

No. 871,124.

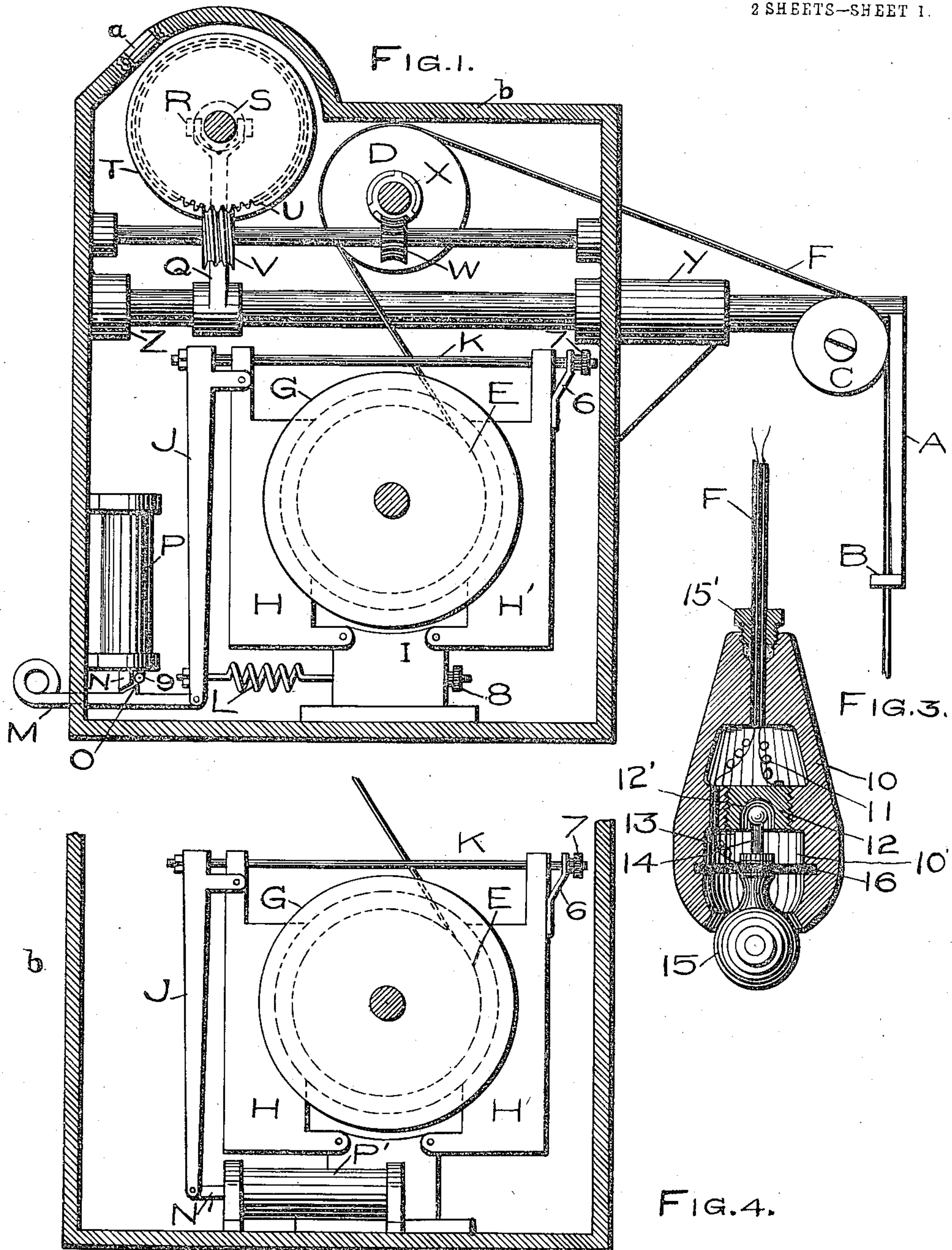
PATENTED NOV. 19, 1907.

O. M. KNOBLOCK & J. DUSHANE.

SOUNDING APPARATUS.

APPLICATION FILED JAN. 2, 1906.

2 SHEETS—SHEET 1.



WITNESSES:—

Edw. F. Dubail
James M. Brindley

By

INVENTORS

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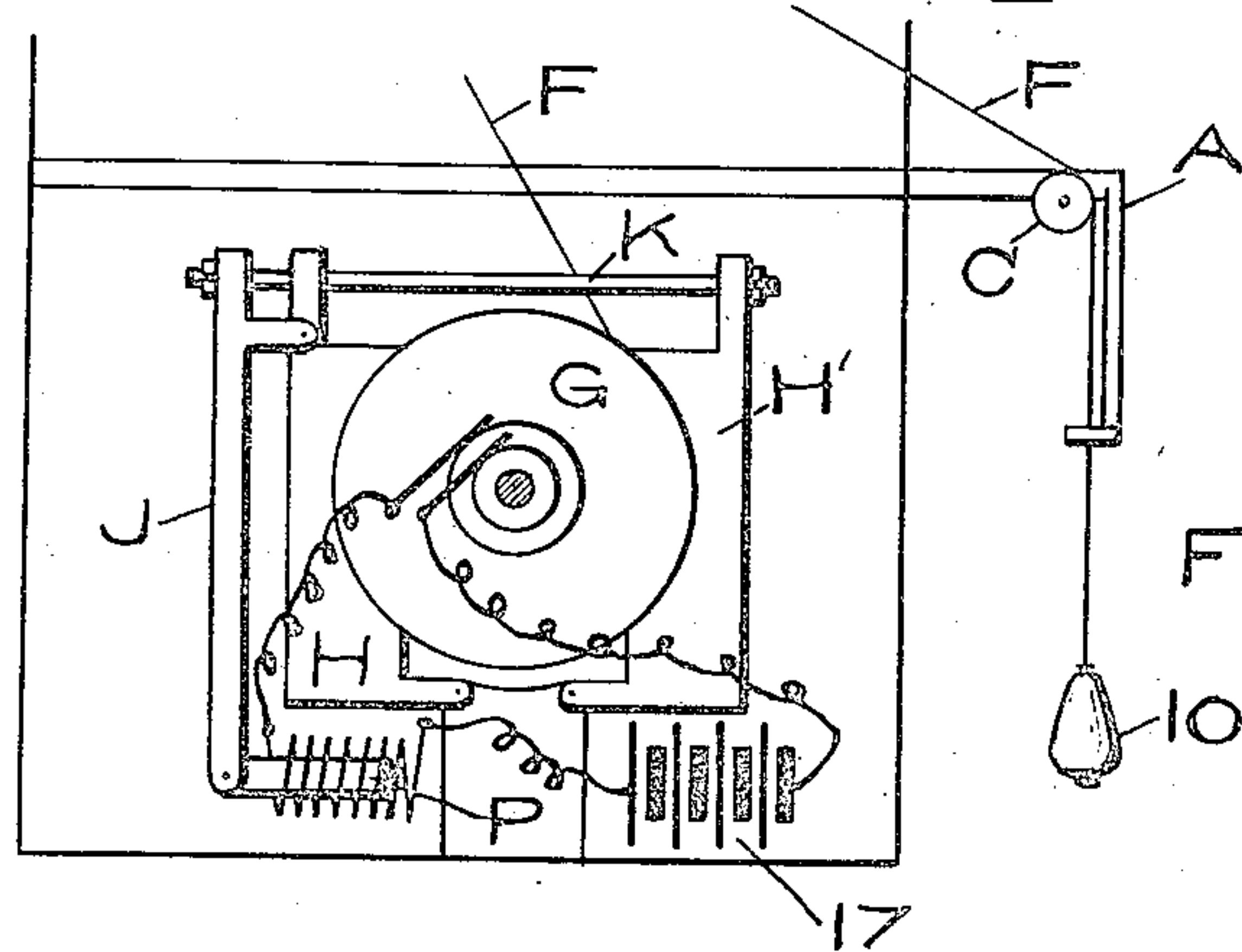
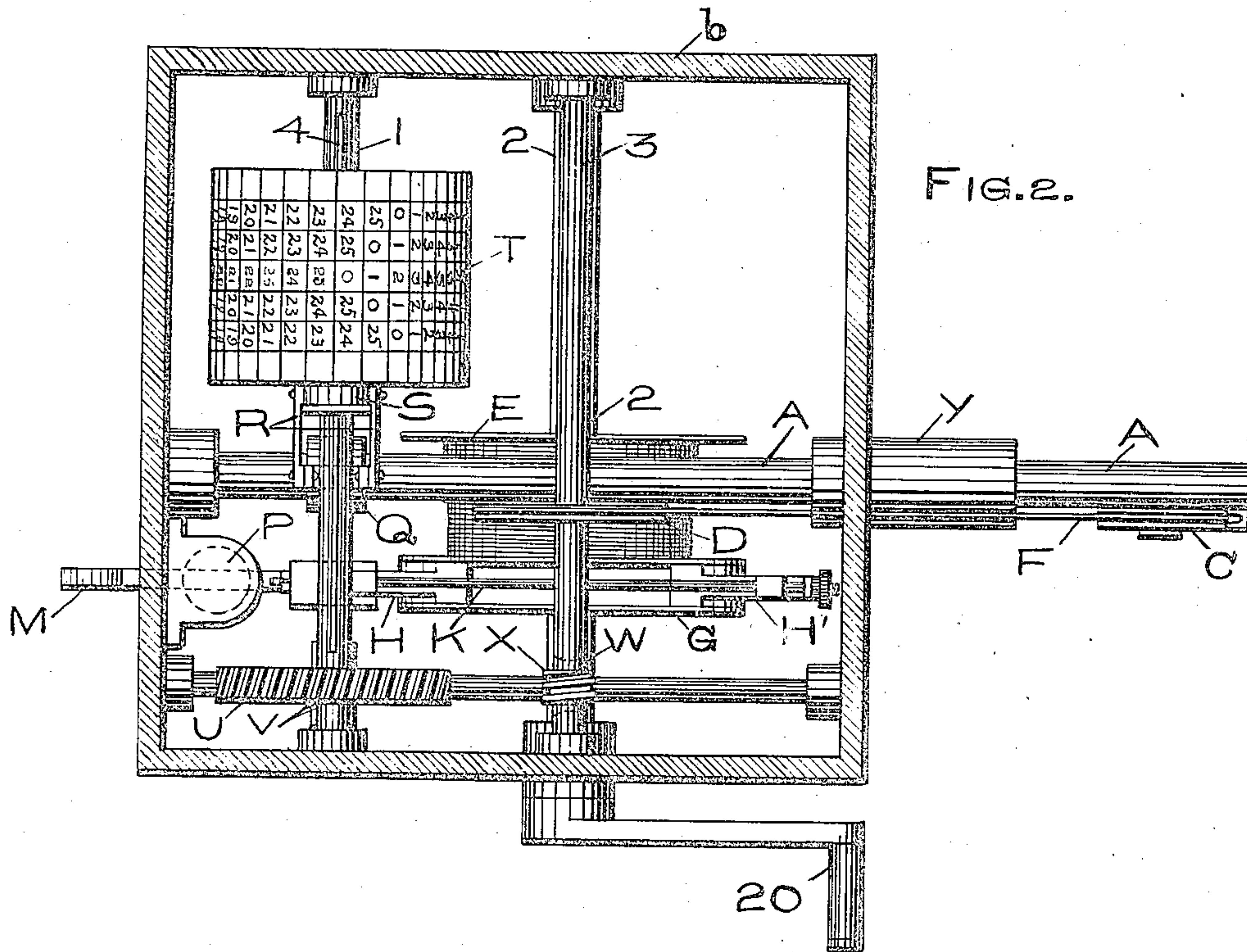
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UNITED STATES PATENT OFFICE.

OTTO M. KNOBLOCK AND JAMES DUSHANE, OF SOUTH BEND, INDIANA.

SOUNDING APPARATUS.

No. 871,124.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed January 2, 1906. Serial No. 294,331.

To all whom it may concern:

Be it known that we, OTTO M. KNOBLOCK and JAMES DUSHANE, citizens of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Sounding Apparatus, of which the following is a specification.

Our invention relates to machines for taking soundings from vessels either at rest or under way and it has for its object the production of a machine that will correctly show the depth of water at the place where the sounding is made whether the motion of the vessel is ahead or astern or if it is at anchor.

It consists of such construction and combination of parts as are hereinafter more specifically described, and shown in the accompanying drawings in which

Figure 1 is a vertical cross-section showing the various parts in their relation to each other. Fig. 2 is a horizontal cross-sectional view of the same. Fig. 3 is a view partly in section of the sinker or lead. Fig. 4 is a vertical sectional view showing the electric magnet applied to the brake lever directly. Fig. 5 is a diagram of the electric connections from the sinker through the battery to the magnet.

Like parts throughout are designated by the same letter or figure.

The working parts are inclosed in a box, *b*, which is provided with a glass-covered opening, *a*, the use of which will appear later. Within this case is mounted a reel, *E*, upon which the sounding wire, *F*, is coiled. This wire passes from the reel, *E*, over a measuring pulley, *D*, thence over a carrying pulley, *C*, down through an eye, *B*, at the lower end of a swinging L-shaped arm, *A*, and carries a sounding weight, *10*, of special construction.

On the shaft of reel *E* is mounted a friction disk, *G*, which is clamped between two brake shoes, *H H'*, which are pivoted to a block *I*, in the bottom of the casing.

The axis of reel *E* projects outside of the case and is provided with a crank, *20*, by means of which the wire *F* may be wound up. The crank may be clutch-connected with the axis *2* so as to engage it only while the crank is in use for winding up the reel.

To the outside of the upper arm of brake shoe *H'* is secured a spring plate *6*, through which passes a draw bar or rod *K*. This rod is provided with a thumb-nut, *7*, which

bears against the outside of spring *6*. Rod *K* passes loosely through the upper ends of shoes *H H'* and also the short arm of lever *J*. and is loosely secured thereto by a nut or head. Lever *J* is fulcrumed upon brake shoe *H* near the upper end. It is evident that by drawing up on the thumb-nut *7*, these shoes *H H'* may be brought into any desired degree of closeness to disk *G*.

To the end of the long arm of lever *J* is secured a spring, *L*, the tension of which may be regulated by a thumb-nut, *8*, as shown, thus determining the degree of force with which brake shoes *H H'* will clamp disk *G*. To the same end of lever *J* is secured a short draw-bar, *M*, having a finger loop at its outer end and a square shouldered catch, *O*, which engages a latch, *N*. This latch *N* is flattened at the point of engagement and it forms the core of a solenoid, *P*, within which it is free to move. *9* is an anti-friction roller behind *N*, to facilitate its action.

Rocking arm *A* has one bearing on the inside of the case, *b*, and a long outer bearing, *Y*, attached to the outside of the case. This shaft may swing in roller bearings to insure its prompt and free motion. Upon this shaft, *A*, is fastened an arm, *Q*, whose free end is connected by a link or bar, *R*, with the collar, *S*, on the hub of a drum, *T*. This drum turns with its shaft, *1*, while it is free to move longitudinally thereon by reason of the feather-key, *4*. It is rotated from measuring wheel *D* through the worm gear, *X* and *W*. The shaft of *W* is provided with a worm, *v*, and this engages and revolves gear wheel *U* and drum *T* through their common shaft, *1*. It will thus be seen that indicating drum, *T*, may be revolved in relation to measuring wheel *D* in any desired ratio of revolutions. And since rocker arm *A* by reason of eye *B* swings with sounding line *F* to the right or left as the vessel may be going ahead or astern, it will through arm *Q* and its connection with drum *T* shift said drum to the left or right along its shaft, *1*, without interfering with its rotation with said shaft.

The surface of drum *T* is provided with circumferential graduations marked with figures to indicate the true depth corresponding to any given length of wire paid out in any given angular direction, *i. e.*, the central line of figures record the length of wire paid out vertically while the vessel is lying still; the next row to either the right

or left record the corrected vertical depth that corresponds to an angular position of say 5° with the vertical. The second row is correct for an angular position of the sounding wire when it stands at an angle of say 15° with the vertical. Successive rows of figures may be supplied that will give the correct verticals for any desired angular position of the measuring wire. It is evident that the angular position of the wire is dependent upon the speed of the vessel at the time the sounding is made, and that the correct depth is the perpendicular of a right angled triangle whose hypotenuse is the length of the sounding wire paid out.

The sounding wire is made up of two strands insulated from each other, the upper ends of which connect through a battery to the terminals of the solenoid P, and the lower ends are connected with parts of the sinker as hereinafter described.

The sinker 10 comprises a body chambered at 10', provided with a threaded portion to receive a removable plug 12 to which is soldered the terminal of wire 11 forming part of sounding line F. The wall of chamber 10' is also provided with an annular groove to receive the edge of a flexible diaphragm 16 which is forced through the opening in the lower end of the body 10 and sprung into said groove. Said diaphragm supports an inverted mushroom-shaped stem 14 the upper end of which extends into a cupped portion 12' formed in the underside of plug 12, but normally out of contact therewith. The terminal 13 of line F is secured to stem 14, the diaphragm serving to insulate same from the body of the sinker, and the enlarged end of said stem projects from chamber 10' and clears the lower edge of body 10 by a short distance. A suitable plug 15' is employed to facilitate the passing of line F to the interior of the plug. The upper portion of stem 14 is of metal, the portion 15 of said stem which extends below diaphragm 16 being of any suitable non-conducting material, such, for instance, as glass, vulcanite, or the like.

The operation is as follows:—Assuming the sinker to have been wound up, draw bar, M, is pulled out until latch N falls behind catch O, and holds lever J against the recoil of spring L. This releases reel E and sinker 10 plunges downward. As it draws wire F over measuring pulley, D, the rotation of the latter is transmitted through the worm gearing, x and v , causing shaft 1 with its drum T to revolve. As the operator looks through the window opening, a , he will see from the figures on the drum as they pass just to what vertical depth the sinker has descended. As soon as the sinker strikes the bottom, bulb 15 will deflect diaphragm 16 and stem 14 will be thrown into contact with plug 12, thus establishing an electric

circuit through the wires, 11 and 13, and the electric current from the battery will energize solenoid, P, which will at once lift its latch-shaped core out of engagement with catch O. Spring L will then become effective and will through lever J instantly set brakes H H', upon friction disk G, thus automatically arresting the further delivery of wire F. A glance through opening, a , will at once show by the figures on the drum, T, the exact depth where the sinker touched the bottom. To get additional soundings the sinker is merely lifted clear of the bottom, when it is again dropped and a new reading will show on the drum. Further, if sufficient wire has been paid out so that the sinker drags upon the bottom the shifting of the drum through the swing of the rocker arm, A, will show the variation in the depth due to the inequalities of the bottom. It will then give a continuous reading.

In Fig. 4 we show a slight modification of our improved sounding apparatus which consists in operating the brakes H H' by means of a solenoid P' the core N' of which is directly connected to brake lever J. In operation the reel E is released in the manner heretofore described and as soon as the sinker strikes the bottom and closes the circuit, solenoid P' is energized whereupon its core will draw upon lever J and cause the brakes H H' to be set.

Having thus described our invention, what we claim and desire to secure by Letters-Patent is as follows:

1. In a sounding apparatus, a winding reel, a friction disk connected therewith, and a brake acting upon said disk, a sounding wire wound on said reel and a sinker carried by said wire in combination with means to alternately set said brake upon said friction disk as soon as the sinker touches the bottom.
2. In a sounding apparatus, a winding reel, a wire wound thereon, electrically operated means for braking said reel, and a contact carried by said wire for automatically controlling the operation of said braking means.
3. In a sounding apparatus, a winding reel, a wire wound upon said reel, means for braking said reel, and a sinker carried by said wire and provided with means for automatically controlling the operation of the braking means.
4. In a sounding apparatus, a winding reel, a wire wound upon said reel, a brake therefor, a sinker carried by said wire, and means carried by said sinker for controlling said brake.
5. In a sounding apparatus, a winding reel, a wire wound upon said reel, an electrically operated brake for said reel, a sinker, and contacts carried by said sinker for controlling said brake.
6. In a sounding apparatus, a drum provided with a series of circumferential parallel

graduations indicating varying depths, a swinging arm, a sounding wire controlling the movement of said arm, means controlled by said wire for rotating said drum, and connections between said arm and said drum, whereby the latter is shifted by the former.

7. In a sounding apparatus, a reel on which the sounding wire is wound, a measuring wheel over which said wire passes as it leaves said reel, an indicating drum geared with said measuring wheel and provided with a series of circumferential parallel graduations indicating varying depths, and means controlled by said wire for shifting said indicator drum longitudinally of its shaft.

8. In a sounding apparatus, a winding reel, a sounding wire coiled on said reel, a measuring wheel over which said wire passes, an indicating drum actuated by the measuring wheel and provided with a series of circumferential parallel graduations indicating varying depths, a swinging arm controlled angularly by said wire, and means for shifting said drum longitudinally upon its shaft to indicate the angular position of said arm.

9. In a sounding apparatus, an indicating drum provided with a series of circumferential parallel graduations for indicating depth corresponding to successive angular positions and length of the sounding wire, and means for automatically shifting said drum longitudinally of its support to conform to said varying positions of the sounding wire.

10. In a sounding apparatus, a sinker connected with a double conductor having one terminal electrically connected with the body of the sinker, the other terminal being connected to a movable contact point, and a flexible diaphragm insulating said terminal from the body of said sinker and also supporting said contact point.

11. In a sounding apparatus, a sinker connected with a double conductor, a plug to which one terminal of said conductor is connected, a movable contact with which the other terminal of said conductor is connected, and a flexible diaphragm supporting said

contact point and insulating said terminals from each other.

12. In a sounding apparatus, a measuring wheel, an indicating drum revolubly connected therewith and provided with a series of circumferential parallel graduations indicating varying vertical depths, and a swinging wire-controlled arm provided with means for shifting said drum longitudinally upon the swinging of said arm.

13. In a sounding apparatus, the combination of a reel, a two-stranded sounding wire attached at one end to said reel, a sinker on the free end of said wire, a swinging arm controlled by said wire, a measuring wheel over which said wire passes, an indicating drum actuated by said measuring wheel and connected to said swinging arm, said indicating drum being provided with a series of circumferential parallel graduations indicating varying depths, and means operated by said arm for shifting said drum longitudinally.

14. In a sounding machine, the winding reel E provided with a friction surface, brake shoes acting thereon, a lever J actuating said shoes, in combination with a spring L, catch M and magnet P having a detaining core N, and means for controlling the circuit to said magnet.

15. In a sounding machine, an indicating drum T, movable longitudinally by arm Q, a swinging arm A to which arm Q is attached, a carrying pulley C at the angle of the swinging arm A, a sounding wire F passing over the pulley C and controlling arm A, a measuring wheel D rotated by wire F, a reel E for carrying said wire, in combination with a spring L, lever J, magnet P, catch M and core N.

In testimony whereof we affix our signatures in presence of two witnesses.

OTTO M. KNOBLOCK.
JAMES DUSHANE.

Witnesses:

EDW. F. DUBAIL,
JAMES M. BRODBUK.