

Aug. 8, 1939.

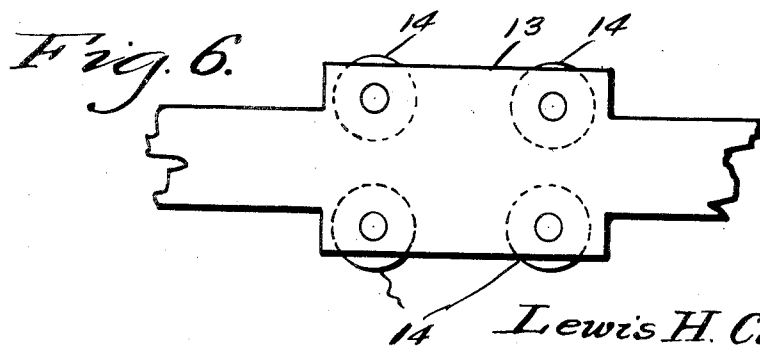
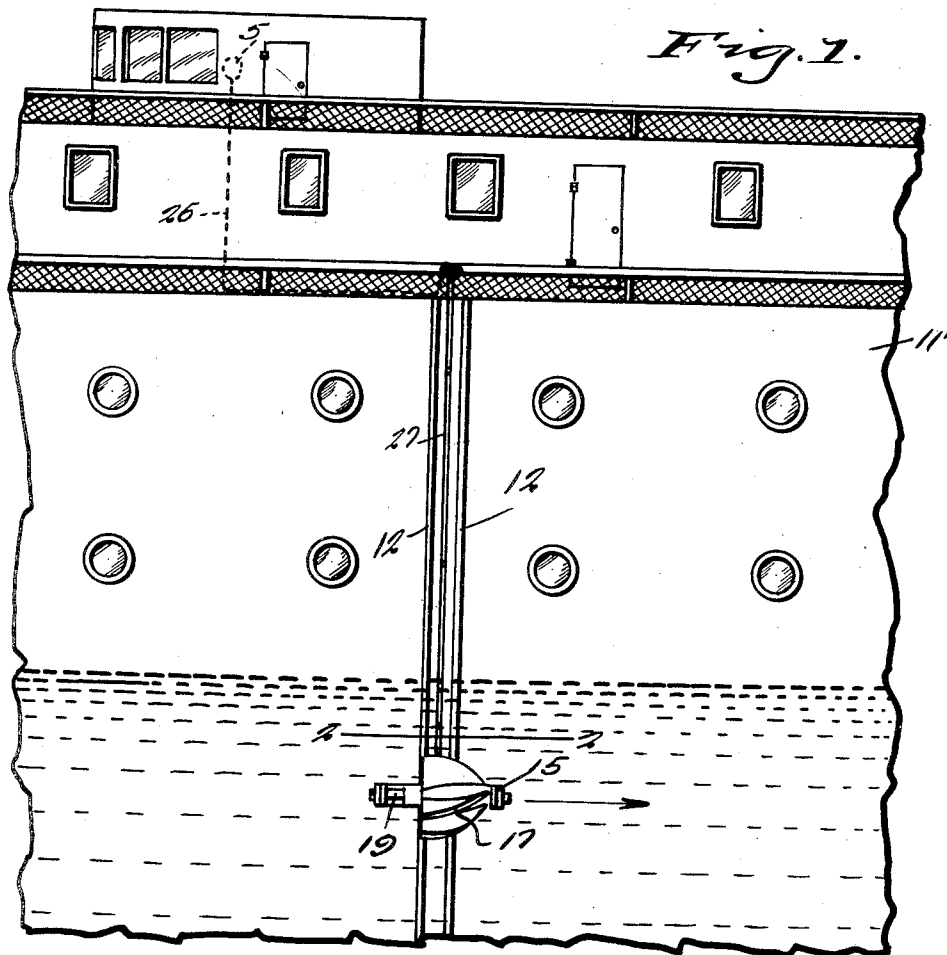
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2,168,473

SWITCH FOR A FLUID OPERATED DEVICE

Filed July 2, 1937

3 Sheets-Sheet 1



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Fig. 2.

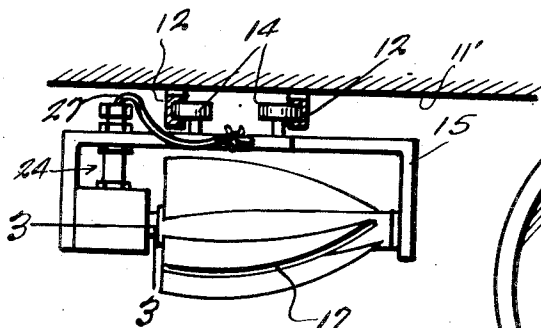


Fig. 8.

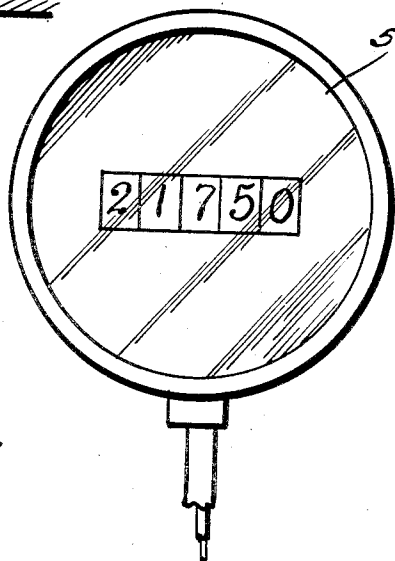


Fig. 7.

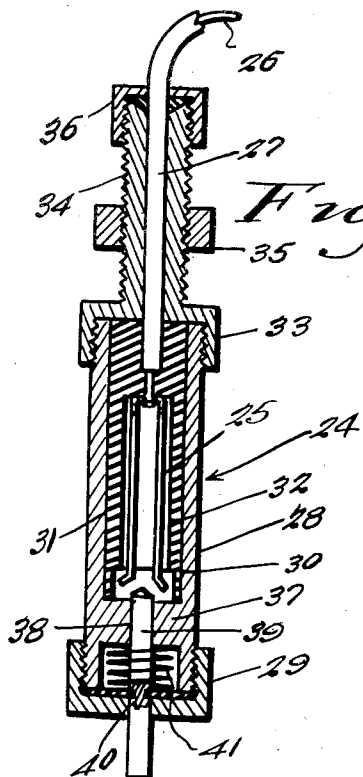
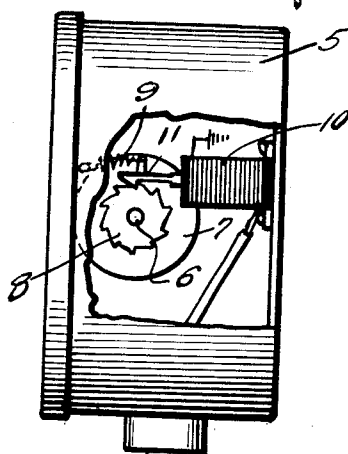


Fig. 9.



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Fig. 3.

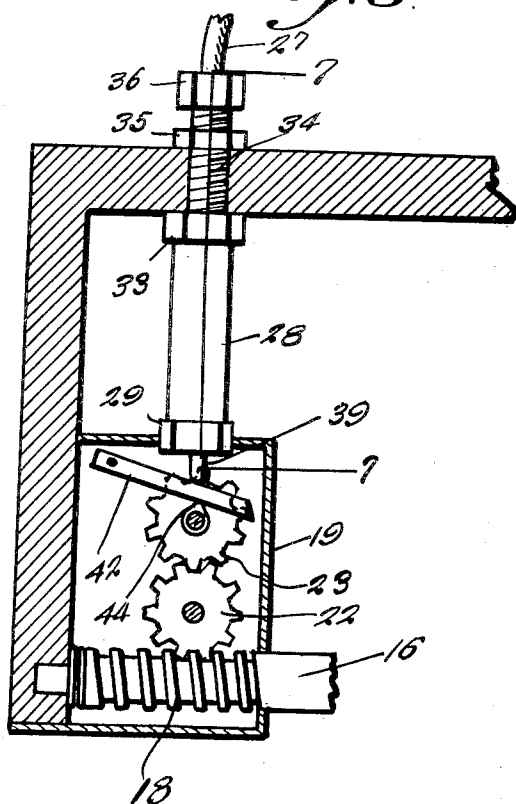


Fig. 5.

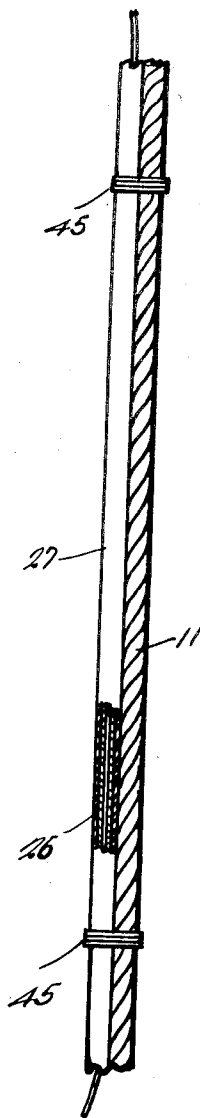
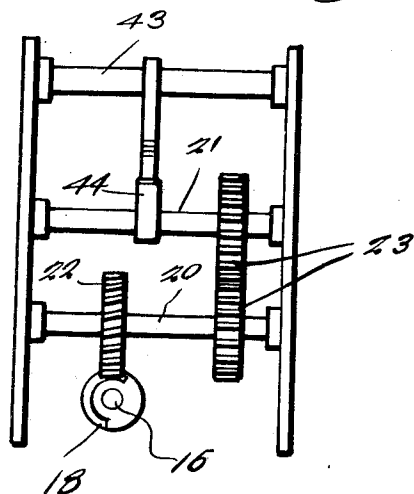


Fig. 4.



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UNITED STATES PATENT OFFICE

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SWITCH FOR A FLUID OPERATED DEVICE

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Application July 2, 1937, Serial No. 151,747

1 Claim. (Cl. 200—159)

This invention relates to a switch for a fluid driven device of a distance registering mechanism for ships, and has for the primary object the provision of a switch which is easily mountable and consists of a minimum number of parts and is so constructed as not to be affected by water.

An object of the present invention is to provide a device or apparatus of the character mentioned which shall overcome the difficulties that are at present experienced with ships' logs hitherto in use for this purpose.

The invention together with its objects and advantages will be best understood from a study of the following description taken in connection with the accompanying drawings wherein—

Figure 1 is an elevational view illustrating the application of the invention.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a detail sectional view taken substantially on the line 3—3 of Figure 2.

Figure 4 is an elevational view of a gear assembly.

Figure 5 is a detail view showing the manner of retaining a cable against the side of the vessel with which the device is used.

Figure 6 is an elevational view of a carriage.

Figure 7 is a detail sectional view taken substantially on the line 7—7 of Figure 3.

Figure 8 is an elevational view of a registering device.

Figure 9 is a side elevational view of a registering device with parts broken away to illustrate certain details hereinafter more fully referred to.

Referring to the drawings by reference numerals it will be seen that in the preferred embodiment thereof the invention includes a register 5 of any suitable construction for registering the total distance run by the ship or vessel during the time the apparatus is in use. Preferably the register 5 approximates in construction that of a usual and well-known type of speedometer for automobiles, and consists, as illustrated, of a suitable casing having a sight window, and in which casing are mounted a plurality of number-disks so provided that upon the completion of one full revolution of one disk the next succeeding disk is brought into operation for totalizing purposes, it being understood however that in the present instance the registering device will be so as to register the distance travelled in terms of "knots" instead of miles as in the case of an automobile speedometer.

Further in accordance with the present invention the shaft 6 on which the number-disks 7 of

the register are mounted is equipped with a ratchet wheel 8 and said shaft is normally urged to rotate in a clock-wise direction through the medium of an electric magnet 10 of the reciprocating armatured type, and the armature of the magnet is provided with a dog 11 of resilient material made integral with or otherwise fixedly secured to one end of the armature of the magnet. Dog 11 cooperates with the ratchet wheel 8 for rotating the shaft for a fraction of a revolution each time the magnet 10 is energized, the armature being returned to its inactive position by a spring 9.

Further there is suitably mounted on the side of the vessel 11 a portion of which is fragmentarily shown in Figure 1, and extending downwardly along the side of the vessel a pair of opposed rails 12. Movable along the rails 12 is a carriage 13 that on one side thereof is equipped with rollers 14 that ride the rails 12 as shown in Figure 2 wherein it will be seen that the rails 12 are of channel-iron and accommodate in the channels thereof the rollers 14.

Suitably mounted on the carriage 13 is a substantially U-shaped bracket 15 including a bight portion and parallel arms arranged at right angles thereto. The bight portion has an opening adjacent one of the arms to receive a switch 24 which parallels the latter-named arm. Journaled in the arms of the bracket 15 is a shaft 16 on which is mounted for rotation therewith a rotor or propeller 17 and a worm 18.

Housing the worm-equipped end of the shaft 16 and suitably mounted on the bracket 15 is a gear case 19 in which are suitably journaled shafts 20, 21.

On the shaft 20 is a worm wheel 22 that is in constant mesh with the worm 18 and shafts 20, and 21 are connected together through the medium of gearing 23.

Also in accordance with the present invention there is provided an electric switch indicated generally by the reference numeral 24 and the same includes a spring contact element 25 that is connected in circuit with the electro-magnet 10 through the medium of a wire 26 that extends through a flexible sheathing 27, said wire being connected with a suitable source of current.

The switch 24 further includes a cylindrical housing 28 that has threaded on one end thereof a cap 29 that is accommodated within a suitable opening provided therefor in a wall of the gear case 19. The housing 28 is provided with a chamber 30 in which is snugly fitted a cylindrical insulator 31. Insulator 31 is provided with an axial

recess 32 in which is located the spring contact element 25. Anchored in one end of the insulator 31 is one end of the sheathing 27 as shown in Figure 7.

Also threaded on a second end of the casing 28 is a cap 33 that is provided with an integral threaded extension 34 axially bored to accommodate one end of the sheathing 27. The extension 34 extends through a portion of the bracket 15, and said portion of the bracket is clamped between the cap 33 and a nut 35 threaded on the stem 34. On the other end thereof the stem 34 is provided with a suitable gland structure indicated generally by the reference numeral 36 and includes a packing cap threaded on the extension 34.

The switch casing 28 is also provided adjacent one end thereof with a partition 37 having an opening 38 therethrough to accommodate a contact plunger 39. Also to accommodate the contact plunger 39 cap 29 is provided with an opening 40, and at one side of the partition and confined between the partition and cap 29 is a spring 41. Spring 41 is suitably connected with the plunger 39 for normally urging the same outwardly with respect to the casing and out of engagement with the switch contact 25. The plunger 39, when engaged with the contacts, acts as a ground therefor through the casing 28 and hull of the ship. The partition 37 divides the casing 28 into a pair of chambers, one of which receives the contact 25 and the other chamber receives the spring 41, and the plunger 40. The cap 33 holds the insulator 31 seated against the partition 37.

Also through the medium of spring 41 the outer end of the contact plunger 39 is held in engagement with a lever 42 provided on a shaft 43 suitably journaled in the gear case 19 and having a free end portion engaging the periphery of a cam 44 fixed on shaft 21 as will be clear from a study of Figures 3 and 4.

It will thus be seen that as shaft 21, driven from shaft 20 revolves, the nub of the cam 44, once for each complete revolution of the cam, engages the lever 42 causing the latter to swing in a counter-clockwise direction (as viewed in Figure 3) and thus urge the contact plunger 39 inwardly and into engagement with the contact 25 for completing an electric circuit through the magnet 10, the magnet being grounded at one side. Magnet 10 being thus energized dog 11 moves inwardly with the armature of the magnet to rotate the ratchet wheel 8 the distance of one tooth on the ratchet wheel whereby shaft 6 is rotated a fraction of a revolution for bringing the proper number on the proper numeral-disk 7 into position opposite the sight window in the casing of the register 5 so that one by reading the register 5 will tell at a glance the total number of "knots" the vessel has thus far travelled.

It will also be apparent that the electric cable consisting of the wire 26 and sheathing 27 may serve as a raising and lowering cable for the carriage 13, and as suggested in Figure 5 said cable is trained through suitable guides 45 provided therefor on the side of the vessel. In this connection, and as shown in Figure 2, a portion of the cable will be suitably connected with or se-

cured to the carriage 13 so that an upward pull on the cable will serve to cause the carriage 13, bracket 15 and associated parts to move upwardly along the rails 12.

Obviously to lower the carriage 13 and associated parts cable 27 is paid out and the carriage 13 and associated parts move downwardly by gravity along the rails 12 to the desired position, and to a position effective for a proper operation of the device.

Obviously with the carriage and associated parts in properly lowered position rotor 17 revolves turning shaft 16 therewith. Drive from shaft 16 is transmitted through the worm 18 and worm wheel 22 to shaft 20 and from shaft 20 to the gearing 23 to shaft 21. Obviously, as shaft 21 revolves cam 44 operates to intermittently raise the lever 42 resulting in an engagement of contact 39 with contact 25 for completing the circuit through the electro-magnet 10 to operate the registering device 5 in the manner hereinbefore explained more in detail. In this connection it may be mentioned that the gear ratio will be such that for each tenth of a knot switch 24 is closed for operating the register 5.

Register 5 may be, as suggested in Figure 1, suitably located in the pilot's room, on the bridge of the vessel, or wherever found desirable, and to be read by any officer or authorized person. Also in the present instance a train of five number wheels is shown on the register 5 giving a capacity for registering up to one hundred thousand miles without resetting.

It is thought that a clear understanding of the construction, utility and advantages of an invention of this character will be had without a more detailed description.

Having thus described the invention what is claimed as new is—

A switch for a distance registering device comprising a cylindrical housing having opposite ends thereof externally screw threaded, caps threaded on said ends of the housing, a partition formed in the housing and dividing the latter into first and second-named chambers closed by said caps, a movable contact slidable through said partition and one of the caps and having one end located in the first-named chamber and its opposite end arranged exteriorly of the housing to be engaged by an operating medium, a coil spring acting on said contact to urge the latter to engage the operating medium and located in the second-named chamber, an insulator mounted within the first-named chamber and held seated against the partition by one of said caps, a fork type contact mounted in the insulator to be engaged by the movable contact, a screw threaded extension formed on the last-named cap and having a bore to receive an electric conductor for connection with said fork type contact and adapted to extend through an opening of a supporting carriage with the latter-named cap engaging the carriage, a nut threaded on the extension against the carriage for cooperating with the latter-named cap in securing the extension to the carriage, and a packing cap threaded on the extension to establish a leak-proof connection between the extension and the conductor.

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