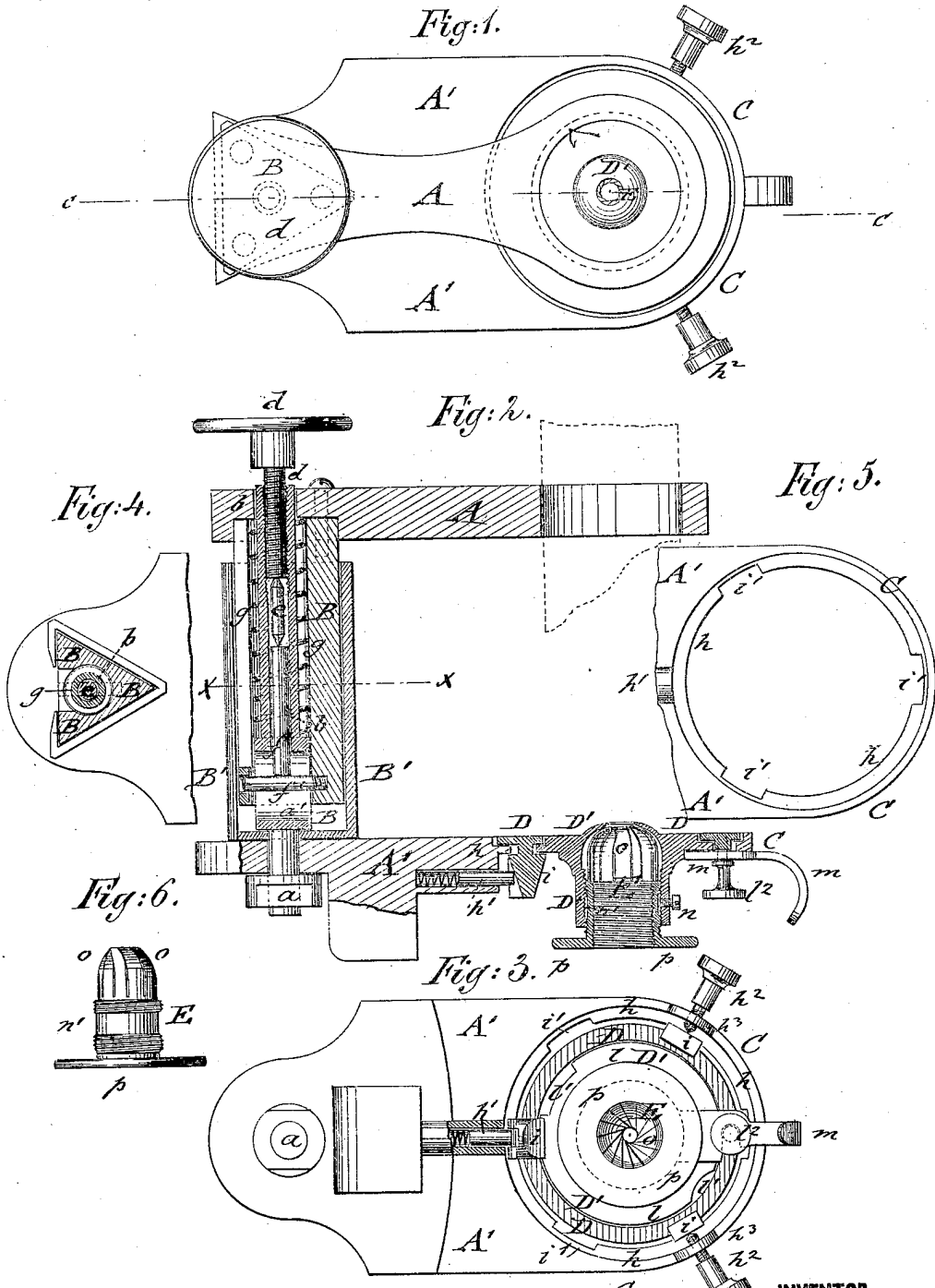


G. WALE.
MICROSCOPE.

No. 178,391.

Patented June 6, 1876.



WITNESSES:
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UNITED STATES PATENT OFFICE.

GEORGE WALE, OF FAIRVIEW, NEW JERSEY.

IMPROVEMENT IN MICROSCOPES.

Specification forming part of Letters Patent No. **178,391**, dated June 6, 1876; application filed April 25, 1876.

To all whom it may concern :

Be it known that I, GEORGE WALE, of Fairview, Bergen county, and State of New Jersey, have invented a new and Improved Microscope-Stand, of which the following is a specification :

In the accompanying drawing, Figure 1 represents a top view ; Fig. 2, a vertical longitudinal section on line C C, Fig. 1 ; Fig. 3, a bottom view of my improved microscope-stand. Fig. 4 is a detail horizontal section of the adjustable vertical pillar of the same on line X X, Fig. 2. Fig. 5 is a detail bottom view of the guide-ring of the object-holder, and Fig. 6 a detail side view of the adjustable light-regulator.

Similar letters of reference indicate corresponding parts.

My invention relates to an improved microscope-stand, by which the object-glass may be adjusted to greater or less distance from the object without being disturbed in the least, or thrown out of its accurate vertical position, and by which the greater or lesser intensity of the light may be regulated and set to various conditions of the object in a simple and convenient manner.

My invention consists, first, of the mechanism for the minute vertical adjustment of the object-glass ; secondly, of the adjustable ring-frame and socket ; and, lastly, of the variable light-admitting aperture of the same.

In the drawing, A represents the horizontal arm, to which the object-glass is attached. The arm is screwed to a vertical pillar, B, of triangular or other shape, that slides in a guide-casing, B', for vertical adjustment. The casing B' is secured, by a bottom screw bolt and nut, *a*, to the lower horizontal arm A', that is secured in a suitable manner to a post, stand, or other support. The lower arm A' supports, in a ring-shaped frame, C, the detachable ring-frame and socket D D', to which the light-regulating device E is applied vertically below the object-glass. The upper arm A is adjusted in vertical direction by a spring-and-screw mechanism, at the inside of the triangular pillar, in such a manner that the object-glass is moved accurately in vertical direction without any axial displacement.

The varying position of the common object-

glass to one side or the other of the vertical axis, by the common set-screw mechanism, forms one of the principal and annoying inaccuracies of the microscopes in use. To overcome this defect, and adjust the glass, without the least deviation, nearer to or farther from the object, as required, the pillar B is centrally bored out, and a stationary sleeve or tube, *b*, made in one piece with the binding-bolt *a*, placed inside of the same. An interior screw-thread at the upper part of tube *b* serves to raise or lower the set-screw *d*, that bears on a smaller rod, *e*, with conically-tapering ends, which bears again on a rod, *f*, sliding loosely in the bottom part of the tube, and pressing on a horizontal and guided cross-pin, *f'*, at the lower part of the pillar B', said cross-pin *f'* moving in a slot, *a'*, of the lower part of the binding screw-bolt *a*. A spiral spring, *g*, is inserted between the lower part of the pillar B and the upper arm A, so as to extend around the tube or sleeve *b* in the small space between the same and the somewhat larger cylindrical boring of the pillar.

When the set-screw *d* is turned in one direction, so as to screw into the tube *b*, the pressure of the same is transmitted, with the least possible friction, by the pointed rod *e* and rod *f*, to the lower part of the pillar, so as to lower the same and compress the spiral spring.

When the set-screw is unscrewed the pressure on the lower part of the pillar is released, and the same compelled to follow the action of the spring, so that a positive motion of the upper arm in vertical direction, without any lateral displacement, is produced.

The ring-shaped frame C (shown in detail in Fig. 5) serves to support, on an annular recessed rim, *h*, and a sliding spring-bolt, *h'*, the detachable ring-frame and socket D'.

The ring-frame D has three or more downward-projecting shoulders, *i*, that project over the under side of the rim of frame C, and are introduced from above through corresponding recesses *i'* of the rim, to slide them along the same until they may be engaged by bolt *h¹* and set-screw *h²*, turning in bottom lugs *h³* of frame C. The action of the set-screws, in connection with the spring-bolt, admits the

moving of the ring-frame a short distance to one side or the other, so that the illuminating apparatus may be brought readily into the exact position required by the object-glass. The socket D' is also detachable from ring-frame D, being introduced from below by recesses *l'* of the circumferential flange *l*, past the lug *i* of the spring-bolt, and a set-screw, *l*², of the ring-frame D, being carried by a slotted hook-shaped handle between set-screw *l*² and ring-frame D, to be then secured to ring-frame D. The convexly-raised center part of socket D' has a perforation for the admission of the light from below. The light-regulator E is screwed into the lower part of socket D', and retained therein by a small screw-pin, *n*, that engages a smooth annular recess, *n'*, of the regulator, for the purpose of preventing the unscrewing of the same, and securing the play of the regulator in the screw-socket within a small but fixed distance. The upper part of the light-regulator E is constructed of a number of narrow spirally-overlapping elastic blades, O, as shown in detail, Fig. 6, that are, by the turning forward or backward of the screw-threads, carried against the concave under side of the raised center part of the socket, and thereby either approached jointly toward their common center, so as to gradually diminish the round aperture formed by the same, or they are withdrawn from the raised center part, and thereby allowed to spread by their spring action, so as to enlarge the aperture between the ends of the steel blades. A bottom flange or rim, *p*, of the regulator E serves to turn the same, and either diminish or enlarge the aperture of the blades, so as to control the passage of the light, and throw a smaller or larger body of light on the object, as required.

The adjustment of the light-admitting aperture of the regulator, in connection with the adjustability of the socket-frame of the same, admits the throwing of the light in a more or less intense manner on any desired part of the object, and facilitates thereby the observations of the microscope, while producing more

accurate results with less fatigue to the observer.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a microscope-stand, of the hollow vertically-guided pillar, supporting the horizontal arm, with a fixed central sleeve or tube of the supporting-bolt or spiral spring and set-screw mechanism, substantially as herein shown and described.

2. The combination of the fixed interior tube or sleeve of the sliding pillar B by a set-screw, conically pointed, and a connecting-rod, with a cross-pin of the bottom part of the pillar, and with a spiral-tube-encircling spring, to raise or lower the pillar, as described, substantially as herein shown and described.

3. The combination, with the ring-shaped frame, of the lower arm, having set-screw and spring-bolt, with the detachable ring-frame and socket part of the light-regulating device, having projecting lugs or shoulders to adjust the light-regulating device within the supporting-ring, substantially as herein shown and described.

4. The combination of the interior ring-frame D, having lug *i* and set-screw *l*², with the detachable socket part D', having recesses *l'* and handle-hook *m*, substantially as herein shown and described.

5. The light-regulator, composed chiefly of a series of elastic blades, in combination with a socket for causing the blades to converge in the form of a cone when the regulator is suitably adjusted for the purpose, as shown and described.

6. The socket part D', having set-screw *n*, in combination with the light-regulator E, having outer screw-threads and intermediate annular recess *n'*, substantially as herein shown and described.

GEORGE WALE.

Witnesses:

T. B. MOSHER,
ALEX. F. ROBERTS.