L. S. ROSS.

MEANS FOR PREVENTING BOILER EXPLOSIONS, LEAKAGE, &c.

APPLICATION FILED FEB. 11, 1916.

1,238,825. Patented Sept. 4, 1917.

Fig. 1.

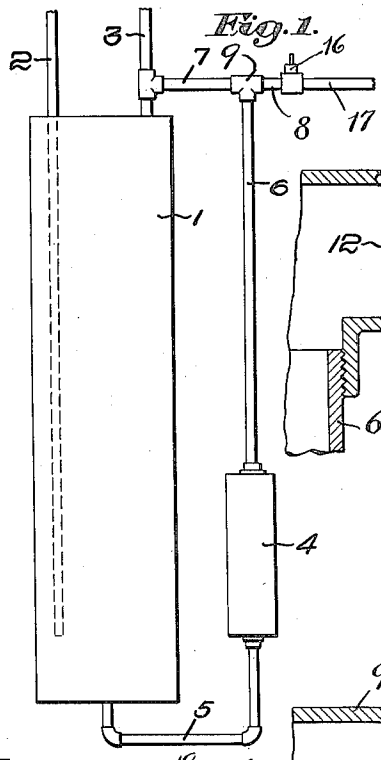
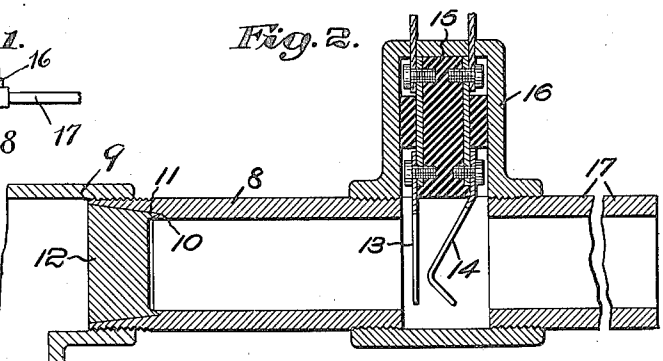


Fig. 2.



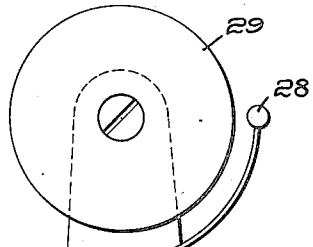


Fig. 4.

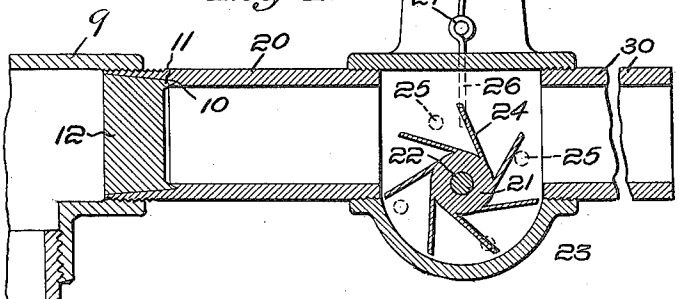
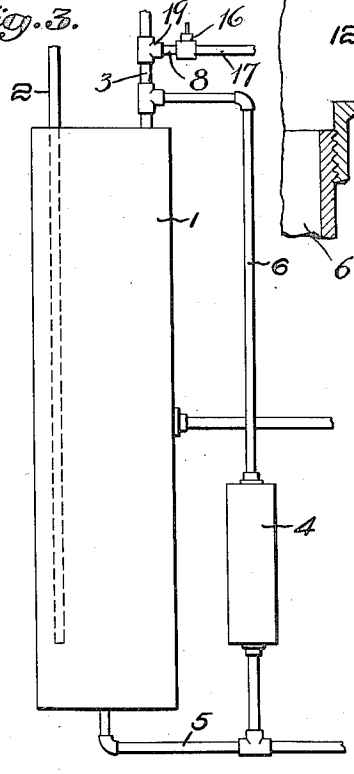


Fig. 3.



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MEANS FOR PREVENTING BOILER EXPLOSIONS, LEAKAGE, &c.

1,238,825. Specification of Letters Patent. Patented Sept. 4, 1917.

Application filed February 11, 1916. Serial No. 77,765.

To all whom it may concern:

Be it known that I, LOUIS S. ROSS, a citizen of the United States, and a resident of Newtonville, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Means for Preventing Boiler Explosions, Leakage, &c., of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to means for preventing boiler explosions, leakage, etc.

In order that the principle of the invention may be readily understood, I have disclosed certain embodiments thereof in the accompanying drawings, wherein—

Figure 1 is a side elevation of one application or embodiment of my invention;

Fig. 2 is a sectional detail upon an enlarged scale of a fitting and related parts constituting a part of and employed in the practice of my invention;

Fig. 3 is a view similar to Fig. 1 of a slightly modified form of my invention;

Fig. 4 is a view similar to Fig. 2 representing a further adaptation of my invention.

It has heretofore been proposed to employ fusible plugs in steam boilers to prevent explosions or bursting of the boiler due to low water. Such plugs are so located in the boiler that when the water gets below the plug, the latter is exposed to the direct action of the fire. The plug is thus melted by the fire and releases the pressure, thus preventing explosions or further damage to the boiler.

In accordance with my invention I provide a fusible plug which, under no circumstances, is in contact with or so positioned as to be acted upon by the fire, the said plug being fused or acted upon only by the overheating of the water. The excessive temperature of the water serves to act upon or melt the fusible plug and releases the water to the open air. In accordance with my invention, the fusible plug is constantly exposed at one side to the water and is exposed at the other side to the open air, thereby wholly relieving the pressure upon the boiler when the plug fuses, and also providing an audible signal due to the action of the escaping water.

While my invention is peculiarly intended for use in connection with boilers, such as are employed in apartment houses, dwellings and the like, obviously my invention is not restricted to such use, but may be variously embodied. In the accompanying drawings, I have disclosed certain selected forms thereof. Any suitable heater may be employed. Among these, I mention coal, gas and electric heaters, to none of which is my invention specifically limited.

Referring more particularly to the drawings, I have in Fig. 1 represented a boiler 1 having a water inlet 2 and a water outlet 3. Such boilers are customarily equipped with gas or other heaters for the quick heating of water. Such a heater I have indicated at 4. It may be of any suitable character and is connected by a pipe 5 with the bottom of the boiler from which it receives a supply of cold water. The water as heated by said heater 4 passes out through the pipe 6 and through the pipe 7 into the outlet pipe 3 from the boiler.

I contemplate the employment of a fusible plug at any suitable point in connection with the system. In the form of my invention shown in Figs. 1 and 2, I have represented a pipe 8 which is adapted to be threaded into a fitting 9 connecting the pipes 6 and 7. The pipe 8 may be of any suitable character, but is preferably provided with an annular V-shaped groove 10 into which is forced a portion 11 of the fusible plug 12 represented as seated in the end of the pipe 8. The pipe 8 leads directly to and is in communication with the open air thereby relieving the pressure upon the boiler when the plug fuses.

The fusible plug 12 may be of any suitable character. I may employ for the purpose a special alloy which will melt at some predetermined temperature, such, for example, as 240° F. For this purpose, I may and preferably do employ substantially the following

compositions for the various temperatures indicated:

Bismuth, lead and tin.

$B_5 L_3 T_2$	212° F.
$B_2 L_1 T_1$	200° F.
$B_5 L_1 T_4$	240° F.
$B_1 T_1$	286° F.

I may employ any suitable alarm device or any mechanism, the operation of which is instituted by the fusing of the plug. In Fig. 2, I have shown for this purpose positive and negative terminals 13, 14 which are adapted to be brought into contact by the flow of water when the plug 12 fuses. The said terminals may be of any suitable character and suitably supported. I have herein represented them as mounted upon an insulating block 15 in a fitting 16. Threaded into the fitting 16 is a suitable discharge pipe 17 by means of which the escaping water may be conducted to any suitable outlet.

In Fig. 3, I have represented a slightly different adaptation of my invention in that the outlet pipe 6 from the heater 4 is directly connected to the hot water outlet 3 from the boiler 1. The fusible plug is positioned in a suitable pipe 18, itself connected by fitting 19 directly to the hot water pipe 3. The other parts shown in Fig. 3 are similar to those already described and need not further be referred to. The plug employed in connection with the form of my invention shown in Fig. 3 may be the same as that shown in Figs. 1 and 2.

In Fig. 4, I have represented a different type of alarm device operated by the flow of water through the pipe 20 upon the fusing of the plug 12. For that purpose I have represented a small water wheel 21 mounted upon an axle 22 in a fitting 23 threaded upon the end of the pipe 20. The water wheel is provided with a series of suitable vanes 24 and pins 25, so that when the escaping water flows through the pipe 20, one of the pins 25 will strike the end 26 of a hammer pivoted at 27 and having a head 28 to strike the bell 29 and sound the alarm. The water escaping past the water wheel 21 passes to a suitable discharge through the pipe 30.

Within the scope of my invention, the fusible plug may be inserted at any suitable point where it comes in contact with the water.

In accordance with my method and by the means employed by me, I am enabled at slight expense quickly to detect the overheating of the water, and thereby prevent explosion or damage due to excessive temperature, such temperature necessarily generating pressure which might cause explosion or rupture.

While I have disclosed my invention as applied to boilers for apartment and dwelling houses, it is evident that it may be otherwise employed.

It will be evident from the foregoing description that in accordance with my invention the fusible plug is never directly exposed to the action of the heating agent, whether it be a coal, oil or gas fire or an electric heater, but that the plug is acted upon only by the water, the latter serving to fuse the plug when an excessive temperature of the water is reached. The said plug is in a sense open to the air, in that it is in an outer wall of the boiler or is in a pipe leading from and outside of the boiler. My invention is thus readily distinguished from fusible plugs adapted to be acted upon in the event of low water. As heretofore pointed out, the plug is constantly exposed at one side to the water and at the other side to the open air, thereby relieving boiler pressure when the plug fuses.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

1. In combination, a boiler having a circulation pipe exterior to the boiler, a heater interposed in said pipe, a hot water outlet pipe leading from said boiler and in communication with said circulation pipe, said pipes together constituting hot water piping, and a fusible plug located exterior to the shell or wall of the boiler and in said hot water piping and constantly exposed at one side to and in constant, direct contact with the hot water exterior to the boiler and adapted to be fused by excess temperature of the hot water with which it is in direct contact, and a pipe leading from said plug and in communication beyond said plug with the outer air, thereby to relieve boiler pressure upon fusing of said plug, said plug being normally exposed to the outer air.

2. In combination, a boiler 1 having a circulation pipe 5, 6 exterior to the boiler, a heater 4 interposed in said pipe, a hot water outlet pipe 3 leading from said boiler and in communication with said circulation pipe, said pipes 5, 6 and 3 together constituting hot water piping, and a fusible plug 12 located in said hot water outlet pipe 3 and constantly exposed at one side to and in constant direct contact with the hot water in the said hot water outlet pipe 3, and adapted to be fused by excess temperature of the water with which said plug is in direct contact, together with a pipe 18 in which said plug is fitted at the junction of said pipe with the pipe 3, the said pipe 18 communicating beyond said plug 12 with the outer air, thereby to relieve boiler pressure upon

the fusing of the said plug, said plug being normally exposed to the outer air.

3. In combination, a boiler, a hot water pipe leading therefrom, and a fusible plug in said pipe and constantly exposed at one side to the water in said pipe, the latter having an interior groove and the plug having a portion extending into said groove, thereby preventing leakage and exposed at the other side to the open air, thereby relieving boiler pressure upon fusing of the plug.

4. In combination, a boiler, a hot water pipe leading therefrom and a fusible plug constantly exposed at one side to the hot water to be conducted from the boiler, the pipe containing said plug having an internal, annular, substantially V-shaped groove, and the plug having a portion forced into said groove and exposed at the other side to the open air, thereby relieving boiler pressure upon fusing of the plug.

In testimony whereof, I have signed my name to this specification.

LOUIS S. ROSS.