

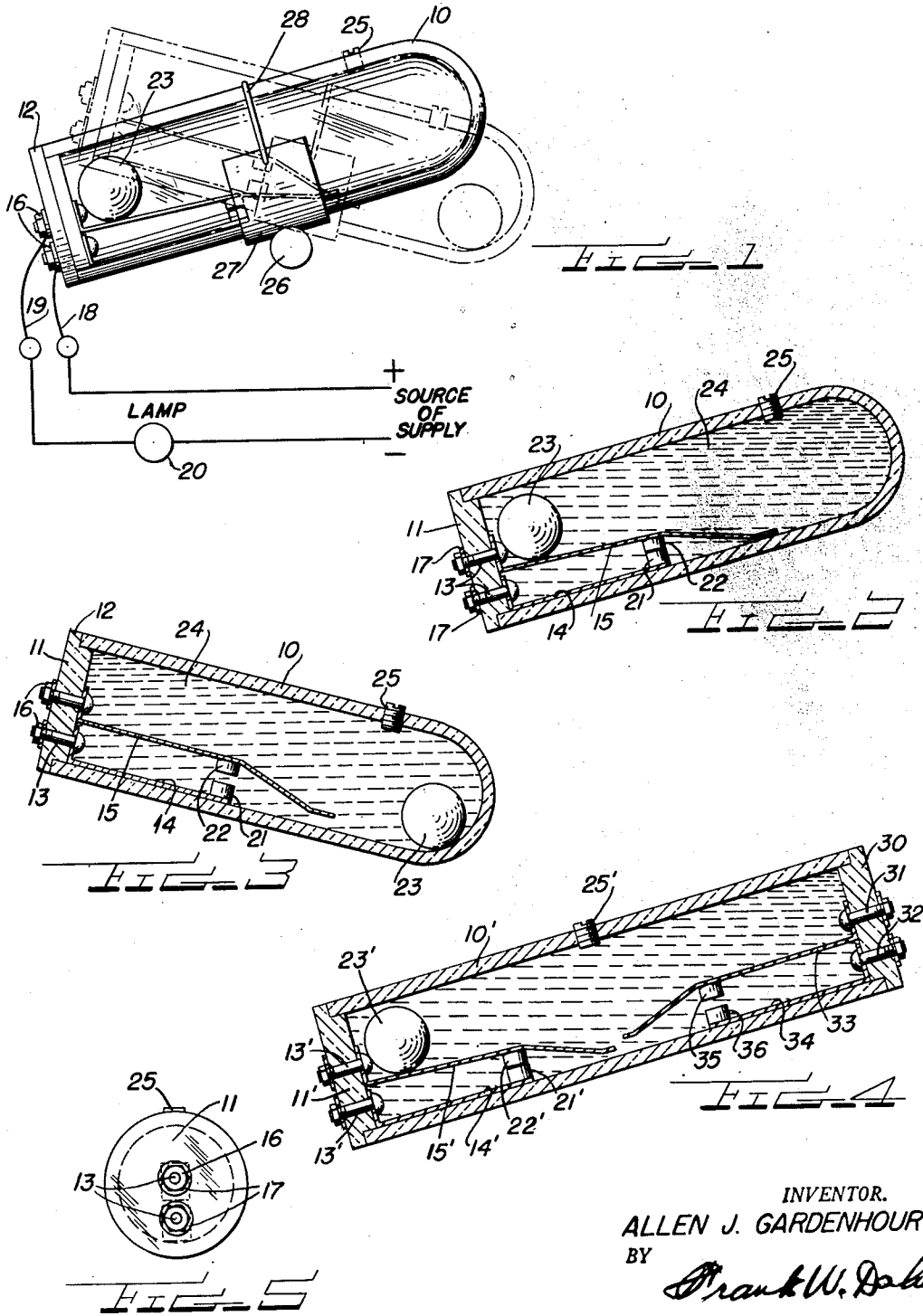
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BALL CONTACTOR SWITCH

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BALL CONTACTOR SWITCH

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My invention relates to a ball contactor switch and it is an object of the same to provide a device of this character which shall be of simple and inexpensive construction, yet positive and reliable in operation. Generally speaking, it is an object of the invention to provide an improved switch adapted for use in place of the well known mercury tube switches, and which has certain advantages over mercury tube switches; e. g., in that mercury oxidizes on contact with air, whereas my device avoids oxidation; a mercury tube will form so great an arc as to blow its glass tube into fragments, in case of an electric overload, which danger is not present in the use of my device; my device can be operated in a vacuum, or the tube may contain vegetable oil or refined mineral oil that will quench the spark occurring as the contacts separate.

Another object of the invention is to provide a delayed action switch, the tube being adapted to contain a liquid (preferably a flameless oil) that will retard the action of the device in making or breaking a circuit. Such delayed action may be varied, if desired, by the use of liquids differing in viscosity, and so offering greater or less resistance to the movement of the gravity-operated switch actuating means employed.

Another object of the invention is to provide a tubular support for a ball contactor switch with means whereby it can readily be emptied or filled with liquid, as desired.

Referring to the drawings, which are made a part of this application and in which similar reference characters indicate similar parts:

Figure 1 is an elevation of a preferred form of my invention, mounted and ready for use;

Figure 2, a longitudinal section of the same, in circuit-closing position;

Figure 3, a similar view, with the parts in open circuit position;

Figure 4, a section of a modified form; and
Figure 5, an end elevation.

In the drawings, reference numeral 10 indicates a tubular vessel or housing which is preferably open at one end and which has a rounded integral closure at the other end, the open end being preferably permanently closed by a disk 11 fitting in said end and having an annular flange 12 bearing against the end of the tube. Any suitable material may be used for the vessel and its closure, such as Pyrex glass or other glass, hard rubber and the like, but a transparent fire-proof plastic is preferred, the disk 11 being cemented in place or otherwise fixed to the end of the tube in leak proof manner.

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Bolts 13, 13 are located in the disk 11, the heads of said bolts serving to hold phosphor-bronze contact spring fingers 14, 15, while nuts 16, 16 hold connectors 17, 17 at the ends of conductors 18, 19, shown as being in circuit with a lamp 20 that is lighted when the circuit is closed, i. e., when the switch is in the full line position of Figure 1.

Each of the springs 14 and 15 is provided with a silver contact, as indicated at 21, 22, riveted or otherwise fixed to said springs. The free end of spring 15 is inclined so that a ball 23 of bronze or stainless steel can run up on it and the extreme end is preferably bent so that it can lie flat against the bottom side of the vessel 10 when forced down by the ball.

While the vessel may contain air or may be evacuated, it is preferably filled with a body of liquid indicated at 24 and the vessel has a threaded aperture that is closed by a screw 25, through which the liquid may be injected or removed, as the case may be. It will be evident that suitably chosen liquids will delay the circuit closing and breaking action differently, according to the viscosity of the liquid; that suitable oil will serve to quench the arcs forward in breaking the circuit; that the vessel is or may be hermetically sealed to prevent any evaporation or deterioration of the liquid; and that by substituting other known closing and sealing means a vacuum may be created and maintained in the vessel.

A method of supporting the device is shown in Figure 1, where a pivot 26 has a clip 27 fixed thereto and the vessel 10 is secured to the clip by a clasp wire 28. When the pivot member 26 is turned to the left the roller 23 will roll up on spring 15 and force its contact 22 down against contact 21, closing the circuit through lamp 20, the parts being now in the full line position of Figures 1 and 2. When the pivot is swung to the right, the parts assume the position shown in Figure 3, and in dotted lines in Figure 1, the circuit being broken by reason of the resilient action of member 15.

In Figure 4, there is shown a double-acting switch, wherein parts such as 11', 13', 14', 15', 21', 22', 23' and 25' are identical with parts 11, 13, 14, 15, 21, 22, 23 and 25 of the figures previously described but the vessel being a cylinder with a closure 30 at the righthand end, which may be identical with that at the other end, and which carries bolts 31, 32, for connecting spring members 33, 34, carrying silver contacts 35, 36, 55 in another circuit, so that tilting the switch

clockwise closes the righthand circuit directly after the lefthand one is broken.

It will be obvious to those skilled in the art that many changes may be made in the invention herein disclosed, all without departing from the spirit of the invention; and therefore, I do not limit myself to what is shown in the drawings and described in the specification, but only as indicated in the appended claims.

Having thus fully described my invention, what I claim is:

1. A circuit closer comprising a tube mounted for oscillation in opposite directions from a horizontal position, a closure fixed to one end of the tube, a lower finger extending from the closure along the bottom of the tube, a resilient upper finger on said closure parallel to the lower finger, the free end of the upper finger extending beyond the free end of the lower finger and downward to a point adjacent to the bottom of the tube, opposed contacts on said fingers, and a ball in the tube, the parts being constructed and arranged so that the ball rests on the upper finger adjacent said disk in one inclined position of the tube and thus holds the contacts in engagement but rolls down over the inclined free end of the upper finger when the tube is in its oppositely inclined position.

2. A circuit closer as in claim 1, wherein both the upper and the lower finger are resilient.

3. A circuit closer as in claim 1, wherein the end closure is a disk sealed into the open end of the tube, and a pair of bolts mounted in said disk to hold the respective fingers, said bolts being adapted for connection to conductors external to the tube.

4. A circuit closer comprising a tube mounted for oscillation in opposite directions from a horizontal position, said tube having an integral closure at one end, a disk closing the other end of the tube, a lower finger extending from the disk along the bottom of the tube, a resilient upper finger on said disk parallel to the lower finger, the free end of the upper finger extending beyond the free end of the lower finger and down-

ward adjacent the bottom of the tube, opposed contacts on said fingers, and a ball in said tube, the parts being constructed and arranged so that the ball rests on the upper finger adjacent said disk in one inclined position of the tube and thus holds the contacts in engagement but rolls down over the inclined free end of the upper finger to permit the contacts to separate when the tube is in its oppositely inclined position.

5. A double-acting circuit closer comprising a tube mounted for oscillation in opposite directions from a horizontal position, said tube having a separate closure at each end, a lower finger extending from each end closure along the bottom of the tube, an upper finger on each end closure parallel to the lower finger, the free ends of the upper fingers extending beyond the free ends of the corresponding lower fingers and downward adjacent the bottom of the tube, opposed contacts on said fingers, and a ball in the tube, the parts being constructed and arranged so that the ball rests on the upper finger adjacent the end closure in one inclined position of the tube and thus holds one pair of contacts in engagement but rolls to a position adjacent the other closure when the tube is moved into its oppositely inclined position so as to hold the other pair of contacts in engagement.

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