J. O. STEENSLAND.

AUTOMATIC DRAINING DEVICE FOR RADIATORS AND THE LIKE.

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Fig. 1.

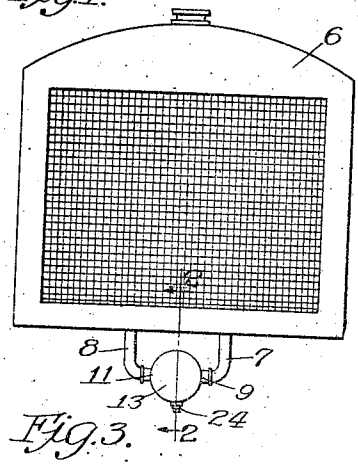


Fig. 2.

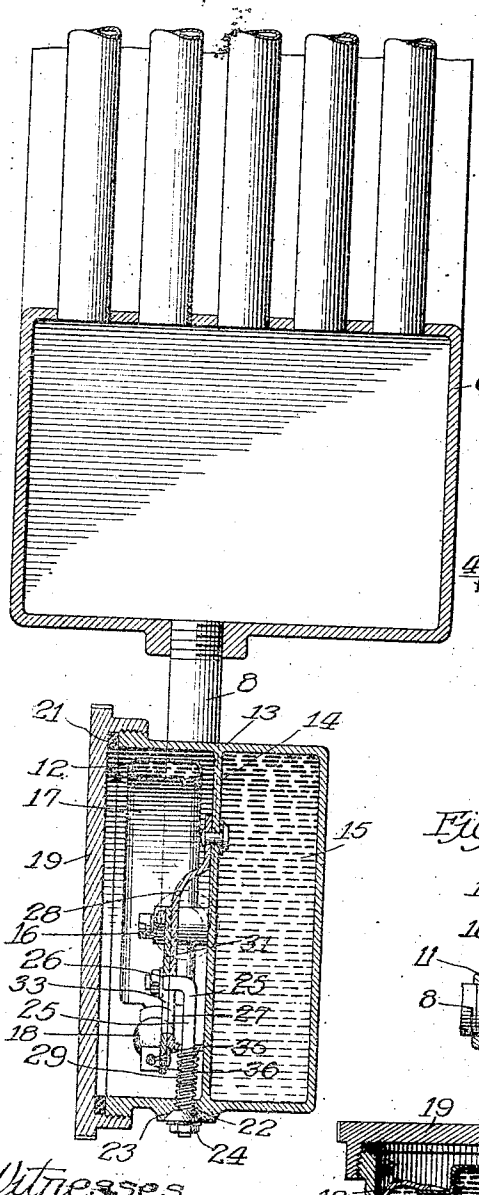


Fig. 3.

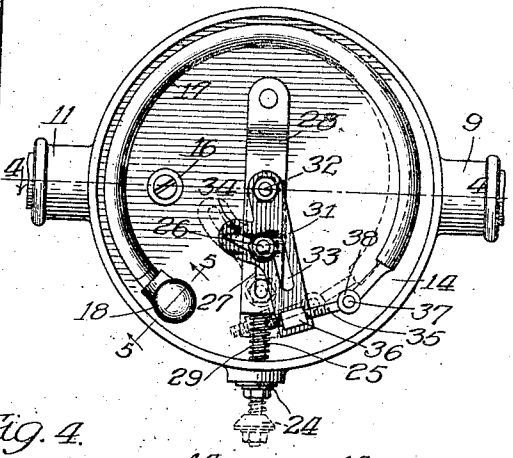


Fig. 4.

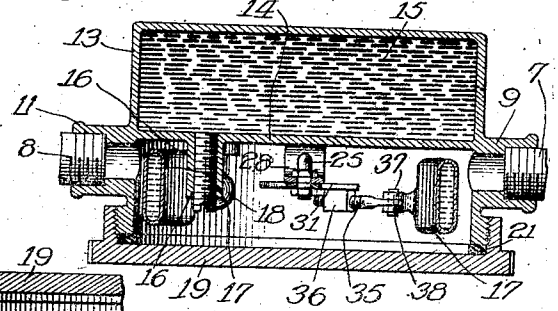
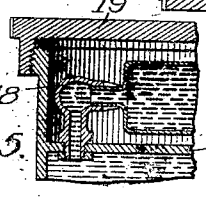


Fig. 5.



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AUTOMATIC DRAINING DEVICE FOR RADIATORS AND THE LIKE.

1,189,306. Specification of Letters Patent. Patented July 4, 1916.

Application filed August 24, 1914. Serial No. 858,253.

To all whom it may concern:

Be it known that I, JAMES O. STEENSLAND, a citizen of the United States, residing at Blanchardville, in the county of Lafayette and State of Wisconsin, have invented certain new and useful Improvements in Automatic Draining Devices for Radiators and the like, of which the following is a specification.

Drivers and users of automobiles, trucks, gasolene tractors and the like are well aware that frequently in cold weather a sudden drop in temperature over night will cause the water in the radiator of the machine to freeze with disastrous results. In order to obviate the necessity of draining off the water from the radiator when the temperature is apparently not cold enough to cause freezing and also to obviate freezing and injury to the radiator in the event of an unexpected drop in temperature I have devised an automatic draining device which, when the temperature of the water in the radiator lowers to a predetermined degree, will automatically open a drain valve, thereby permitting the water to drain out of the radiator and prevent freezing. One of the primary objects of the invention is to provide an automatic draining device of this character which will be simple in construction, cheap to manufacture and at the same time certain and accurate in its operation, so that the water will never be unnecessarily drained out but will, without fail, be drained out in the event that the temperature approaches the freezing point.

In order to facilitate an understanding of my invention I have disclosed one embodiment thereof on the accompanying drawings from which, when considered in connection with the following description, the construction and operation of the device should be apparent.

Referring to the drawings—Figure 1 is an end view of a radiator equipped with my invention; Fig. 2 is an enlarged fragmentary view on the line 2—2 of Fig. 1; Fig. 3 is a face view of my improved device with the cap removed; Fig. 4 is a sectional view on the line 4—4 of Fig. 3, and Fig. 5 is an enlarged detail sectional view taken on the line 5—5 of Fig. 3.

On the drawings reference character 6 designates generally a radiator of the usual or any preferred type, an ordinary radiator such as is customarily used on automobiles being shown for purposes of illustration. It should be apparent, however, that my invention is capable of employment in connection with any receptacle which it may be desirable to drain when the temperature of the fluid contained therein reaches or approaches a predetermined degree.

At one of the lowest points of the radiator 6 I contemplate attaching my device. In the present instance the attachment is effected and communication is established between the device and the interior of the radiator by a pair of pipes 7 and 8 respectively, threaded into suitably tapped openings in the radiator bottom and connected at their lower ends with nipples 9 and 11 projecting laterally from opposite sides of the chamber 12 formed in the casing 13. The casing, as best shown in Figs. 2 and 4, is divided transversely by a partition 14 into the chamber 12 and a chamber 15 adapted to contain alcohol or any volatile fluid having a relatively high co-efficient of expansion and contraction. The fluid is introduced into the chamber 15 through a nipple 16 (Fig. 4) and the desired pressure under normal temperatures may be secured in the chamber by threading a closure screw 17 into the nipple which not only closes the nipple and prevents the escape of the fluid but also acts as a plunger or compression member to produce the required fluid pressure in the chamber. Any other suitable means for closing the nipple and establishing the required pressure may be employed if preferred. The fluid in the chamber 15 will, of course, expand and contract under variations in atmospheric temperature, and for the purpose of utilizing this expansion and contraction to open a valve and permit the drainage of the radiator when the temperature approaches the freezing point I have employed in the present instance a thermostatic element in the form of a coiled tube 17 connected at one end to a fixed nipple 18 (Fig. 5) which is in communication with the chamber 15. The opposite end of this tube is free to move and its position will vary according to the pressure of the liquid therein in a manner very similar to the action of an ordinary steam gage Bourdon tube.

The chamber 12 in which the tube 17 is located is closed by a cap 19, preferably

threaded onto the open end of the casing, suitable packing 21 being interposed between the cap and the edge of the casing to insure a water-tight joint. The chamber 12 is provided in its bottom wall with a valve opening 22 provided with a tapered valve seat 23 adapted to be normally closed by a valve disk 24 mounted on a rod 25 projecting through the opening. The upper end of the valve stem is bent laterally as indicated at 26 and projects through a slot 27 formed in a guide 28 mounted on the partition 14. A coiled expansion spring 29, abutting at one end against the inturned lower end of the guide 28 and at its other end against the inner face of the valve disk 24, normally tends to urge the valve away from its seat into open position as shown in dotted lines in Fig. 3. For the purpose of holding the valve in its closed position to prevent drainage of the water from the casing under ordinary temperatures and to utilize the movements of the tube 17 for releasing the valve when the temperature approaches the freezing point I have provided mechanism connecting the valve stem with the free end of the tube 17 which comprises a member 31 pivoted on the guide 28 by a bolt 32 and provided with a slot through which the laterally projecting end 26 of the valve stem extends, comprising a longitudinally extending portion 33 and a laterally extending arcuate portion 34. The lower end of the member 31 is adjustably connected to the free end of the tube 17 by a bolt 35 threaded through a nut 36 formed on the outer face of the member 31 and pivoted on a pin 37 to an ear 38 extending from the end of the tube. The bolt 35 is so adjusted, by reason of its threaded connection with the member 31, that under ordinary temperatures the expansive action of the tube 17 will hold the member 31 in position to maintain the arcuate laterally extending portion 34 of the slot in engagement with the offset portion 26 of the valve stem, as shown in Figs. 2 and 3, thereby holding the valve against its seat. Any increase in temperature will cause the tube to expand still more and its free end to travel outwardly toward the wall of the casing, this movement of the tube end being permitted by reason of the arcuate shape of the slot 34 which is struck from the bolt 32 as a center. During any normal inward or outward travel of the free end of the tube, the member 31 will be swung on its pivot, still maintaining, however, the engagement between the portion 34 of the slot and the offset portion 26 of the valve stem. Should the temperature of the water in the chamber 12 approach the freezing point the contraction of the liquid 15 in the tube will permit the free end of the tube to move inwardly into the position shown in dotted lines in Fig. 3, and when this point is reached the lateral portion 34 of the slot will be swung to the left from beneath the offset portion 26 of the valve stem thereby permitting the valve to be opened under the action of the spring 29, the offset portion 26 of the stem being then disposed in the vertical portion 33 of the slot. The valve will remain in open position, permitting all of the water to drain out of the radiator and before the radiator can be filled the valve must be manually closed by pressing upwardly on the valve stem outside the casing.

It will thus be seen that I have provided a device in which the valve will be maintained in closed position during any normal fluctuations in temperature but that when the temperature approaches the freezing point the valve will be automatically released and opened to permit drainage of the radiator, thereby obviating freezing of the water therein and injury to the structure.

In the form of the invention disclosed I have shown two pipes 7 and 8 connecting the chamber 12 with the radiator, the two pipes permitting the free circulation of water. It will be obvious, however, that but one pipe might be employed if desired. Furthermore, in some instances the device might be located inside the radiator and the valve seat formed directly in the radiator wall.

Various other modifications of the structure disclosed and of the form of thermostat shown will readily suggest themselves to those skilled in the art and it should be understood that the mechanical details shown and described are illustrative merely and that various changes may be made without departing from the spirit of this invention or sacrificing any of its material advantages.

I claim:

1. The combination of a chamber, a thermostat disposed in said chamber, a valve closing an outlet opening in said chamber, means tending normally to open said valve, and mechanism connected to said thermostat and movable within predetermined limits relatively to the valve for holding said valve in closed position during normal movements of the thermostat, abnormal movement of said thermostat, when the temperature of the fluid in the chamber falls to a predetermined degree, being adapted to release said valve and permit the same to open.

2. The combination of a chamber adapted to be connected with a water receptacle, a thermostat disposed in said chamber, a drain valve, means including a sliding connection between said valve and said thermostat whereby said valve is maintained in closed position during normal movement of the thermostat, and means for automatically

opening said valve upon excessive movement of the thermostat to permit said receptacle to drain through said chamber.

3. The combination of a water chamber provided with a drain opening, a valve adapted to close said opening, a thermostat disposed in said water chamber, a member connected with said thermostat and having a sliding connection with said valve whereby the valve is maintained in closed position during normal expansion and contraction of said thermostat, and means for automaticaly opening said valve to drain the chamber upon undue contraction of the thermostat.

4. The combination of a water chamber, a thermostat disposed therein, a drain valve, the stem of said valve being provided with a lateral extension, a pivoted member provided with a slot engaged with said lateral extension, said slot comprising an arcuate portion adapted to normally hold said valve in closed position, and connections between the free end of said member and said thermostat whereby the member is moved upon excessive contraction of the thermostat to withdraw the arcuate portion of said slot from said extension and thereby permit the valve to open.

5. A draining device comprising a chamber, means for establishing communication between said chamber and a water receptacle through which said chamber is filled with water, a thermostat inclosed in said chamber, a valve adapted to close an outlet port from said chamber, and connection between said valve and said thermostat including a pivotally mounted slotted member constructed to normally hold said valve in closed position and to permit said valve to open when said thermostat contracts a predetermined amount.

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