

(No Model.)

S. PRATT.
RANGE FINDER.

No. 434,950.

Patented Aug. 26, 1890.

Fig. 1.

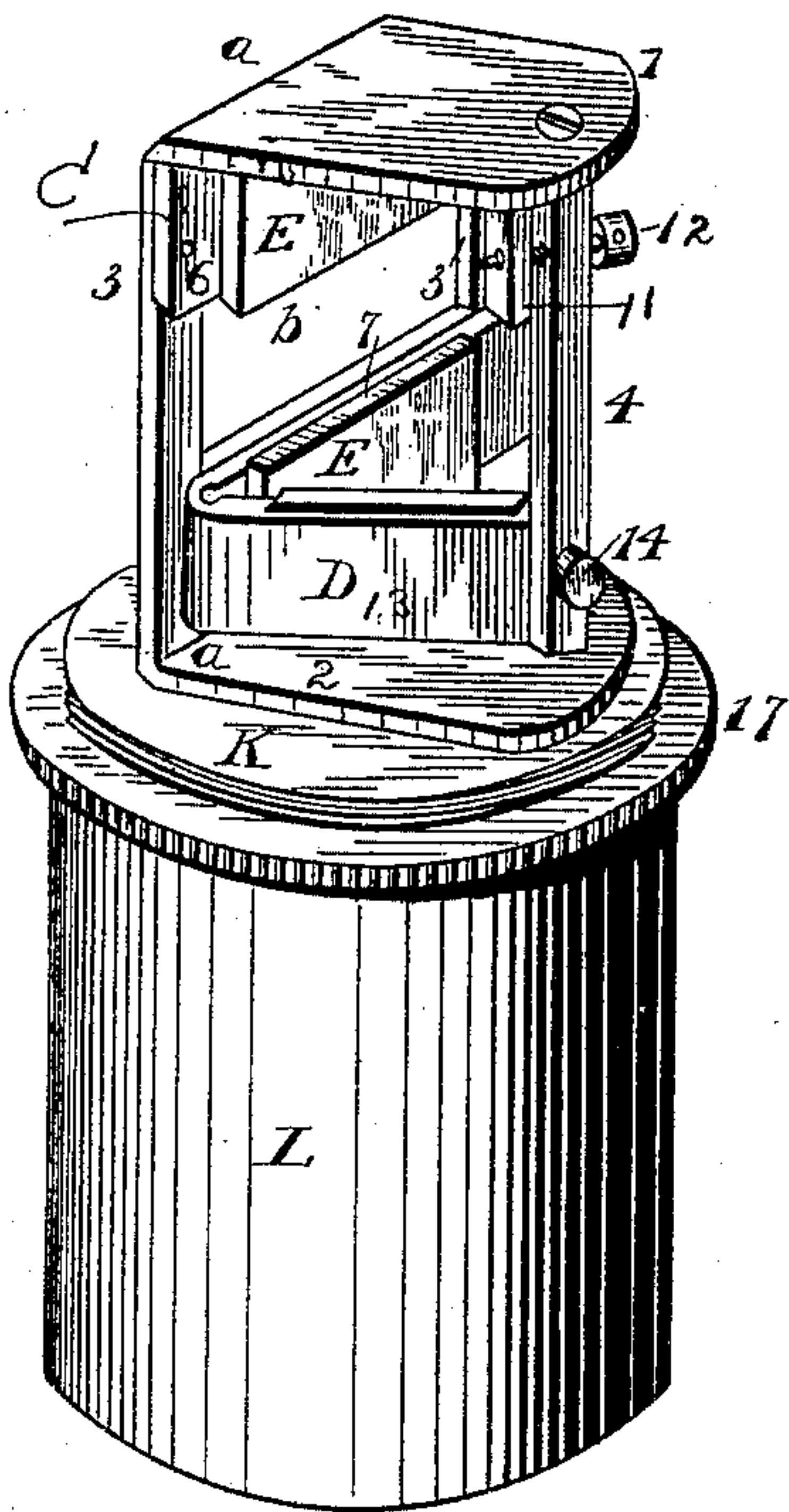


Fig. 4.

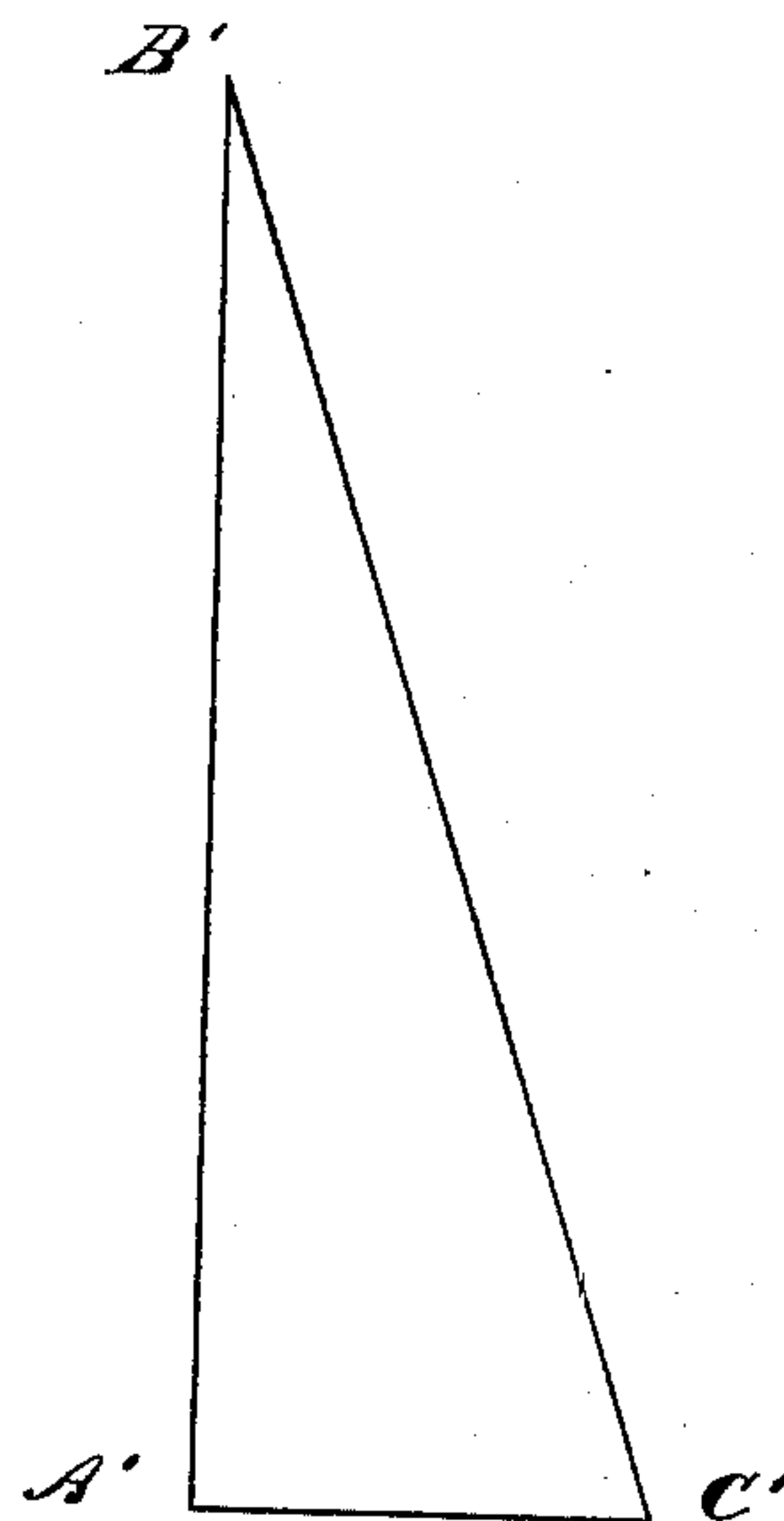


Fig. 2.

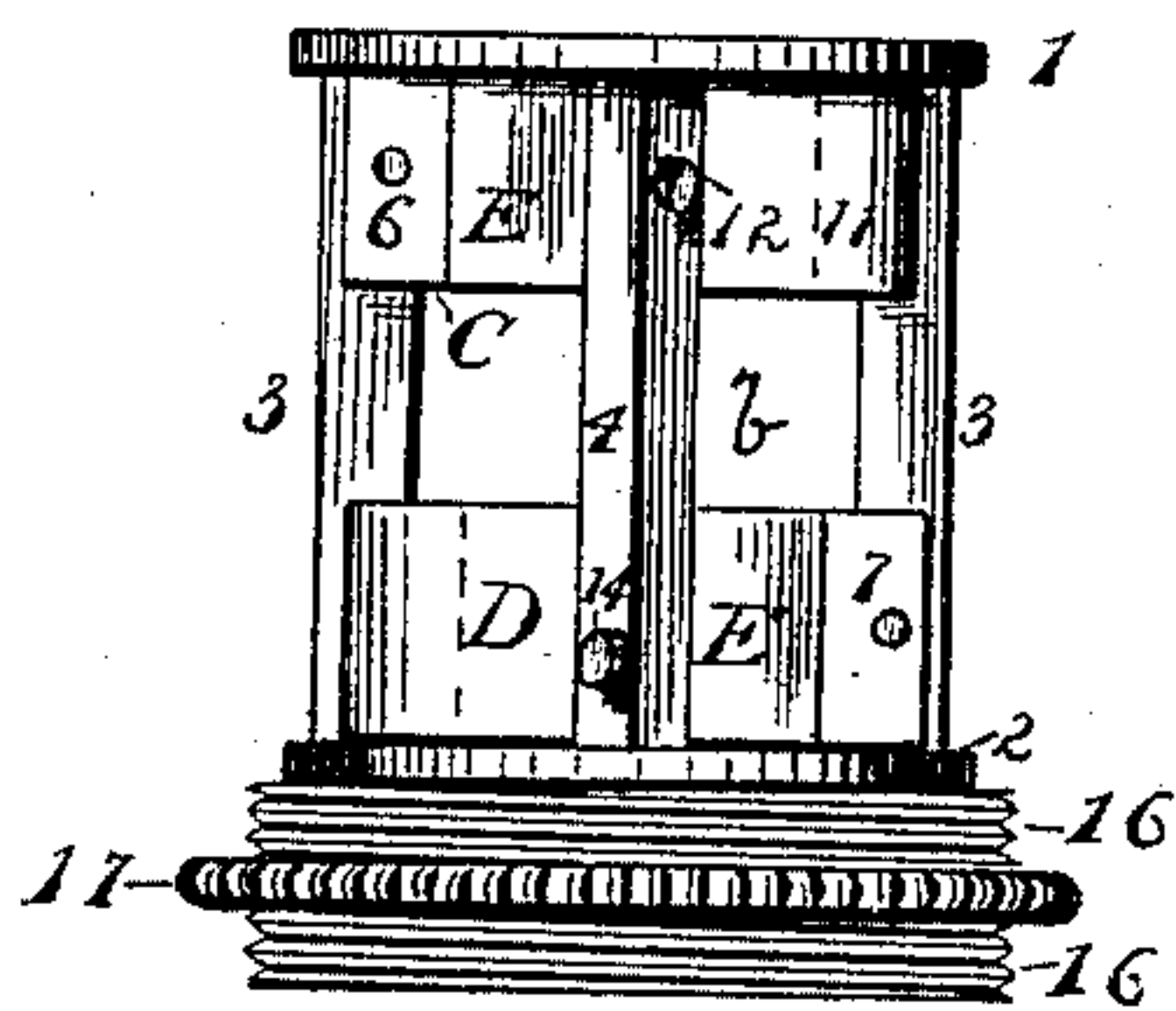
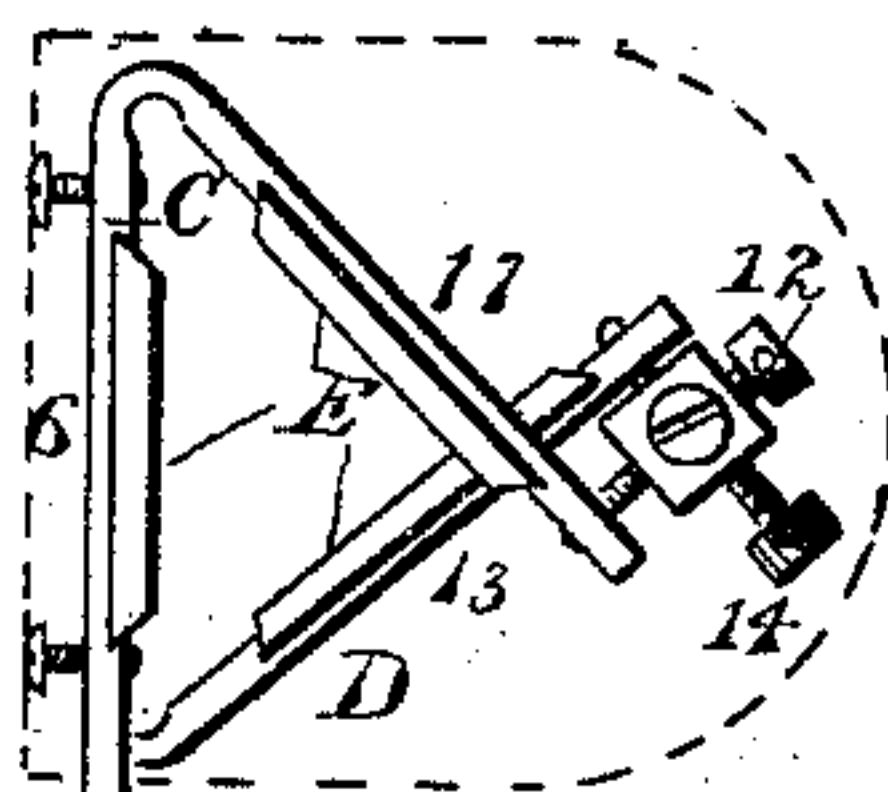


Fig. 3.



Witnesses:
L. M. Bartlett
O. W. Johnson.

Inventor
Sedgwick Pratt
By W. A. Bartlett
att'y

UNITED STATES PATENT OFFICE.

SEDGWICK PRATT, OF THE UNITED STATES ARMY.

RANGE-FINDER.

SPECIFICATION forming part of Letters Patent No. 434,950, dated August 26, 1890.

Application filed November 6, 1889. Serial No. 329,410. (No model.)

To all whom it may concern:

Be it known that I, SEDGWICK PRATT, of the United States Army, residing at West Point, in the county of Orange and State of New York, have invented certain new and useful Improvements in Range-Finders, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in range-finders, in which four mirrors are attached in sets of two to a frame, and so arranged that in each set the inclination of the mirrors with each other may be changed at pleasure; and the object of my improvement is to afford means of determining objects that are certain angular distances from each other relative to a third point or station, and thus enable the distance of one of these objects to be determined. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the instrument mounted on its box or casing. Fig. 2 is a rear elevation of the instrument removed from its casing. Fig. 3 is a top plan showing the relation of the mirrors and their supports, part of the frame being indicated in dotted lines and part omitted. Fig. 4 is a diagram to explain one manner of using the range-finder.

The frame is composed of a top piece 1, a bottom piece 2, a side plate 3, and a rear plate or bar 4. The top, bottom, and side plates 1 2 3 are preferably integral, formed of a single strip of thin metal, having two right-angled bends at *a a*, and the bar 4 (of the same length as 3) is secured between the open ends of the plate. An opening *b* is made in the side plate 3 about midway between the top and bottom. One bar or arm 6 of a V-shaped metallic piece C is secured to the inside of the plate 3 above the opening *b* therein, and arm 7 of a similar V-shaped piece D is secured to the bar 3 below the opening, the angles of these V-shaped pieces being at opposite sides of plate 3. The other arm 11 of piece C is held by the end of a set-screw 12, which screw passes through upright 4 in such manner that the screw can be turned to change the angle between the arms 6 and 11 of piece C. The V-shaped piece D can be adjusted in similar manner by a set-screw 14, passing

through upright 4 in opposite direction to that of screw 12 and engaging arm 13 of the V-shaped piece D. The proximate faces of the V-shaped pieces C D carry plane mirrors E, and as the V-shaped pieces are adjustable these mirrors will partake of the adjustment.

The above description applies to the instrument proper. For convenience the plate 2 is attached to a disk K, having a screw-threaded edge 16, and a milled edge 17 on a flange projecting centrally from the disk. The disk is thus made reversible, and can be screwed either side up into the box or casing L. When turned up, as in Fig. 1, the instrument is ready for use. For transportation the disk is turned over and screwed into the box, thus inclosing the instrument.

Referring now to the diagram Fig. 4, suppose it to be desirable to ascertain the distance from the point A' to the point B'. Hold the instrument directly over point A', keeping the instrument vertical, the post 4 being close to the eye, so that the point B' can be seen through the opening *b* in the plate 3. Find an object C' at an angle of ninety degrees from B' by means of the upper mirrors, set (as by means of a gage or square) at an angle of forty-five degrees. Then move toward C' until the lower mirrors cause the point A' by reflection to coincide with B', (seen by direct vision through the opening *b*,) the lower mirrors being set at such an angle with each other that A' C' will be one-fourtieth (or any desired part) of A' B'. Then the distance from A' to C' multiplied by forty will give the distance from A' to B'.

The instrument may be used in other ways to ascertain the distance, height, and angular relation of distant objects on the principle that two angles and a side being known the other dimensions of a triangle may be found. It is obvious that the angle to which the mirrors with which the first observation is taken may be other than a right angle; but this angle should be known.

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

1. A range-finder of substantially the character described, consisting, essentially, of a suitable support and four mirrors arranged in pairs on different planes, each pair arranged at an angle to each other, and the open

sides of the two pairs facing in reverse directions, substantially as described.

2. A range-finder consisting, essentially, of a suitable support and four mirrors, the mirrors in pairs at different elevations, the open sides of the triangles facing in reverse directions, at least one of the mirrors being adjustable so as to vary its angular relation with its fellow, substantially as described.

10 3. The combination, in a range-finder, of the supporting-frame having an opening therein, the V-shaped pieces attached to said frame with their angles in different directions, a set-screw engaging one arm of each

V-shaped piece to adjust the same, and a pair 15 of mirrors on the inside faces of each V-piece, substantially as described.

4. The combination of the box, the frame attached to the cover thereof, and the plane mirrors adjustably held in the frame, substantially as described. 20

In testimony whereof I affix my signature in presence of two witnesses.

SEDGWICK PRATT.

Witnesses:

E. M. WEAVER,
WM. F. FLYNN.