

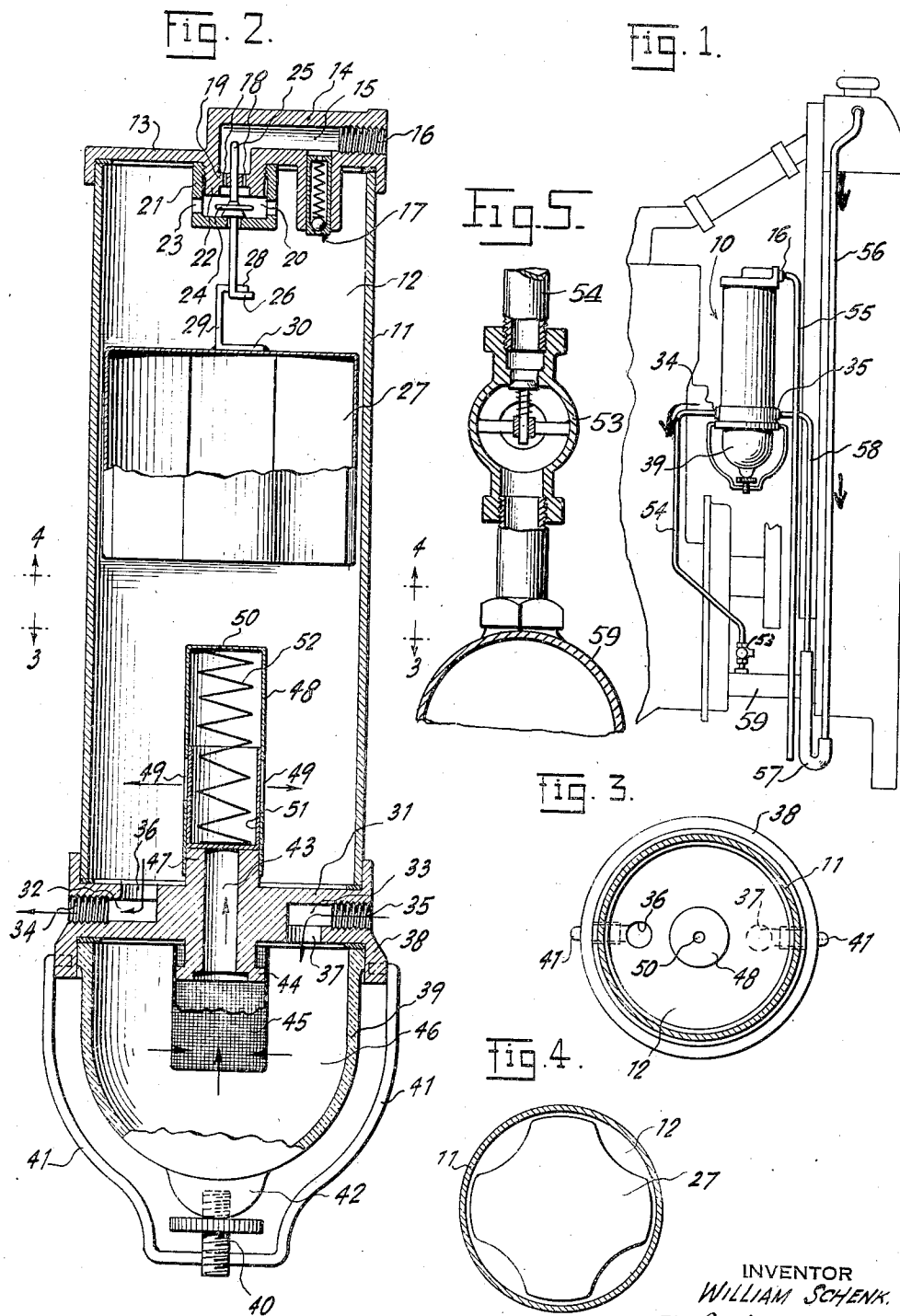
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WATER PROTECTIVE DEVICE FOR AUTOMOBILE MOTORS

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WATER PROTECTIVE DEVICE FOR AUTO-MOBILE MOTORS

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One object of this invention is the provision of a device adapted to be connected with the water cooling system of an automobile motor, whose purpose is to prevent the loss of water in the cooling system as a result of over heating of the motor and consequent boiling up of the water.

Another object of the invention is the provision of such a device whereby the overheated water, which would ordinarily overflow and be lost down the overflow pipe of the radiator, will instead, be returned to the water system. The device also embodies a storage tank in which the water, which would normally be lost through overflow, is retained so that upon subsequent cooling of the motor, this stored water will re-enter the water jacket.

A further object of the invention is the provision of a screen or filter as a part of the above device, so that the water which boils up out of the water jacket and which normally carries with it rust and accumulated sediment, is passed through a screen prior to its return to the water jacket. Over heating of a motor is frequently the result of excess accumulation of rust and sediment in the water system, whence, this cleaning of the overflow water and returning of the cleaned water to the system will frequently result in a cooling of the water to a point within its normal limits.

The above and other objects will become apparent in the description below, in which characters of reference refer to like-named parts in the accompanying drawing.

Referring briefly to the drawing, Figure 1 is a view, partly schematic, illustrating the manner of installing the device on an automobile.

Figure 2 is a longitudinal cross-sectional elevational view of the device.

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a longitudinal cross-sectional view through the check valve of the installation.

Referring in detail to the drawing, the numeral 10 indicates the device as a unit. The device comprises an upright wall 11 enclosing a tank 12. A cap 13 surmounts the wall 11 and is provided with a neck 14 enclosing a passage 15. An outlet nipple 16 is provided at one end of the neck 14. A safety exhaust valve 17 is provided at the base of the neck 14 and communicates between the tank 12 and the passage 15. The other end of the passage 15 communicates through holes 18 in a spider or the like 19, with a compartment 20 enclosed by a cap 21. The latter is threadably se-

cured on a downward extension 22 of the neck 14, and is provided with a plurality of openings 23 through which passage is provided from the tank 12 into the compartment 20. A valve 24, rigid on its stem 25 which is slidably mounted in the spider 19, serves to open or close the lower end of the extension 22 and thus, obviously, to open or close the through communication between the tank 12 and the passage 15. The valve stem 25 is extended downward through an opening in the cap 21, and its lower extremity is provided with a hook 26. A hollow float 27, whose walls are vertically corrugated, is mounted in the tank 12. A hook 28 extends on its upper surface, and the float 27 is normally suspended by means of the hook 26 supporting the hook 28, in the position shown. The base of the member 29 of which the hook 28 forms a part, is indicated at 30 and is fixed to the upper surface of the float 27. It is to be noted that the distance between the base 30 and hook 26 is slightly less than the distance between the hook 28 and the lower surface of the cap 21.

The bottom of the wall 11 is closed by a union 31 which is provided with a pair of oppositely disposed radial passages 32 and 33. The former is provided with a nipple 34, and the latter with a nipple 35. The passage 32 communicates with the tank 12 through an opening 36. The passage 33 communicates with the underside of the union 31 through an opening 37. The union 31 is provided with a depending flange 38. Within the flange 38, a substantially hemispherical glass bowl 39 is mounted. This bowl is held in place by means of the screw 40 supported at the juncture of the two spring fingers 41 which are suspended from openings in the flange 38. The bottom of the bowl 39 is provided with a boss 42 having an opening in which the screw 40 registers.

A central vertical passage 43 having an extending neck on each end, is provided in the union 31. On the lower neck 44 of this passage, a screen filter 45 is mounted frictionally, or in any other desirable manner. The bowl 39 encloses a compartment 46. The upper neck 47 of the passage 43 has mounted thereon a pressure valve comprising a cylinder 48 having openings 49 in its side walls and a vent 50 in its top. A hollow piston 51 is slidably mounted in the cylinder 48 and is normally urged downward by a spring 52. In its lowermost and normal position, the piston 51 closes the top of the passage 43.

The device is installed by connecting the nipple 35 through a tube 53 and a hose 57 with the

bottom of the standard overflow pipe 56. The nipple 34 is connected by a tube 54 to a point near the lowest extremity of the water jacket, such as the pipe 59. A one way or check valve 53 may be installed near the lower end of the tube 54 to prevent upward flow of water in the tube 54, as shown. The nipple 16 is connected to an auxiliary overflow pipe 55. It is apparent that the pipes 56, 58, and 54, and the tank 10, form a by-pass between the topmost and bottommost points of the water system.

The operation of the device is as follows: Assuming that the water in the cooling system becomes overheated to a point that it boils up slightly, it will rise and pass through the overflow pipe 56, then through tube 58 and nipple 35 into the bowl compartment 46 through the passage 33—37. It thence will rise through the filter 45 into the passage 43. Continued flow of this water will force the piston 51 upward against its spring 52 until the piston clears the openings 49, in which case the water will flow out through the openings 49 into the tank 12. If this flow of water is not excessive, it will pass directly from the tank 12 through the passage 32—36, nipple 34, tube 54, and back into the water jacket. Should the rate of overflow of the water into the overflow pipe 56 be excessive, however, so that its level will continue to rise in the tank 12, then it will ultimately raise the float 27 to its maximum elevated position. Just before it reaches the latter position, however, the base 30 on top of the float 27 will strike the hook 26 and raise the valve 24, thus closing the exhaust passage through the passage 15 against escape of the water therethrough. Until the latter takes place, the passage 15 serves as a steam or air outlet from the tank 12. Thus, the water trapped in the tank 12 is prevented from passing on into the overflow pipe 55, and if the temperature of the water in the motor jacket ceases to rise as a result of the cleaning of the water by the filter 45 prior to its return to the water system, then no water will have been lost from the water jacket. If, however, the temperature increase continues to a point at which the pressure of the water in the tank 12 requires an escape, then the safety exhaust valve 17 will be forced open to permit passage of the water therethrough, and out of the nipple 16 down the auxiliary overflow pipe 55. As most cases of overheating are at first slight in degree and are caused by clogging of the water system by accumulated sediment, the temperature of the water will, in a great majority of cases, have been reduced to a normal range by cleaning of the return water by the filter 45, prior to occurrence of the extreme condition just mentioned, so that in the great majority of such cases no water will have been lost. Without the provision of this device, there is no possibility of the overheating to cease once the water has begun to overflow down the overflow pipe, as the reduction in the quantity of water in the system resulting from this loss causes accelerated overheating of the insufficient amount retained, and the overheating is not checked before water has been added to take the place of that lost down the overflow pipe. In normal running of the motor without overheating, the water does not circulate through the device 10, as is obvious.

Obviously, modifications in form and structure may be made without departing from the spirit and scope of the invention.

I claim:

1. A device of the class described comprising a housing enclosing an upper compartment having an opening near the top thereof and a lower compartment, a union dividing said compartments, a pair of passages in said union each having an opening at one end on the outside of said union, one of said passages communicating with said upper compartment and the other with said lower compartment, a tube connecting the outside opening of one of said passages with the water system of a motor at a point near the top of the system, a tube connecting the outside opening of the other of said passages with said water system at a point near the bottom of the system, said union having an opening communicating between both of said compartments, a filter surrounding said last-named opening, a normally open valve in said first-named opening, said valve having a rigid member extending downward therefrom and lying above said float in the path of said float, said float on rising to the top of said tank striking and lifting said rigid member and lifting said valve, thereby closing said valve.

2. A device of the class described comprising a housing enclosing an upper compartment having an opening near the top thereof and a lower compartment, a union dividing said compartments, a pair of passages in said union each having an opening at one end on the outside of said union, one of said passages communicating with said upper compartment and the other with said lower compartment, a tube connecting the outside opening of one of said passages with the water system of a motor at a point near the top of the system, a tube connecting the outside opening of the other of said passages with said water system at a point near the bottom of the system, said union having an opening communicating between both of said compartments, a filter surrounding said last-named opening, a float mounted in said upper compartment, a normally open valve in said first-named opening, and means partly on said last-named valve and partly on said float for closing said last-named valve upon rising of said float to the top of said upper compartment.

3. In the circulating water system of a combustion engine, a by-pass connected to said system between a point near the top of the system and a point near the bottom thereof, the overflow water from said system caused by overheating of the engine entering said by-pass through said bottom point, a tank having an inlet in its top and an outlet in its bottom at a spaced-apart distance from said inlet, said tank being mounted in series in said by-pass and serving as a condenser to cool said overflow water, a filter in said tank, said overflow water after leaving said tank passing by gravity back into said system at said bottom point of the system, an escape passage into the atmosphere in the top of said tank and a valve in said passage, the water level in said tank rising when the rate of said overflow resulting from continued overheating of the engine exceeds the rate of said outflow from said tank by gravity, means in said tank adapted to be automatically operated upon rising of said water level to a point near the top of said tank to close said escape valve to prevent loss of said overflow water from said tank.

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