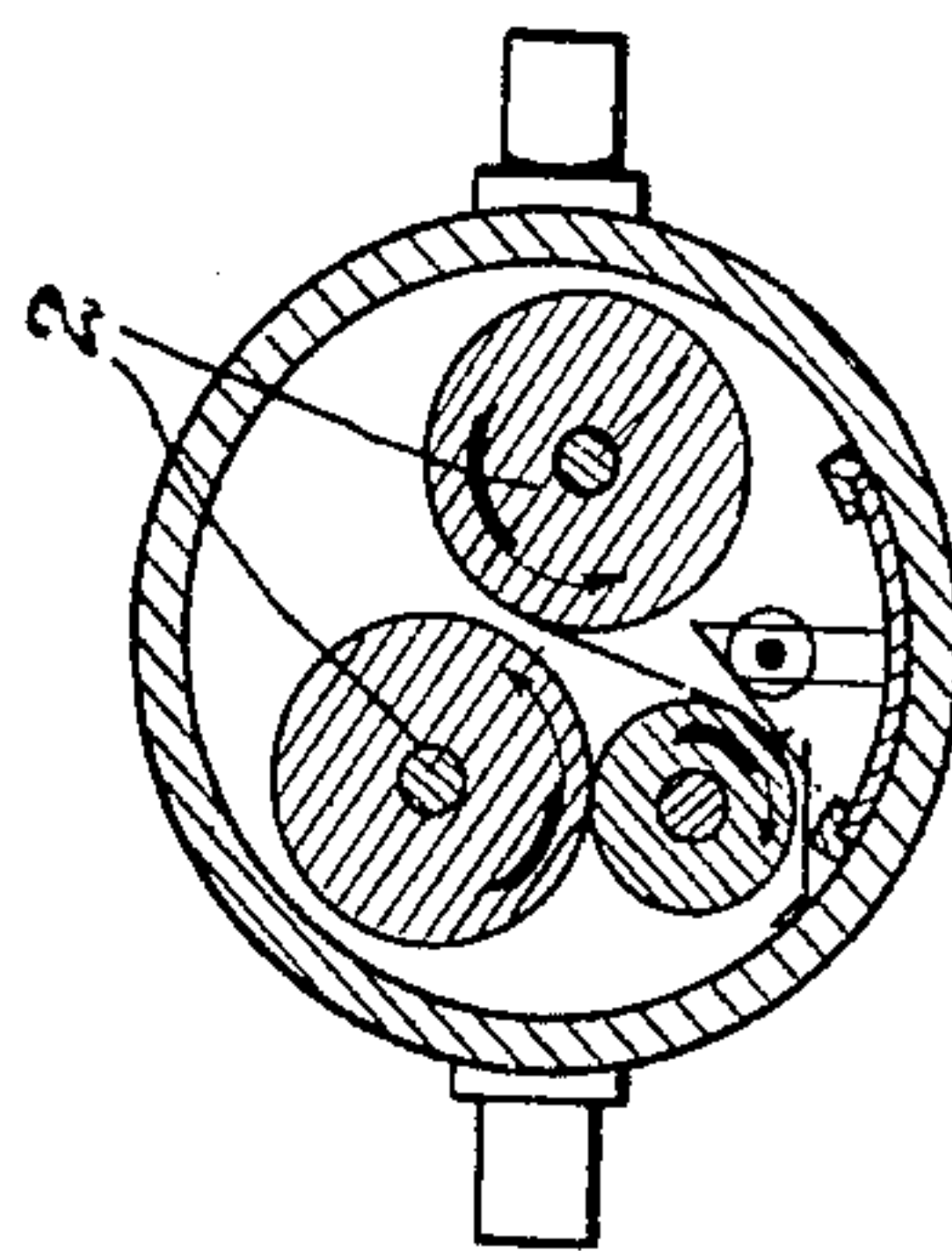
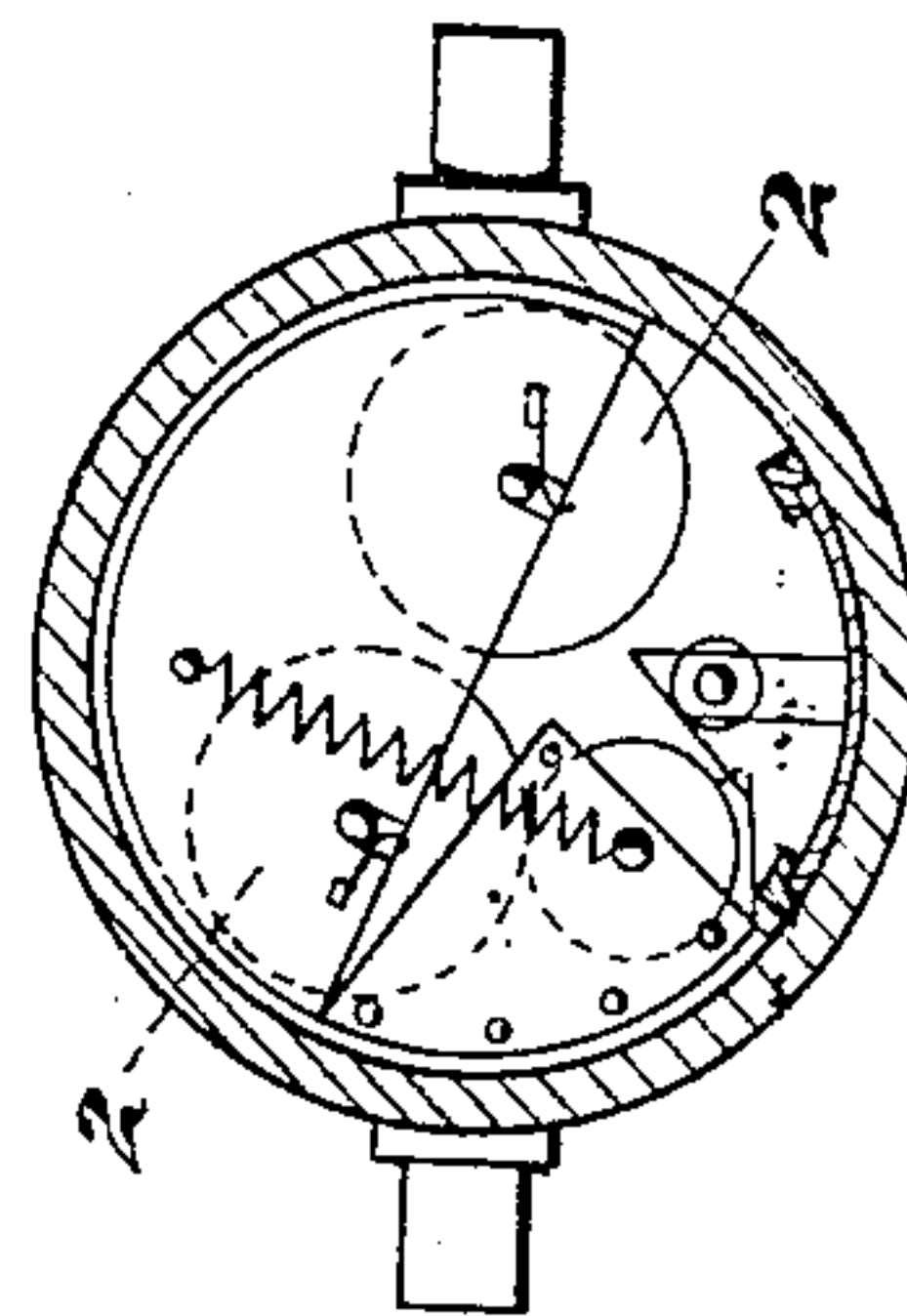
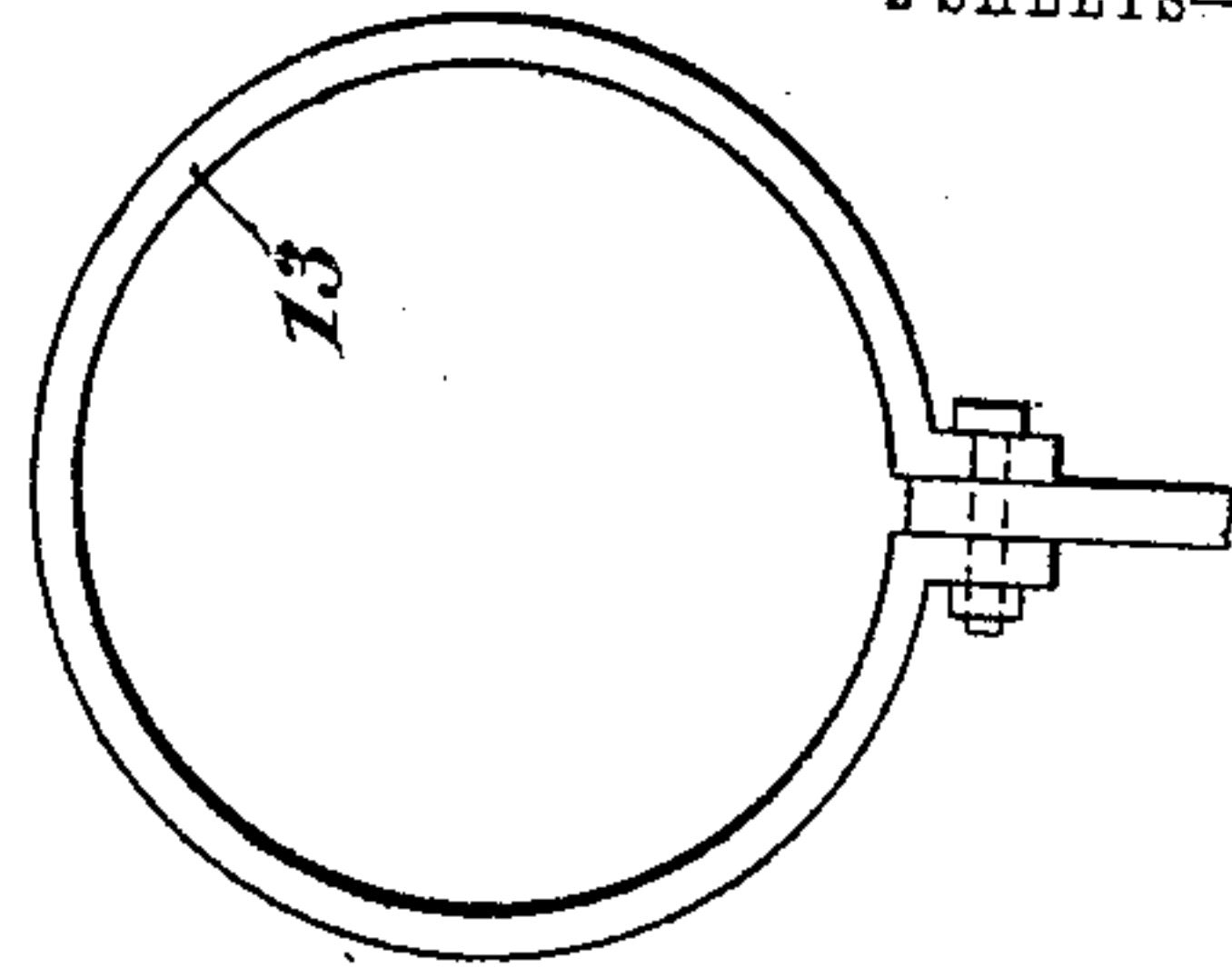
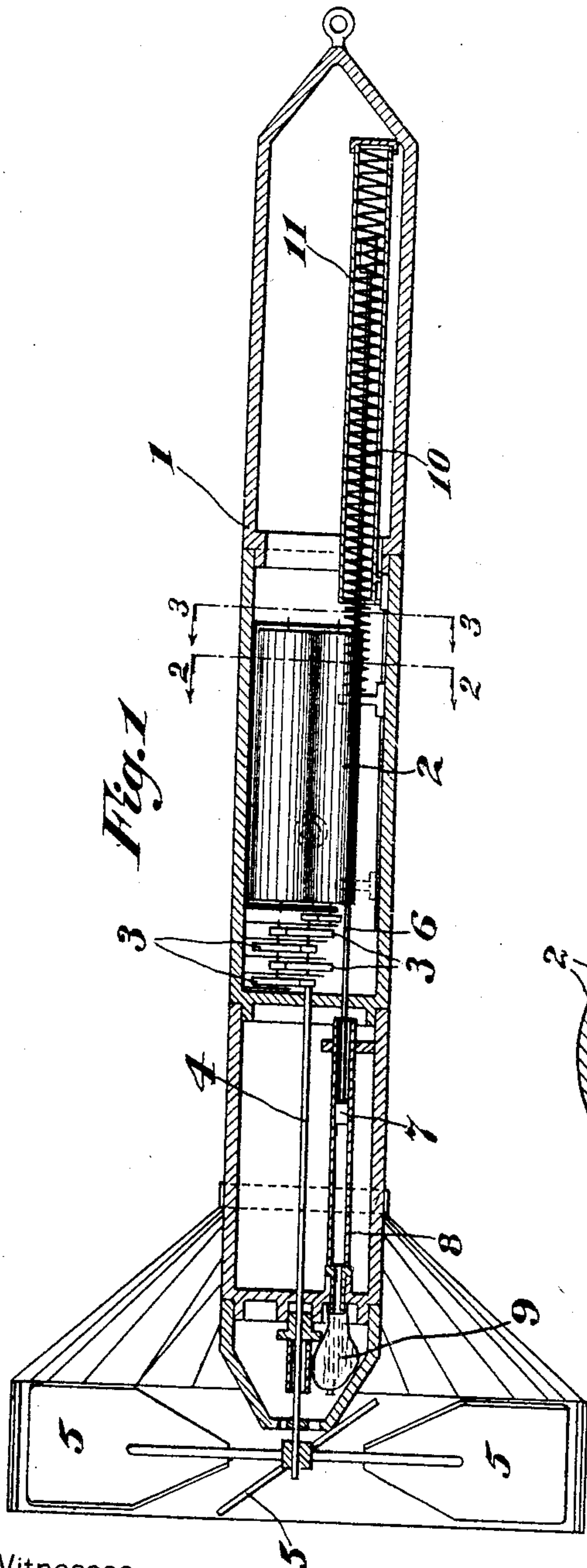


967,623.

O. EVENSEN.  
HYDROGRAPHIC APPARATUS.  
APPLICATION FILED AUG. 14, 1909.

Patented Aug. 16, 1910.

2 SHEETS—SHEET 1.



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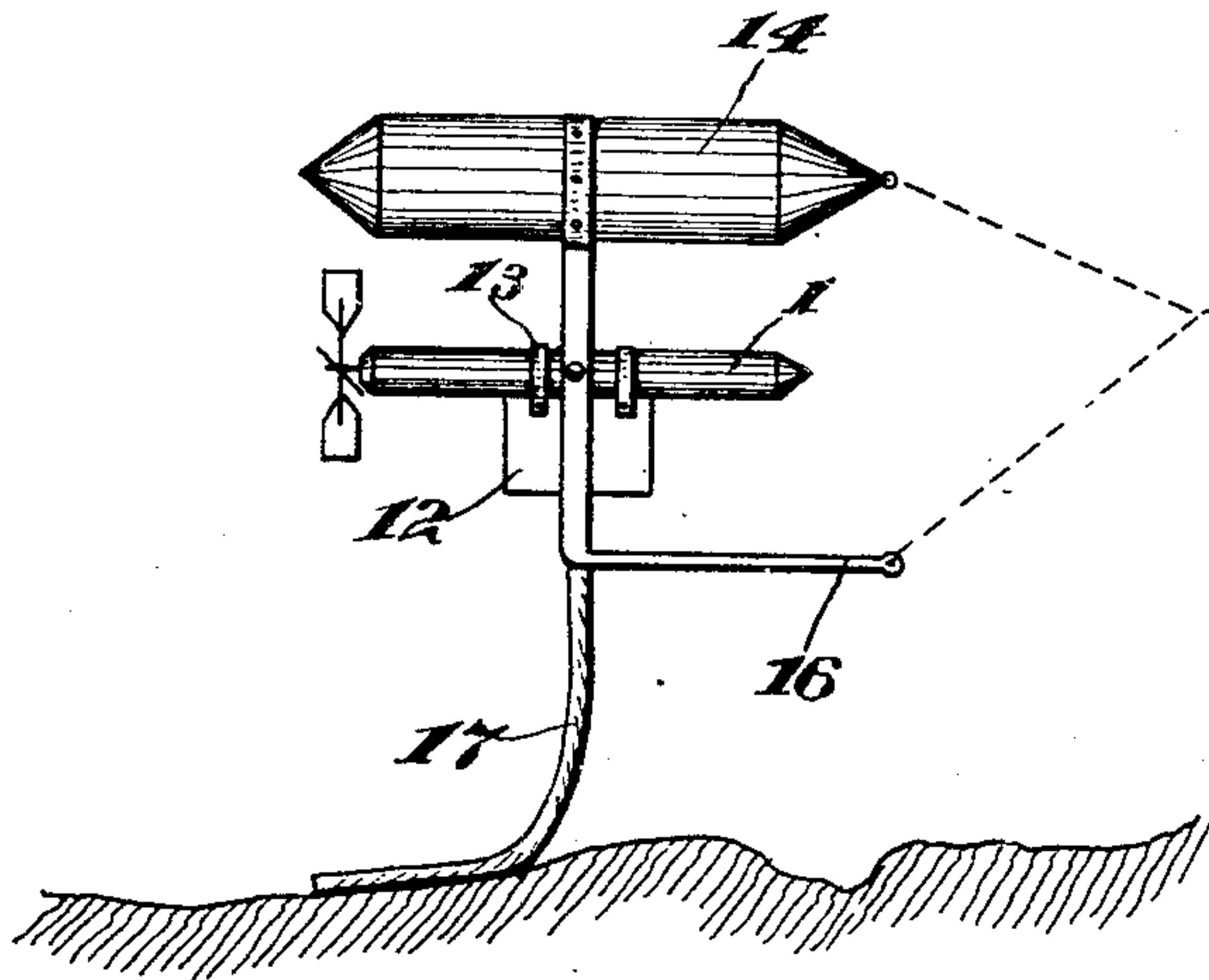


Fig. 5

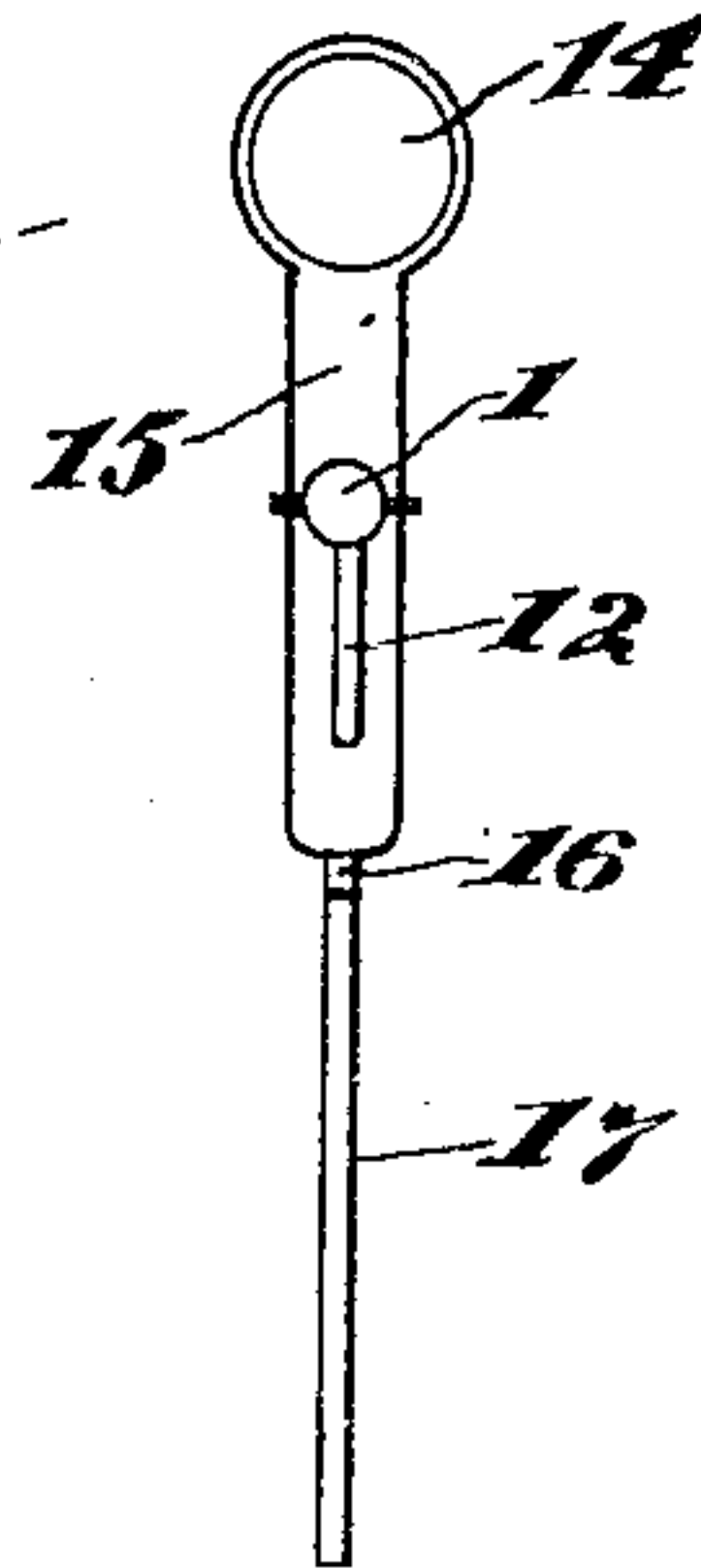


Fig. 6

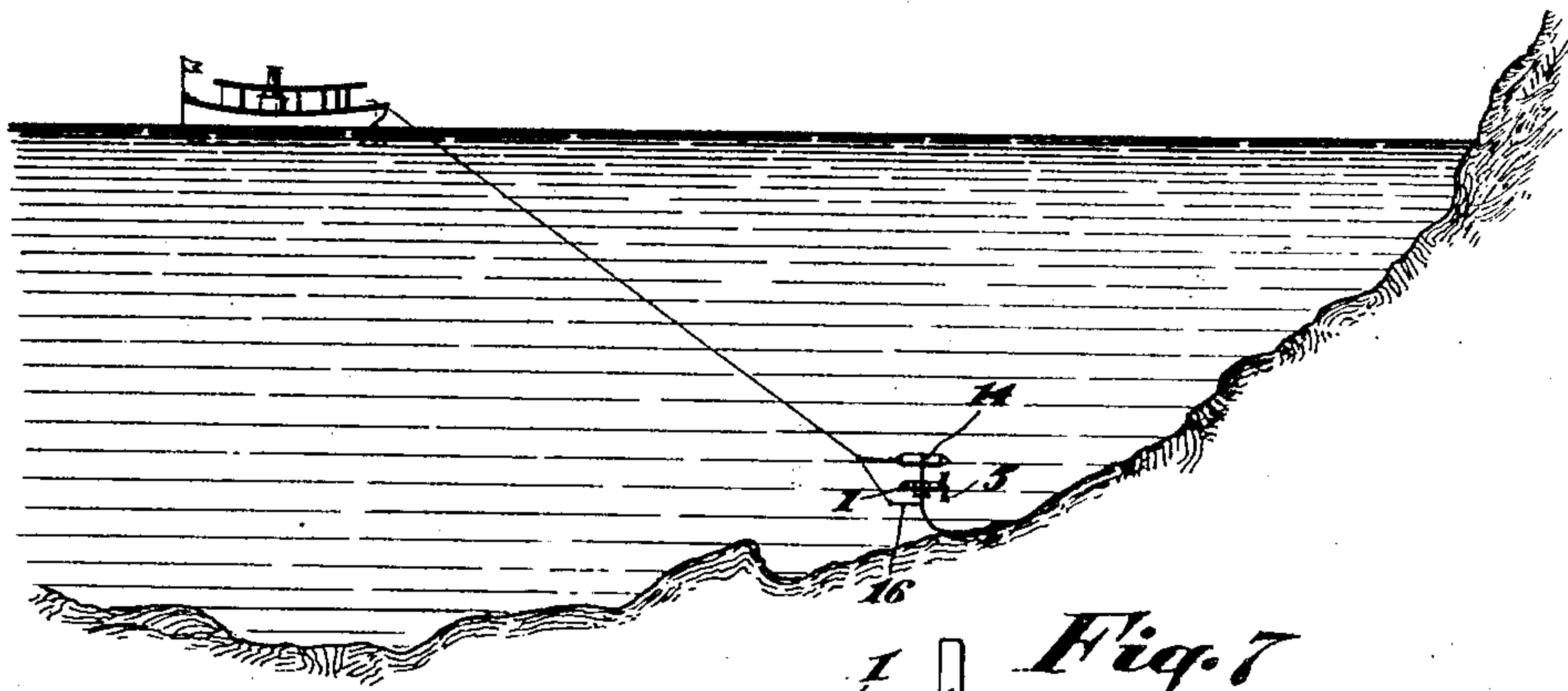


Fig. 7

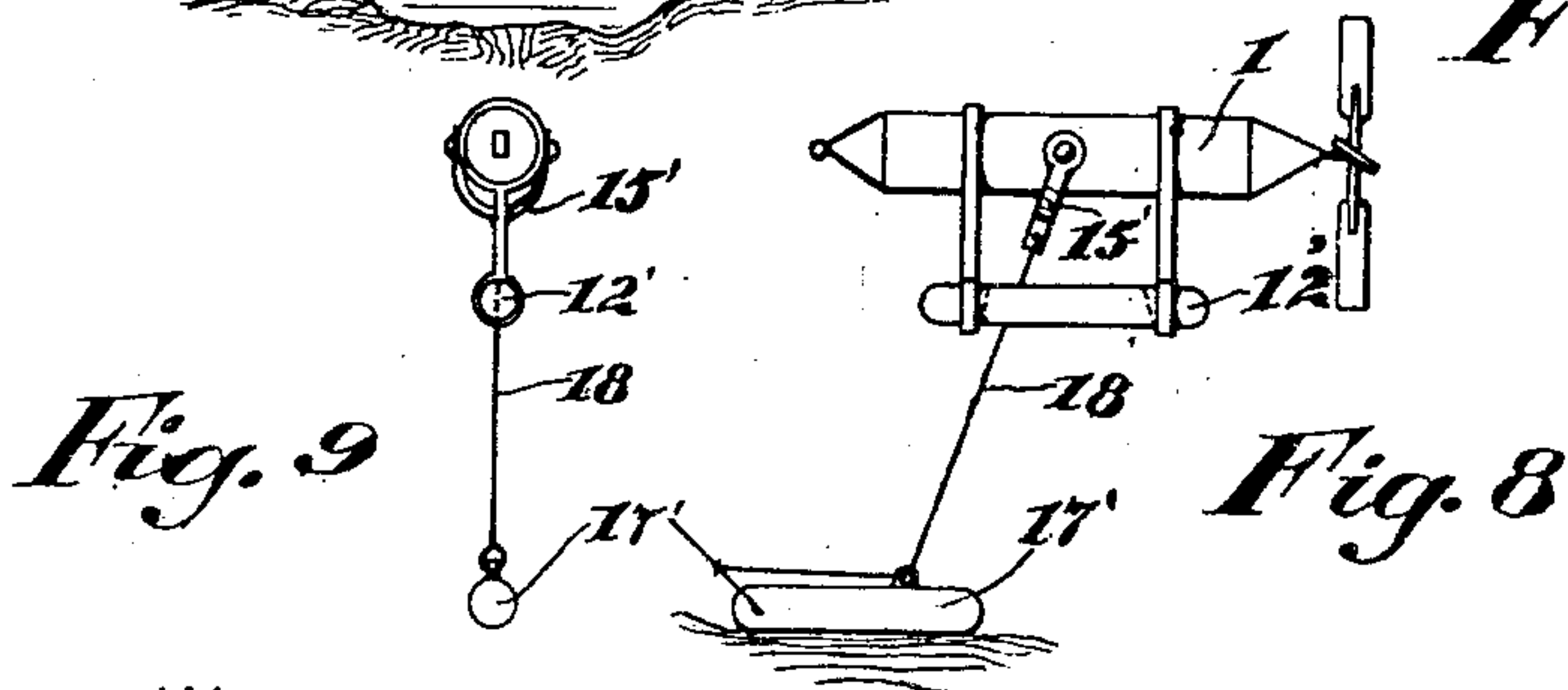


Fig. 9

Fig. 8

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# UNITED STATES PATENT OFFICE.

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## HYDROGRAPHIC APPARATUS.

967,623.

Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed August 14, 1909. Serial No. 512,800.

*To all whom it may concern:*

Be it known that I, OLAF EVENSEN, a subject of the King of Norway, residing at the city and District of Montreal, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Hydrographic Apparatus; and I do hereby declare that the following is 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.

The invention to be hereinafter described relates to hydrographic apparatus, and particularly to hydrographic contour mapping apparatus.

Broadly speaking, the invention comprises a float, a compartment casing carried thereby, revoluble cylinders mounted in one of the compartments thereof and adapted to carry a record sheet, means for revolving said cylinders, a longitudinally movable pencil adapted to mark on the record sheet, and means for moving the pencil.

In order to more clearly disclose the construction, operation and use of the invention, reference should be had to the accompanying drawings forming part of the present application.

Throughout the several figures of the drawings, like reference characters designate the same parts.

In the drawings: Figure 1 is a vertical longitudinal section through the casing; Fig. 2 is a cross section on line 2—2 of Fig. 1; Fig. 3 is a cross section on line 3—3 of Fig. 1; Fig. 4 is an end view of one of the keel supporting rings, detached; Fig. 5 is a side elevation of the invention, complete; Fig. 6 is an end view of the casing support, detached; Fig. 7 is a side elevation of the invention, in use; Fig. 8 is a side elevation of a modification; and, Fig. 9 is a front end view of Fig. 8.

The present invention is especially adapted to give an accurate contour drawing of the surface above which it travels, and so avoid the clumsy methods of frequent actual measurements now in vogue in determining such contours.

In the preferred form of the invention, a casing 1 of several compartments is used, each compartment being adapted to contain a part of the mechanism used in making the contour. In order to give an accurate and continuous contour, it is necessary to pro-

vide a traveling record sheet of considerable size. This must be done in the minimum space. Accordingly, a series of cylinders or rolls 2 have been used. One of these may be used as a holder for the unused sheet, a second as a guide over which the sheet may be drawn as the contour is being recorded, and a third may be used to receive the sheet on which the record has been made. In order to revolve these rolls, a series of gears 3 may be used, one of the gears being fixed to one end of a revoluble shaft 4, the opposite end of which is provided with a wheel or propeller blade 5, which is forced to rotate as the casing is drawn through the water. In this way, the cylinders 2 are revolved, and the sheet of paper will be wound from one to the other. As the paper moves, it is necessary, of course, to provide means to indicate thereon the contours of the surface above which the casing 1 is traveling. To this end, a longitudinally movable pencil has been provided. This pencil is made fast to a piston rod 6 having a head 7, which travels freely in the cylinder 8, which receives oil or other fluid from a compressible reservoir 9. The piston head 7 is kept normally seated on the surface of the fluid in the tube 8, by the pressure of a spring 10 in the tube 11. As the depth to which the casing 1 is lowered varies, the water pressure on the reservoir 9 varies. This last variation causes movement of the tracing pencil carried by the piston rod 6, thus indicating on the record sheet the variations in depth, or the profile of the surface above which the device travels.

In order to insure accuracy, of course it is necessary to keep the device in an upright position during use. To this end, a guide keel 12 has been provided. This keel is suspended from the casing 1 by rings 13, or yokes, which surround or inclose the casing and are secured to it. In this way, the casing 1 will always be held in its proper upright position.

In using the apparatus, it is necessary of course to provide means for suspending it a short distance above the bottom of the stream, while at the same time preventing its actual contact with the bottom. For this purpose, a float 14 is used, and a yoke 15 is dropped from the float and acts to suspend the casing 1 therefrom. This yoke is provided with a forwardly projecting arm 16, to which one branch of a tow rope may be



connected, the other branch being connected to the forward end of the float 14.

19 designates a guard for propeller 5 and is supported by wires 20 secured to collar 21, which fits tightly around said casing 1 not far from its rear end.

In order to counteract the buoyancy of the casing 1, a flexible device 17 is used, comprising, preferably, a rubber tube, weighted. This device depends from the yoke 15, and is adapted to travel with its free end trailing on the surface above which the apparatus travels.

In the form shown in Figs. 8 and 9, the casing 1 is made large enough to act as a buoy, and the float 14 is omitted. Instead of the rigid yoke 15, a pivotally connected swinging yoke 15' is used, and instead of the flexible member 17, a drag 17' is used, being connected to the yoke 15' by the member 18. The keel 12 is replaced by the longitudinally slotted guide member 12', suspended from the casing 1. The member 18 plays back and forth in the slot in the member 12', and so keeps the casing 1 in an upright position.

It is thought that the operation and use of the invention will be clear from the preceding detailed description.

Changes may be made in the construction, arrangement and disposition of the several parts of the invention, without in any way departing from the field and scope of the same, and it is meant to include all such within this application, wherein only a preferred form has been disclosed.

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

1. An apparatus of the character described, comprising a casing, recording mechanism mounted therein, pressure operated means for actuating said recording mechanism, and a float for maintaining said casing at a constant distance above a river bottom.

2. An apparatus of the character de-

scribed, comprising a casing, recording mechanism mounted therein, pressure operated means for actuating said recording mechanism, means for maintaining said casing in upright position, and a float for maintaining said casing at a constant distance above a river bottom.

3. An apparatus of the character described, comprising a casing, recording mechanism mounted therein, pressure operated means for actuating said recording mechanism, a keel secured to said casing and adapted to maintain it in upright position, and a float for maintaining said casing at a constant level above a river bottom.

4. In combination, in bathometers, a casing containing pressure operated recording mechanism, a float for suspending said casing and a weight for pulling down said float and casing.

5. In combination, in bathometers, a casing containing pressure operated recording mechanism, a float for suspending said casing, a yoke joining said casing and float and a weight attached to said yoke for pulling down said casing and float.

6. In combination, in bathometers, a casing containing pressure operated recording mechanism, a float, a yoke joining said casing and float, a keel secured to the bottom of said casing and a weight attached to said yoke for pulling down said casing and float.

7. In combination, a casing of a bathometer, pressure operated recording mechanism arranged in said casing, means for shifting the record, a guard arranged on the rear end of said casing to protect said shifting means, a float, a yoke joining said casing and float and a weight attached to said yoke for pulling down said casing and float.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

OLAF EVENSEN.

Witnesses:

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E. J. GAUVIN.