

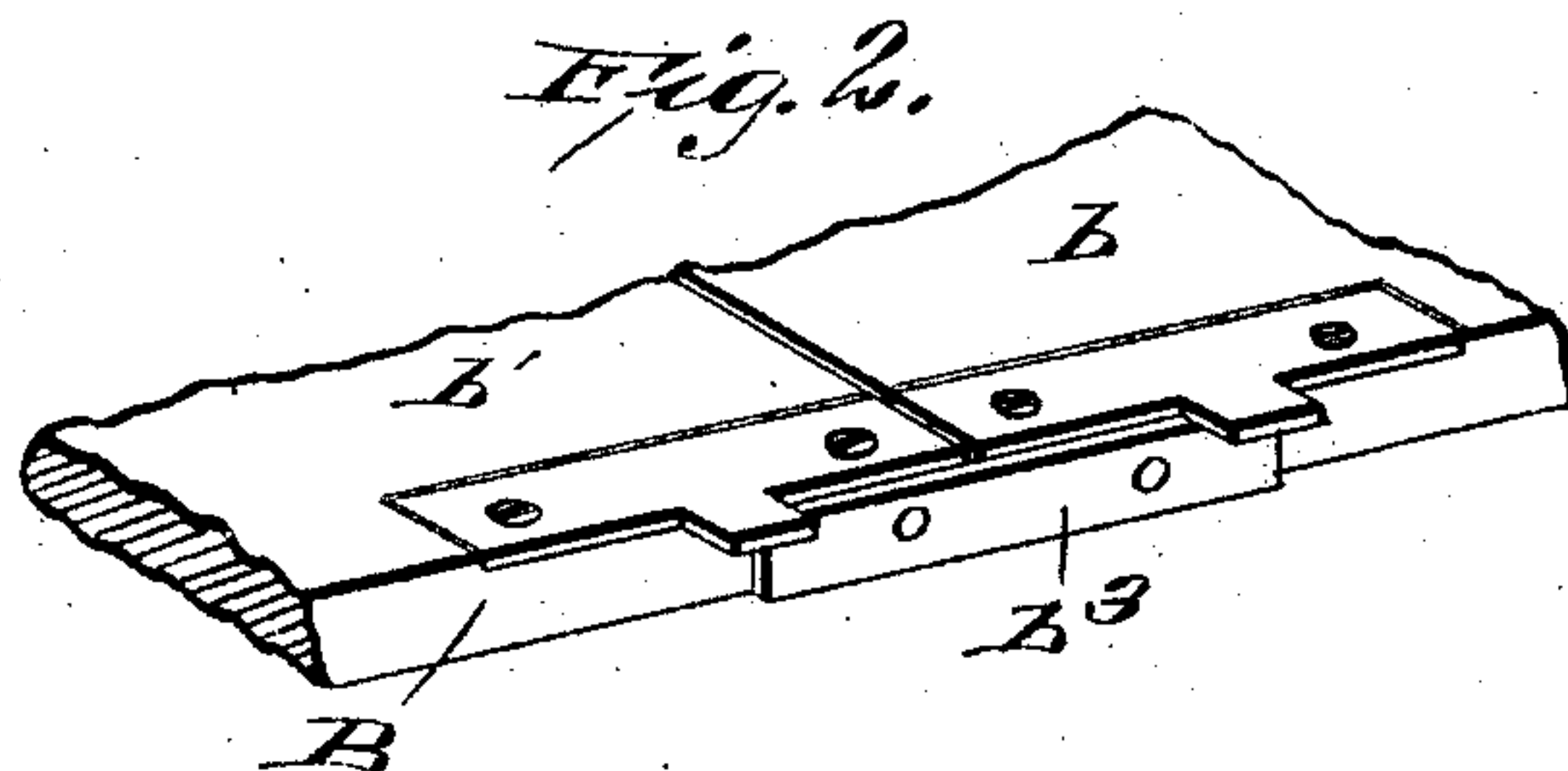
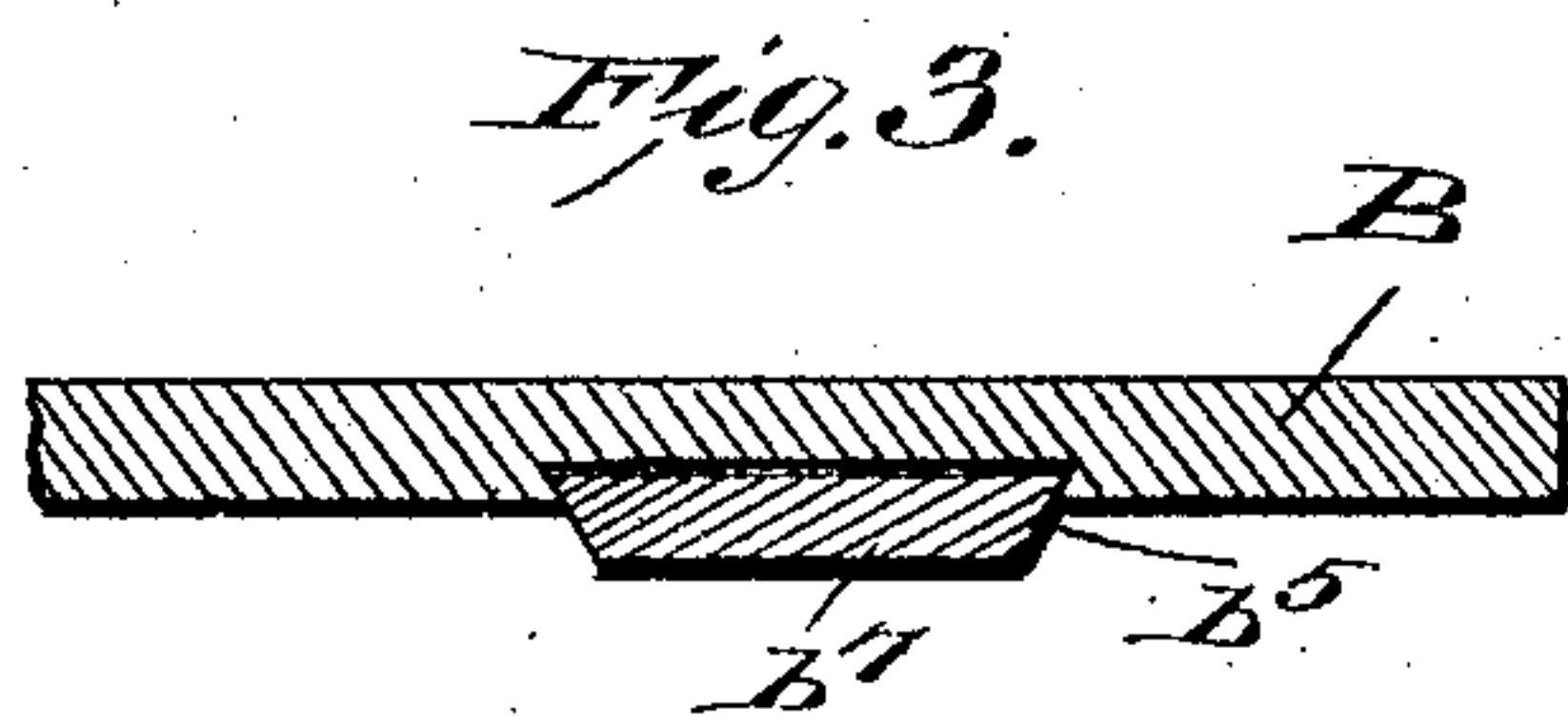
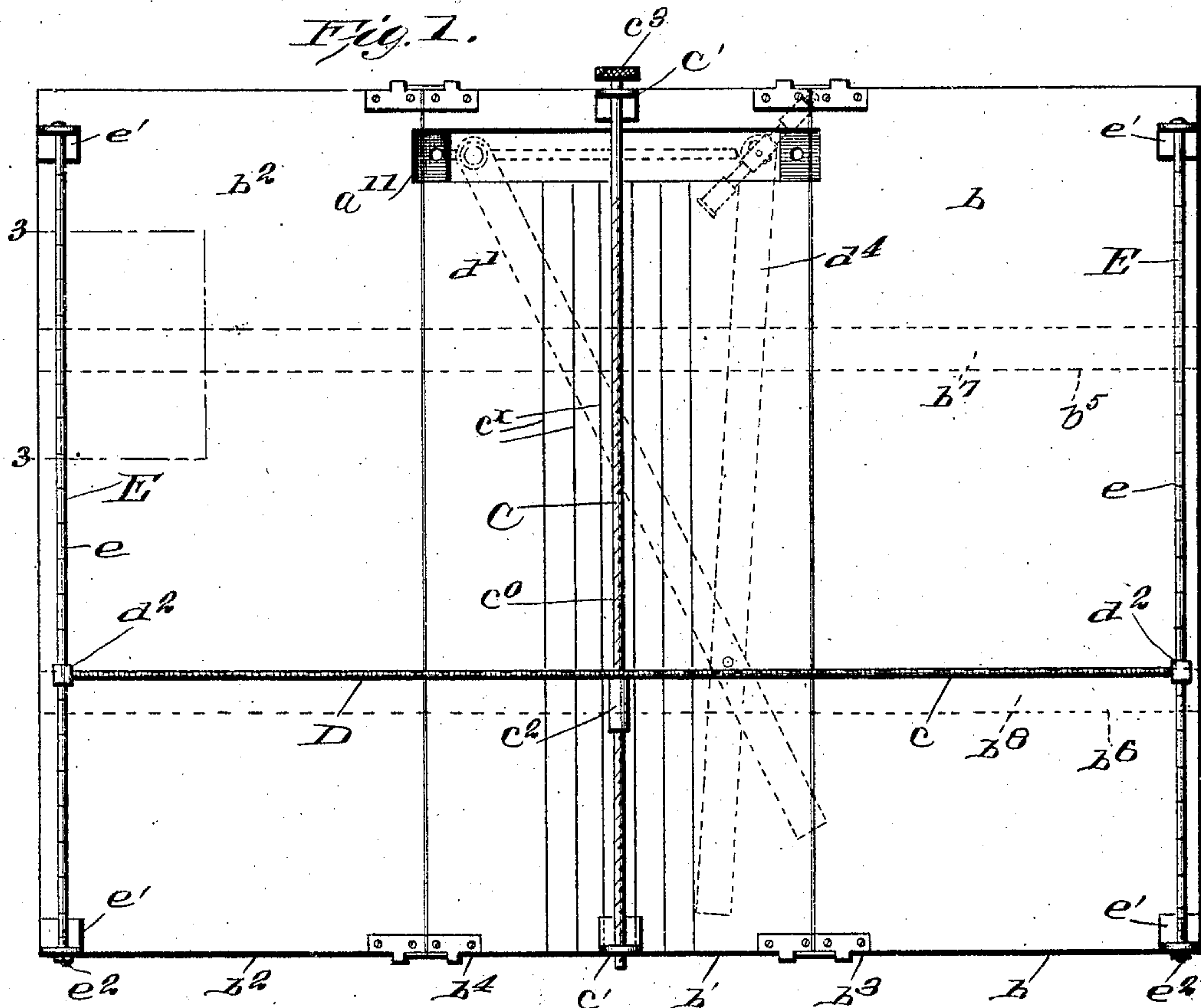
No. 848,567.

PATENTED MAR. 26, 1907.

H. C. PERCY.  
RANGE FINDER.

APPLICATION FILED APR. 13, 1906.

2 SHEETS—SHEET 1.



WITNESSES:  
*E. M. Callaghan,*  
*C. E. Trainor*

INVENTOR  
HARRY C. PERCY  
BY *Munn & Co.*  
ATTORNEYS

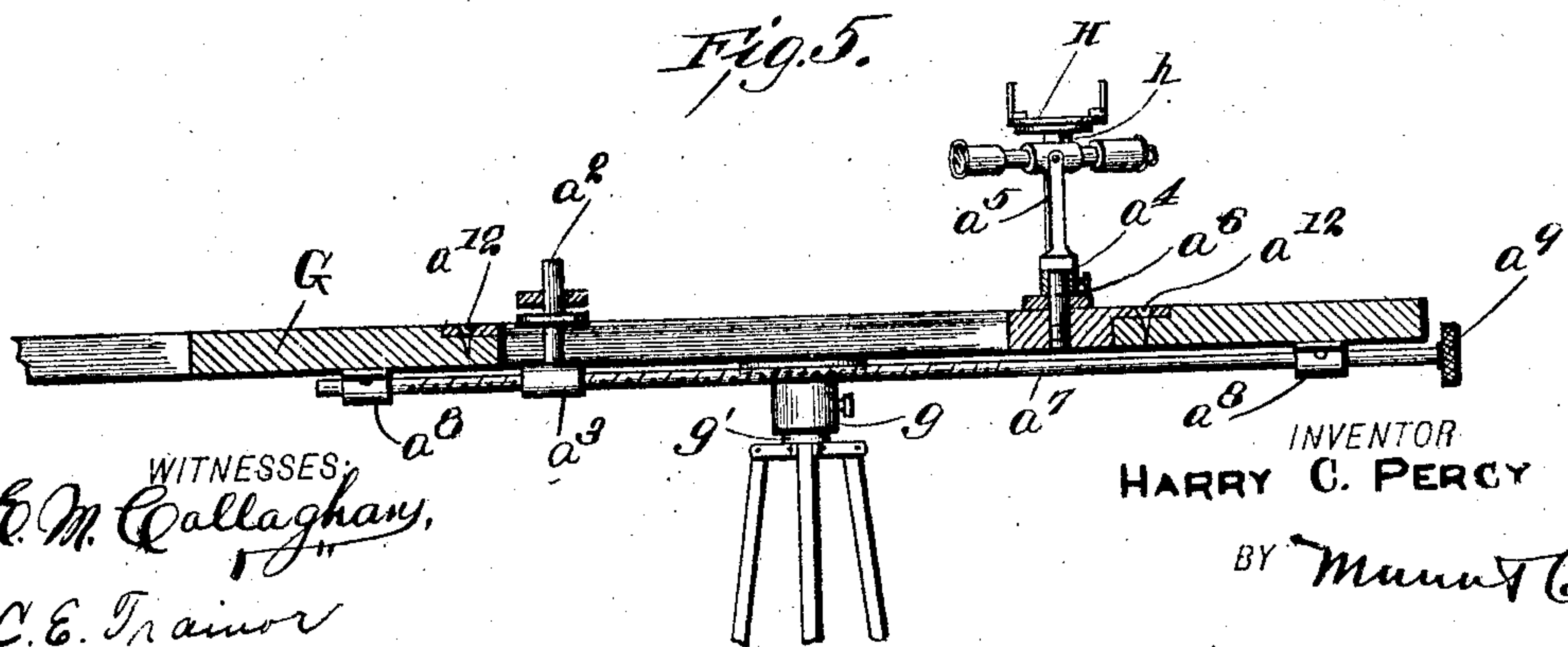
No. 848,567.

PATENTED MAR. 26, 1907.

H. C. PERCY.  
RANGE FINDER.

APPLICATION FILED APR. 13, 1906.

2 SHEETS—SHEET 2.



WITNESSES,  
E. M. Callaghan,  
C. E. Trainor

INVENTOR:  
HARRY C. PERCY

BY *Munn & Co.*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

HARRY C. PERCY, OF NATCHITOCHES, LOUISIANA.

## RANGE-FINDER.

No. 848,567.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed April 13, 1906. Serial No. 311,620.

*To all whom it may concern:*

Be it known that I, HARRY C. PERCY, a citizen of the United States, and a resident of Natchitoches, in the parish of Natchitoches and State of Louisiana, have made certain new and useful Improvements in Range-Finders, of which the following is a specification.

My invention is an improvement in range-finders, and consists in certain novel constructions and combinations of parts hereinafter described and claimed.

Referring to the drawings forming a part hereof, Figure 1 is a plan view of the plane table. Fig. 2 is a detail view of a part of said table, showing the hinge between the sections; and Fig. 3 is a section on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the range-finder. Fig. 5 is a section on the line 5 5 of Fig. 4. Fig. 6 is a section on the line 6 6 of the same figure.

In the present embodiment of my invention a plane table B, comprising three sections  $b\ b'\ b''$ , hinged at their adjacent corners, as at  $b^3\ b^4$ , is provided for supporting the range-finder A, the sections of the table being provided upon their backs with a plurality of series of aligned grooves  $b^5\ b^6$ , adapted to have inserted therein bars  $b^7\ b^8$ , the said grooves being undercut and the bars shaped to fit the grooves, whereby to rigidly retain the table in a flat condition.

The range-finder proper comprises a triangular frame composed of a base  $a$ , having a longitudinal slot  $a'$ , in which is slidably mounted a shaft  $a^2$ , the lower end of the shaft being provided with a transverse screw-threaded sleeve  $a^3$  and the upper end being adapted to receive the socket  $a^4$  of a telescope-mounting  $a^5$ . At one end of the slot is a second shaft  $a^6$ , traversing an opening in the base and having its upper end also adapted to receive the said socket  $a^4$  of the telescope-mounting. The sleeve  $a^3$  of the shaft  $a^2$  is engaged by a screw-threaded rod  $a^7$ , mounted in bearings  $a^8$  on the under face of the table, the rod being provided with a milled head  $a^9$  for convenience in manipulating the same. It will be evident from the description that when the rod  $a^8$  is rotated the shaft  $a^2$  will be moved toward and from the shaft  $a^6$ . The base  $a$  is graduated, as at  $a^{10}$ , and is mounted in a slot  $a^{11}$  at the center of one of the sides of the table, being removably secured therein by the screws  $a^{12}$ .

The sides of the triangular frame comprise

bars  $d^3\ d^4$ , each composed of the parallel pieces  $d^5\ d^6$ , each of the parallel pieces being provided with an inwardly-facing groove  $d^7$ , and are secured together at their opposite ends by cross-pieces  $d^8$ . The bars are revolvably mounted about the shafts  $a^2\ a^6$  by means of a ring  $d^9$ , encircling the shaft, and are retained in their adjusted position by a set-screw  $d^{10}$ , traversing the ring and engaging the shaft. The outer half of each of the bars is provided with a scale  $d^{11}$ , and a sighting-line  $d^{12}$  is arranged on the ring centrally between the two parallel faces, the socket of the telescope-mounting being also provided with a line adapted to register with the first line when the telescope is sighted along the bar.

Sliding blocks  $d^{13}$  are mounted in the grooves of each bar and are connected together by a pin  $d^{14}$ , having an upwardly-projecting portion  $d^{15}$  for a purpose to be hereinafter described, the other end of the pin being threaded into the lower block, whereby to retain the blocks in their adjusted position.

It is evident from the description that when the sliding blocks are moved in the grooves the point at which the bars cross each other may be varied, thus varying the length of the sides of the triangle, while the length of the base may be varied by rotating the rod  $a^7$ , before described.

The plane table B is provided at the center of each of its sides with bearings  $c$ , in which is rotatably mounted a rod C, having a screw-thread  $c^0$  of low pitch, and upon the rod is mounted a sleeve  $c^2$ , the said sleeve being internally screw-threaded to correspond with the screw-threads of the rod, and one of the ends of the rod is provided with a milled head  $c^3$  for convenience in manipulating the said rod. A bar D is secured transversely of the sleeve and is provided upon each side of its center, which corresponds to the position of the sleeve, with graduations  $c'$ , each of said graduations representing the hundredth part of a foot.

The ends of the bar D are provided with sleeves  $d^2$ , engaging rods E, mounted in bearings  $e'$  at the respective ends of the table, the said rods being retained in the bearings by nuts  $e^2$  upon the end thereof. The rods are graduated, as at  $e$ , each of the graduations representing the hundredth part of a foot, for a purpose to be hereafter described.

In the usual operation of my invention the range-finder proper is arranged upon a base-



plate G, having on the lower face thereof a socket  $g$  for receiving a Jacob's staff or tripod-head  $g'$ , the upper face of the base-plate having arranged therein a plurality of spirit-levels  $g^2 g^3$ , one of said levels being arranged longitudinally of the base and the other transversely thereof, whereby to properly level the base-plate. To find the range of the object from a known base-line, the base-plate is placed upon the Jacob's staff or tripod and leveled and a telescope placed on one of the shafts and sighted along the known base-line. The base-plate is then turned upon the Jacob's staff until the base-line of the range-finder proper is in line with the telescope, when the table is clamped upon the Jacob's staff to retain it in place. The telescope is then turned and sighted on the object whose distance is to be ascertained, and the bar corresponding to the shaft upon which the telescope is mounted is moved along the surface of the table until the sight-line corresponds with the sight of the telescope. By means of the set-screw  $d^{10}$  the ring is clamped to the shaft. The telescope is then removed and placed on the opposite shaft, and the table is removed to the other end of the known base-line. The base-line of the table is again brought into coincidence with the known base-line, after which the table is again clamped to the Jacob's staff or tripod. The telescope is sighted a second time on the object whose distance is to be measured, and the bar corresponding to the socket is adjusted until it coincides with the line of sight of the telescope, after which the set-screw upon the pin is turned to tighten the sliding blocks together. It will be evident that the sides of the imaginary triangle will be proportionate to the sides of the triangular frame and that the base of the triangular frame will represent the known base-line and the sides of the triangular frame the sides of the triangle formed by the known base-line and object. In using the range-finder with the plane table the range-finder proper is removed from the base-plate G and placed upon the plane table, which may be supported and leveled in any suitable manner. The triangle is formed in the same manner as described above, after which the screw-threaded rod C is manipulated to bring the bar D into contact with the pin on the sliding blocks. The position of the pin connecting the sliding block with respect to the rod C will determine the departure, whether east or west, while the position of the ends of the bar upon the graduated side rods E will determine the latitude of the apex of the triangle.

It will be understood that the graduations upon the rod E commence at a point directly opposite the base when it is placed in position on the table and that the rod C corresponds with the exact center of said base-line when it is in proper position on the table.

It will also be understood that the graduations upon the bars and the base-line of the range-finder proper are on the same scale as the graduations on the bar C and the rods E. The upper face of the plane table may be provided with meridian lines  $c^x$ , if desired. The compass H is rotatably mounted upon the telescope and may be fixed with respect thereto by the set-screw  $h$ . The sliding blocks  $d^{13}$  are provided with vernier-scales  $d^{20}$  for obtaining close readings in connection with the graduations on the bars; but any suitable form of indicator may be used instead.

What I claim is—

1. In apparatus of the class described, a range-finder comprising a table, a triangular frame having a base-line fixed to the table at the center of one of the sides thereof, and side lines pivoted to the ends of the base-line and movable upon each other, a slide engaging each of said sides, and means for ascertaining the east or west departures and latitude of the apex of the triangular frame comprising a screw-threaded rod journaled in bearings upon the table and arranged perpendicular to the center of the base-line, a sleeve having a screw-threaded opening for engaging the rod, a bar having graduations for indicating east and west departures fixed by its center to the sleeve at right angles to the rod, rods on each side of the table and parallel with the first rod, the ends of said bar having sleeves secured thereto and sliding upon said rods and said rods having graduations to indicate the latitude, and means on said slide for contacting with said bar, said table being divided on lines parallel with the central rod and upon each side thereof, into three sections, and the sections being hinged to each other whereby to fold upon the central section.

2. In apparatus of the class described, a range-finder comprising a table, a triangular frame having a base-line fixed to the table at the center of one of the sides thereof, and side lines pivoted to the ends of the base-line and movable upon each other, a slide engaging each of said sides, and means for ascertaining the east or west departures and latitude of the apex of the triangular frame comprising a screw-threaded rod journaled in bearings upon the table and arranged perpendicular to the center of the base-line, a sleeve having a screw-threaded opening for engaging the rod, a bar having graduations for indicating east and west departures fixed by its center to the sleeve at right angles to the rod, rods on each side of the table and parallel with the first rod, the ends of said bar having sleeves secured thereto and sliding upon said rods and said rods having graduations to indicate the latitude, and means on said slide for contacting with said bar.



3. In range-finders, means for computing the sides of a triangle having a known base-line, comprising a triangular frame having a base-line adapted to be brought into coincidence with the known base-line, and movable sides adapted to be brought into relations with the frame base-line corresponding with the relations of the sides of the triangle to the known base-line, and means for computing the east or west departures and the latitude of the apex of the triangle, comprising a screw-threaded rod arranged perpendicular to the center of the frame base-line, a bar arranged at right angles to the rod and having at its center a sleeve having a screw-threaded opening for engaging the rod, said bar having graduations upon each side of its center indicating east and west departures, rods upon each side of the screw-threaded rod and parallel therewith, means on the bar for engaging said rods, said rods being graduated to indicate the latitude, and means for rotating the screw-threaded rod whereby to move the bar into and out of contact with the apex of the triangular frame.

4. In range-finders, means for computing the sides of a triangle having a known base-line, comprising a triangular frame having a base-line adapted to be brought into coincidence with the known base-line, and movable sides adapted to be brought into relations with the base-line corresponding to the relations of the sides of the triangle to be computed to the known base-line, and means for computing the east and west departures and the latitude of the apex of the triangle, comprising a bar arranged parallel to the base-line of the frame, said bar having graduations upon each side of the center thereof, indicating east and west departures, and having its center directly opposite the center of the frame base-line, means for moving said bar toward and from the base-line of the frame, means for retaining the bar in parallelism with the frame base-line during the movement thereof, and means at the apex of the frame for contacting with the bar.

5. In range-finders, means for computing the sides of a triangle having a known base-line, comprising a triangular frame having a base-line adapted to be brought into coincidence with the known base-line, and movable sides adapted to be brought into relations with the frame base-line, corresponding to

the relations of the sides of the triangle to the known base-line, and means for computing the east or west departures of the apex of triangle, comprising a screw-threaded rod arranged perpendicular to the center of the frame base-line, a bar having a screw-threaded opening at its center for engaging the rod, and having graduations upon each side of its center indicating east and west departures, said bar being arranged at right angles to the rod, and means for rotating the rod whereby to move the bar into and out of contact with the apex of the triangular frame.

6. In range-finders, means for computing the sides of a triangle having a known base-line, comprising a triangular frame having a base-line adapted to be brought into coincidence with the known base-line, and movable sides adapted to be moved into positions corresponding to the positions of the sides of the triangle with respect to the known base-line, and means in connection with the frame for computing the east or west departures and the latitude of the apex of the triangle, comprising a bar arranged parallel to the base-line and having its center in the same vertical line with the center thereof, said bar having graduations upon each side of the center thereof indicating the east and west departures, a rod having graduations indicating the latitude, for guiding said bar and arranged perpendicular thereto, and means for moving the bar into contact with the apex of the frame.

7. In a range-finder, means for computing the sides of a triangle having a known base-line, comprising a triangular frame having a base-line adapted to be brought into coincidence with the known base-line, and movable sides adapted to be moved into positions corresponding with the positions of the sides of the triangle with respect to the known base-line, and means in connection with the frame for computing the east or west departures comprising a bar arranged parallel to the base-line and having its center in a line perpendicular to the center of the base-line, said bar having graduations upon each side of the center thereof indicating east and west departures.

HARRY C. PERCY.

Witnesses:

JAMES McCook,  
G. A. SOMPAYRAC.