Jan. 4, 1927. 1,613,305

H. W. BATCHELLER

CIRCUIT CLOSER

Filed Oct. 19, 1925

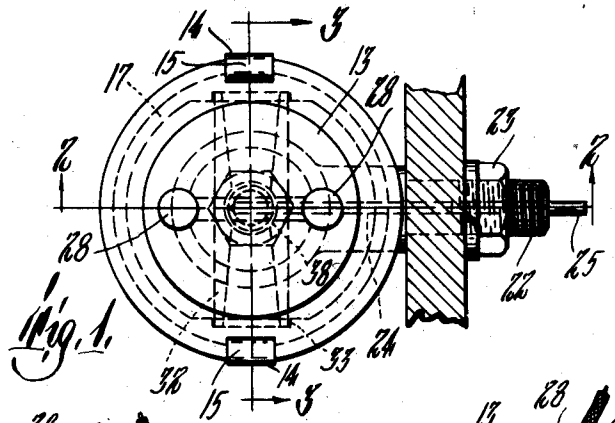


Fig. 1.

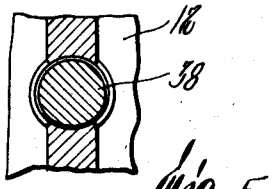


Fig. 5.

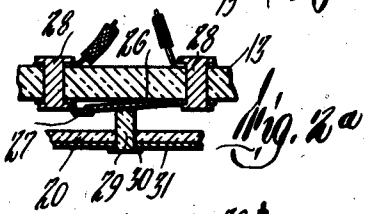


Fig. 2a

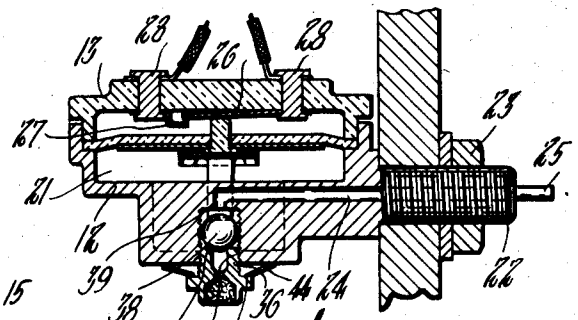


Fig. 2.

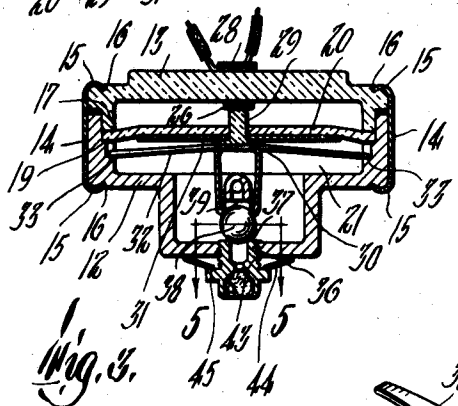


Fig. 3.

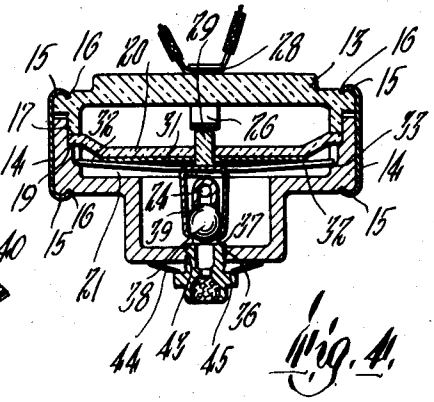


Fig. 4.

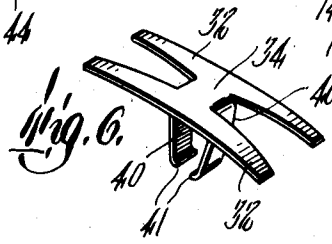
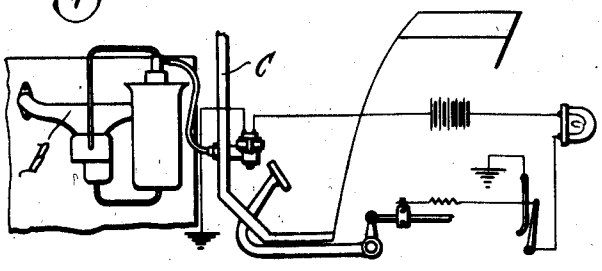


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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CIRCUIT CLOSER.

Application filed October 19, 1925. Serial No. 63,300.

This invention relates to a circuit closer for an electric signal device for motor vehicles including signal lights which are alternately lighted and extinguished in rapid succession, to give a flashing signal.

The present application is in part a continuation, and in part a division of my application for Letters Patent for traffic signals for motor vehicles, filed March 21, 1925, Serial No. 17,218.

The object of the invention is to provide an improved flashing element for a traffic signal of the type disclosed by said application.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is a top plan view of a flashing element embodying the invention.

Figure 2 is a section on line 2—2 of Figure 1, showing the flashing circuit broken.

Figure 2ª is a fragmentary view similar to a portion of Figure 2, showing the circuit closed.

Figure 3 is a section on line 3—3 of Figure 1, the circuit being broken.

Figure 4 is a view similar to Figure 3, the circuit being closed, as in Figure 2ª.

Figure 5 is a section on line 5—5 of Figure 3.

Figure 6 shows in perspective the diaphragm-controlling spring hereinafter described.

Figure 7 is a side view, showing a portion of a motor vehicle equipped with a traffic signal including a flashing element embodying the invention.

The same reference characters indicate the same parts in all of the figures.

My improved flashing mechanism includes a casing composed of a hollow base 12, fixed at a point adjacent to the intake manifold B (Figure 7) of the engine, and preferably to the dash C, and a cap 13, detachably secured to the base 12, preferably by resilient metal clips 14, having hooks 15 detachably engaged with grooves 16 in the base and cap, as shown by Figures 3 and 4. The cap has an annular flange 17, entering the base, and the clips are adapted to be forced by inward pressure thereon into engagement with the grooves 16, and disengaged from the grooves by outward pressure exerted on the hooks.

Between the cap flange 17 and an annular shoulder 19 on base, is clamped the margin of a circular flexible diaphragm 20, forming one side of a working chamber 21, below the diaphragm. The base is provided with a shank 22, extending through a hole in the dash, and secured by a clamping nut 23 (Figure 2). A duct 24, extends from the working chamber through the shank 22, and is connected by a pipe 25, with the intake manifold.

The diaphragm 20 is normally substantially flat, as shown by Figures 2 and 3, and is alternately flexed to the position shown by Figure 4, and restored to its normal position, as hereinafter described. When the diaphragm is flexed, the flashing circuit is closed by the contact of a spring contact 26 with a fixed contact 27, as shown by Figure 2ª, each contact being included in the flashing circuit.

When the diaphragm assumes its normal position, the spring and the fixed contact are separated, as shown by Figure 2, and the flashing circuit is broken.

The contacts 26 and 27 are fixed to the cap 13, which is of insulating material, by means of binding posts 28, secured to the cap. To the center of the diaphragm is secured an upwardly projecting presser which raises the spring contact 26, when the diaphragm assumes its normal position. Said presser is preferably a stud 29, of insulating material, inserted in a central orifice in the diaphragm, and in a washer 31 interposed between the under side of the diaphragm and the shoulder 30. The diaphragm is normally raised, as shown by Figures 2 and 3, by a spring preferably formed as shown by Figure 6, and including two resilient metal members 32, seated on shoulders 33 on the base, and a connecting neck 34, bearing on the head 30.

The exhaust gases moving as usual in the manifold B, act through the pipe 25 and duct 24, to create a suction in the working chamber 21, sufficient to flex the diaphragm downward and break the flashing circuit. This movement of the diaphragm causes the opening of a passage connecting the working chamber with the atmosphere, so that the diaphragm is returned by atmospheric pressure to its normal position, and the flashing circuit is closed.

The passage to the atmosphere is formed by a tubular nipple 36, screwed into the bottom of the base 12. The inner end of the

nipple forms an upwardly facing valve seat 37, on which a ball valve 38 is adapted to close downward. The duct 24 terminates in a downwardly facing valve seat 39, located above the seat 37.

The diaphragm is provided with a valve controller, adapted to hold the valve on the seat 37, when the diaphragm is raised, thus shutting off the air entrance, and to force the valve against the seat 39, when the diaphragm is depressed, thus shutting off the suction. In this instance, said controller is composed of two resilient arms 40, integral with the neck 34 (Figure 6) and having terminal hooks 41. When the diaphragm is raised, the hooks 41 bear on the upper portion of the valve 38, and hold it on the seat 37, as shown by Figure 3. When the diaphragm is depressed, the hooks 41 are first sprung outward by the valve until they pass below the center thereof, and then spring inward and force the valve upward against the seat 39. The suction is thus shut off, so that air enters and raises the diaphragm, the hooks 41 being sprung outward while they are rising, until they release the valve and permit it to drop upon the seat 37, so that suction is again exerted.

It will now be seen that the diaphragm is alternately raised and depressed, when the engine is running, and thus caused to alternately break and close the flashing circuit.

The nipple 36 may be vertically adjusted to increase or decrease the frequency of the movements of the diaphragm, the nipple having a screw-thread connection at 43 with the base. An adjustment of the nipple which decreases the distance between the valve seats 37 and 39, increases the frequency of the movements of the diaphragm. Accidental rotation of the nipple 36 is prevented by a dished spring washer 44, interposed between a bottom face of the base and a shoulder 45 on the nipple.

I claim:

1. A circuit closer for a motor vehicle traffic signal system comprising a casing, a diaphragm within the casing forming one side of a working chamber in the casing, a spring yieldingly holding the diaphragm in a normal position, circuit closing and breaking contacts separated by the diaphragm when in its normal position, an outlet conduit leading from said working chamber of the casing and adapted to be connected with an internal combustion engine of a motor vehicle, whereby the diaphragm will be subjected to fluid pressures produced by operation of such engine, an inlet conduit connecting said working chamber with the atmosphere, and valve means operable by movement of the diaphragm for alternately closing the inner ends of the outlet and inlet conduits.

2. A circuit closer as specified by claim 1, said valve means including a downwardly facing valve seat on the outlet conduit, an upwardly facing valve seat on the inlet conduit, a ball valve adapted to close said seats alternately, and valve-shifting means movable by the diaphragm, and adapted to hold the valve on the inlet conduit seat when the diaphragm is in its normal position, and on the outlet conduit seat when the diaphragm is flexed from its normal position.

3. A circuit closer as specified by claim 1, the casing being composed of a base forming the bottom and margin of the working chamber, and a cap of insulating material secured to the base, separably connected with the base, supporting said contacts, and insulating the same from each other when they are separated.

4. A circuit closer as specified by claim 1, the casing being composed of a base forming the bottom and margin of the working chamber, and a cap supporting said contacts, said element comprising also resilient hooked clips engaged with grooves in the base and cap and detachably connecting said parts.

5. A circuit closer as specified by claim 1, said spring being composed of resilient curved members seated on a shoulder on the base, and a neck connecting said members, and exerting upward pressure on the diaphragm, said valve means including oppositely facing valve seats, formed respectively on the inlet and the outlet conduit, a ball valve movable between said seats, and hooked resilient arms integral with said neck and adapted to cooperate with the ball valve, to hold the same against either valve seat.

6. A circuit closer as specified by claim 1, said spring being composed of resilient curved members seated on a shoulder on the base, and a neck connecting said members, and exerting upward pressure on the diaphragm, said valve means including oppositely facing valve seats, formed respectively on the inlet and the outlet conduit, a ball valve movable between said seats, and hooked resilient arms integral with said neck and adapted to cooperate with the ball valve, to hold the same against either valve seat, the inlet conduit being adjustably connected with the base to vary the distance between said valve seats, means being provided for preventing an accidental adjustment of the inlet conduit.

In testimony whereof I have affixed my signature.

HUGH W. BATCHELLER.