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RADIATOR CAP

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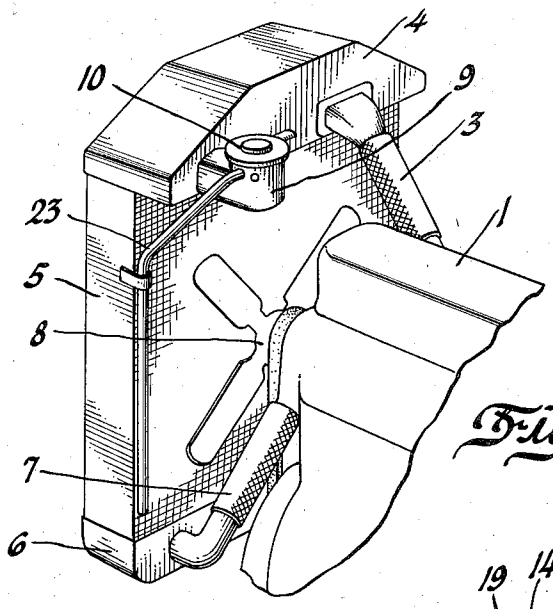


Fig. 1

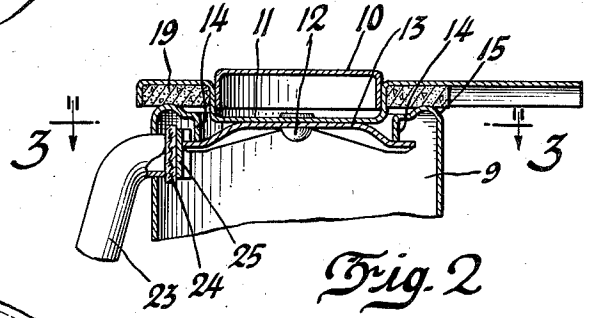


Fig. 2

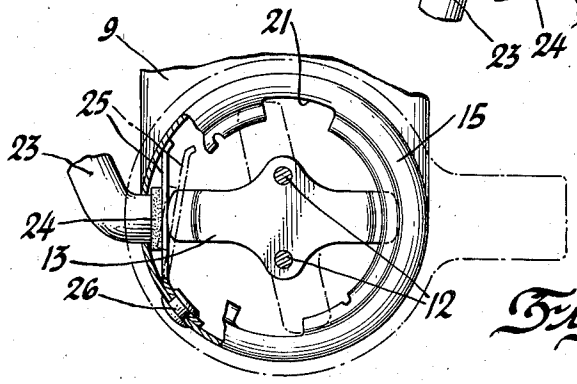


Fig. 3

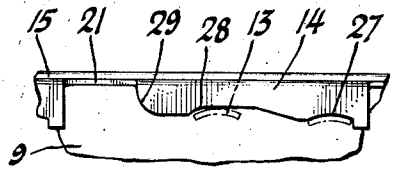


Fig. 4

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RADIATOR CAP

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5 Claims. (Cl. 220—44)

This invention relates to automobile engine cooling systems and more particularly to an improved filling spout construction.

It is an object of the invention to provide a safeguard against injury by scalding when the filler cap of a closed cooling system is to be removed for inspection or replenishment of the liquid supply.

Cooling efficiency can be increased if the system is operated under a slight internal pressure and a pressure can be built up, due to expansion of liquid with temperature increase, if the usual overflow vent is sealed and all parts fitted tightly against leakage. That is what is here contemplated, but in addition it is proposed to relieve the internal pressure by unsealing the overflow vent prior to complete removal of the filler cap. This will allow the cap to be detached safely and without danger of a surge of hot water or steam spouting out and spraying over everything and everyone close at hand. Not only is personal injury avoided but also damage prevented to the vehicle and especially surface finish where the cooling solution contains an anti-freeze which is also a paint solvent.

The invention will be best understood upon reference to the accompanying drawing wherein Figure 1 is a perspective view showing an engine cooling assembly embodying the invention; Figure 2 is a detail sectional view of the filling spout closure structure; Figure 3 is a view taken on line 3—3 of Figure 2; and Figure 4 is a fragmentary view showing the development of the camming abutment which forms a part of a bayonet joint.

In the drawing the numeral 1 indicates a jacketed engine block having an outlet connection 3 with the top tank or header 4 of a cooling radiator. A heat dissipating unit or core 5 joins the inlet tank with the bottom outlet tank 6 and the cooling liquid after passing through the cooling unit 5 returns to the engine block through the hose connection 7, joining the bottom tank 6 with an engine driven pump assembly 8 mounted on the front of the engine block 1.

As is customary in systems of this type, the upper tank or header 4 is provided with a filling spout 9 closed by a removable cap 10. A bayonet type lock may be employed between the closure cap 10 and spout and for this purpose the cap is provided with a central depression 11 to which is secured, by a pair of rivets 12, a locking bar or retainer 13, each end of which is adapted to ride on the underside of a downturned extension 14 of the inturned flange 15 at the top of the filler spout 9.

The bottom edge of the downturned flange 14, at diametrically opposite sides, has a cam profile as seen in the Figure 4 development thereof, and terminates in a depressed seat or notch 27 into which the end of the bar 13 may snap when the cap has been rotated upon its application to the spout. A stop or abutment prevents further rotation of the cap. When the cap is thus positioned on the filler spout, leakage is prevented by a washer or gasket ring 19 carried by the cap for engagement with the beaded lateral flange 15 of the spout. At the opposite end of the camming surface, the flange 14 is cut away in alinement with an axial slot 21 in the flange 15, to admit entrance of the locking bar 13 upon axial movement of the cap. The nose of the flange 14 is rounded as at 29 to facilitate engagement of the bar 13 with the underside or cam surface of the flange and immediately beyond the nose a secondary seating notch 28 is provided for the locking bar. The notches 27 and 28 afford stations near opposite limits of retainer bar movement and with the bar in either position the gasket 19 is effective as a seal. In applying the cap to the spout the retainer bar is entered axially in the opening 21 and then turned to bring the retainer bar under the flange 14 and into snap engagement with the final seating notch 27. Removal of the cap is accomplished by a reverse procedure except that it is intended that there should be a slight delay after the cap has been rotated to bring the retainer bar into the secondary seating position. In this position the cap is held against accidental removal in spout closing relation and the engagement of the bar in the notch 28 serves as a warning that internal pressure should be relieved before the cap is completely removed.

In order that relief of pressure may be accomplished automatically and without any attention, except for the delay in movement of the cap, there is provided a valved overflow pipe 23 which extends from the top of the spout down the side of the radiator to a remote point where any discharge therefrom will not be harmful. The valve is in the form of a disc 24 of cork, rubber, or the like, mounted upon a spring blade 25, one end of which is secured to the spout as by means of the rivet 26. This spring blade 25 tends to hold the washer 24 off its seat as is shown by the dotted lines in Figure 3 and it is adapted to be sprung to the full line position

shown, upon its engagement by one end of the locking bar 13.

The location of the overflow valve in relation to the seats 27 and 28 is such that the valve is closed whenever the bar engages the seat at the final limit of its movement to lock the closure cap in position. Therefore, in the normal operation of the cooling system the overflow vent is closed and the system operates under internal pressures as may be built up with temperature increases. This not only increases cooling efficiency by reducing the tendency of the liquid to vaporize but also prevents the escape of vapors and, therefore, conserves liquid supply. However, as soon as the cap is rotated for its removal, the locking bar 13 moves out of engagement with the spring blade 25 and the valve is unseated for the relief of internal pressure through the overflow pipe before the cap seal is broken and during the momentary interval of delay with the bar in the seat 28. After pressure is relieved and the cap has been rotated to its opposite limit, it may be lifted for passage axially of the bar 13 through the oppositely disposed openings 21.

Thus it will be seen that the engagement of the flange 14 with the locking bar 13 is such that there is little danger of the cap being immediately or unintentionally freed upon initial movement in its removal, and the secondary seat provided keeps the cap from being blown off the spout by reason of internal pressures. With the relief of pressure through the overflow, the likelihood of liquid or gas spurting out the filler to do harm is minimized.

We claim:

1. In an engine cooling system, a filler spout an overflow pipe leading therefrom, a spring plate carried by the spout and adapted for deflection to close the overflow pipe, a spout closure cap having a locking bar, and a camming abutment for engagement with the bar upon rotation of said closure and having spaced stations between which the bar is movable in locked relation with the spout, one of the stations being positioned in relation to said spring plate that one end of the bar engages and deflects the plate to close the overflow pipe.

2. The combination with a filler spout and a removable closure therefor, of a vent pipe, a valve to close said vent pipe, spring means tending to open the valve, means carried by the closure to lock the valve closed against the opening tendency of said spring means and means for adjusting the closure on the spout prior to complete removal to render said locking means inoperative.

3. In an engine cooling system, a spout closure having a latching bar, a filler spout having spaced seats with either of which the bar is engageable to retain the closure on the spout, a vent, and vent sealing means adapted to be locked by the bar against unsealing when the bar is engaged with one of said seats and to open the vent when the bar is engaged with the other of said seats.

4. In an engine cooling system, a spout closure having a locking bar, a spout having a latching formation with initial and final seating stations for engagement by said bar, vent means and a vent controlling valve movably supported by the spout in the path of said bar for actuation between open position when the bar is in its initial seating station and closed position when the bar is in its final seating station.

5. In an engine cooling system, a filler spout having a vent pipe, a valve movably supported by the filler spout and adapted to seal said vent pipe, a removable spout closure adjustable on the spout and valve actuating means carried by the closure for engagement with the valve to seal or unseal the same by adjustment of the closure on the spout.

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