July 4, 1939. F. WALLER 2,164,791

APPARATUS FOR TAKING SOUNDINGS

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Fig. 1.

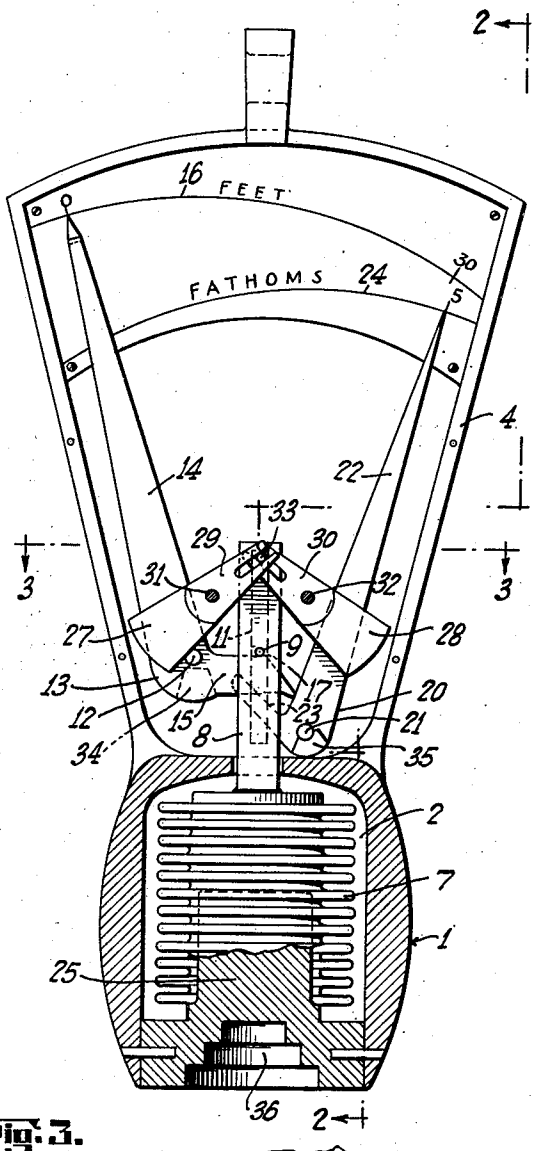

Fig. 2.

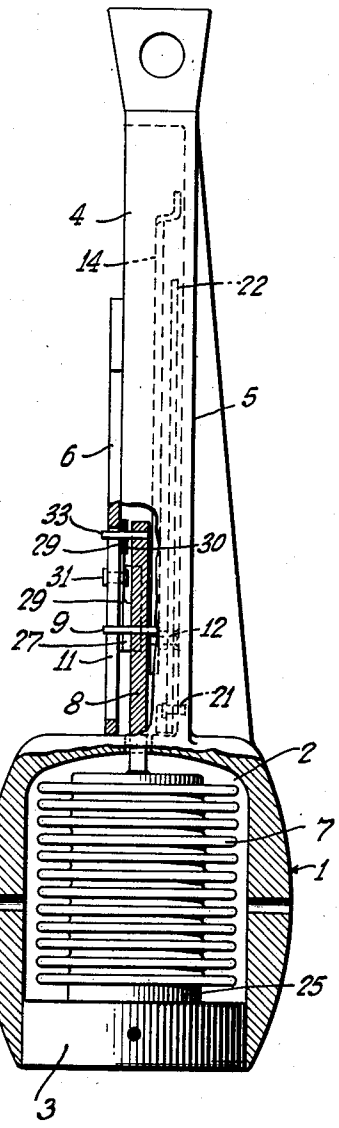

Fig. 3.

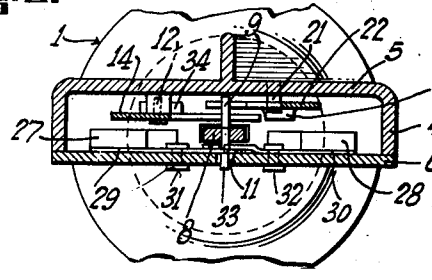

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Fig. 4.

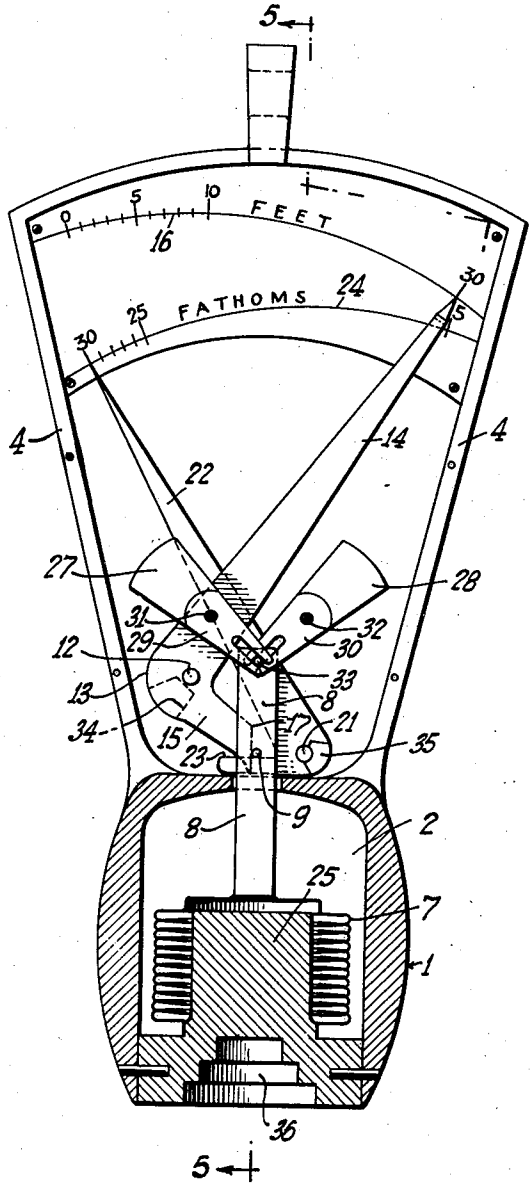
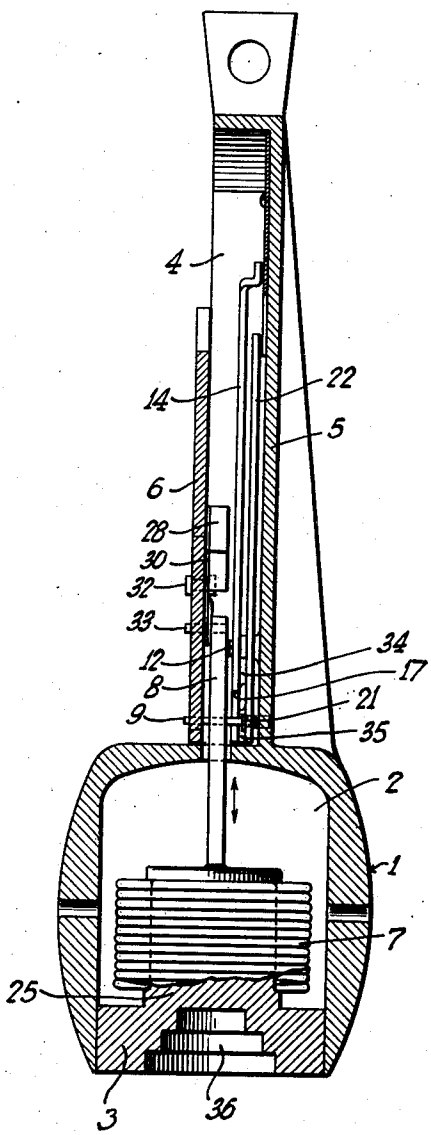


Fig. 5.



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APPARATUS FOR TAKING SOUNDINGS

Fred Waller, Huntington, N. Y.

Application May 29, 1937, Serial No. 145,453

4 Claims. (Cl. 73—300)

This invention relates to apparatus for taking soundings.

It is an object of the invention to provide a device which is responsive to hydrostatic pressure, and which when lowered into the water in the usual manner of taking soundings, will register the depth thereof.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawings, in which,

Figure 1 is a front elevation with the cover plate removed.

Figure 2 is a vertical section on the line 2—2 of Figure 1.

Figure 3 is a transverse section on the line 3—3 of Figure 1.

Figure 4 is a front elevation showing the bellows collapsed as when under pressure, and

Figure 5 is a vertical section on the line 5—5 of Figure 4.

Referring to the drawings, the apparatus comprises a shell 1 formed to provide a cylindrical recess 2 therein. Extending upwardly from shell 1 is a plate 5 having a flange 4 projecting forwardly therefrom.

Seated against the flange and secured thereto is a plate 6 extending parallel to the plate 5 but spaced therefrom to provide room for the parts hereinafter described.

Mounted in the recess 2 is a collapsible metal bellows 7, the lower end of which is fixed to the plug 3 which closes the recess 2. The upper end of the bellows is movable. Connected to the movable end is a rod 8 having a cross rod 9 which extends through and is guided by slot 11 formed in the plate 6.

Pivotally mounted between the plates 5 and 6 for oscillation about pin 12 is a bell crank 13 having an arm 14 serving as an indicator arm or pointer, and an arm 15, the upper edge of which is engaged by the under face of the cross rod 9 whenever the bellows is collapsed. Thus it will be observed that when the metal bellows 7 is collapsed, as when hydrostatic pressure is applied, the bell crank 13 is moved in clockwise direction, causing the pointer 14 to move along the scale 16 on the plate 5. When the apparatus is immersed in water, of course, the hydrostatic pressure collapses the bellows 7 more or less depending on the depth, and if the scale 16 is properly calibrated, the depth may be read directly therefrom. The pivotal connection of the bell crank on the plates 5 and 6 is preferably such as to cause the pointer to be frictionally held in the position to which it is moved by the bellows.

The edge of the arm 15 which engages the cross rod 9 is so designed that when the pointer 14 reaches the right hand end of the scale 16, the cross rod rides over the corner 17, and further collapse of the bellows has no effect on the pointer 14. However, a second bell crank 20 is pivotally mounted on pin 21 between the plates 5 and 6, having an arm 22 serving as an indicator arm or pointer, and an arm 23 the upper edge of which is engaged by the cross rod 9 at the point in its travel where it rides over the corner 17. Further collapse of the bellows 7, therefore causes the bell crank 20 to move in counterclockwise direction, causing the pointer 22 to move along the scale 24.

Thus if the depth of the water is such as to cause the bellows 7 to collapse beyond the point where the pointer 14 is affected thereby, further motion is transmitted to the pointer 22 and the depth may be read directly from the calibrated scale 24.

Preferably the lever arm 23 is somewhat shorter than the lever arm 15 in order that relatively short increments of travel of the bellows 7 may be multiplied to cause relatively long corresponding movements of the pointer 22.

The use of two pointers operating successively in opposite directions from a single bellows permits the use of relatively long scales, with consequent increase in accuracy of readings, without the use of an excessively large, and hence cumbersome scale plate.

The sounding range or capacity of the apparatus within the limit of scales of reasonable length may be increased by the provision of means to reduce the volumetric capacity of the bellows without reducing its capacity for linear movement. Thus, in the interior of the bellows 7 there may be mounted a non-compressible member such as the metal cylinder 25 which may be formed integrally with the plug 3, and which occupies a substantial portion of the interior volume of the bellows. This member, however, is of insufficient height to interfere with the complete collapse of the bellows. It will be observed that with such a member in the bellows, any given change in the hydrostatic pressure will cause less movement of the bellows than in the absence of such member, and consequently greater depths may be indicated on scales of given length.

In order to prevent errors due to inertia of the metal bellows and connected parts in cases where the apparatus may be lowered rapidly through

the water and thus be jolted severely on striking bottom, counterweights **27** and **28** may be provided, mounted on levers **29** and **30**, pivoted at **31** and **32** respectively. The ends of the levers **29** and **30** are slotted for engagement with the cross rod **33** on rod **8**.

It is also desirable to counterbalance the bell cranks **13** and **20** in order to prevent inaccuracies. This may be done by weighting the arms **15** and **23** as shown at **34** and **35** respectively to cause said bell cranks to balance on their pivots.

If desired, a recess **36** may be formed in the bottom of the casing **1** to permit arming with grease to obtain samples of the bottom.

It will be understood that the invention may be variously modified and embodied within the scope of the subjoined claims.

I claim as my invention:

1. Apparatus for taking soundings comprising, in combination, a frame, a plurality of pointers pivoted thereon, a collapsible metal bellows mounted thereon, and means connected to the free end of said bellows to engage and move said pointers successively as said bellows is collapsing.

2. Apparatus for taking soundings, comprising, in combination, a frame, a pair of bell cranks pivotally mounted thereon, each of said bell cranks comprising a pointer arm and an actuating lever arm, a collapsible metal bellows mounted on said frame, and means connected to the free end of said bellows to engage and move said actuating lever arms successively as said bellows is collapsing to thereby move said pointers successively.

3. Apparatus for taking soundings, comprising, in combination, a frame, a pair of bell cranks pivotally mounted thereon, each of said bell cranks comprising a pointer arm and an actuating lever arm, one of said lever arms being shorter than the other, a collapsible metal bellows mounted on said frame, and means connected to the free end of said bellows to engage and move said actuating lever arms successively as said bellows is collapsing to thereby move said pointers successively.

4. Apparatus for taking soundings, comprising, in combination, a frame, a pointer pivoted thereon, a collapsible metal bellows mounted thereon, means connected to the free end of said bellows to engage and move said pointer when said bellows is collapsing, but to disengage said pointer when said bellows is expanding, and means to counterbalance said collapsible metal bellows and said connected means to prevent overthrow due to inertia.

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