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TEMPERATURE CONTROLLED RELIEF VALVE

Filed May 2, 1927

Fig. 1.

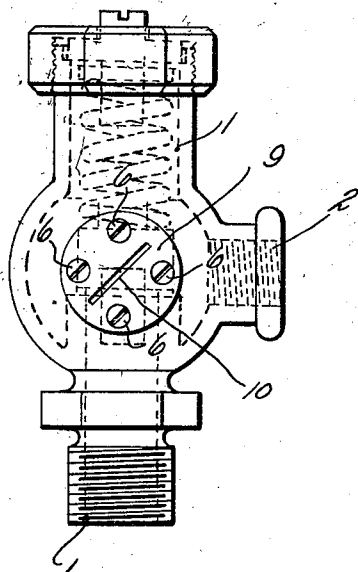


Fig. 4.

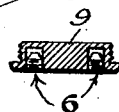


Fig. 2.

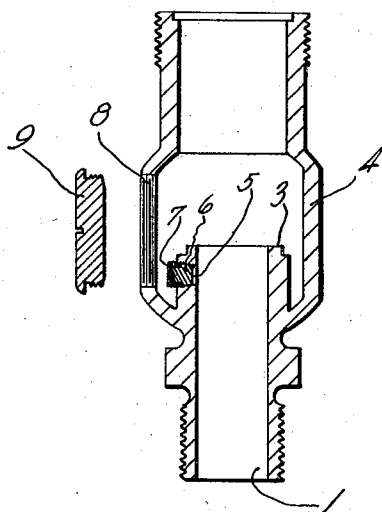
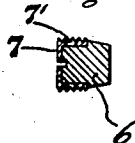


Fig. 3.



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TEMPERATURE-CONTROLLED RELIEF VALVE.

Application filed May 2, 1927. Serial No. 188,241.

This invention relates to an improved safety valve. In the prior art it is old to provide a safety valve for a hot water heating system, for example, that will open a drain either on excessive pressure or excessive temperature. It is customary to have one valve opening controlled by a pressure operable closure and a by-pass opening for such valve controlled by a temperature operable closure. The present invention is directed to an improved means in the construction of the temperature controlled by-pass opening and its environment.

In commercial forms of safety valves having both the pressure and temperature controlled openings, so far as I am aware, the construction of the temperature controlled means is not as simple and efficient as it should be. Furthermore, when such means operate as a relief it is not so easy in prior art structures to reset the valve for additional future operations. For this reason the resetting of the temperature controlled means is frequently slighted. For example, original installations of safety equipment are ordinarily required by city ordinance to be inspected when placed, but their future condition is thereafter neglected. In the case of the pressure controlled safety means, the neglect is not so important because such means resets itself automatically after each operation. In the case of the temperature controlled means the resetting operation requires personal attention which is frequently lacking as the safety device is used.

By my invention I have provided extremely simple means for the temperature controlled part, which invites the personal attention of the user of the safety valve for its proper resetting. The construction is designed to simplify the valve, increase the factor of safety during the life of the valve, and render the valve capable of convenient and efficient attention, even in the hands of an unskilled or careless user.

The invention specifically can be understood best from a description of its detail construction.

In the drawings:

Fig. 1 is a side view of the valve ready for use with interior parts shown dotted;

Fig. 2 is a cross-section with the pressure operable valve parts omitted and the cap closure for the opening giving access to the by-pass opening shown spaced at the left;

Fig. 3 is a detail of the preferred form of fusible plug or cartridge; and

Fig. 4 is a cross-sectional view through the disc or cap closure and a pair of the fusible plugs carried thereby.

In the valve, the pressure inlet port is 1, the drain or main relief port 2, and the pressure operable relief valve seat is 3 which is located between these ports 1 and 2. The construction shown provides an enlarged central portion 4 in the valve casing so that the seat 3 may be in a tubular extension with a by-pass opening 5 below the seat for the pressure fluid to reach the drain port independently of said seat.

The opening 5 is slightly tapered to receive the fusible plug 6. The latter is preferably made like the one shown in Fig. 3. For the most part it is of fusible metal. Its head is strengthened by a thin brass or other suitable thin metal cup-shaped part 7 which has a slot cut through it and into the fusible metal and also threads to engage threads in the opening 5. The cup-shaped part 7 is thin enough to be blown out of opening 5 by pressure after the fusible plug is wholly or partially melted. A hole 7' is also provided through the side of the cup 7 for an additional outlet.

Centrally of the valve casing part 4 and in line with opening 5 I provide a large opening 8 adapted to be closed by a threaded circular disc or carrier 9 shown spaced from the opening at the left as if it were just about to be screwed into the opening. This disc 9 is preferably flat and only slightly thicker than the walls of the valve casing so as to conform to the general contour of the casing. The disc 9 is thick enough to receive and carry in suitable recesses a supply of fusible plugs 6 for replacement purposes as the plugs 6 in opening 5 are successively spent or used up in performing their intended function. A rather long slot 10 is cut on the outside of disc 9 so that it may be worked in to its opening by a screw driver or the edge of a coin and the slot in the cup 7 and the head of the fusible plug is preferably of the same character to take the same tool.

The advantage of the particular structure described will be clear from the following considerations. With the valve in place as indicated in Fig. 1, there may be a leak through the drain port 2. If so, it may

be caused by the working of the pressure relief means over seat 3. (This means, not a part of this invention, is fully shown in co-pending application Serial No. 182,507 and indicated in dotted lines in Fig. 1.) In such a case the resetting will be automatic. But it may be that plug 6 has melted out of opening 5. Then a new plug needs to be inserted. The disc 9 is removed and the condition of opening 5 is clearly seen. If a new plug is needed it is taken from the carrier 9 and inserted when the system is back to its normal condition and without excessive temperature. If opening 5 needs any preparation as by picking out parts of the spent plug, it can be done conveniently through opening 8, but ordinarily such parts will be carried out by the pressure vented through opening 5. With this construction there can never be any doubt about the condition of the by-pass opening 5. The opening 8 is normally out of contact with the pressure fluid, so it does not need to be particularly tight or packed against leakage. Disc 9 of the casing may be removed from time to time for the purpose of prying the valve off seat 3 with a suitable tool. As well known, safety valves may be in place ready to operate but not actually operated over long periods of time. The idle valve sometimes sticks on its seat and in my construction may be most conveniently pried off once in a while to insure a proper operation of the pressure safety valve when needed. The small ledge just below the valve seat 8 facilitates the prying operation.

One of the nice effects of my construction is that it leaves the body of my valve casing of the simplest form and contour without excrescences due to mechanism that must work with relation to the valve. As will be seen, the valve casing is of the simplest form and of general stream line contour. In this respect my improvement on the temperature controlled relief means is something that is carried wholly within an ordinary valve casing and yet has all the advantages for inspection and more advantages for replacement than prior art structures have which provide much more elaborate means for removing parts of the valve from the casing for inspection. I am in this invention reaching the same result for the temperature controlled relief means as said co-pending application reaches with respect to the pressure relief means—namely, a simplification of the valve and particularly its exterior form.

In the use of my valve, the user is in-

vited to give it all the attention it needs because of its simplicity and convenience, so that the skilled and sometimes careless help of the plumber is not as necessary as it otherwise would seem if the valve were more complicated either in fact or in appearance.

I claim as my invention:

1. A safety valve having a casing wholly enclosing a valve seat, a by-pass around said seat, a fusible plug in said by-pass, a removable section of said casing adjacent said plug and a series of spare plugs carried in the body of said section.

2. A safety valve having a casing wholly enclosing a valve seat, a by-pass around said seat, a fusible plug in said by-pass, a removable section of said casing adjacent said plug and a series of spare plugs carried in the body of said section, the plugs being buried in recesses of the section.

3. A safety valve having a casing wholly enclosing a valve seat, a by-pass around said seat, a fusible plug in said by-pass, a removable section of said casing adjacent said plug and a series of spare plugs carried in the body of said section, the plugs being buried in recesses of the section, the casing and section forming a symmetrical contour for the safety valve as a whole.

4. A carrier for fusible plugs adapted to form a section of a safety valve casing and of about the same thickness as such casing, said carrier having recesses of about the depth of the fusible plugs to be carried and adapted to removably hold the plugs as spare parts for a valve.

5. A fusible plug for use in a safety valve comprising a fusible portion and a non-fusible threaded head portion of thin construction, a slot through the head portion, and extending into the fusible portion.

6. In a safety valve construction, a valve casing having a pressure inlet port and a drain port with an enlarged section between the two, a tubular extension from the inlet port into the enlarged portion provided with a valve seat at the end, a by-pass opening through the tubular portion at right angles thereto just below said seat adapted to receive a removable fusible plug from without the casing, and an opening through the casing adjacent the by-pass opening but much larger, and a closure for said opening having the same general contour as the valve casing.

In testimony whereof I have affixed my signature.

FRANKLIN T. HOLMES.