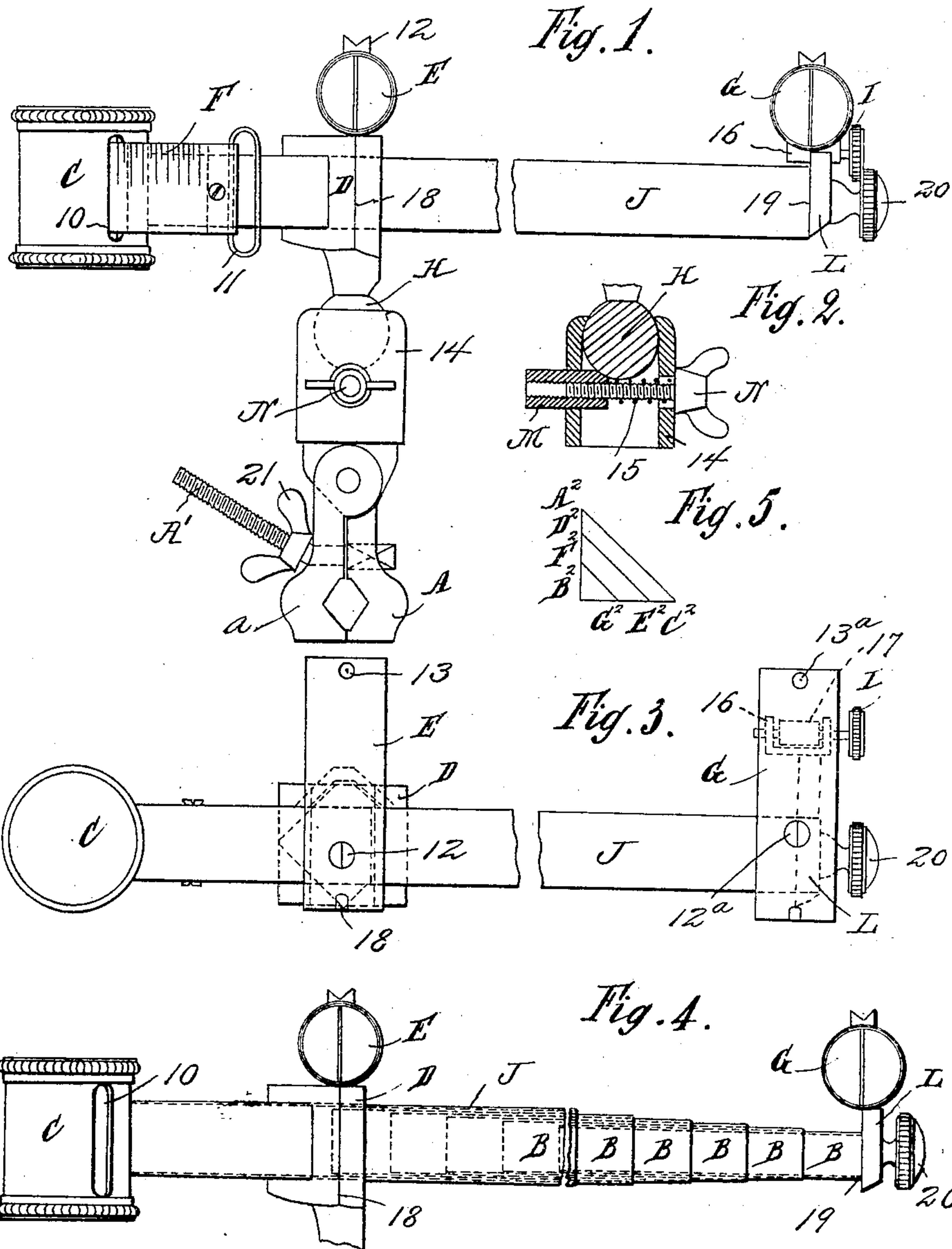


No. 810,541.

PATENTED JAN. 23, 1906.

A. JOORS & A. MERCENIER.  
TELEMETER.

APPLICATION FILED MAR. 6, 1905.



Witnesses.

Harry L. Amer.

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# UNITED STATES PATENT OFFICE.

ALPHONSE JOORS, OF FOREST, NEAR BRUSSELS, AND ADHÉMAR  
MERCENIER, OF BRUSSELS, BELGIUM.

## TELEMETER.

No. 810,541.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed March 6, 1905. Serial No. 248,556.

*To all whom it may concern:*

Be it known that we, ALPHONSE JOORS, 5  
mechanician, residing at Forest, near Brus-  
sels, 77 Avenue Albert, and ADHÉMAR MER-  
CENIER, officer of the Belgian army, residing  
at Brussels, 32 Rue Philippe-le-Bon, King-  
dom of Belgium, citizens of the Kingdom of  
Belgium, have invented certain new and use-  
ful Improvements in New Practical Teleme-  
ters; and we do hereby declare the following  
to be a full, clear, and exact description of  
the invention, such as will enable others  
skilled in the art to which it appertains to  
make and use the same, reference being had  
to the accompanying drawings, and to letters  
and figures of reference marked thereon,  
which form a part of this specification.

Our invention relates to telemeters, and  
has for its object to construct a simple and  
easily-operable instrument capable of adjust-  
ment to various distances with details of con-  
struction hereinafter described and claimed.

Referring to the drawings, in which like  
parts are similarly designated, Figure 1 is an  
elevation of the telemeter. Fig. 2 is a sec-  
tion of the ball-and-socket joint. Fig. 3 is a  
plan view of the apparatus. Fig. 4 is an ele-  
vation showing the telescopic tubes partly  
extended, the foot being broken away. Fig.  
5 is a diagram illustrating the principle of op-  
eration.

The apparatus consists of a tape-case C,  
having a lateral longitudinal slot 10, through  
which a tape or scale F can be drawn from  
its spring or other barrel. The tape is a fab-  
ric having a copper face and is graduated  
either from zero to three thousand meters for  
infantry or from zero to six thousand meters  
for artillery at the will of the operator. A  
wire loop or other piece 11 prevents the end  
of the tape from passing through the slot into  
the case. Attached to the side of the case C  
is a main tube J, in which are slidably, but  
not rotatively, mounted a number of tele-  
scoping tubes B, here shown as five. The  
main tube as well as the telescoping tubes are  
preferably, but not necessarily, rectangular  
in section to prevent their rotation one with-  
in the other.

On the main tube J is a supporting mem-  
ber D, capable of being moved along the tube  
J and clamped in any desired position. This  
support has formed on its lower end a ball H,

forming part of ball-and-socket joint, and is  
surmounted by a sight-tube E or small tele- 55  
scope provided with the usual hair-lines, and  
on the top of the tube are gun-sights, the rear  
one, 12, being a notch and the front one, 13,  
a point. The sight-tube or telescope E is  
mounted so as to be fixed always at right an- 60  
gles to the main tube J.

The ball H is mounted in a suitable socket  
14, (see Fig. 2,) having a perforation through  
which a sleeve M, threaded internally, can  
slide. Passing in the socket is a thumb- 65  
screw N, that screws into the sleeve and  
forces it against the ball to hold the latter  
tight in the socket. A spring 15 surrounds  
screw N and tends to force the sleeve M out-  
ward, so that the ball will be quickly released 70  
when the thumb-screw N is unscrewed. The  
lower end of the socket member is threaded  
to receive the end of the stationary member  
A of a clamp *a* A, the movable member *a* of  
the clamp being pivoted. A screw A' is 75  
fixed at one end in the jaw A and passes  
through a slot or perforation in the jaw *a*. A  
thumb-nut 21 on screw A' will hold the jaws  
closed on the object to which the instrument  
is to be fastened. 80

At the end of the innermost tube B is fas-  
tened a plate L by means of the screw 20, the  
head of which forms a knob by which the  
telescopic tubes are drawn out.

On the plate D is mounted the adjustable 85  
sight-tube or telescope G, having gun-sights  
12<sup>a</sup> and 13<sup>a</sup> and in construction like the one  
E; but this tube is pivoted to move slightly  
toward the sight-tube E, and in order to do  
this the plate L is extended forward and 90  
formed into a fork 16. From the under side  
of the sight-tube G depends a lug 17, Fig. 3,  
that is moved by the thumb-screw I. On  
the part D is an edge 18 in line with sight-  
point, and on the part L is a similar edge 19, 95  
the distance between which edges is meas-  
ured by the tape F to give the distance of the  
object sighted.

The operation is as follows: The device is  
fixed, by means of its clamp *a* A, to a bayonet 100  
or saber that is stuck in the ground or in a  
tree or to a stake or to any other convenient  
object and is then set level by means of the  
ball-and-socket joint H 14 and moved so that  
the sight-tube E is directed on the object 105  
and is clamped in position by the screw N.



The sight-tube G is then moved to or from the one E until the object is sighted through it. The distance between the edges 18 and 19 is then measured by the tape and the distance of the object directly read off. To adjust the apparatus, the two sight-tubes are placed a distance apart measured by the tape—say one hundred units, the actual distance apart being two centimeters. Both sight-tubes are now directed to a person or object placed one hundred meters from the instrument, the one, E, being directed on the object first, and the other one, G, is set on the object by the set-screw I. For infantry this adjustment is made for one hundred meters and for artillery for two hundred meters, so that the apparatus will indicate distances up to three thousand meters for infantry and six thousand meters for artillery. If the adjustment is made on an object five hundred meters distant from the instrument for the given distance apart of the sight-tubes or telescopes, distances can be measured to fifteen thousand meters.

The principle of operation is based on the proportionality of like sides of similar right triangles, (see Fig. 5,) where the base  $B^2 C^2$  is represented by the extensible tubular members J B of the apparatus, the side  $A^2 B^2$  the distance of the object from the instrument, and the angle  $A^2 C^2 B^2$  being constant and the same as the angle between the sight-tube G and the extensible base J B of the instrument. The triangles  $A^2 B^2 C^2$ ,  $D^2 B^2 E^2$ , and  $F^2 B^2 G^2$  being similar right triangles, the angles at their bases being equal, their bases and sides are proportional, and we have

$$\frac{B^2 F^2}{B^2 G^2} = \frac{B^2 D^2}{B^2 E^2} = \frac{B^2 A^2}{B^2 C^2}$$

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A telemeter comprising a plurality of telescoping tubes, a sight-tube mounted on the outer tube at right angles thereto, a like sight-tube mounted on the end of the innermost telescoping tube and at an angle to the first sight-tube and means to measure the

distance between the two tubes, substantially as described.

2. In a telemeter, a plurality of telescoping tubes, a supporting member on and adjustable along the outer tube, a sight-tube fixed on said member at right angles to the outer tube, a sight-tube fixed on the end of the innermost tube, an angular adjustment for the last-named sight-tube and a measure for the distances between the two tubes graduated to read distances of the objects sighted.

3. In a telemeter, a plurality of telescoping tubes, a supporting member on and adjustable along the outer tube and having a measuring edge, a sight-tube fixed on the member at right angles to the telescopic tubes and in alinement with the measuring edge, a plate having a measuring edge fixed on the end of the innermost telescopic tube, a sight-tube in alinement with the edge on said plate, means on the plate to angularly adjust the second sight-tube, and means to measure the distance between the measuring edges.

4. In a telemeter, a plurality of rectangular telescoping tubes, a supporting member on and adjustable along the outer tube, and having a measuring edge thereon, a tape-case, and tape on one end of the outer tube, a sight-tube mounted on the member in vertical alinement with said edge at right angles to the telescoping tubes, a ball-and-socket joint on the member and a clamp on the ball-and-socket joint, a plate having a forked extension fixed on the end of the innermost telescoping tube and having a measuring edge, a sight-tube mounted on the plate in vertical alinement with the measuring edge and means in the forked extension to angularly adjust the second sight-tube, substantially as and for the purpose set forth.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

ALPHONSE JOORS.  
ADHÉMAR MERCENIER.

Witnesses:

VICTOR LEONARD,  
GEORGES GLISLAIN.