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AUTOMATIC CIRCUIT INTERRUPTER

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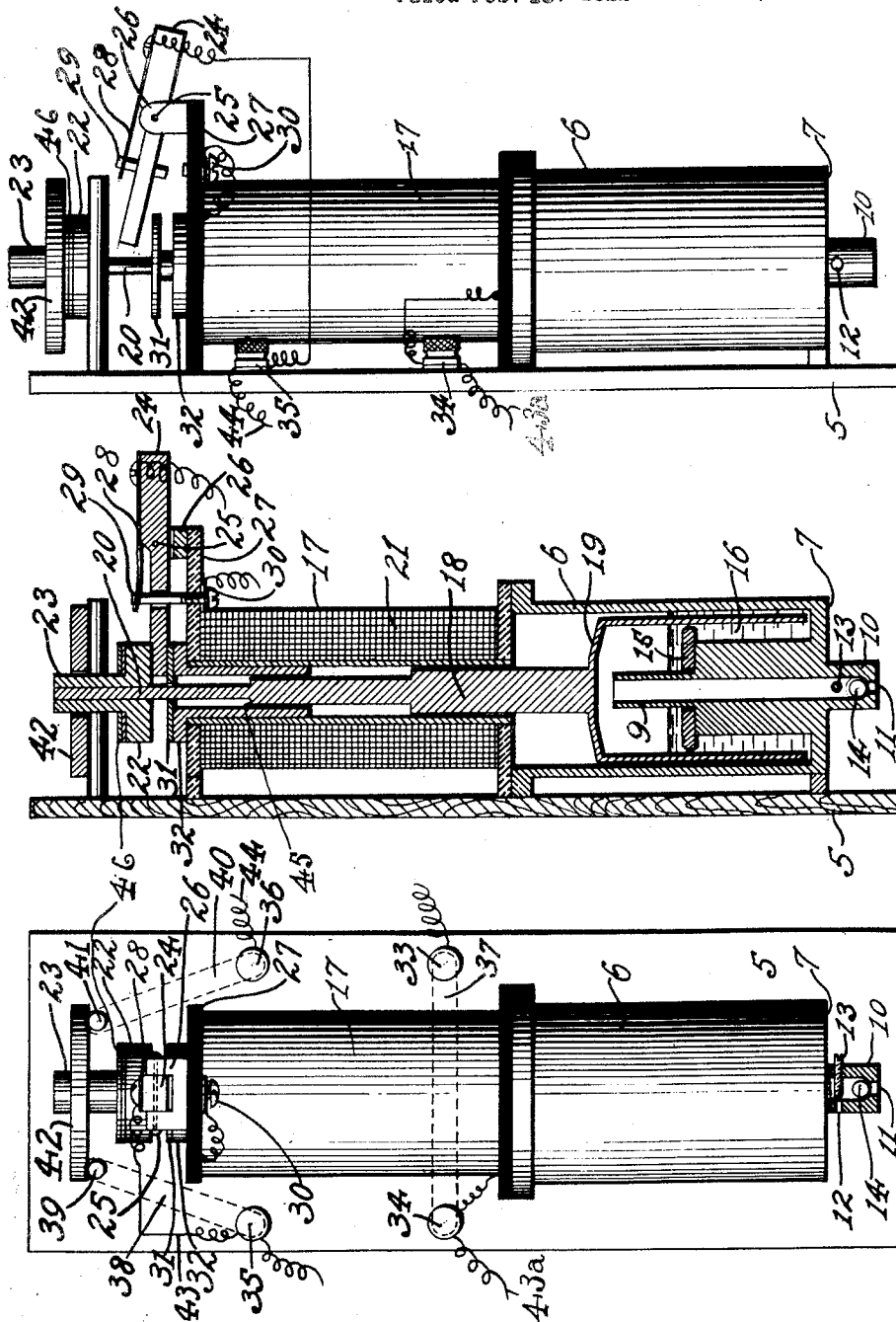


Fig. 3.

Fig. 2.

Fig. 1.

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AUTOMATIC CIRCUIT INTERRUPTER.

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My invention primarily relates to means for controlling the circuit of electric flash signs; and the object thereof is to produce a device by means of which the times at which an electric flash sign will be active and inactive will be automatically controlled. A further object is to produce a device in which the times of activity and inactivity of the sign can be easily changed. While my device is primarily designed for electric flash signs, I do not restrict myself to such use as it is adapted for other uses.

In the drawings forming a part of this application, Fig. 1—is a front elevation of my device with the circuits active but with the control valve in section. Fig. 2—is a central vertical section of Fig. 1. Fig. 3—is a side elevation of my device with the circuits interrupted or inactive.

Referring to the drawings, 5 is the base of my device of insulating material. Secured to base 5 is a bottom casing 6 from the bottom 7, of which projects upwardly about half way, an air tube whose lower portion is thicker than the upper portion 9. The lowest part or bottom portion 10 of the air tube projects below the bottom of 7. Portion 10 is closed at the lower end, except at the inlet port 11. An outlet port 12 just below bottom 7 is controlled by a screw 13 which regulates the passage of air there-through. A ball check 14 prevents air from passing out of port 11. The side walls, and bottom, and the air tube are all preferably cast integral as shown, but may be made of separate parts if desired. A washer 15 surrounds portion 9 of the air tube and rests upon the thicker lower portion and prevents the splashing of liquid 16 with which the lower portion of casing 6 is filled when the device is in use. A solenoid 17 is secured to base 5 and rests upon casing 6 and forms the top thereof. The solenoid has a core 18 which projects into casing 6 and has attached thereto an inverted cup 19, which cup at the start of the energizing of the solenoid extends to near the bottom of the liquid. The upper portion of core 18 is stepped and nonmagnetic, and the upper end 20 is quite small and projects above the winding 21 and has secured thereto a fiber collar 22 which is provided with a neck 23. At the start of the energizing of the solenoid this collar rests upon the inner end of lever 24, and holds said lever horizontal as shown in Figs.

1 and 2. Lever 24 is mounted on pin 25. Pin 25 is mounted in ears 26 attached to the top plate 27 of the solenoid, which projects at one side for that purpose. The outer end of lever 24 is thicker and heavier than the inner end and has secured thereto a spring 28 which projects toward the inner end and carries a contact 29. Contact 29 engages contact 30 at the start of energizing the solenoid and spring 28 is flexed, as best shown in Fig. 2. Contact 30 consists of a screw which holds one end of the winding of the solenoid. A loose nonmagnetic washer 31 separates the inner end of lever 24 from pole piece 32. While solenoid 17 is energized, it magnetizes washer 31 through pole piece 32, thereby holding contacts 29 and 30 in engagement until washer 31 is pried loose from 32 by shoulder 45 of plunger 18. Mounted on the base are binding posts 33—34—35 and 36. Posts 33 and 34 are connected by bus bar 37. Post 35 is connected by bus bar 38 with contact bar 39 mounted on the base. Post 36 is connected by bus bar 40 with contact bar 41. These bus bars are shown in dotted lines in Fig. 1. A contact washer 42 rests upon bars 39 and 41. Wire 43^a is connected to post 34 and to a source of energy not shown. Post 34 is also connected to the winding of the solenoid. The outer end of lever 24 is connected by wire 43 to post 35. Wire 44 leads to and forms part of the flasher sign circuit, being the return wire. The other side of the flasher sign circuit is connected to post 33 by wire 45. The flasher signs are not shown, as they are of any desired construction.

Operation.

When my apparatus is in the position shown in Figs. 1 and 2 all the circuits are closed and the solenoid is energized and draws core 18 upward, which carries cup 19 and collar 22 upward. As cup 19 goes up, air comes into the cup through ports 11 and 12. Collar 22 engages washer 42 and raises it off bars 39 and 41 thereby breaking the circuit to the flasher sign. In its upward movement shoulder 45 of core 18 engages and raises washer 31, and lever 24 assumes the position shown in Fig. 3, thereby separating contacts 29 and 30 and the solenoid is de-energized. The weight of core 18, cup 19, and collar 22 causes these parts to descend. The rapidity of descent

of these parts is controlled by the rate of escape of the air from cup 19 through port 12 thereby determining the length of time that the flasher sign shall remain inert and the number of times it will be active in any given time. As soon as washer 42 engages bars 39 and 41, and contacts 29 and 30 are engaged, the solenoid is again energized and the operation is repeated.

By this construction it will be seen that I have provided a switch device that will work on an alternating current. By placing removable washers 46 upon collar 22 the time of opening the circuit can be shortened, and the time of inaction lengthened. It will be seen that the engagement of contacts 29 and 30 flexes spring 28 and that the contacts 29 and 30 remain in engagement a short time after the inner end of lever 24 leaves the position shown in Fig. 2. By regulating the speed at which the air escapes through port 12 the number of times the solenoid is energized or de-energized in a given time can be changed, by having the bottom of cup 19 slope away from the plunger if any liquid gets above the cup it drains back.

Having described my invention, I claim:

1. In a device of the class described a solenoid; a casing connected to the bottom of said solenoid; a stepped air tube projecting through the bottom of said casing, said tube having a port in the bottom thereof, and another port in the side thereof below said bottom; a screw to regulate said last port; a ball check for said other port; an inverted cup in said casing surrounding said air tube; a stepped core for said magnet, said core being composed of magnetic and nonmagnetic portions, the smaller portions being nonmagnetic and the magnetic portion being connected to said cup; liquid in said

casing surrounding a portion of said tube; a washer surrounding the smaller portion of said tube, and resting on the larger portion thereof; a contact mounted in the top of said magnet and connecting to the winding; a lever rockably mounted on the top of said magnet; a spring connected to said lever, a contact carried by said spring and adapted to engage the other contact and flex the spring; a nonmagnetic washer surrounding the upper and nonmagnetic end of the core of the magnet between the lever and pole piece; a nonmagnetic collar secured to the upper part of said core; a base to which said magnet is secured; contact bars secured to said base, binding posts secured to said base, connections from said posts to said bars, one of said posts being connected to said spring and the other post being adapted to be connected in the circuit; and a magnetic washer upon said bars and adapted to be raised off the bars upon the upward movement of the collar.

2. In a device of the class described, a solenoid, an operating circuit therefor, a switch in said circuit composed of a fixed and a movable contact, said movable contact being carried on the inner end of a pivoted lever whose outer end is heavier than the inner end; means carried by said solenoid to hold said lever with its contact engaging the other contact while the solenoid is energized; and other means operated by the solenoid to move said lever at stated periods of time to cause the disengagement of said contacts whereby the solenoid circuit is broken.

In witness that I claim the foregoing I have hereunto subscribed my name this 6th day of February, 1922.

GEORGE HESSE.