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COMBINED RADIATOR CAP AND PRESSURE RELIEF VALVE

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The invention relates to radiator caps of that type having associated therewith a pressure relief valve normally functioning to prevent discharge of water through the overflow pipe. It is the object of the present invention to obtain an exceedingly simple and inexpensive construction having various advantageous features and to this end the invention consists in the construction hereinafter set forth.

In the drawings:

1. Fig. 1 is a vertical central section through the fill tube of a radiator showing my improvements applied thereto;
2. Fig. 2 is a similar view illustrating the manner of relieving pressure before removal of the cap;
3. Fig. 3 is a cross section on line 3—3 of Fig. 2.

In the present state of the art various constructions of combined radiator cap and pressure relief valve have been devised which, however, are complex in construction and expensive to manufacture, in comparison with the ordinary plain cap. It is the primary purpose of my invention to avoid such complexity and increase in cost while at the same time to obtain an exceedingly efficient device for normally holding the water in the radiator without danger of over pressure and for insuring complete relief of pressure prior to the detachment and removal of the cap. As illustrated, A is the upper portion of a radiator of any suitable construction and B is the fill tube at the upper end thereof. This tube is formed with a cupped flange C terminating in a conical flange D which surrounds a central opening E into the radiator. The overflow pipe F extends upward from the radiator through the flange C terminating a short distance below the upper end of the tube B. E is a cap for the tube B having an internally threaded flange F for engaging a correspondingly threaded portion on the tube. G is a valve disk having a conical flange G' adapted to seat upon the flange D so as to shut off communication between the radiator header and the space within the tube B.

The valve G is perminantly attached to the cap F through the medium of a coil spring H which abuts against and is secured to cupped members I and I' at its opposite ends, these being respectively riveted or otherwise secured to the cap F and valve disk G.

The coil spring H is of such dimensions that when the threaded flange F of the cap is first engaged with the threaded end of the tube B, the valve G will be separated from the seat D. However, in screwing the flange F downward upon the tube, the valve will first come in contact with the seat D and then in the further screwing down of the cap will be revolved on the seat while the spring H will be placed under compression. This when the cap is in normal position the tension of the spring will be sufficient to prevent the unseating of the valve during normal operation of the car. If, however, excess pressure should develop within the radiator, this will overcome the spring tension, forcing the valve from its seat and permitting escape of pressure through the overflow tube F.

One very important feature of my construction is that in removing the cap all pressure is relieved by the withdrawal of the valve from its seat, this taking place before the cap becomes detached from the fill tube B. This is due to the proportion of the spring which as above stated holds the valve spaced from its seat when the cap is first engaged with the threads of the tube and also before the cap can be disengaged from the tube. Another important advantage of my construction is that after the valve contacts with its seat it is revolved in relation thereto, thereby producing a grinding action which insures effective sealing. This operation takes place every time the cap is screwed down and while it is being removed so that at all times the valve is maintained operative and any sediment or corrosion on either the valve or its seat will be quickly removed.

For anchoring the spring to the cups I and I', a portion of the flange of each is cut at J and a tongue K is bent around and clinched with the end coil of the spring. These cups are secured by rivets L. Thus the entire structure is one which can be easily manufactured and assembled and at a relatively low cost.

What I claim as my invention is:

1. In a radiator, the combination with a fill tube, of an annular flange within said tube forming a valve seat surrounding a central opening, an overflow pipe passing through said annular flange into the upper portion of the fill tube, a cap having a threaded engagement with the upper end of said fill tube, a valve for cooperating with said seat and a connection between said valve and cap for holding the former spaced from said seat when the cap is first engaged with the fill tube and for contacting said valve with its seat and rotating the same thereon before said cap is fully engaged with said fill tube.
2. In a radiator, the combination with a fill tube, of an annular flange within said tube forming a valve seat surrounding a central opening, an
overflow pipe extending upward through said annular flange into the upper portion of said fill tube a cap having a threaded engagement with the upper end of said fill tube, a valve for cooper-
ating with said seat and a spiral spring connecting said valve and cap, said spring being of such dimen-
sions as to hold the valve spaced from its seat during initial engagement of said cap with said fill tube and before disengagement thereof, and to also contact said valve with its seat and revolve the same thereon before said cap is fully engaged with said fill tube.

3. In a radiator, the combination with a fill tube, of an annular flange in said tube having a conical portion forming a valve seat surrounding a central opening, a valve having a conical por-
tion for engaging said conical seat, an overflow connection to said tube above said annular flange, a cap having a threaded engagement with the upper end of said fill tube, cupped members secured to the inner side of said cap and to said valve, and a coil spring seated in and secured to said cupped members, said spring being of such dimen-
sions that said valve will be held spaced from its seat during initial engagement of the cap with said fill tube and before disengagement thereof, said valve contacting with its seat and being revolved thereon by the rotation of said cap prior to complete engagement thereof with said fill tube and said spring being compressed by said complete engagement to impose a predetermined resilient yieldable pressure of said valve against said seat.

4. In a radiator, the combination with a fill tube, of an annular valve seat within said tube an overflow connection to said tube above said seat, a cap for closing the upper end of said tube, a valve for engaging said seat, and a spring forming the sole attachment between said cap and valve adapted to press the latter to its seat.

5. In a radiator, the combination with a fill tube, of an annular valve seat therein an overflow connection to said tube above said seat, a cap having a threaded engagement with the upper end of said tube, a valve for engaging said seat and a spring forming the sole connection between said cap and valve adapted when said cap is init-
ially engaged with said fill tube to hold said valve spaced from its seat, and when fully engaged to press the valve against its seat.

6. In a radiator, the combination with a fill tube, of an annular valve seat therein an overflow connection to said tube above said seat, a cap having a threaded engagement with the upper end of said fill tube, a valve for engaging said seat, and a spring forming a suspensory connection between said cap and valve adapted when said cap is init-
ially engaged with said fill tube to hold said valve spaced from its seat, and to yieldably press said valve against said seat and to rotate the same thereon during the screwing of said cap to its fully engaged position.

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