

No. 618,161.

Patented Jan. 24, 1899.

A. W. BRIGHTMORE.  
THEODOLITE, LEVEL, &c.

(Application filed Dec. 7, 1897.)

(No Model.)

FIG. 1.

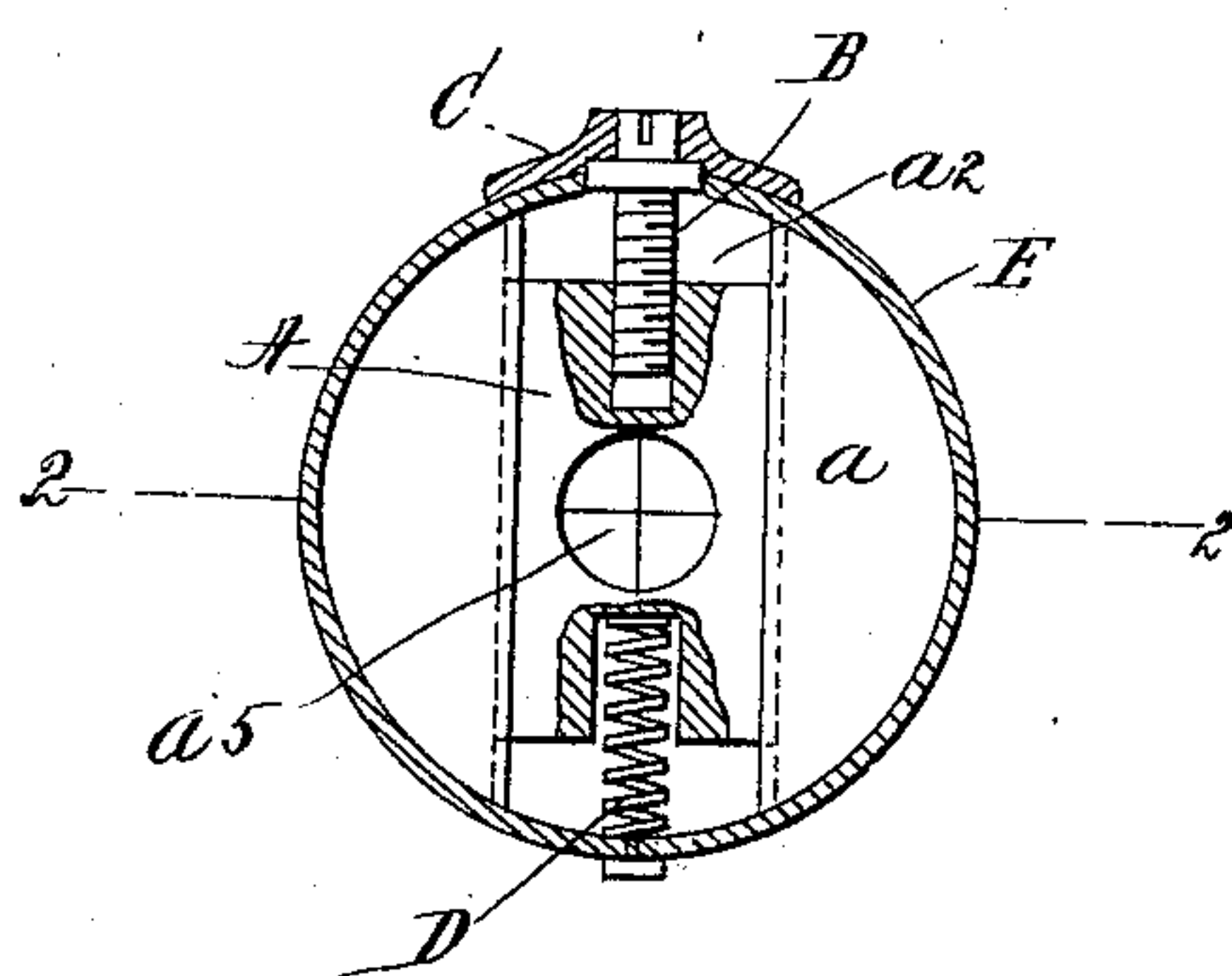


FIG. 2.

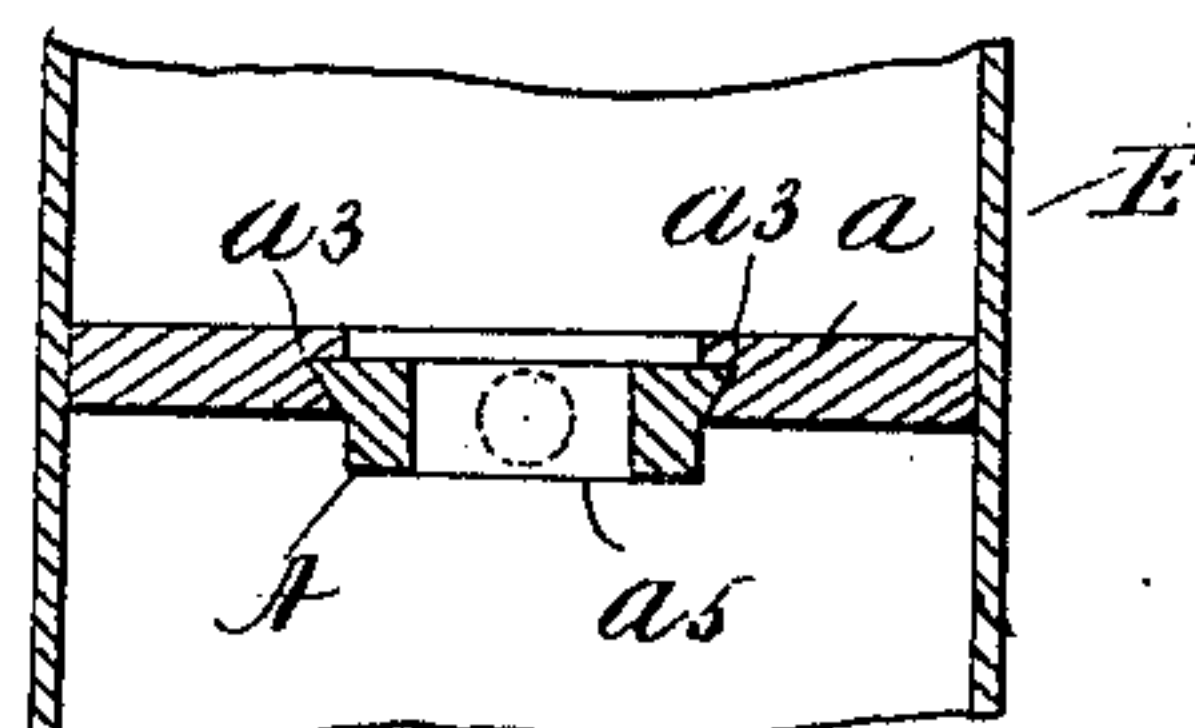


FIG. 3.

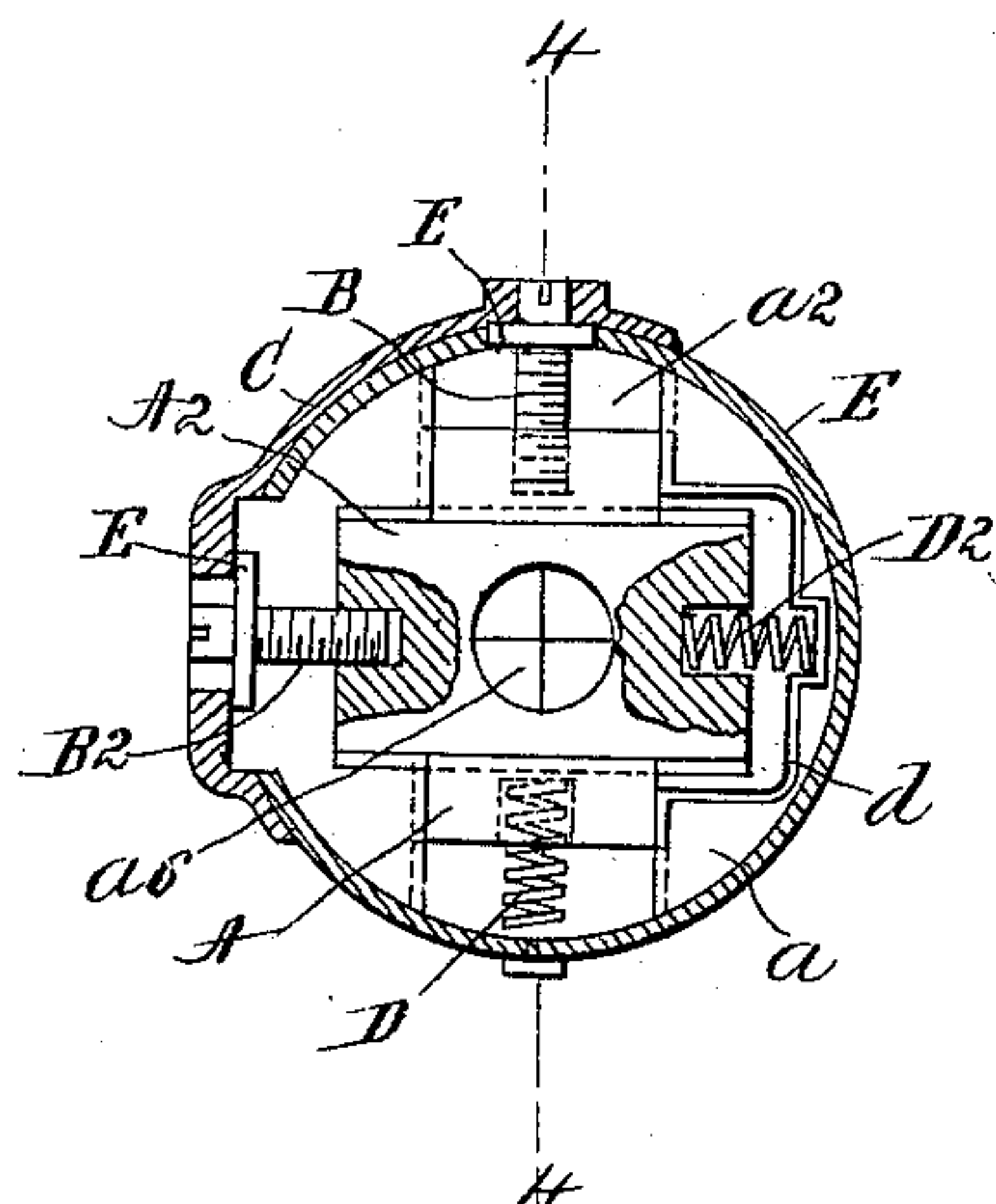
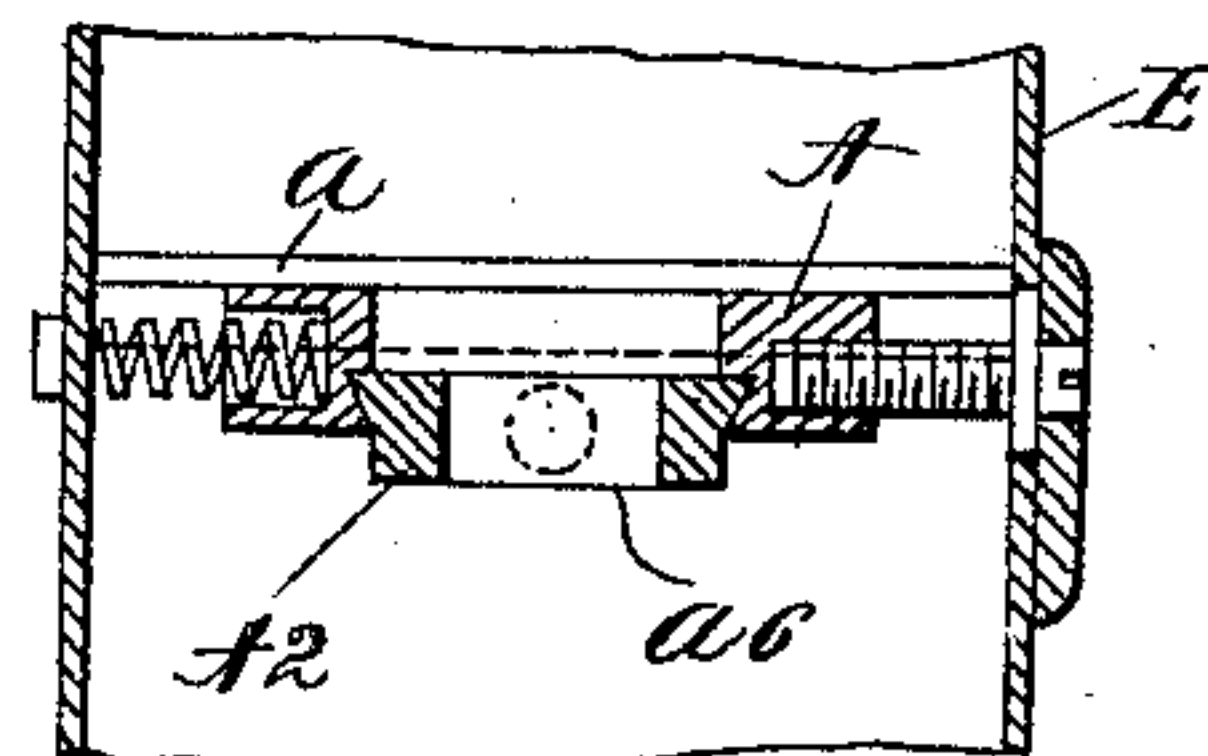


FIG. 4.



WITNESSES

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# UNITED STATES PATENT OFFICE.

ARTHUR WILLIAM BRIGHTMORE, OF KNIGHTON, ENGLAND.

## THEODOLITE, LEVEL, &c.

SPECIFICATION forming part of Letters Patent No. 618,161, dated January 24, 1899.

Application filed December 7, 1897. Serial No. 661,073. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR WILLIAM BRIGHTMORE, a subject of the Queen of Great Britain, residing at Knighton, in the county of Radnor, Wales, England, have invented certain new and useful Improvements in Theodolites, Levels, and the Like, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to means for adjusting the line of collimation in telescopes, levels, and like instruments; and the object thereof is to provide improved means for making such adjustment in one or more directions. When the adjustment is in one direction only, a diaphragm is fixed at the eyepiece end of a telescope, and this diaphragm is provided with a beveled slot or opening which extends transversely of said diaphragm in the direction of the desired adjustment, and said slot or opening is provided with a plate which fits therein and is longitudinally adjustable therein and is connected with the sides thereof by a tongue-and-groove joint, and said plate is provided with a central circular hole, over which the cross-hairs are stretched, and said plate is moved in said slot or opening by means of a screw supported so as to be capable only of retention, and when the said screw is turned it causes the plate, with the cross-hairs, to travel in said slot or opening. If adjustment in two directions at right angles to each other is desired, a second plate in addition to the first-named plate is provided, with a central circular hole across which the hairs are stretched, and said second plate is mounted transversely of the first-named plate and adapted to be moved transversely thereof, said second plate and first-named plates being connected by a tongue-and-groove joint and said second plate is also operated by a screw in the same manner as the first-named plate; but when the first-named plate is moved by means of its screw the second plate and its screw travel with it. These screws are pressed against the face of the supports, which prevent them from moving longitudinally by means of springs, and said screws can either have milled heads or have their heads protected and be made to turn with the blade of

a pocket-knife or with any suitable instrument.

The invention is the same as that for which Letters Patent were granted to me in Great Britain November 11, 1896, No. 25,283, and is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a sectional end view of the eyepiece end of a telescope provided with my improvement; Fig. 2, a cross-section thereof on the line 2 2 of Fig. 1, said Figs. 1 and 2 being intended to show means for adjustment in one direction; Fig. 3, a view similar to Fig. 1 of a modified form of construction; and Fig. 4, a section thereof on the line 4 4, said Figs. 3 and 4 being intended to represent means for adjustment in any direction.

In the drawings forming part of this specification the separate parts of my improvement are designated by the same letters of reference in each of the views, and in said drawings I have shown at E a section of the eyepiece end of a telescope and at *a* a diaphragm which is placed therein and provided centrally with a transverse slot or opening *a*<sup>2</sup>, and in the construction shown in Figs. 1 and 2 I place in said slot or opening a plate A, said plate being shown partially in section in Fig. 1 and in cross-section in Fig. 2, and said plate is connected with the diaphragm *a* by a tongue-and-groove joint, as shown at *a*<sup>3</sup>. I have also shown a screw B, which passes through one side of the part E and is held in place by a cover-plate C, in which said screw is free to turn, and said screw enters the end of the plate A, and the opposite end of said sliding plate is provided with a spring D, which is countersunk therein and which has a bearing in the adjacent side of the end or eyepiece E of the instrument, and in practice the sliding plate A is provided with a circular hole or opening *a*<sup>5</sup>, across which the hairs are stretched, and by means of this construction I provide for the adjustment hereinbefore referred to in one direction.

In Figs. 3 and 4 I have shown a modification in which provision is made for the double adjustment in two directions hereinbefore referred to, and in this construction I employ the slotted diaphragm *a*, having the central transverse slot or opening *a*<sup>2</sup>, in which is



placed the sliding plate A, which is provided with the screw B and spring D, as hereinbefore described. In this form of construction I also provide a sliding plate A<sup>2</sup>, which is  
 5 mounted transversely of the plate A and is connected therewith by a tongue-and-groove joint, and said plate A<sup>2</sup> is free to slide cross-wise of the plate A, and the plate A<sup>2</sup> is also provided with a screw B<sup>2</sup> and a spring D<sup>2</sup>, the  
 10 outer end of which has a bearing in a yoke-shaped holder *d*, connected with the plate A. The screw B<sup>2</sup> and the spring D<sup>2</sup> provide for the adjustment of the plate A<sup>2</sup> transversely of the plate A, and for this purpose the screw  
 15 B<sup>2</sup> and the spring D<sup>2</sup> operate in connection with the plate A<sup>2</sup> in the same manner in which the screw B and the spring D operate in connection with the plate A. The screws B and B<sup>2</sup> are each provided with a circular  
 20 collar E, by which their outward movement is limited, and the heads thereof are adapted to be operated by a knife-blade, screw-driver, or other tool, and the head of the screw B<sup>2</sup> is much smaller than the hole in the plate C, by  
 25 which it is held in place, and said screw is therefore adapted to move laterally in said plate, and by means of this construction the plate A<sup>2</sup> may be adjusted transversely of the plate A, and when the plate A is adjusted  
 30 in the slot or opening in the diaphragm *a* the plate A<sup>2</sup> will move therewith, and I thus provide for the double adjustment hereinbefore referred to. The screws B and B<sup>2</sup> are respectively threaded into the plates A and A<sup>2</sup>; but  
 35 said screws do not move longitudinally in their supports when turned, and by means of this fact the plates A and A<sup>2</sup> may be adjusted at will, as will be readily understood, the springs D and D<sup>2</sup> serving to force said plates  
 40 in the direction of said screws.

In practice the cross-hairs in the form of construction shown in Figs. 3 and 4 are placed transversely of the central hole or opening *a*<sup>6</sup> in the plate A<sup>2</sup>; and my improvement is simple  
 45 in construction and operation and well adapted to accomplish the result for which it is intended, and it will be apparent that changes in and modifications of the construc-

tion herein described may be made without departing from the spirit of my invention or  
 50 sacrificing its advantages.

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

1. The herein-described means for adjusting the cross-hairs or whatever corresponds therewith in an instrument of the class specified, said means consisting of a diaphragm placed in the end or eyepiece of the instrument and provided with a transverse slot or  
 55 opening, a sliding plate mounted in said slot or opening and provided with a central opening, and means for adjusting said plate and for holding it in any desired position consisting of a screw connected with one end there-  
 60 of and a spring at the opposite end, substantially as shown and described.

2. The herein-described means for adjusting the cross-hairs or whatever corresponds therewith in an instrument of the class specified, said means consisting of a diaphragm placed in the end or eyepiece of the instrument and provided with a transverse slot or  
 65 opening, a sliding plate mounted in said slot or opening and provided with a central opening, and means for adjusting said plate and for holding it in any desired position consisting of a screw connected with one end thereof  
 70 and a spring at the opposite end, and a supplemental plate having a central opening, said  
 75 supplemental plate being mounted transversely of the first-named plate and transversely adjustable thereon, said supplemental plate being also provided at one end with  
 80 a screw and at the opposite end with a spring,  
 85 one end of which is supported by an attachment connected with the first-named plate, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 23d day  
 90 of November, 1897.

ARTHUR WILLIAM BRIGHTMORE.

Witnesses:

ARTHUR SANDFORD CORSER,  
 GEORGE SANDFORD CORSER.