No. 738,407. PATENTED SEPT. 8, 1903.

F. T. CABLE.

CLINOMETER.

APPLICATION FILED DEC. 13, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 3.

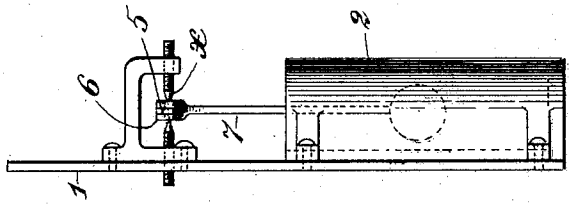


Fig. 4.

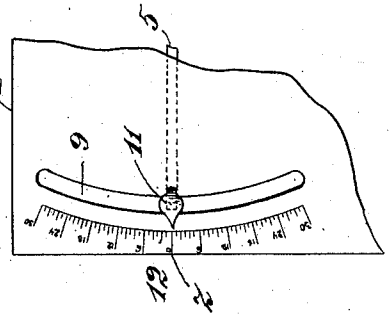


Fig. 1.

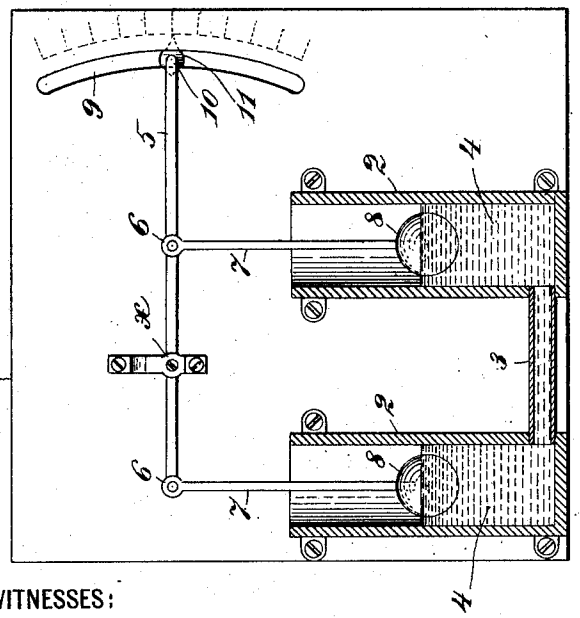
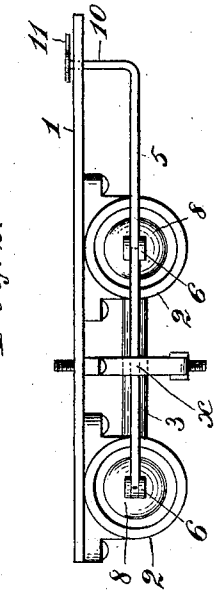


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

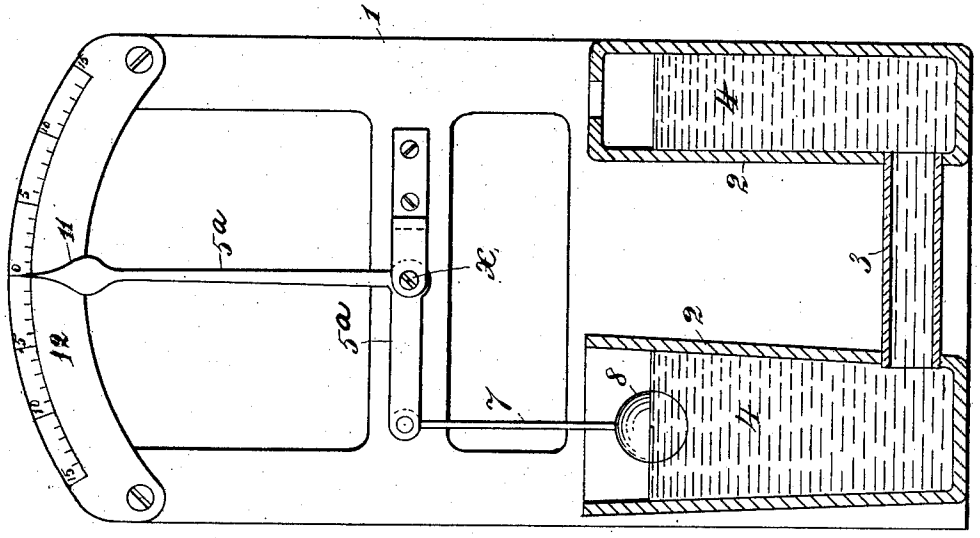


Fig. 5

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No. 738,407. Patented September 8, 1903.

UNITED STATES PATENT OFFICE.

FRANK T. CABLE, OF NEW SUFFOLK, NEW YORK, ASSIGNOR TO ELECTRIC BOAT COMPANY, A CORPORATION OF NEW JERSEY.

CLINOMETER.

SPECIFICATION forming part of Letters Patent No. 738,407, dated September 8, 1903.

Application filed December 13, 1902. Serial No. 135,076. (No model.)

To all whom it may concern:

Be it known that I, FRANK T. CABLE, a citizen of the United States, residing at New Suffolk, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Clinometers, of which the following is a specification.

This invention relates to devices for indicating the inclination in degrees of any line or surface with the horizon; and, as herein represented, the invention is embodied in a clinometer adapted for use on a submarine boat to show and measure at all times the boat's inclination with the level of the water of flotation, both laterally and longitudinally, if desired.

In the accompanying drawings, which illustrate the clinometer, Figure 1 is a rear elevation showing the back of the supporting-plate and the cups in section. Fig. 2 is a plan. Fig. 3 is a side or edge view. Fig. 4 is a fragmentary front view showing the scale on the front of the plate. Fig. 5 is a view similar to Fig. 1, illustrating a construction where only one float is employed.

Referring primarily to Figs. 1 to 4, 1 is the supporting-plate of the apparatus, and on the back of said plate is secured two cups 2 2, connected at their lower parts by a tube 3 and containing mercury 4 or other suitable liquid. Pivotally mounted on the plate at x is a beam or lever 5, and to this lever are coupled at 6 6 two float-stems 7 7, attached at their lower ends, respectively, to floats 8 8, as clearly shown. The points 6 6 are situated at equal distances from the fulcrum-point x and at opposite sides of the same. In the plate 1 is a slot 9, preferably curved, and in said slot plays a lateral branch 10 on the beam or lever 5, and to this lateral branch, at the front of the plate 1, Fig. 4, is secured a pointer 11, which is adapted to traverse a scale 12, graduated in both directions from a zero-point z to measure degrees of inclination. The floats 8 may be of metal if the liquid in the cups is mercury, and the stems 7 will be, by preference, of equal length and the cups so disposed with reference to the beam or lever that when the liquid stands at the same height in both of the cups the lever will be horizontal and the pointer at zero. This, however, is not essential to the operation of the clinometer.

It will be obvious from the description above that if the supporting-plate be slowly rocked, so as to cause the liquid to flow from one cup to the other for maintaining its level, the lever 5 will be compelled by the floats to maintain its position, but the scale 12 on the plate will move under the pointer, and the latter will indicate the degree of inclination reached—that is to say, the beam or lever will remain in one position and the scale will move under the pointer, no matter whether the lever be horizontal or not.

Two floats are not absolutely essential to operation of the instrument; but they provide a weight at both sides of the fulcrum for holding the lever steady. Fig. 5, however, shows a construction where but one float is employed. This construction shows the lever 5^a in elbow form, so as to assume an upright position, the scale 12 being correspondingly located, so that the pointer will traverse it.

The drawings show two of the many forms in which the invention may be embodied.

It is most convenient to mount the scale 12 on the plate, as shown, and the pointer on the lever, so that the scale will move under the pointer, but this is not a material matter so long as the two devices move relatively to each other, as in all such indicators.

Having thus described my invention, I claim—

1. A clinometer, comprising a support, cups mounted thereon and open above to the atmosphere at their tops, said cups communicating only with each other at their lower parts, a liquid in said cups, a lever fulcrumed on the support above said cups and provided with a pointer, a float in one of said cups, a rigid stem connecting the float with said lever, and a scale on the support adapted to be moved under said pointer.

2. A clinometer comprising a support, two cups thereon connected at their lower parts and containing mercury, metal floats in the respective cups, a lever fulcrumed on the support, stems connecting the supports respectively with said lever on opposite sides of the fulcrum, a pointer carried by said lever, and a scale on the support adapted to

move under said pointer when the support is rocked, substantially as set forth.

3. In a clinometer, a support carrying a scale, and a lever provided with a pointer to traverse said scale, the said scale, lever and pointer, and means for maintaining the lever stationary when the scale and its support are moved, substantially as set forth.

In witness whereof I have hereunto signed my name, this 2d day of December, 1902, in the presence of two subscribing witnesses.

FRANK T. CABLE.

Witnesses:
HENRY CONNETT,
PETER A. ROSS.