June 9, 1925. 1,541,073

A. L. SOHM

INDICATOR

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Fig. 1.

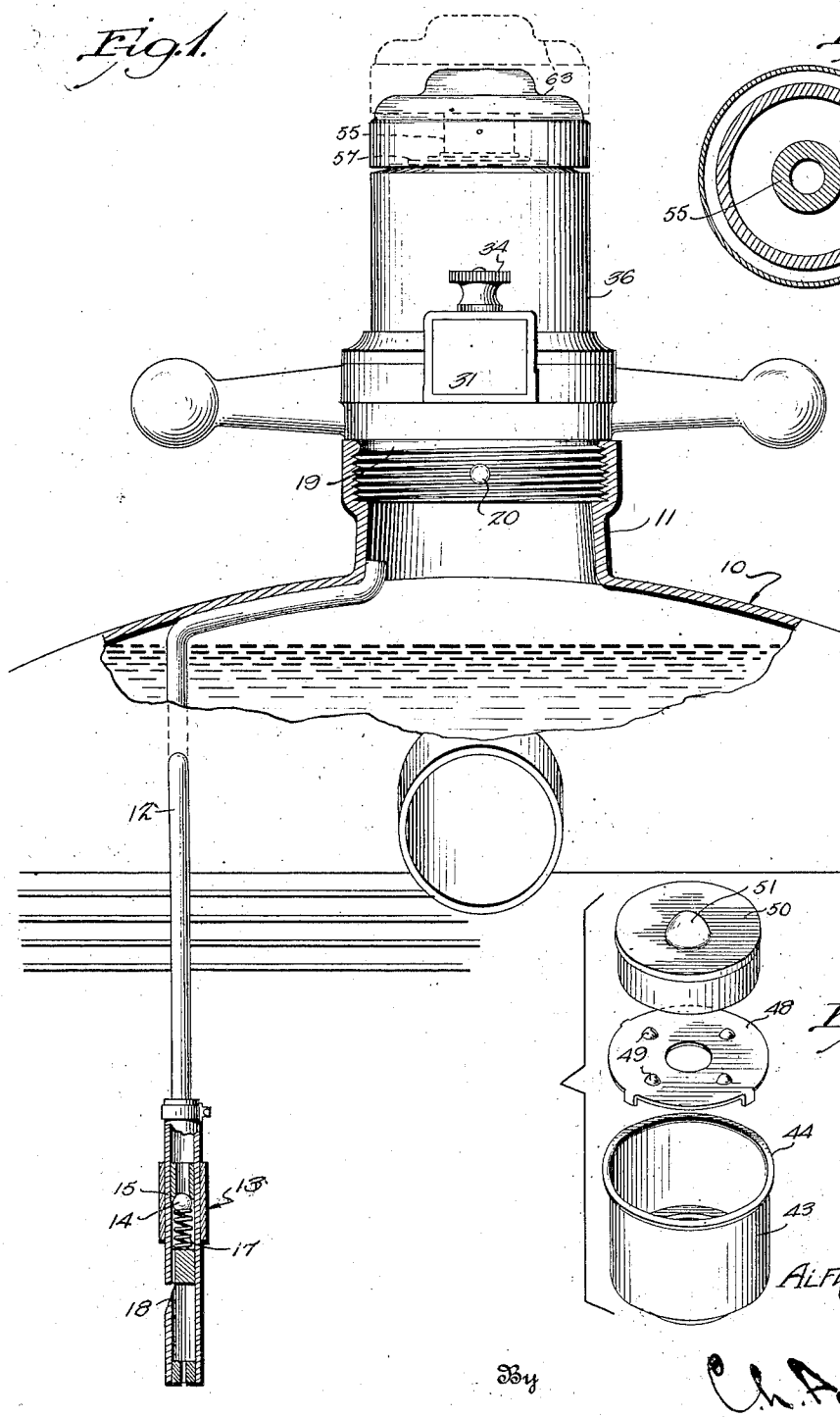


Fig. 3.

Fig. 2.

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Fig. 4.

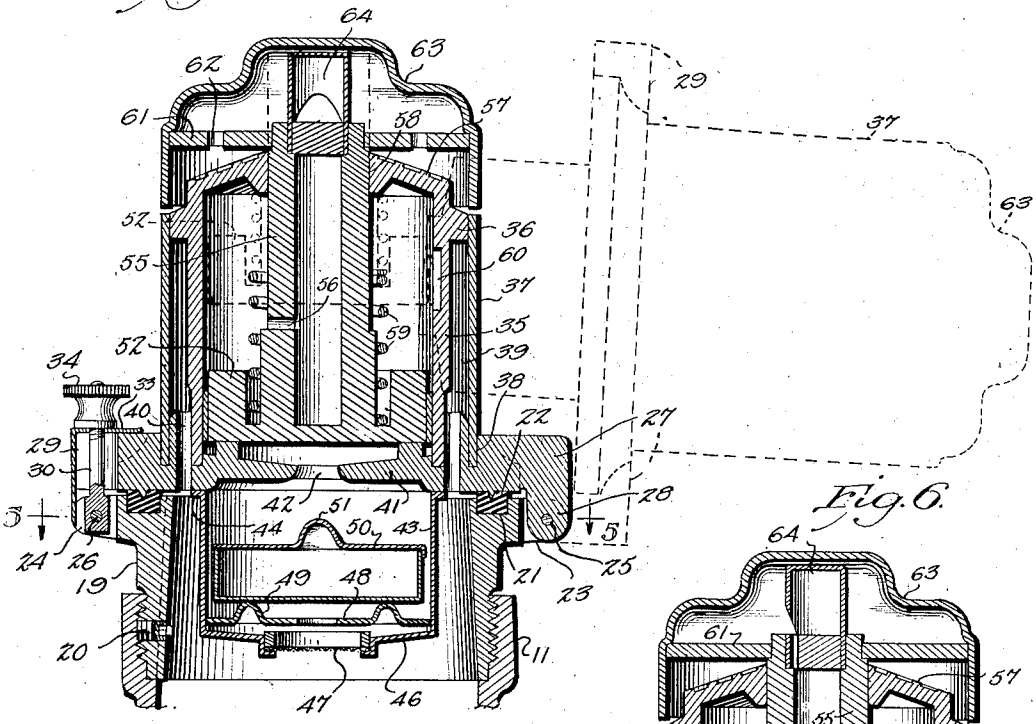


Fig. 6.

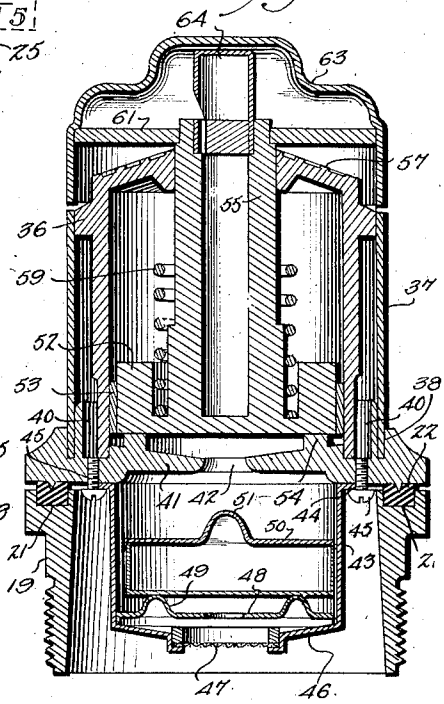
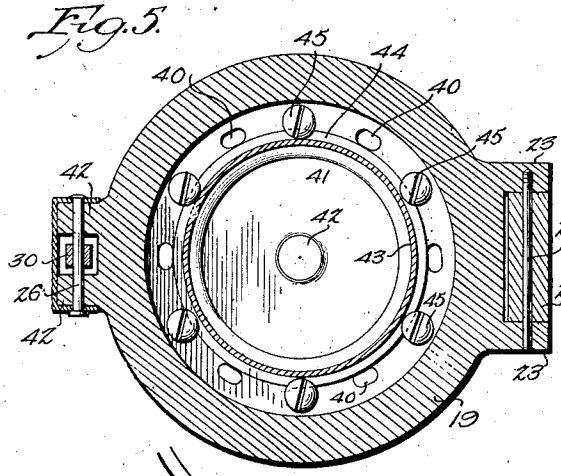


Fig. 5.



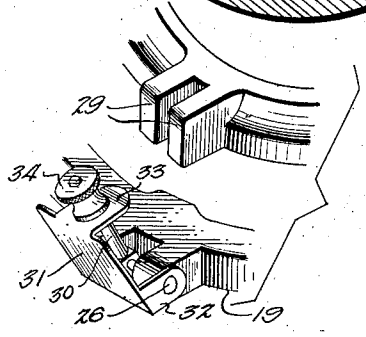


Fig. 7.

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UNITED STATES PATENT OFFICE.

ALFRED L. SOHM, OF CHICAGO, ILLINOIS.

INDICATOR.

Application filed September 12, 1924. Serial No. 737,376.

To all whom it may concern:

Be it known that I, ALFRED L. SOHM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Indicators, of which the following is a specification.

This invention relates to indicators and more particularly to a pressure operated device adapted for use in connection with motor vehicle cooling systems to indicate fluid pressures within the radiator due to abnormal thermal conditions of the engine and further adapted to condense water vapors and return them to the radiator in the form of water to minimize loss of water in the radiator.

In a copending application, Serial No. 664,985, filed September 26, 1923, I have shown and described a generally similar indicating device wherein I employ a cylinder and a piston mounted therein and adapted to be moved by fluid pressure in an automobile radiator to provide a warning signal when the motor becomes overheated and to indicate other abnormal conditions of the engine such as cracked cylinder heads, leaky cylinder head gaskets and leaky glands on the intake sides of the water circulating pumps. In this device a horizontal diaphragm is provided beneath the piston and this diaphragm has a central opening serving as a valve seat adapted to be closed by a float valve to prevent water from flowing upwardly into the cylinder under certain conditions from whence it is blown outwardly through the whistle employed as an audible indicator.

The device shown in my copending application also employs a condensation chamber surrounding the cylinder and communicating therewith just above the diaphragm whereby water vapors flowing into the condensation jacket will be condensed and flow back into the radiator through the valve seat in the diaphragm. I have found that when the radiator is substantially completely filled with water when the engine is relatively cold the expansion of the water causes it to rise into the float chamber causing the float valve to close communication with the interior of the cylinder whereupon pressure built up by the continued expansion of the water will open a spring pressed check valve carried by the lower end of the overflow pipe, thus permitting escape of the excessive water whereby the device is permitted to perform its normal functions. It has been found, however, that when the device is operating normally, water collecting on the upper face of the diaphragm due to the action of the condensing jacket will be blown outwardly through the whistle in small quantities when the engine becomes abnormally hot due to clogged radiator tubes, etc., whereby a considerable steam pressure will be built up in the radiator.

It is an important object of the present invention to provide a device of the above mentioned character wherein water of condensation will be returned directly to the radiator without passing through the opening in the float valve thus preventing the water from being spattered over the hood of the automobile when an excessively high pressure is present in the radiator.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings I have shown one embodiment of the invention. In this showing,

Figure 1 is a front elevation of the device shown in place on an automobile radiator, parts being shown in section,

Figure 2 is a detached perspective view of the float valve and associated elements,

Figure 3 is a horizontal sectional view through the indicator cylinder taken through the bypass therein,

Figure 4 is a central vertical sectional view through the device,

Figure 5 is a section taken on line 5—5 of Figure 4,

Figure 6 is a view similar to Figure 4 taken at right angles thereto, and,

Figure 7 is a fragmentary perspective view of the locking mechanism.

Referring to the drawings the numeral 10 designates an automobile radiator having an internally threaded filling neck 11 and the usual overflow pipe 12. The overflow

pipe 12 is provided with a combined check valve and whistle designated as a whole by the numeral 13. As shown, a ball check valve 14 is normally seated against a valve seat 15 by a spring 17. When the valve 14 is opened under certain conditions to be described, communication is established between the upper end of the radiator and a whistle 18 to afford a relatively loud audible signal.

Referring to Figures 1, 4 and 6, the numeral 19 designates a substantially cylindrical supporting member having an externally threaded lower end adapted to be received in the filling neck of the radiator as shown and provided with a lock nut 20 extending through the wall thereof to engage threads of the filling neck to prevent removal of the supporting member. The member 19 is provided in its upper end with a groove 21 receiving a packing washer 22 for a purpose to be described and is further provided upon opposite sides with pairs of ears 23 and 24. Hinge pins 25 and 26 pass through the ears 23 and 24 respectively as clearly shown in Figures 4 and 5.

As shown in Figures 4 and 6 a base member 27 is mounted above the member 19 and is provided upon one side with an apertured depending ear 28 adapted to receive the hinge pin 25 whereby the base 27 will be hingedly connected with the supporting member 19. The opposite side of the base member is provided with a pair of ears 29 arranged directly over the ears 24 as shown in Figure 4. A screw 30 extends upwardly between the ears 24 and 28 and is apertured at its lower end to pivotally receive the pin 26 as shown in Figure 4. A locking member 31 is arranged outwardly of the ears 24 and 29 and is provided with lower extensions 32 which are also adapted to pivotally receive the pin 26 as shown in Figure 7. The locking member 31 is provided at its upper end with an inwardly extending projection 33 apertured for the passage of the screw 30. A nut 34 is arranged on the upper end of the screw 30 and is adapted to engage the upper face of the projection 33. The projection 33 is preferably resilient and adapted to snugly engage the upper faces of the ears 29. The base member 27 is provided with a vertically extending cylinder 35 which may be secured to the base member in any suitable manner. The cylinder 35 is provided at its upper end with an external annular flange 36 and a cylindrical jacket surrounds the cylinder in snug contact with the flange 36, the lower end of the jacket being received in an annular groove 38 formed in the base 27. It will be apparent that an annular space 39 will be provided between the jacket 37 and the cylinder 35 and this space forms a condensing chamber to be described. The base member 27 is provided with a plurality of circularly arranged openings 40 adapted to afford communication between the interior of the supporting member and the condensing chamber as clearly shown in Figure 4.

As shown in Figures 4 and 6, the base 27 is provided with a substantially horizontal inwardly extending portion 41 centrally apertured as at 42 to provide a valve seat. A cage 43 is arranged within the member 19 beneath the valve seat 42. The cage is preferably cylindrical in shape and is provided at its upper end with a flange 44 adapted to contact with the lower face of the base 27 inwardly of the openings 40 therein. Screws 45 are provided for securing the cage 43 in position as shown in Figure 5. The cage 43 is provided with a bottom portion 46 having a central opening provided with a screen 47 to prevent foreign matter from the radiator from flowing upwardly into the cage. A valve support 48 is arranged within the cage and is provided with a plurality of upwardly extending knobs 49 adapted to support a float valve 50 preferably formed of thin sheet metal. The float 50 is provided on its upper face with an upwardly projecting knob 51 serving as a valve adapted to engage the seat 42 under certain conditions to be described.

A piston 52 is mounted to reciprocate within the cylinder 35 and is provided with a ring 53 which engages the inner wall of the cylinder. The piston 52 is supported above the valve seat 42 by means of lugs 54 carried by the inward extension 41 of the base 27 whereby any steam present within the radiator may freely flow upwardly into the cylinder beneath the piston when the valve seat 42 is opened. A hollow piston rod 55 extends upwardly from the piston and is preferably integral therewith as shown in Figures 4 and 6. The piston rod 55 is provided intermediate its ends with a port 56 adapted to afford communication between the interior of the piston rod and the interior of the cylinder 35 above the piston therein. The cylinder 35 is provided with a head 57 having a central aperture 58 slidably receiving the upper end of the piston rod. The upper face of the head 57 is preferably colored red to provide a visible signal, to be described. A spring 59 surrounds the piston rod and the upper end of the spring is adapted to engage beneath the head 57 when the piston moves upwardly a predetermined distance. As shown in Figures 3 and 4 the inner wall of the cylinder 35 is provided with a bypass 60 which is slightly longer vertically than the width of the ring 53 surrounding the piston whereby the cylinder on opposite sides of the piston will be in communication when the latter moves to its uppermost position as shown in dotted lines in Figure 4.

A supporting plate or ring 61 is secured to the piston rod above the head 57 as shown in Figures 4 and 6. This plate is apertured as at 62 to permit steam to flow outwardly of the device in a manner to be described. A cap 63 is mounted on the plate 61 to be supported thereby and a whistle 64 is arranged within the cap and connected to the upper end of the hollow piston rod to be actuated by steam flowing upwardly therethrough.

The operation of the device is as follows: When it is desired to fill the radiator, the nut 34 is loosened and pulled outwardly thus releasing the projection 33 of the locking member from the ears 29. The base 27 and all the mechanism connected therewith then may be swung upwardly and backwardly about the pivot pin 25 whereby the radiator may be filled through the member 19 as will be obvious. In Figure 4 of the drawings I have illustrated in dotted lines the position of the device when opened to permit the radiator to be filled. After the radiator is filled the device is closed and the locking member forced into place with the projection 33 engaging the upper faces of the ears 29. The nut 34 is then screwed downwardly to engage the projection 33 causing the latter to tightly grip against the ears 29 to maintain the device in closed position. It will be apparent that the engagement of the base 27 with the packing washer 22 provides a leak-proof joint to prevent the escape of water or steam outwardly between the base 27 and the supporting member 19.

In filling the radiator it is desirable to leave sufficient space above the level of the water to permit the water to expand under the influence of the heat of the engine so that the water will not flow upwardly into the cage 43. However if the radiator is completely filled the expansion of the water will seat the valve 51 against the seat 42 whereupon continued expansion of the water will create pressure within the radiator to unseat the valve 15 at the lower end of the overflow pipe thus permitting escape of excess water.

During the operation of the device water vapors will be present within the chamber 39 and these water vapors will be condensed and returned directly to the radiator through the openings 40 thus minimizing loss of water from the radiator as will be obvious. If, during the operation of the engine the latter becomes overheated, steam will be generated within the radiator and will flow upwardly into the cylinder beneath the piston therein. The piston will be raised due to the steam pressure and the cap 63 will be lifted sufficiently to uncover the colored cylinder head 57 to provide a visible signal. The raising of the piston will continue until the upper end of the spring 59 engages beneath the head 57 whereupon continued movement of the piston will be retarded. If the excessive generation of steam continues the piston will be lifted against the tension of the spring 59 until the ring 53 is positioned intermediate the ends of the bypass 60. Steam then will flow into the upper end of the cylinder and pass through the opening 56 to the interior of the piston rod and this steam will blow outwardly through the whistle 64 to provide an audible signal. The steam passing through the whistle is permitted to escape to the atmosphere through the openings 62 in the plate 61.

It will be apparent that water of condensation from the chamber 39 will flow directly back into the radiator without effecting the operation of the moving parts of the device so that his water will not be blown outwardly through the whistle when an excessively high pressure is present within the radiator. I have found that condensation of water vapors and steam within the chamber 39 takes place at a sufficiently rapid rate to prevent operation of the piston when the engine is only slightly overheated such as when climbing hills or driving through sand and gravel. Thus I provide a signal which will operate only when an actual overheated condition of the engine is present. I have also found that admission of explosive gases from the engine into the water jacket due to leaky cylinder head gaskets or cracked cylinder heads creates sufficient pressure within the radiator to lift the piston and indicate to the driver of the vehicle that an abnormal condition exists in the engine.

The piston and associated elements are sufficiently light in weight to permit the signal to operate at relatively small pressures, but if the generation of steam is so excessive as to be dangerous to the thin tubes of the radiator the valve 15 will open to permit escape of this excess of pressure. Obviously the tension of the spring 17 is such that the valve 15 is adapted to open only at higher pressures than those necessary for actuating the whistle 64.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having described my invention, I claim:

1. A device of the character described comprising a pressure chamber, a movable member therein adapted to be actuated by fluid pressure, said movable member having a portion adapted to serve as a signal, and a condensing chamber surrounding said

pressure chamber, said chambers being adapted to separately communicate with the interior of an automobile radiator.

2. A device of the character described comprising a supporting member adapted to be connected with an automobile radiator to communicate therewith, a pressure chamber, a movable member mounted in said pressure chamber and adapted to be actuated by pressure therein, said movable member having a portion adapted to serve as a signal, and a condensing chamber surrounding said pressure chamber, said chambers being adapted to communicate through separate openings with the interior of said supporting member.

3. A device of the character described comprising a substantially cylindrical supporting member adapted to communicate with the interior of an automobile radiator, a base member arranged over said supporting member and forming a substantial closure therefor, said base member being provided with a central aperture, a pressure chamber arranged above said base member and communicating through the aperture therein with the interior of said supporting member, a movable member arranged in said pressure chamber and adapted to be actuated by fluid pressure therein, said movable member having a portion adapted to serve as an indicator, and a condensing chamber surrounding said pressure chamber, said base being provided with a second aperture affording communication between said condensing chamber and the interior of said supporting member.

4. A device of the character described comprising a substantially cylindrical supporting member adapted to communicate with the interior of an automobile radiator, a base member arranged over said supporting member and forming a substantial closure therefor, said base member being provided with a central aperture forming a valve seat, a substantially cylindrical valve cage arranged in said supporting member and spaced from the walls thereof, a float valve arranged in said cage and adapted to engage said seat, a pressure chamber arranged above said base member and communicating through said valve seat with the interior of said supporting member, a movable member arranged in said pressure chamber and adapted to be actuated by fluid pressure therein, said movable member having a portion adapted to serve as an indicator, and a condensing chamber surrounding said pressure chamber, said base being provided with a second aperture arranged between said valve cage and the walls of said supporting member to afford communication between said condensing chamber and the interior of said supporting member.

5. A device of the character described comprising a pressure chamber provided with a base arranged over the filling opening of an automobile radiator and provided with an opening adapted to afford communication between the interior of the radiator and said pressure chamber, a signal operable upon a predetermined increase in pressure in said chamber, and a condensing chamber surrounding said pressure chamber, the base of said pressure chamber being provided with a second opening through which said condensing chamber is adapted to communicate with the interior of the automobile radiator.

6. A device of the character described comprising a pressure chamber provided with a base arranged over the filling opening of an automobile radiator, said base being provided with a valve seat having an opening therethrough to afford communication between the interior of the radiator and said pressure chamber, a signal operable upon a predetermined increase in pressure in said pressure chamber, a float valve arranged below said base and adapted to engage said valve seat, and a condensing chamber surrounding said pressure chamber, the base of said pressure chamber being provided with a second opening through which said condensing chamber is adapted to communicate with the interior of the automobile radiator.

7. A device of the character described comprising a pressure cylinder, a base secured to said cylinder and extending outwardly therebeyond, said base being adapted to be arranged over the filling opening of an automobile radiator and provided with an opening to afford communication between the interior of said cylinder and the interior of the radiator, a piston mounted to reciprocate in said cylinder, a signal operable upon movement of said piston, and a sleeve surrounding said cylinder and spaced therefrom intermediate its ends to form a condensing chamber, said sleeve being secured to said base, said base being provided with a second opening arranged outwardly of said cylinder and adapted to afford communication between said condensing chamber and the interior of the automobile radiator.

8. A device of the character described, comprising a pressure cylinder, a base secured to said cylinder and extending outwardly therebeyond, said base being adapted to be arranged over the filling opening of an automobile radiator and provided with a valve seat having an opening therethrough to afford communication between the interior of said cylinder and the interior of the radiator, a piston mounted to reciprocate in said cylinder, a signal operable upon movement of said piston, a sleeve surrounding said cylinder and spaced therefrom in-

termediate its ends to form a condensing chamber, said sleeve being secured to said base, said base being provided with a second opening, arranged outwardly of said cylinder and adapted to afford communication between said condensing chamber and the interior of the automobile radiator, and a float valve arranged beneath said base and adapted to engage the valve seat therein.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED L. SOHM.

Witnesses:
W. G. JACOBS,
CHARLES L. UPLEGGER.