Feb. 20, 1934. L. O. THOMPSON 1,948,056

FUSIBLE BLOW-OUT PLUG

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Fig. 1.

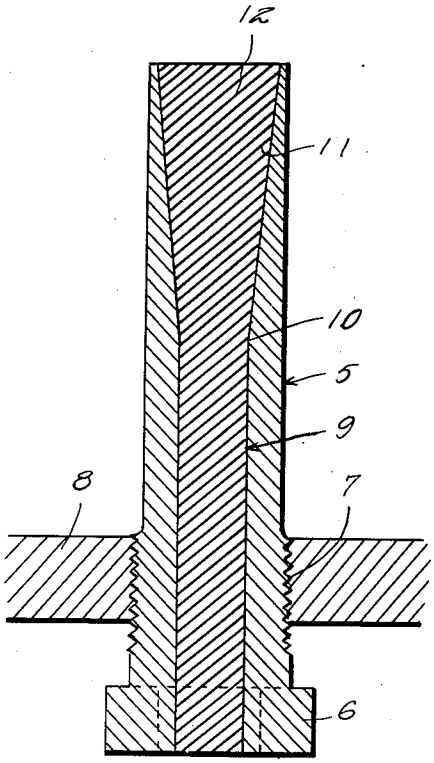
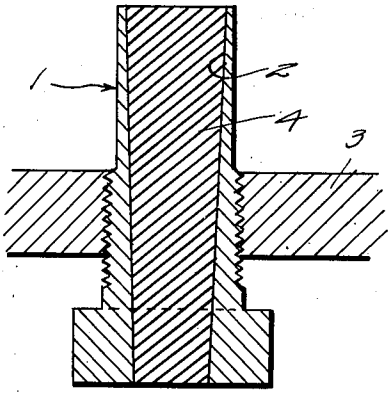


Fig. 2.



Old Form

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FUSIBLE BLOW-OUT PLUG

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2 Claims. (Cl. 122—504.3)

This invention relates to improvements in fusible plugs for use in boilers and pertains particularly to a novel design of plug which will not blow out under high pressure.

In the use of fusible soft plugs for steam boilers the present practice requires the use of a plug where the pressure does not exceed 225 pounds per square inch. Above this pressure the code controlling the use of boilers does not call for the use of such plugs and consequently plugs for use above this pressure have not been designed, although it is essential for safety that such devices be used.

The present standard fusible plug is of such a character that the cores readily melt out through the major portion of their lengths with the result that the amount of fusible metal or core remaining is insufficient to hold the pressure thereon. The result is that these plugs blow out under normal working pressures even where the water level in the boiler is at normal height.

The primary object of the present invention is to provide a plug which will not be made ineffective through the melting out of a portion of the core thereof and which will carry pressures well above 225 pounds.

Another object of the invention is to provide a plug in which the tapered portion of the core is located within the water chamber so that the filler thereof will be protected from heat radiated from the crown sheet and will not therefore, melt out or soften so as to reduce the efficiency of the plug.

A further object of the invention is to provide a fusible plug of a length materially greater than that of the standard plug at present in use and having a bore of substantially constant diameter which extends from the outer end or bottom inwardly to a point well beyond the crown sheet where it merges with the inner end of a tapered area which conforms in dimensions with the requirements of the boiler code. This construction allows for the usual melting away of a portion of the core without weakening the tapered core which holds the pressure.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Figure 1 is a view in longitudinal section of the fusible plug embodying the present invention, showing the same in position in a crown sheet;

Figure 2 is a view in longitudinal section of a fuse plug of the standard type at present in use, showing the same in position in a crown sheet.

Referring now more particularly to the drawing wherein like numerals of reference indicate corresponding parts throughout the several views, the numeral 1 indicates generally a fuse plug of the standard type at present in use. As shown, this plug has a tapered bore 2 which extends entirely through the length of the plug body. This plug is approximately 2¼ inches in length and is of the size both exteriorly and interiorly prescribed and required by the standard boiler code.

This standard type of plug is unsatisfactory and will not withstand the 225 pound pressure which it is intended to hold, because of the fact that the heat from the fire-box and from the crown sheet 3 in which it is mounted melts away approximately two inches of the soft metal core 4 leaving only ¼ inch of core to hold the boiler pressure.

The plug embodying the present invention is indicated as a whole by the numeral 5.

This plug as shown is of materially greater length than the standard plug which is indicated by the numeral 1 and is preferably approximately four inches in length. At one end it is formed to provide the polygonal head 6 by means of which a suitable tool such as a wrench may be coupled therewith to tighten it into position in the boiler crown sheet and adjacent this head threads are formed as indicated at 7 which engage in a suitable threaded aperture in the crown sheet 8.

Extending from the outer or bottom end of the plug body 5 is a bore which is indicated generally by the numeral 9. This bore 9 is of constant diameter from the bottom end through the plug for approximately half the length thereof or to the point 10 from which point it flares and is of constantly increasing diameter to the inner end, thus forming the tapered inner end portion 11. This tapered inner end portion conforms approximately to the code required dimensions for the taper of the standard plug.

The bore 9 is filled throughout with the required fusible metal which is pure tin or tin in as pure condition as it can be obtained which is approximately 99%. This body of fusible metal

or tin is indicated generally by the numeral 12.

While, of course, any suitable method may be employed for filling the bore it is preferred that the surface of the bore be swabbed with a suitable cutting acid or some prepared fluxing mixture and that the tin be introduced in a hot condition so that it will be substantially welded to the surface of the bore when it cools.

With the present type of fusible plug it will be seen that heat will not be readily transferred or radiated to the tapered area 11 from the crown sheet in which the plug is mounted and also that although a portion of the filling may melt away due to the direct contact of the fire in the fire-box with the bottom end of the plug, no part of the tapered portion of the filling will be melted and, therefore, the plug will remain up to the standard requirements and will withstand a pressure in the properly filled boiler of anywhere from 225 to 445 pounds per square inch. Of course, when the water level within the boiler drops to the point where the crown sheet is covered by only a small area or is not covered at all, the filling in the tapered portion 11 will melt out and, where some water covers the crown sheet, discharge water and steam from the boiler into the fire-box and thus blow out fire from the fire-box and notify the fireman of the condition existing so that he will not pump cold water in on the crown sheet and thereby cause an explosion.

When using pure tin as the filler or core for the blow-out plug a pressure of 450 pounds per square inch is the maximum which the plug will stand as the temperature at this pressure to which the plug will be subjected will be 456° F., which is approximately the temperature at which the tin melts. By mixing other metals with the tin or using other alloys the plug may be made to stand increased pressures.

Having thus described the invention, what is claimed is:—

1. A fuse plug, comprising an elongated body designed to be extended through an opening in aa crown sheet, means for securing the body adjacent one end to the crown sheet with the major portion of the body within the boiler of which the crown sheet forms a part, said plug having a bore extending therethrough which is of constant diameter from the end of the body adjacent the crown sheet to a point beyond the crown sheet and then constantly increasing in diameter to the other end, and a fusible filling in said bore.

2. A fuse plug, comprising an elongated tubular body designed to extend through an opening in a boiler crown sheet, means for securing the body adjacent one end to the crown sheet with the major portion of the body disposed within the boiler, said body having the interior passage therethrough of constant diameter from the end of the body nearest the crown sheet through a distance greater than half the length of the body and then constantly increasing in diameter to the other end thereof, and a fusible substance completely filling the passage through the body, said body being free of lateral openings intermediate its ends.

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