Sept. 17, 1935. E. V. COUSINEAU 2,014,964

FUSIBLE PLUG

Filed Dec. 31, 1934

Fig. 1.

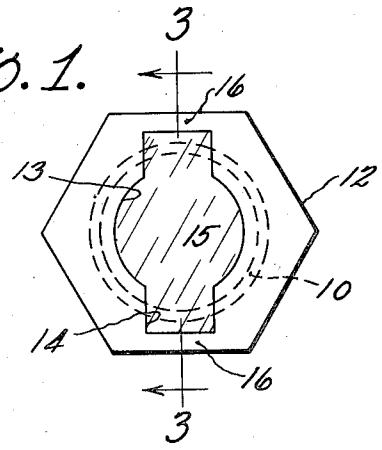


Fig. 2.

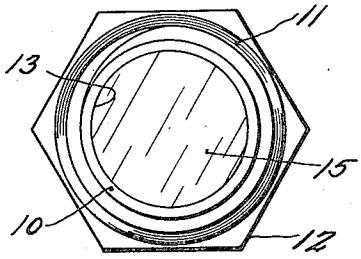


Fig. 3.

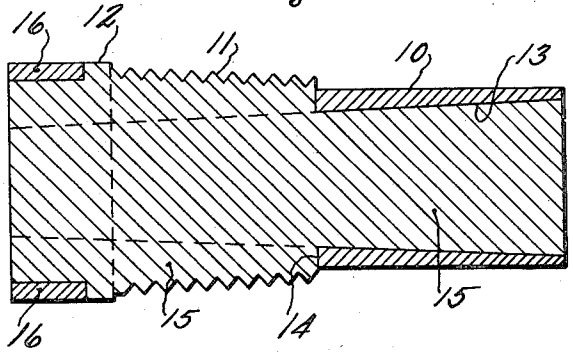
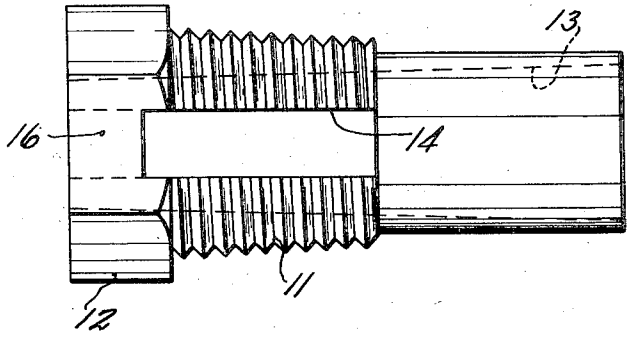


Fig. 4.



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FUSIBLE PLUG

Ernest V. Cousineau, Holyoke, Mass.

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10 Claims. (Cl. 122—504.3)

This invention relates to fusible plugs for use on boilers and the like, and has for its object to improve upon prior plugs of this type in particulars which will appear more fully below. It is necessary to provide boilers with fusible plugs located in the wall of the water chamber and adapted to melt if the water level therein falls below the plug, so that danger of explosion or damage due to overheating of the boiler material will be obviated. Such plugs are generally located in that part of the boiler wall which is situated at the top of the firebox, this being the part subjected to the greatest heat and therefore to the greatest possibility of damage. The exposure of the plug to the heated products of combustion, however, causes a progressive change in the chemical and physical characteristics of the fusible material, necessitating the replacement of the plug at periodical intervals in the interest of safety. In some states it is a legal requirement that such plugs be replaced every year.

Prior types of fusible plugs consisted generally of a brass body having an external screw thread to engage the screw threads in the boiler wall, a wrench engaging head, and a through hole decreasing in diameter towards the head filled with a fusible material such as tin or a special alloy. The removal of such a plug, whether its replacement is due to the previous fusion of the plug or to the legal requirement above mentioned, has been an extremely arduous and expensive undertaking. Due to the exposed position of the plug it becomes almost inseparably united with the material of the boiler wall. The location of the plug within and at the top of the firebox prevents the easy application of a wrench, and renders it impossible for the workman to obtain an adequate view of what he is doing. In many cases the plug has been impossible of removal without completely drawing the fire and getting inside the boiler to remove the plug material either with drills and chisels or with a welding torch. It is obvious that such a procedure requires skilled work, and results in frequent accidents both to the boiler wall and to the workman.

It is one object of the present invention to produce a fusible plug which can be removed from the boiler wall readily and without the use of skilled labor. In actual use of the invention the time of removal is about five minutes as against from one to fourteen hours with prior devices. In fact, the plug of my invention can be removed in general without the use of a wrench. This result is attained by making a portion of the wall of the head and of the screw threaded portion of the plug readily collapsible when the fusible center of the plug has been melted out by the accidental lowering of the water level, or artificially by an ordinary blowtorch, although the plug is rigid so long as the fusible center remains in position.

The preferred manner of constructing my improved fusible plug will now be described with reference to the accompanying drawing, in which:

Fig. 1 is a view of the end of the plug which is to receive the wrench;

Fig. 2 is a view of the opposite end;

Fig. 3 is a section on line 3—3 of Fig. 1; and

Fig. 4 is a side elevation, with the fusible metal removed.

The plug has a body portion 10 generally of brass, threaded at 11 preferably with the standard pipe thread. A wrench engaging portion 12, here shown as hexagonal in form, is located at the large end of the threaded portion. Through the entire plug is a tapered hole 13 the inside of which is to be first tinned and which is then to be filled with a fusible metal or alloy. Before this is done, however, the screw threaded portion 11 and the head 12 are cut away with one or more slots 14 which are ultimately filled with the fusible metal 15. To remove such a plug from the boiler the fusible metal is first melted out with an ordinary plumber's blowtorch, whereupon the opposing sides of the plug can be collapsed by a few blows of a hammer and the plug taken out with the fingers. The plug has ben shown as formed with diametrically opposed slots, but a different number can be used if desired. It is unnecessary to have the slot extent any substantial distance beyond the small end of the screw threads 11, as this portion is of lesser diameter than the hole in the boiler wall and will pass out of it without difficulty.

It is preferable to leave a portion of the metal in the head bridging across the slot as shown at 16, the exact amount and position of the bridging metal being variable to suit different plug sizes and designs. This bridging metal is useful in giving a better rigidity to the plug when it is being screwed into place, but can be broken away by a hammer and chisel so as to present no substantial barrier to the collapsing of the plug when the latter is to be removed. It will be understood that the proportions and dimensions of the various parts will be determined in accordance with the requirements of various installations. The fusible metal may be cast in place after the formation of the screw threads

11, either by the use of a suitable threaded mold or by a cutting operation; or may be cast in place before the screw threads are formed, in which case the threads on the brass body and the exposed part of the fusible metal may be formed simultaneously. Other changes in design may be made within the scope of the invention as defined in the following claims.

It will be obvious from the description above that the improved plug frees itself from the screw threaded hole in the boiler wall by being collapsed after the fusible core has been removed. In the preferred form shown in the drawing, this collapse is caused by a forcible breakage of the wall 16, or by the application of a wrench to the head after the fusible core has been melted out. The resulting distortion of the plug is of considerable importance since it prevents the plug being refilled, possibly with inferior materials or without a suitable bond being secured between the body and the fusible core. The preferred plug is impossible of reuse, making it certain that all plugs in use shall have been made under standard and controlled conditions.

I claim:

1. A fusible plug having a collapsible wall held in place by a core of fusible metal.

2. A fusible plug having a tubular body portion provided with a threaded portion and a wrench engaging head, said body portion being slotted sufficiently to permit collapse upon application of an external force and a fusible metal core extending into said slot to hold the plug against collapse until said fusible core is melted out.

3. A fusible plug having a hollow externally threaded body and a fusible core, said body being slotted throughout a portion only of its length to such an extent as to permit the collapse of the body by the application of an external force when the fusible core is removed.

4. A fusible plug having a hollow externally threaded body slotted throughout a portion only of its length to such an extent as to permit the collapse of the body upon the application of an external force, and a fusible core extending through the hollow interior of the body and into the slot.

5. A fusible plug having a hollow body provided with an external tapered thread and a wrench engaging portion, and having one or more slots formed in the wrench engaging portion and in at least the part of the threaded portion having the larger diameter, and a fusible core extending through the hollow interior of the body and into the slot.

6. A fusible plug having a hollow body provided with an external thread and a wrench engaging portion, and having one or more slots formed in the wrench engaging and threaded portions, the wrench engaging portion having portions of bridging metal partially closing the slot, and a fusible core extending through the hollow interior of the body and into the slot.

7. A fusible plug having a hollow externally threaded body and a fusible core, said body having weakened areas permitting its collapse when the fusible core is melted.

8. A fusible plug having a hollow body formed with an external tapered screw thread and a wrench engaging head at the larger end of said tapered thread, said body being slotted at a plurality of points completely through the screw threaded portion and at least partially through the head, and a fusible metal core extending through the hollow interior of the body and into the slots.

9. A fusible plug having a hollow body formed with an external tapered screw thread and a wrench engaging head at the larger end of said tapered thread, said body being slotted at a plurality of points completely through the threaded portion and partially only through the head to leave breakable portions of bridging metal therein, and a fusible metal core extending through the hollow interior of the body and into the slots.

10. A non-refillable fusible plug having a core of fusible metal and a body portion formed to give sufficient rigidity for the application of a wrench when the fusible core is in place, but to distort out of refillable form when subjected to the action of a wrench after the fusible core has been melted out.

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