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FLOAT SWITCH

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Fig. 1.

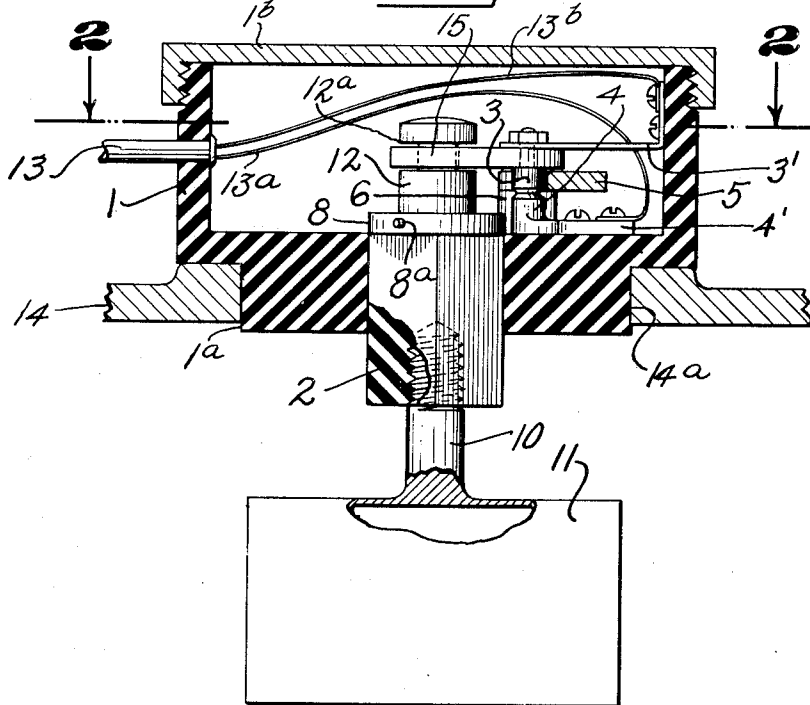
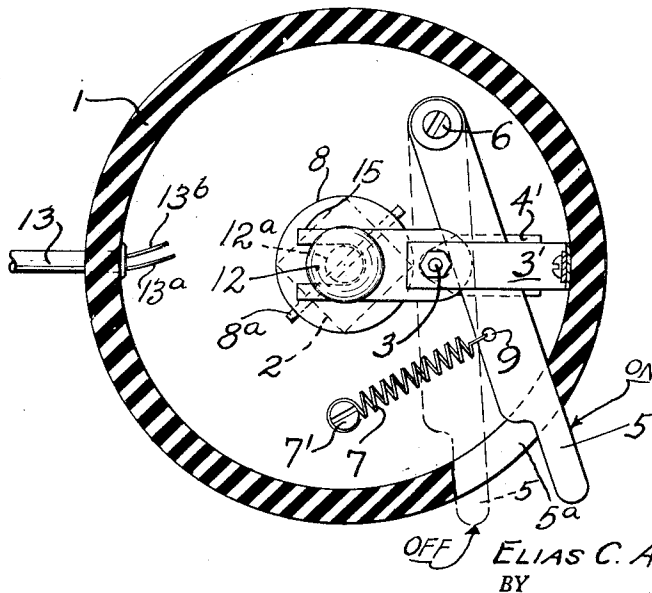


Fig. 2



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FLOAT SWITCH

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7 Claims. (Cl. 200—84)

My invention relates to improvements in float switches and it consists of the combinations, constructions, and arrangements hereinafter described and claimed.

5 This device relates to float switches, and has for its objective, to break an electrical current when a liquid in a container reaches a predetermined level.

One of the device's many uses is to break a 10 current in a coffee maker of the type where the pressure in a lower heated liquid container forces the liquid into an upper container.

When the liquid in the upper container reaches a predetermined level (and the application of heat 15 is no longer necessary) the electrical heating element is automatically shut off and remains so until the switch is manually closed again.

The above effects are accomplished by means of the novel and efficient construction as set 20 forth.

It shall be noted that the figures in the drawing may be so modified in construction details to facilitate manufacturing the device, without departing from the spirit and scope of the invention. 25

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

30 My invention is illustrated in the accompanying drawing forming a part of this application, in which

Figure 1 is a transverse section through the device, portions being shown in elevation; and

35 Figure 2 is a section along the line 2—2 of Figure 1.

In carrying out my invention I made use of the upper receptacle of a coffee maker and show the upper portion of the receptacle at 14 in Figure 1. 40 The top of the receptacle has an opening 14a for receiving the reduced portion 1a of a cylindrical molded container 1. The container is preferably constructed from an insulating material and is closed by a cover 1b.

45 A non-circular insulating rod 2 is slidably mounted in a non-circular opening in the base of the container and is supported against downward movement by a disc 2 secured to a reduced portion 12 of the rod by a pin 2a. A float 11 has a threaded stud 10 screwed into a threaded bore 50 provided in the lower end of the rod 2.

55 Within the container 1, I mount a fixed contact 4 that has a base 4' to which an electric wire 13a is secured, the wire being received in an electric wire conduit 13. A movable contact 3 is secured

to a spring arm 3' carried by the side wall of the container. A second wire 13b leads from the spring arm 3' to the conduit 13. It will be noted that a forked member 15 extends from the movable contact 3 and has its bifurcated end 5 received in an annular groove 12a formed in the top of the rod 2. A vertical movement of the rod 2 in an upward direction will lift the forked member causing the latter to raise the movable contact 3 above the fixed contact 4 and flex the 10 spring support 3'.

I provide novel means for moving an insulating arm 5 between the contacts when they are initially separated by the rising float. Figure 2 15 shows the arm pivoted at 6 and movable from the "on" position, shown by the full lines, into the "off" position, shown by the broken lines. The side wall of the container 1 has a slot 5a through which the arm extends. The free end of the arm is shaped to act as a handle. 20

The arm 5 is yieldingly held in abutting position against the side of the movable contact 3 by a biasing means consisting of a spring 7 connected at one end to a screw 7' and having its other end received in an opening 9 in the arm. 25 The spring will immediately move the arm from the "on" to the "off" position as soon as the contacts are separated.

From the foregoing description of the various parts of the device, the operation thereof may 30 be readily understood.

The coffee maker is placed on the electric heater, not shown, with the proper amount of water in the lower compartment and the required amount of ground coffee in the upper compartment. 35 The container 1 is now placed over the opening in the upper receptacle 14 and constitutes a cover therefor. The float 11 will be suspended within the receptacle and is spaced above the ground coffee. The switch within the container 1 is in series with the heating element 40 and the source of current, and the switch is closed by moving the arm 5 to the right in Figure 2, i. e., into the "on" position.

The electrical heating element will now heat 45 the water in the lower receptacle and the pressure developed in this receptacle will cause the water to move upwardly into the upper receptacle 14 and mix with the ground coffee. When the desired amount of water is transferred from the lower receptacle to the upper one, the float 11 50 will be raised by the water and will carry with it the movable contact 3 to a position where the arm 5 may move between the contacts 3 and 4. The spring 7 moves the arm as soon as the float 55

moves the contact 3 above the contact 4 to the required extent. The separation of the contacts will open the circuit to the heating element and therefore the water in the bottom receptacle of the coffee maker cannot boil dry. The insulating member 5 also prevents any arcing of the current between the contacts 3 and 4 during their separating movement.

The float 11 is maintained in its raised position and is prevented from moving downwardly because the arm 5 will remain between the two contacts and space the contact 3 from the contact 4. The device therefore needs no watching of any kind by the operator after the current is initially connected to the heating element by the switch. The arm 5 must be manually moved into "on" position before the circuit can again be closed. The adjustment of the float 11 with respect to the rod 2 will permit the operator to determine at what height he wishes the liquid in the receptacle 14 to reach before the switch is automatically opened.

It is evident that this device is useful in places where attention is not given to shutting off the electric current when the coffee making is completed, when the water rises from the lower to the upper container.

This device may be sold as an accessory for the many non-automatic coffee makers now in use.

I claim:

1. In a float operated switch, a fixed contact, a movable contact cooperating therewith and operated by a float, an insulating strip held in abutment with said movable contact in the engagement position of the contacts, biasing means for causing said insulating strip to enter between and hold apart said contacts upon their initial separation by said float.

2. In a float operated switch, a pair of separable contacts, a float for separating one contact from the other when the float is moved, an insulating strip, and means for moving the strip between the contacts when the latter are separated from each other by the float.

3. In a float operated switch, a fixed contact, a movable contact cooperating therewith, a float for moving the movable contact away from the fixed contact when the float is lifted by a fluid,

said float aiding in moving the movable contact toward the fixed contact when the fluid level lowers, and a spring actuated insulating strip movable between the contacts upon their initial separation by said float, said strip being manually movable for again permitting the contacts to touch each other when the fluid level permits the float to freely lower.

4. In a float operated switch, a pair of contacts, yielding means for holding them together, a float aiding in holding the contacts together when a fluid fails to lift the float, and separating the contacts when the fluid raises the float, an insulating strip, and biasing means for moving the strip between the contacts upon their initial separation by the float.

5. A float switch comprising a housing, a rod slidably mounted in the bottom of the housing, a float secured to the rod, a fixed contact disposed within the housing, a movable contact yieldingly held against the fixed contact, connections between the rod and movable contact for lifting the contact above the fixed contact when the float raises the rod, an insulating member abutting against the movable contact, and biasing means for moving the members between the contacts when the contacts are initially separated by the float.

6. A float switch comprising a housing, a float carrying a rod slidably mounted in the housing base, a fixed contact, a movable contact normally contacting with the fixed contact, connections between the rod and the movable contact for lifting it above the fixed contact when the float lifts the rod, an insulating arm, and biasing means for moving the arm between the contacts when they are initially separated by the float.

7. A float switch comprising a housing, a float carrying a rod slidably mounted in the housing base, a fixed contact, a movable contact normally contacting with the fixed contact, connections between the rod and the movable contact for lifting it above the fixed contact when the float lifts the rod, an insulating arm, and biasing means for moving the arm between the contacts when they are initially separated by the float, said arm being manually movable to permit the contacts to again move together.

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