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COMPASS CONTROLLED CIRCUIT CLOSER

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Fig. 1.

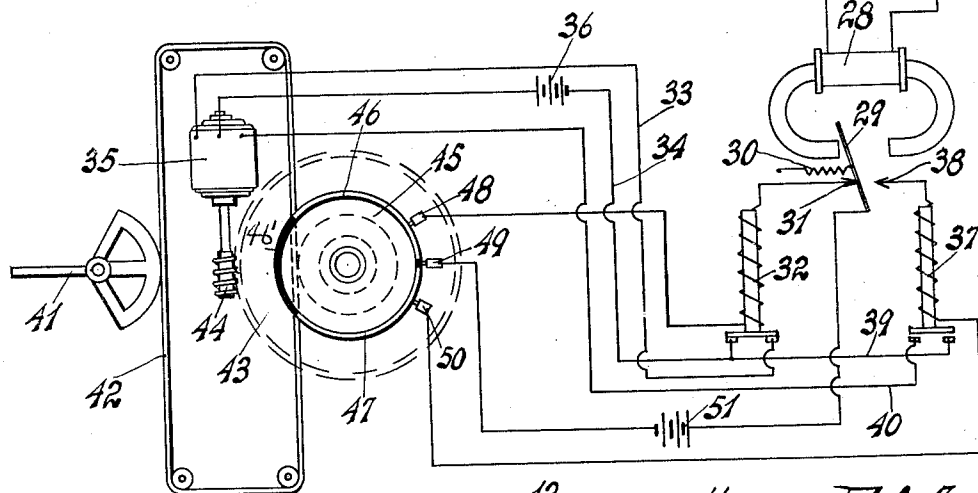
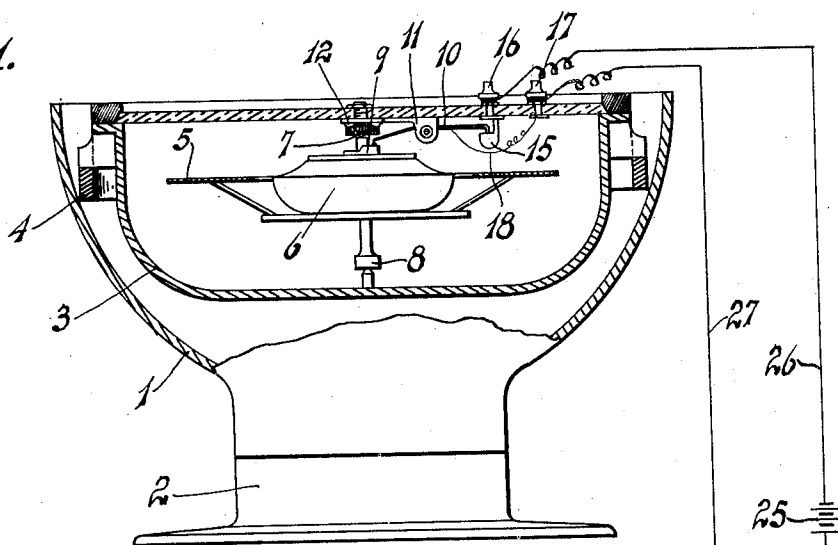


Fig. 2.

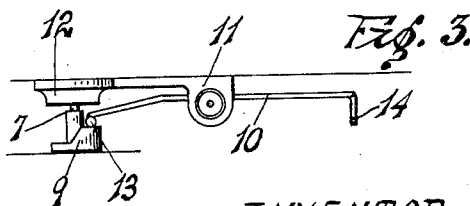
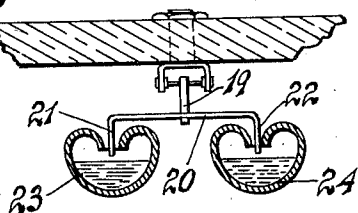


Fig. 3.

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COMPASS CONTROLLED CIRCUIT CLOSER

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5 Claims. (Cl. 200—56)

This invention relates to a compass controlled steering device, and particularly to a novel means whereby the swing of the compass card will actuate an electrical circuit to control a driving means for the rudder.

An object of my invention is to provide a novel contact means actuated by the rotating element of the compass, said contact means being so arranged that it will not impair the proper functioning of the compass.

Still another object is to provide a device of the character stated, which is simple in construction and inexpensive to manufacture.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description, and the appended claims.

In the drawing

Figure 1 is a side elevation of a compass, with parts broken away to show interior construction and a diagrammatic wiring layout to the rudder actuating means.

Figure 2 is a fragmentary transverse sectional view of a modified form of contact arm and mercury cups.

Figure 3 is a side elevation of the contact arm and its mounting.

Referring more particularly to the drawing, the numeral 1 indicates the usual box or housing in which the compass is mounted. This box is journaled in a base 2, and adjustment is thus made to the course desired. The box 1 may be calibrated above the base 2 so that the course can be accurately set.

A compass bowl 3 is mounted in the box 1 on gimbals rings 4, in the usual and well known manner. A compass card 5 is suitably attached to a float 6 which is floating in a liquid in the bowl 3. The float is journaled at the top and bottom on pins 7, 8. These pins may be set in jewels so that the friction is reduced to a minimum. It will be evident that the mounting of the float will prevent it from dipping from side to side when in operation.

A cam 9 is mounted on the upper face of the float 6, for the purpose of actuating a contact means, as will be further described.

A contact arm 10 is pivotally mounted in a bracket 11 adjacent the float 6. The bracket 11 is suitably attached to the bowl 3, or to the top cover of this bowl, or it may be attached or be a part of the upper float bearing 12.

The inner end of the contact arm 10 rests lightly upon the cam 9. A jewel 13 may be attached to the end of the arm to reduce friction,

if it is found necessary. The outer end of the arm 10 is bent downwardly to form a contact finger 14. The arm 10 is so mounted that the jewel 13 will always ride on the cam 9.

A mercury cup 15 is suspended from the cover of the bowl 13 and the upper part of the cup serves as a terminal 16. A second terminal 17 is also mounted in the cover of the bowl, and a very light and flexible wire 18 extends from this last named terminal to the contact arm 10. This wire is so light that it will not affect the delicate balance of the contact arm. The cup 15 is partially filled with mercury or some other suitable contact means, and when the compass rotates, the inner end of the contact arm will ride up on the cam 9, thus depressing the outer end of the contact arm to move the finger 14 into the mercury and close the contact.

In Fig. 2, the contact arm 19 has a yoke 20 secured to the outer end thereof, and this yoke is bent downwardly into contact fingers 21, 22. Each of the contact fingers extend into a mercury bowl 23, 24, respectively. By this arrangement, the two terminals extend from the mercury cups 23, 24, and the contact is simultaneously made in each cup by the fingers 21, 22 when the contact arm is actuated by the cam 9. With this last arrangement, the wire 18 is eliminated.

Current is supplied to the terminals 16, 17 from a battery 25. One lead 26 from the battery extends to the terminal 16 and a lead 27 extends from the terminal 17 to a relay 28. A lead also extends from the battery to the relay. The relay 28 is of the double-throw type and the armature 29 thereof is held to one side by a spring 30. When the relay is energized, the armature moves to the other side, all of which is usual and well known.

The one contact 31 of the relay 28 is connected to a relay 32. Two leads 33 and 34 extend to one of the fields of a reversible motor 35. A battery 36 in series in this last named circuit serves to operate the motor.

A second relay 37 is connected to the second contact 38 of the relay 28. The secondary terminals of the second relay are connected to the second field of the motor 35 thru leads 39 and 40. The lead 39 is common with the lead 34, both of which extend to the battery 36 and thence to the center post of the motor.

The rudder 41 is actuated by means of a cable 42, said cable extending to a suitable drum which is rotated by a gear 43, said gear being actuated by the worm 44 on the motor 35.

The movement of the motor is controlled by an adjustable cut-off 45 which comprises a pair of segmental contact rings 46 and 47. These rings rotate with the gear 43.

5 Three brushes, 48, 49 and 50 engage the rings 46 and 47. The middle brush 49 is connected thru a battery 51 to the armature 29. The brush 48 is connected to the windings of the relay 32, thence to the terminal 31. Similarly, the brush 10 50 is connected to the windings of the relay 37 and thence to the terminal 38.

When the ship moves off its course, the compass casing moves with the ship about the float 6 which remains directionally fixed, thus the cam 15 9 will move the inner end of the contact arm 10. The contact arm, in turn, closes the contacts in the mercury cup 15, or 23 and 24. The relay 28 is then energized, the armature 29 thereof swings to the right, as viewed in Figure 1 and the motor 20 35 will be operated to move the rudder 41. The spring 30 normally holds the armature 29 in the position shown in Figure 1. The switch 31 is then closed, the relay 32 is energized and the electrical circuit is completed to the motor 35 25 thru the wires 33 and 34. The motor then slowly moves the rudder in one direction (towards the left, for example); the ship then slowly swings off its course until the upper dwell of the cam 9 engages the contact arm 10 causing an electrical 30 contact to be made in the mercury cup 15, whereupon the relay 28 is energized thru the leads 26 and 27; the armature 29 then swings to the right as viewed in Figure 1; the contact 38 is closed and the relay 37 is energized.

35 The motor 35 is now rotated in the opposite direction thru the leads 40 and 34; the rudder is then slowly moved to the right until the upper dwell of the cam moves from under the contact arm 10, whereupon the contact at 15 is broken 40 and the spring again returns the armature 29 to the position shown in Figure 1, and the operation first described is repeated.

The control ring 46 limits the amount of throw of the rudder 41, due to the fact that this ring 45 is attached to the control mechanism of the rudder, and when the insulated portion 46' of the ring 46 is moved under a contact 48 or 50, the electrical circuit in the relays 32 or 37 is broken and the motor 35 will stop. The amount of throw 50 of the rudder 41 will be maintained, however, and the ship will slowly swing to the left or to the

right so that the contact arm 10 will be actuated, as described above.

Having described my invention, I claim:

1. In a compass controlled circuit closer, a compass comprising a bowl, and a rotatable magnetic 5 element in the bowl, a contact arm, means pivotally mounting said contact arm on the bowl, cam means on the rotatable element, one end of said contact arm engaging the cam means, a contact means on said bowl and engageable by the 10 other end of said contact arm.

2. In a compass controlled circuit closer, a compass, a bowl, a rotatable element in the bowl, a cam on the rotatable element, a contact arm, means pivotally mounting said contact arm on 15 the bowl, one end of said contact arm engaging the cam, a mercury cup mounted on the compass bowl, the other end of said contact arm entering the cup when said contact arm, is pivotally moved by said cam. 20

3. In a compass controlled circuit closer, a compass, a bowl, a rotatable element in the bowl, a cam on the rotatable element, a contact arm, means pivotally mounting said contact arm on 25 the bowl, one end of said contact arm engaging the cam, a pair of mercury cups, the other end of said contact arm having branches dipping into the respective cups when said arm is pivoted by said cam whereby an electrical circuit is closed. 30

4. In a compass controlled circuit closer, a compass, a bowl, a float in the bowl, upper and lower mounting pins on the float, a cam on the top of the float, a contact arm, a bracket on said bowl, said contact arm being pivotally mounted on the bracket, one end of said arm resting on the cam, 35 a mercury cup on said bowl, the other end of said arm extending into said cup, said arm closing an electrical circuit when said cam lifts the inner end of the arm.

5. In a compass controlled circuit closer, a compass, a bowl, a float in the bowl, upper and lower mounting pins on the float, a cam on the top of the float, a contact arm, a bracket on said bowl, said contact arm being pivotally mounted on the bracket, one end of said arm resting on the cam, 45 a pair of mercury cups on said bowl, the outer end of said arm extending into said cups, said arm closing an electrical circuit when the inner end of said arm is raised by the cam. 50

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