Aug. 8, 1939. L. F. CARTER 2,169,088

AUTOMATIC AUTOMOBILE SIGNAL LIGHT SWITCH

Filed Dec. 17, 1937

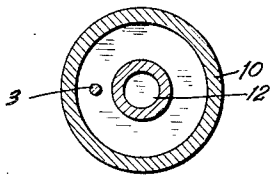


Fig. 2.

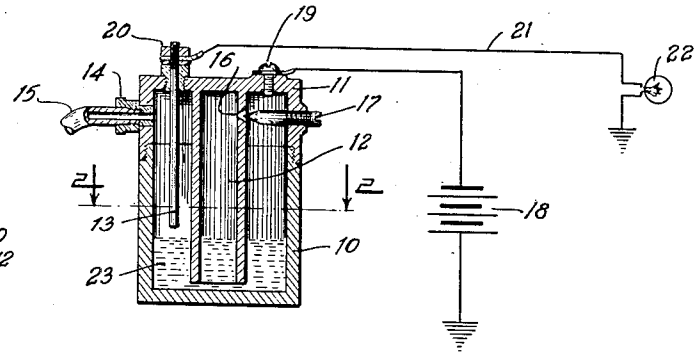


Fig. 1.

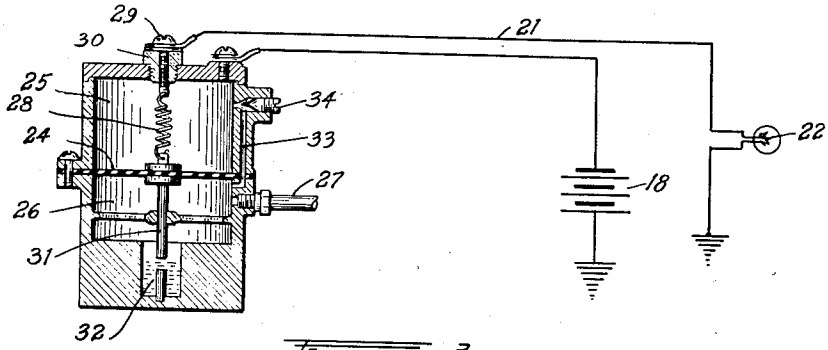


Fig. 3.

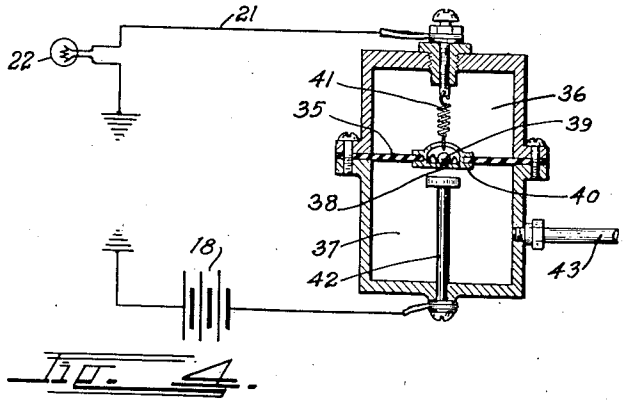


Fig. 4.

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Patented Aug. 8, 1939

2,169,088

UNITED STATES PATENT OFFICE

2,169,088

AUTOMATIC AUTOMOBILE SIGNAL LIGHT SWITCH

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Application December 17, 1937, Serial No. 180,379

3 Claims. (Cl. 200—81)

This invention relates to an automatic signal light switch for automotive vehicles.

Stop lights and signal lights have been designed to operate from the brake pedal of a vehicle. Such lights are not satisfactory since often a driver will slow down considerably by simply closing the throttle without applying the brake. This gives no signal to the driver in back that the car ahead is slowing down and often results in an accident.

The principal object of this invention is to provide a switch for the operation of caution or signal lights which will close a circuit whenever the driver closes or decreases the throttle opening so that a signal will be given regardless of whether the brake is applied.

It is, of course, desirable to have means for again opening the circuit should the throttle remain closed since it is only the first retarding period that is dangerous. Another object of this invention is to provide a throttle operated switch which will automatically open after a sufficient period of time so that the signal will only be displayed during the retardation periods.

A still further object is to construct a pneumatic device for operating the switch which will be independent of the atmospheric pressure at the place of use. Signal switches have been employed depending upon the atmospheric pressure. These are not certain or uniform in operation at both the sea level and at elevations such as encountered in the Rocky Mountain regions. The present invention however operates efficiently regardless of the altitude.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 illustrates the preferred form of the improved pneumatic switch.

Fig. 2 is a horizontal section thereof taken on the line 2—2, Fig. 1.

Fig. 3 is a vertical section through an alternate form of the invention.

Fig. 4 is a similar section through still another alternate form.

In the preferred form a hermetically sealed chamber is employed consisting of a lower bowl portion 10 threaded or otherwise secured and sealed to an upper cap portion 11. An inner chamber or tube 12 projects downwardly from the cap portion 11 and terminates above the bottom of the bowl portion 10. An electrode 13 provided with a binding nut 20, projects downwardly from the cap portion 11 into the bowl 10. The bowl and cap are preferably of metal so that electric current will be conducted from an attachment screw 19 to a quantity of mercury 23 in the bottom of the bowl.

A nipple 14 is provided which may be connected to the intake manifold of an automobile engine by means of a suitable tube 15. A bleed passage 16 is formed in the wall of the tube 12, the opening of which is controlled by means of a needle valve 17.

When installed the tube 15 is connected to the intake manifold of the engine; a conductor 21 to a signal light 22 is connected to the electrode 13 by means of the binding nut 20; and a second lead wire is connected to the cap portion 11 by means of the binding screw 19.

When the driver removes his foot from or decreases pressure on the accelerator, the increased vacuum in the intake manifold of the engine builds up a vacuum in the outer chamber of the bowl 10. This causes the relatively high pressure in the inner chamber to force the mercury 23 from within the inner tube 12 into the outer chamber 10. This, of course, causes the mercury surface to rise in the outer chamber until it contacts the electrode 13 thus closing the circuit to the signal light 22. Should the throttle remain closed, the air pressure from the inner tube 12 will pass through the bleed passage 16 into the outer chamber to again equalize pressures, causing the mercury to again assume a common level and break the circuit with the electrode 13. The period or the interval of illumination of the signal light 22 can be controlled by the setting of the needle valve 17 which, of course, controls the period in which the pressure in the inner and outer tubes will equalize with each other.

The alternate form shown in Fig. 3 operates on the same principle as the preferred form. In this form, however, a flexible diaphragm 24 is employed between an upper chamber 25 and a lower chamber 26. The lower chamber is formed with a threaded passage for receiving a vacuum pipe 27 to the intake manifold. The diaphragm 24 is normally supported by means of a tension spring 28 which extends to a conducting screw 29 in an insulating bushing 20. The lower face of the diaphragm is formed with a contact pin 31

extending into a mercury pot 32. An equalizing passage 33 is provided between the upper and lower chambers, the opening of which is controlled by means of a needle valve 34.

The second form is connected in the signal circuit similarly to the first form. An increase of vacuum in the tube 27 draws the diaphragm downwardly until the pin 31 closes contact with the mercury 32. Should this vacuum be maintained the air from the upper chamber 25 will pass through the passage 33 to the lower chamber causing the pressures to equalize and to break the circuit.

The same principle is also employed in the second alternate form of Fig. 4, in which, a flexible diaphragm 35 separates an upper chamber 36 from a lower chamber 37. The diaphragm 35, however, is provided with a central bleed opening 38 which is closed by means of a ball 39. The opening 38 and the ball 39 are contained within a metal cage member 40 secured to the mid portion of the diaphragm 35.

A spring 41 supports the diaphragm and carries current to the cage member 40. A contact member 42 closes the circuit with the cage member when the diaphragm moves downwardly. The lower chamber 37 is connected to the intake manifold by means of a tube 43. The air from the upper chamber seeps past the ball 39 to allow the diaphragm to return to its normal position and interval after operation.

It is desired to call attention to the fact that the entire operation is within a sealed container. The motion of the mercury or the diaphragm is not dependent upon the atmospheric pressure but simply upon difference in pressure in the two chambers. Therefore, the operation of the device is not affected in any way by atmospheric conditions.

It will also be noted that the operation of the device is not dependent upon the degree of vacuum. This is important for as the usual automotive engine becomes worn, the compression and the vacuum in the cylinders decreases. In this device, however, any vacuum whatsoever in one of the chambers will create an unbalanced condition between the chambers which will cause the device to function.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is—

1. A vacuum-operated, compensating switch for automobiles comprising: a vacuum chamber; means for connecting said chamber to a source of vacuum; a diaphragm closing one wall of said chamber; a closed equalizing chamber sealed against the opposite side of said diaphragm; a controllable passage communicating between said chambers; adjustable spring means for urging said diaphragm outwardly from said vacuum chamber; a contact member in said vacuum chamber; and a second contact carried by said diaphragm positioned to engage the first contact as the diaphragm is drawn inward by the vacuum in said vacuum chamber.

2. A vacuum-operated, compensating switch for automobiles comprising: a vacuum chamber; means for connecting said chamber to a source of vacuum; a diaphragm closing one wall of said chamber; a closed equalizing chamber sealed against the opposite side of said diaphragm; an adjustable electric conducting member extending into said equalizing chamber; a spring extending from said conducting member to a first contact on said diaphragm, said spring acting both as a conductor and to constantly draw said diaphragm toward said equalizing chamber; and a second contact in said vacuum chamber positioned to be contacted by the first contact as said spring is flexed.

3. A vacuum-operated, compensating switch for automobiles comprising: a vacuum chamber; means for connecting said chamber to a source of vacuum; a diaphragm closing one wall of said chamber; a closed equalizing chamber sealed against the opposite side of said diaphragm; an adjustable electric conducting member extending into said equalizing chamber; a spring extending from said conducting member to a first contact on said diaphragm, said spring acting both as a conductor and to constantly draw said diaphragm toward said equalizing chamber; a second contact in said vacuum chamber positioned to be contacted by the first contact as said spring is flexed; and a check valve controlling an equalizing passage through said diaphragm to prevent air from flowing from said equalizing chamber to said vacuum chamber.

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