

(No Model.)

G. H. EATON & J. L. PATCH.  
COLLAPSIBLE OPERA GLASS.

No. 463,660.

Patented Nov. 24, 1891.

Fig: 1.

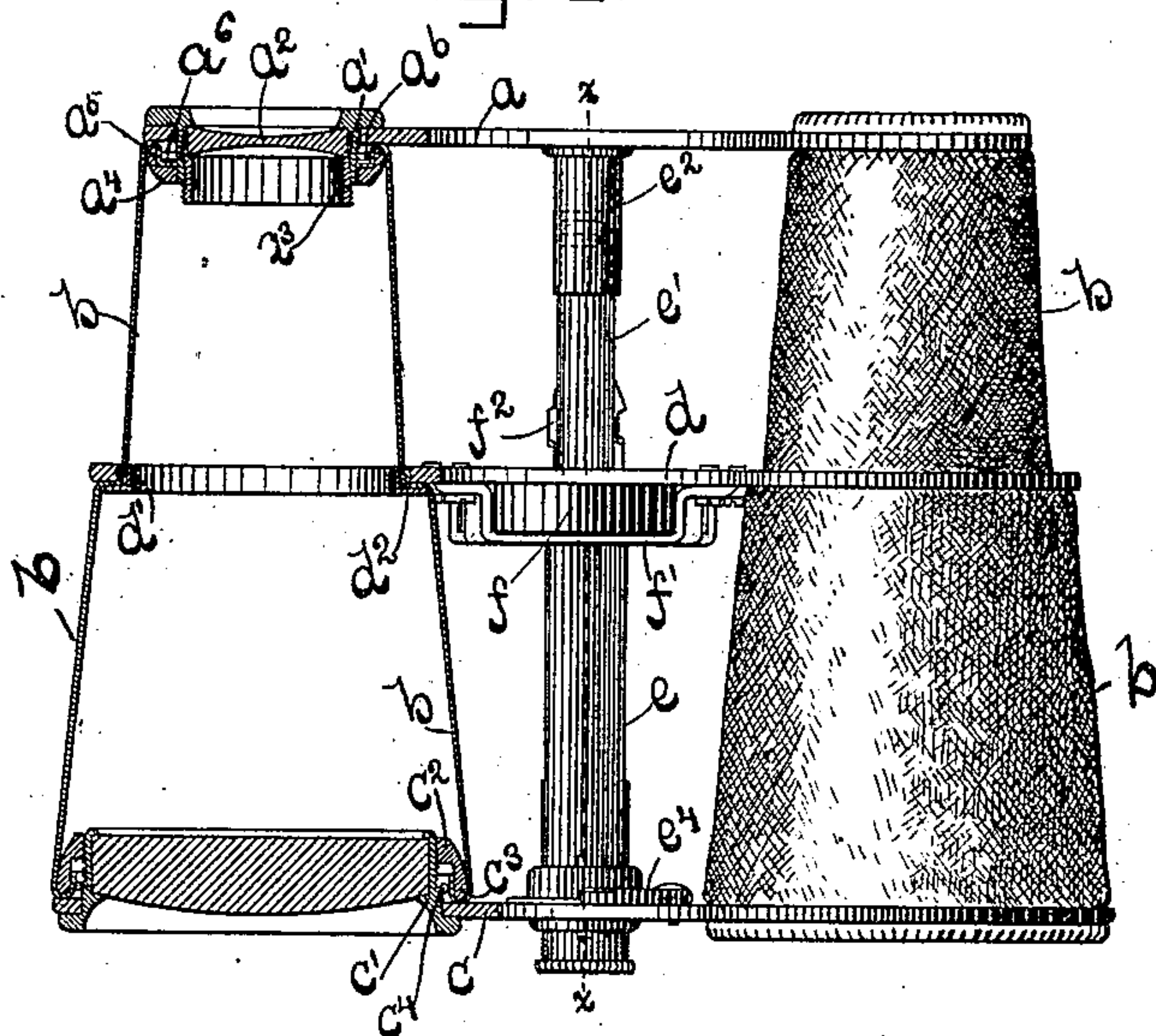


Fig: 2.

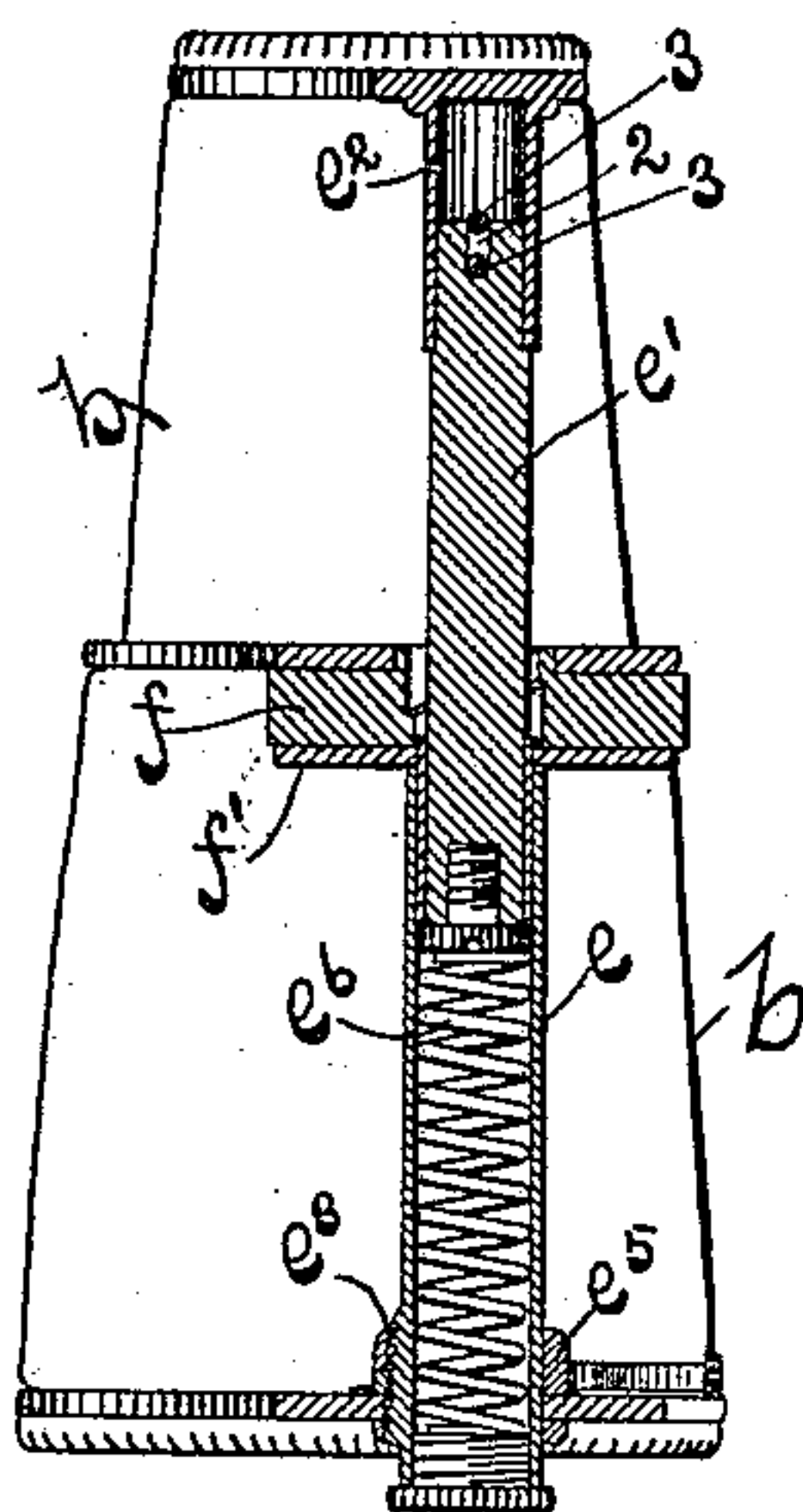


Fig: 4.

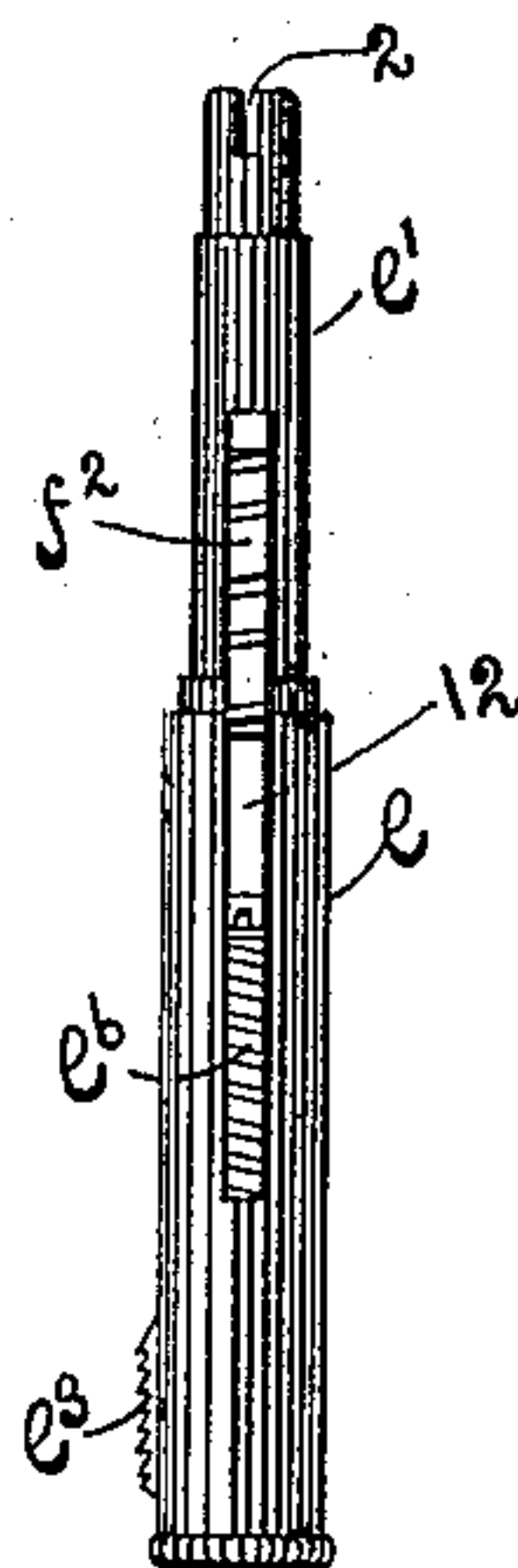
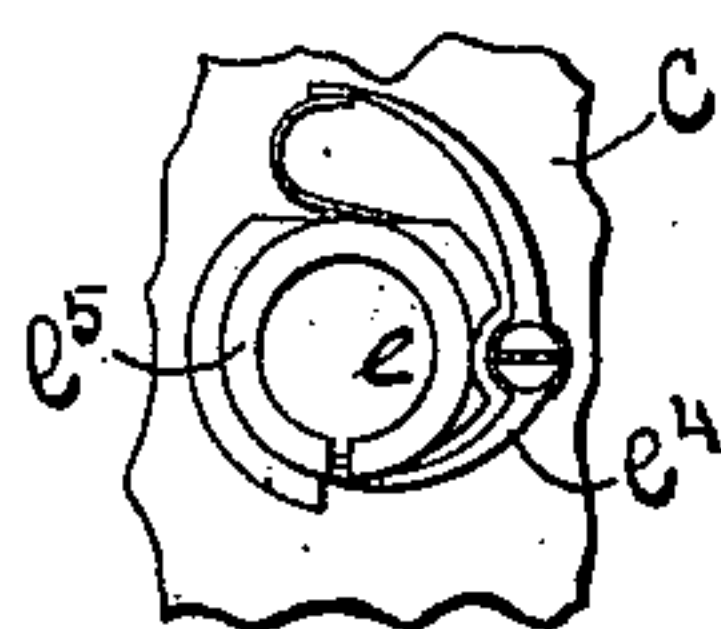


Fig: 3.



Witnesses:

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# UNITED STATES PATENT OFFICE.

GEORGE H. EATON AND JOHN L. PATCH, OF BOSTON, MASSACHUSETTS;  
SAID PATCH ASSIGNOR TO SAID EATON.

## COLLAPSIBLE OPERA-GLASS.

SPECIFICATION forming part of Letters Patent No. 463,660, dated November 24, 1891.

Application filed June 13, 1891. Serial No. 396,103. (No model.)

*To all whom it may concern.*

Be it known that we, GEORGE H. EATON and JOHN L. PATCH, both of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Collapsible Opera-Glasses, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the construction of collapsible opera-glasses.

Our invention comprehends the employment of two lens-holding plates and an intermediate plate and flexible tapering tubes, as cloth or equivalent material, attached to and held by said plates, and a detachable extensible post or support adapted to be interposed between the lens-holding plates, and an adjusting device for adjusting the length of said post or support, whereby the lens-holding plates may be held at any desired distance apart to thereby change the focus.

Figure 1 shows in side elevation and vertical section a collapsible opera-glass embodying this invention; Fig. 2, a vertical section of the device shown in Fig. 1, taken on the dotted line  $x x$ ; Figs. 3 and 4, details to be referred to.

The plate  $a$ , made of metal and of suitable shape, has two holes through it, which, as herein shown, are adapted to receive thimbles  $a'$ , which contain lenses  $a^2$ , held therein by bushings  $a^3$ . Rings  $a^4$  are screwed or otherwise secured to the thimbles  $a'$ , each of which rings has an upwardly-extended flange  $a^5$ , over which one end of the tapering flexible tube  $b$ , of cloth or other suitable material, is drawn. A spring-acting ring  $a^6$  is placed within each flange  $a^5$  of the rings  $a^4$ , acting to hold the flexible material in place. The rings  $a^4$  are turned on the thimbles until the flanges  $a^5$  thereof press the material firmly against the under side of the lens-holding plate  $a$ . The other lens-holding plate  $c$  has two holes through it similar to the lens-holding plate  $a$ , and in said holes thimbles  $c'$  are placed which receive and hold the lenses. Rings  $c^2$  are screwed or otherwise secured to said thimbles, having flanges  $c^3$ , over which are drawn the opposite ends of the flexible

tubes  $b$ , the material being held in place by the spring-acting rings  $c^4$ , and said rings  $c^2$  being turned on the thimbles until the flanges  $c^3$  press the material firmly against the plate  $c$ .

A plate  $d$ , placed midway between the lens-holding plates  $a$  and  $c$ , has two holes through it like said lens-holding plates  $a$  and  $c$ , which receive the tubular flexible material  $b$ , said material at such point being firmly and securely attached to the plate  $d$  by the wire-like rings  $d'$  and the flanged clamping-rings  $d^2$ .

A detachable extensible post or support is interposed between the lens-holding plates  $a$  and  $c$ , passing through a hole in the plate  $d$ , said post or support being composed of the tubular or hollow stem  $e$  and the stem  $e'$  movable telescopically within the stem  $e$ . The upper end of the stem  $e'$  is adapted to fit snugly in a socket  $e^2$ , attached to the inner or under side of the lens-holding plate  $a$ . The stem  $e'$  is slotted at its upper end, as at 2, to receive a cross-bar 3, secured diametrically in the socket  $e^2$ , to thereby keep the stem  $e'$  from rotating, and the tubular or hollow stem  $e$  has arranged on it exteriorly at or near its extreme end a series of ratchet-teeth  $e^3$ , and a pawl  $e^4$  (see Figs. 1 and 3) is pivoted to the inner side of the plate  $c$ , the engaging end of which passes through a hole in a boss  $e^5$  on said plate and engages one or another tooth of the series of ratchet-teeth  $e^3$ . A spring  $e^6$  is contained in the tubular or hollow stem  $e$ , which exerts its force against the stem  $e'$ .

A milled-edge wheel  $f$ , having a hole through it provided with an internal screw-thread, is held in position on the plate  $d$  by a bracket or holder  $f'$ , secured to the under side of said plate  $d$ , the central hole of said wheel registering with a hole in the plate  $d$ , through which hole the stem  $e'$  of the extensible and detachable post  $e e'$  passes. The stem  $e'$  has arranged spirally on it projections  $f^2$ , or said stem may be screw-threaded to be engaged by the wheel  $f'$ . The stem  $e$  is slotted longitudinally, as at 12, (see Fig. 4,) to receive the projections  $f^2$  on the stem  $e'$ , as said stem is withdrawn or pressed into the hollow stem  $e$  against the tension of the spring  $e^6$ .

The extensible post or support  $e e'$ , it will be seen, is readily detachable, and when detached the three plates  $a$ ,  $d$ , and  $c$  are con-



nected only by the flexible tubes *b*, and may  
 therefore be brought together and made to  
 occupy but little space. The detachable post  
 or support is inserted by passing it with its  
 5 stem *e'* foremost through the holes in the  
 plates *c d* and into the socket *e<sup>2</sup>* of the plate  
*a*, and at such time the plate or holder *f'*,  
 which supports the wheel *f*, will bear upon  
 the upper end of the tubular or hollow stem  
 10 *e* and draw the tubular material between the  
 plates *c d* substantially taut. Then by rotat-  
 ing the wheel *f*, which it will be understood  
 serves as the adjusting-wheel, the stem *e'* may  
 be moved in either direction at will. As the  
 15 stem *e'* is moved outward it acts to separate  
 the plate *a* from the plate *d* by bearing against  
 the cross-bars 3 3, and as the said stem is  
 drawn inward it acts to move the plate *a* to-  
 ward the plate *d* by its frictional engage-  
 20 ment with the socket *e<sup>2</sup>*, assisted, as it usually  
 will be at such time, by the plate *a* being  
 held firmly against the face of the user.

The hollow stem, it will be understood, is  
 made of such length that when interposed be-  
 25 tween the plates *c d* the flexible material will  
 be drawn taut, and although we have shown a  
 series of ratchet-teeth adapted to be engaged  
 by a pawl, whereby the length may be slightly  
 varied to compensate for any shrinkage or  
 30 stretching of the material, it is obvious that  
 any other suitable locking device may be em-  
 ployed.

It is obvious that the means herein shown  
 for adjusting the parts may be used in com-  
 35 bination with other forms of collapsible opera-  
 glasses.

We do not desire to limit ourselves to the  
 particular means herein shown for attaching  
 the flexible material or tapering tubes *b* to the  
 40 plates, as it is obvious that they may be at-  
 tached in many different ways.

We claim—

1. In a collapsible opera-glass, two lens-  
 holding plates *a c*, an intermediate plate *d*,  
 45 and flexible tubes *b b*, rigidly connected to  
 said plates *a c d*, combined with an adjust-

ing-wheel *f*, having a central internally-screw-  
 threaded bore, the holder *f'* for said wheel se-  
 cured to the plate *d*, and the detachable and  
 extensible post or support comprising the hol- 50  
 low stem *e*, adapted to hold separated the  
 plates *c* and *d* and thereby hold the flexible  
 material between said plates taut, and also  
 comprising the stem *e'*, adapted to engage the  
 plate *a* and having spirally-arranged projec- 55  
 tions on it, said stem being embraced and  
 moved telescopically in the hollow stem *e* by  
 the said adjusting-wheel, substantially as de-  
 scribed.

2. In a collapsible opera-glass, two lens- 60  
 holding plates *a c* and the intermediate plate  
*d*, having two holes through it, flexible tubes  
*b b*, rigidly connected to the plates *a c* and  
 passing through the holes in the plate *d*, and  
 fastenings contained within the said tubes *b* 65  
*b* for securing them rigidly to the plate *d* at  
 the holes, combined with the detachable and  
 extensible post or support interposed be-  
 tween the two lens-holding plates *a c*, sub-  
 stantially as described. 70

3. In a collapsible opera-glass, two lens-  
 holding plates *a c* and the intermediate plate  
*d* and flexible tubes *b b*, rigidly secured to  
 said plates *a c d*, combined with the adjust-  
 ing-wheel, as *f*, a holder for it secured to the 75  
 plate *d*, and the detachable and extensible  
 post or support comprising the hollow stem  
*e*, slotted as at 12, and interposed between the  
 plates *c* and *d*, and the stem *e'*, having pro-  
 jections *f<sup>2</sup>* on it, which enter said slot 12 as 80  
 the stem is moved longitudinally with rela-  
 tion to the stem *e* by the adjusting-wheel,  
 substantially as described.

In testimony whereof we have signed our  
 names to this specification in the presence of 85  
 two subscribing witnesses.

GEO. H. EATON.  
 JOHN L. PATCH.

Witnesses:

BERNICE J. NOYES,  
 EDWARD F. ALLEN.