No. 621,196. Patented Mar. 14, 1899.

H. ZIRNGIBL

MICROSCOPE.

(Application filed Dec. 17, 1898.)

(No Model.)

Fig. 1.

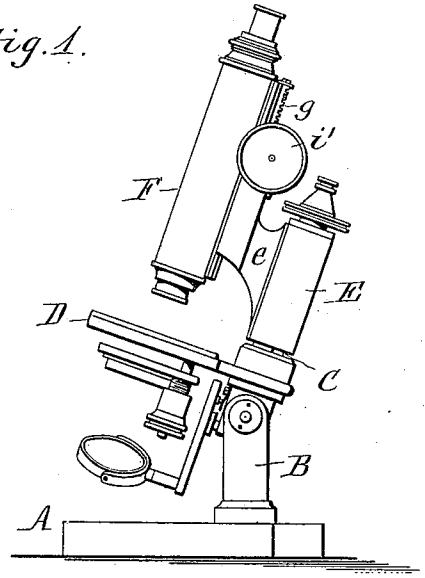


Fig. 2.

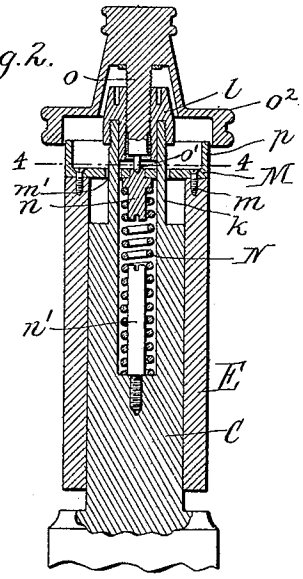


Fig. 5.

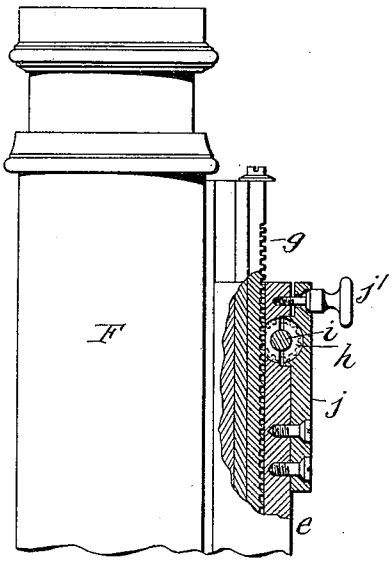


Fig. 3.

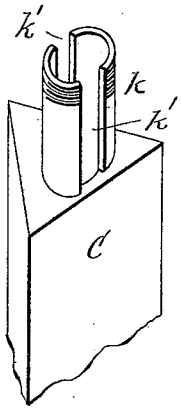
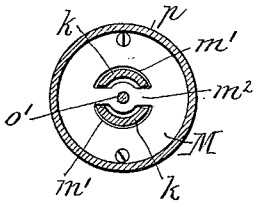


Fig. 4.



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MICROSCOPE.

SPECIFICATION forming part of Letters Patent No. 621,196, dated March 14, 1899.

Application filed December 17, 1898. Serial No. 699,537. (No model.)

To all whom it may concern:

Be it known that I, HERMANN ZIRNGIBL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Microscopes, of which the following is a specification.

This invention relates more particularly to microscopes and similar instruments having a main adjusting device for the lens-tube, known as the "coarse" adjustment, and an auxiliary adjusting device, known as the "fine" adjustment.

The objects of my invention are to simplify and improve the construction of the fine adjustment, so as to reduce the cost of manufacture of the instrument and facilitate the assemblage of its parts, and to provide the operating-shaft of the coarse adjustment with simple means for regulating its resistance to rotation, so as to obtain the necessary friction to hold the lens-tube in position and at the same time insure the easy working of the shaft.

In the accompanying drawings, Figure 1 is a side elevation of a microscope embodying my improvements. Fig. 2 is an enlarged sectional elevation of the prismatic pillar, the sleeve mounted thereon, and the fine adjustment. Fig. 3 is a perspective view of the upper portion of the pillar and the yoke or guide. Fig. 4 is a horizontal section in line 4 4, Fig. 2. Fig. 5 is an enlarged side elevation of the lens-tube and the coarse adjustment, showing the latter partly in section, the plane of the sectional portion being immediately in rear of the pinion.

Like letters of reference refer to like parts in the several figures.

A is the base of the instrument; B, the standard rising from the same; C, the usual pillar pivoted at its lower end to the standard and made of the customary angular or prismatic form, and D the ordinary table or stage carried by the pillar.

E is the vertically-movable sleeve sliding on the pillar and carrying the lens-tube F. This tube slides vertically on the bracket *e* of the sleeve and is adjusted by the usual gear-rack *g*, secured to the rear side thereof, and the pinion *h*, meshing therewith, this pinion being shown by dotted lines in Fig. 5. The pinion-shaft *i* is journaled in a bearing formed partly in the bracket *e* and partly in a cap *j* and is provided with the usual wheel or wheels *i'* for turning it. The cap *j* is rigidly secured at one end, preferably its lower end, to the bracket *e*, while its opposite end is adjustably secured to the bracket by a clamping or set screw *j'*, so that the cap may be caused to bear with a greater or less degree of pressure against the pinion-shaft for obtaining the proper frictional resistance of the same to support the lens-tube in any desired position and at the same time allow the shaft to turn freely. The cap possesses sufficient elasticity to permit of this adjustment.

My improved fine adjustment is constructed as follows:

k is an upright cylindrical stem or yoke formed on or secured to the upper end of the pillar and divided vertically by diametrically opposite guide-slots *k'*, which extend from the upper end to the base of the stem, as shown in Fig. 3.

l is a nut or collar applied to the upper end of the yoke *k*, so as to close the upper ends of the guide-slots *k'* and engage with an external screw-thread formed on the upper portion of the yoke-segments.

M is a bridge secured to the upper end of the sleeve E and guided by the slotted stem or yoke *k*. This bridge consists of a disk which is secured to the sleeve by screws *m* or similar fastenings passing through the marginal portion of the disk and which is provided with segmental slots or openings *m'* for the passage of the correspondingly-shaped segments of the yoke, as shown in Figs. 2 and 4. The cross-bar or bridge of metal m^2 left between the openings *m'* is arranged in the guide-slots *k'* of the yoke and is confined therein by the nut or collar *l*.

N is the usual spring, seated in a vertical cavity of the pillar and operating to force the sleeve and the bridge upward. This spring may bear directly against the under side of the cross-bar m^2 of the bridge; but it preferably bears against a flanged stud *n*, projecting downward from the bridge into the upper end of the spring and serving to prevent buckling of the upper portion of the spring. A

similar stud n', projecting from the bottom of the spring-cavity, prevents the lower portion of the spring from buckling.

o is the adjusting-screw of the fine adjustment, whereby the bridge M and the sleeve connected therewith are depressed against the resistance of the spring N. This screw is arranged in a screw-threaded opening extending axially through the nut l and bears, preferably through the medium of an upright pin o', against the upper side of the cross-bar or bridge-piece m^2 or against the upper end of the stud n when the latter extends through said cross-bar, as shown in Fig. 2, so that upon turning the adjusting-screw forwardly it depresses the bridge and the sleeve, while upon turning the screw backward the spring forces the bridge and the sleeve upward, thus adjusting the lens-tube up or down accordingly. The adjusting-screw is preferably provided with a cap o^2, which overlaps a marginal rim or flange p, extending upwardly from the bridge or disk M, whereby dust is excluded from the parts of the fine adjustment.

In assembling the parts the bridge-disk M is secured to the upper end of the sleeve, and after placing the spring N in the pillar the sleeve is slipped over the pillar, the cross-bar m^2 of the bridge being arranged in the proper position to enter the open upper ends of guide-slots k' of the yoke. The nut l is then applied to the upper end of the yoke, and the adjusting-screw is finally screwed into said nut.

As the bridge-piece m^2 is formed in one piece with the disk M, this part of the fine adjustment is materially simplified, and when the guide-yoke of the bridge is formed integral with the pillar, as shown in the drawings, the cost incident to making the yoke separate from the pillar is saved and the liability of its becoming loose is avoided, while by constructing the yoke with upwardly-opening guide-slots the assemblage of the parts is greatly facilitated.

I claim as my invention—

1. The combination with the pillar and a vertically-slotted yoke or stem arranged at the upper end thereof, of a sleeve mounted on the pillar and carrying the lens-tube, a bridge-disk secured to the upper end of said sleeve and having an integral central bar guided in the slot of said yoke, a spring operating against the under side of said central bar, and an adjusting-screw operating against the upper side of said bar, substantially as set forth.

2. The combination with the pillar and a divided yoke or stem arranged at the upper end thereof and having its sections separated by a guide-slot which extends to the upper end of the yoke, a sleeve mounted on the pillar and carrying the lens-tube, a bridge-disk secured to the upper end of said sleeve and provided with an integral cross-bar passing through the slot of the divided yoke and on opposite sides of said cross-bar with openings through which the sections of the yoke pass, a nut or collar applied to the upper end of said yoke, and an adjusting-screw passing through said nut and operating against the cross-bar of said bridge-disk, substantially as set forth.

3. The combination with the pillar and a divided yoke or stem surmounting the same and having its sections separated by a vertical guide-slot, a sleeve mounted on the pillar and carrying the lens-tube, a bridge-disk secured to the upper end of said sleeve and having an upwardly-extending marginal flange and an integral cross-bar guided in the slot of the yoke, and an adjusting-screw operating to depress said bridge-disk and having a cap which overlaps the flange of the disk, substantially as set forth.

4. The combination with the pillar and a divided yoke formed integrally therewith and having its sections separated by a slot which extends to the upper end of the yoke, a sleeve mounted on the pillar and carrying the lens-tube, a bridge secured to the upper end of said sleeve and guided in said slotted yoke, a nut applied to the open upper end of the yoke, and an adjusting-screw passing through said nut and operating against the bridge, substantially as set forth.

5. The combination with the vertically-movable lens-tube having a gear-rack, and the bracket on which the tube is guided, of a shaft carrying a pinion meshing with said gear-rack, a bearing for said shaft formed partly in said bracket and partly in a yielding cap secured to the bracket, and a clamping device for pressing said cap against the pinion-shaft, substantially as set forth.

6. The combination with the vertically-movable lens-tube having a gear-rack, and the bracket on which the tube is guided, of a shaft carrying a pinion meshing with said gear-rack, a bearing for said shaft formed partly in said bracket, an elastic cap forming the other part of said bearing and secured at one end to said bracket, and a set-screw for adjusting the opposite end of said cap toward and from the bracket, substantially as set forth.

Witness my hand this 2d day of June, 1898.

HERMANN ZIRNGIBL.

Witnesses:

CARL F. GEYER,

E. R. DEAN.