(No Model.)

G. W. LAYMAN, J. A. DEMPSEY & T. COPPINGER.

EXPLOSIVE SAFETY PLUG FOR BOILERS.

No. 371,333. Patented Oct. 11, 1887.

Fig. 1.

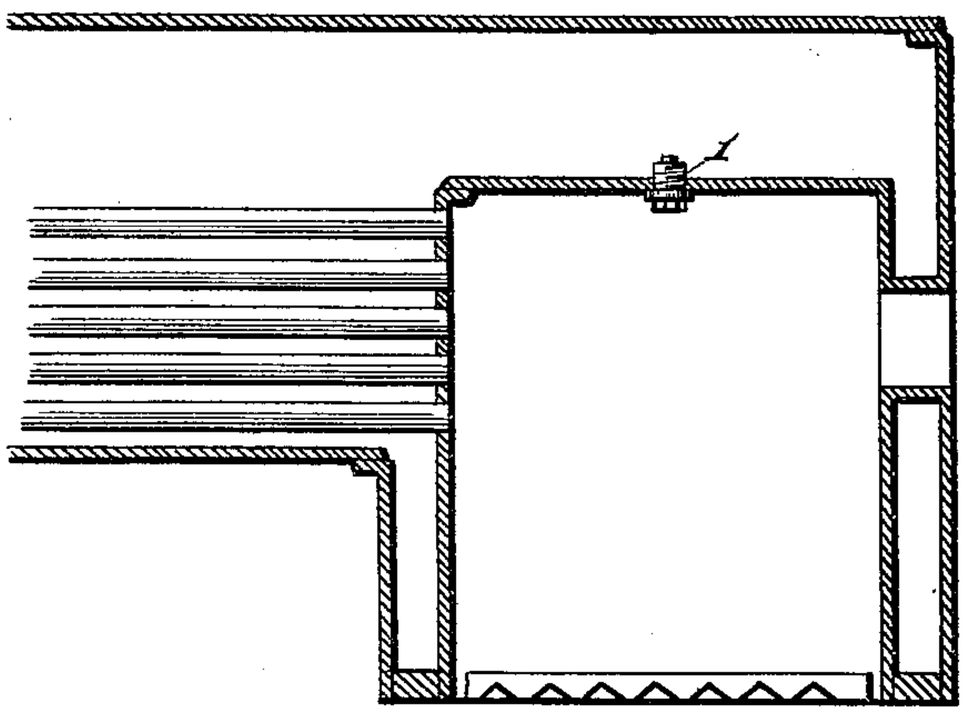
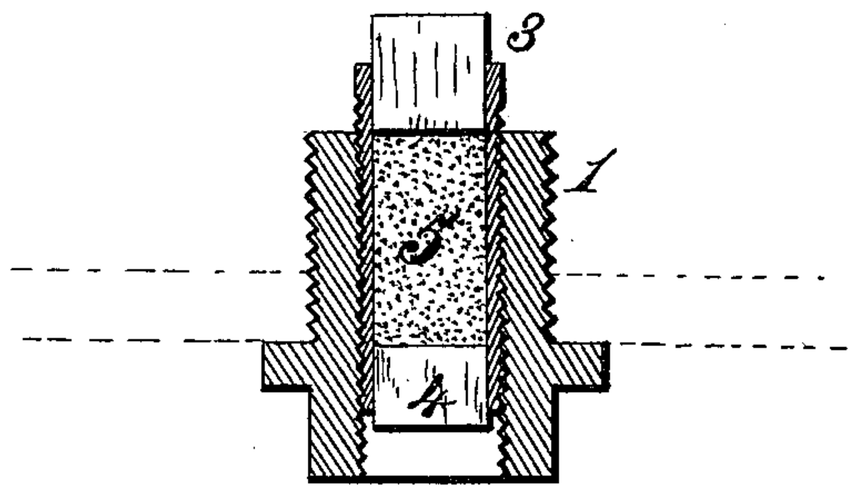


Fig. 2.



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UNITED STATES PATENT OFFICE.

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EXPLOSIVE SAFETY-PLUG FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 371,333, dated October 11, 1887.

Application filed April 9, 1887. Serial No. 234,275. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. LAYMAN, JOHN A. DEMPSEY, and THOMAS COPPINGER, citizens of the United States, residing at Bolivar, in the county of Allegany and State of New York, have invented new and useful Improvements in Explosive Safety-Plugs for Steam-Boilers, of which the following is a specification.

The object of the present invention is to provide an attachment for steam-boilers, which is so constructed and located that when the water reaches too low a level in the boiler, or the crown-sheet or upper plate of the fire-box is not covered with water, and hence is intensely heated, an explosive substance will be brought into action for releasing or blowing out a plug and allowing an outlet for the steam into the fire-box, in order to relieve the pressure within the boiler and extinguish the fire.

The invention consists in an explosive safety-plug for steam-boilers, which is constructed and applied in the manner and for the purpose hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is a sectional view of part of a steam-boiler, showing our explosive safety-plug applied to the crown-sheet of the boiler. Fig. 2 is an enlarged vertical section of our explosive safety-plug.

The reference-numeral 1 designates an ordinary hollow plug, which has an external screw-thread and a flange for securing it to the crown-sheet of any steam-boiler. Into this plug 1 is inserted our improved safety-plug, the same being retained by a screw-thread inside the plug 1, or in any other approved manner.

The safety-plug is composed of an upper portion, 3, a bottom portion, 4, and an intermediate charge, 5, of explosive, such as gunpowder or dynamite. The parts 3 and 4 are made of any soft metal, plaster-of-paris or of a compound having a pyroxyline base, it being the intention to have the plug acted upon and blown out by the action of heat when conditions arise such as are hereinafter mentioned. The upper portion, 3, of the safety-plug projects above the plug 1, and consequently rises above the top surface of the crown-sheet, and hence when the boiler contains a proper quantity of water this projecting portion is covered with water.

It is evident that when the crown sheet is covered with water the safety-plug is maintained at such a temperature that it cannot explode, and hence the boiler is closed and no steam can escape therefrom except through the proper channels. When, however, the water is converted into steam and made to descend so low as to cause the crown-sheet to become uncovered, then the latter being subjected to the intense heat of the fire will cause the explosive charge, 5, to become ignited. The firing of this charge will serve to blow out both of the plugs 3 and 4, thus opening a passage-way for the steam from the boiler into the fire-box. The discharge of the steam which then takes place will not only relieve the dangerous pressure within the boiler, but it will also extinguish the fire by the direct action of the steam.

A safety-plug made in accordance with our invention is simple in construction and very effective in use, as will be readily understood.

We are aware that plugs of fusible metal have heretofore been employed for the same purpose as our explosive-plug; but the great difficulty experienced with the ordinary soft-metal or other plug is that it does not melt or leave a clear open passage for steam to escape through, the reason being that as soon as it is melted sufficiently to allow any steam to pass through it the escaping steam cools the soft metal and it will not melt any further. Furthermore, a corrosive substance very frequently forms over the ordinary soft plug, and when it melts the lime or other substance that has formed over it will not allow the steam to escape. By our invention, however, the above objections possessed by the ordinary fusible plug are completely overcome, because it necessarily follows that as soon as the crown-sheet is exposed to the fire and no water exists over it to keep it cool the explosive charge will be fired immediately and the plug blown out bodily, so as to clear the way for an immediate escape of steam, and thus attain the results aimed at.

Having thus described our invention, what we claim is—

1. An explosive safety-plug for steam boilers, consisting of a shell or holder, top and bottom plugs, and an intermediate explosive charge, substantially as described.

2. The combination, with a steam-boiler, of an explosive safety-plug fitted in its crown-sheet, substantially as described.

3. The combination of the shell or holder, the upper portion of the safety-plug projecting above said shell or holder, the lower portion of the safety-plug, and the intermediate explosive charge with the crown-sheet of a steam-boiler, substantially as described.

In testimony whereof we have affixed our signatures in presence of two witnesses.

GEORGE W. LAYMAN.
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Witnesses:
CHAS. H. BROWN,
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