

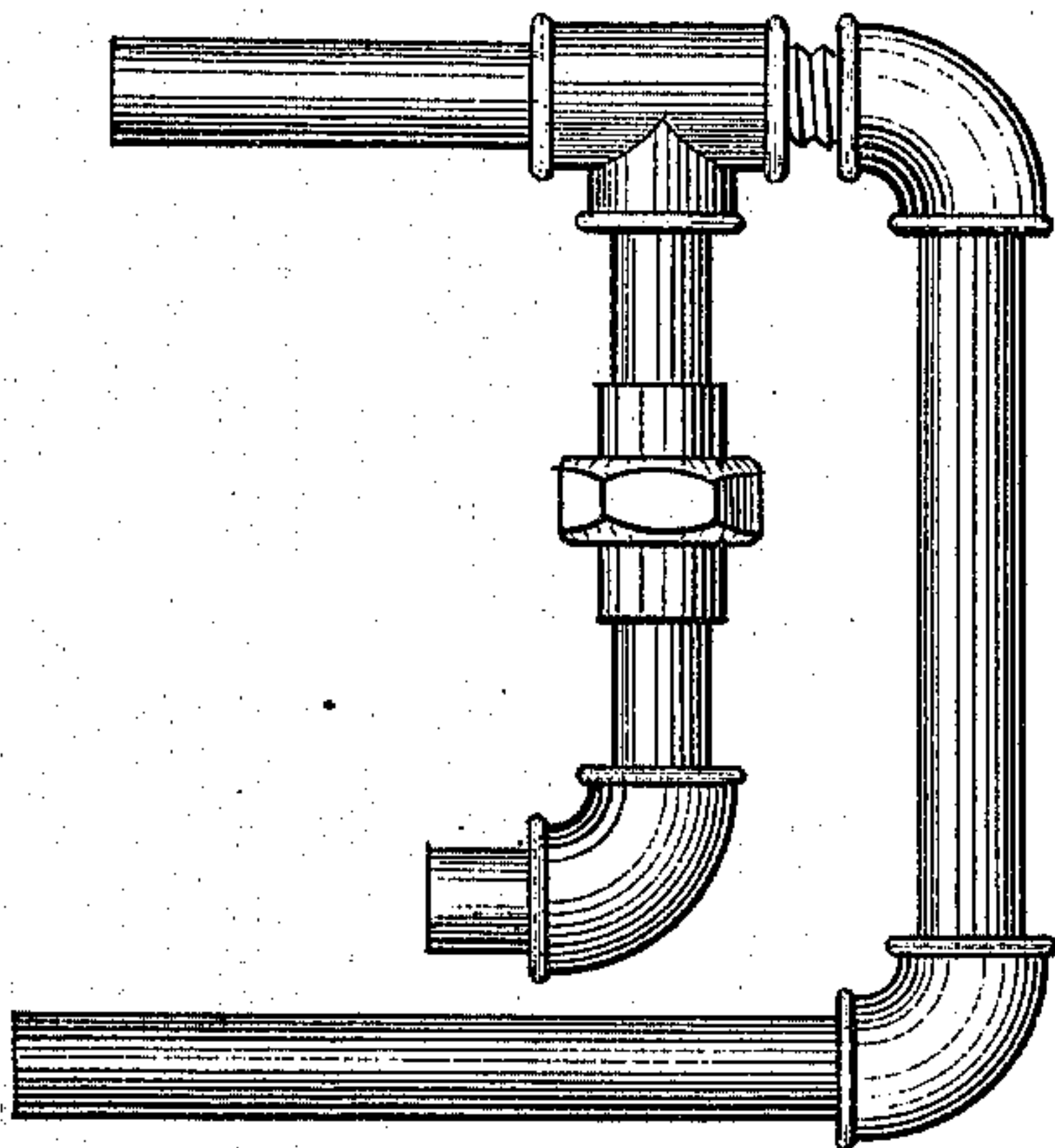
*Probes & Chapman,*

*Safety Valve.*

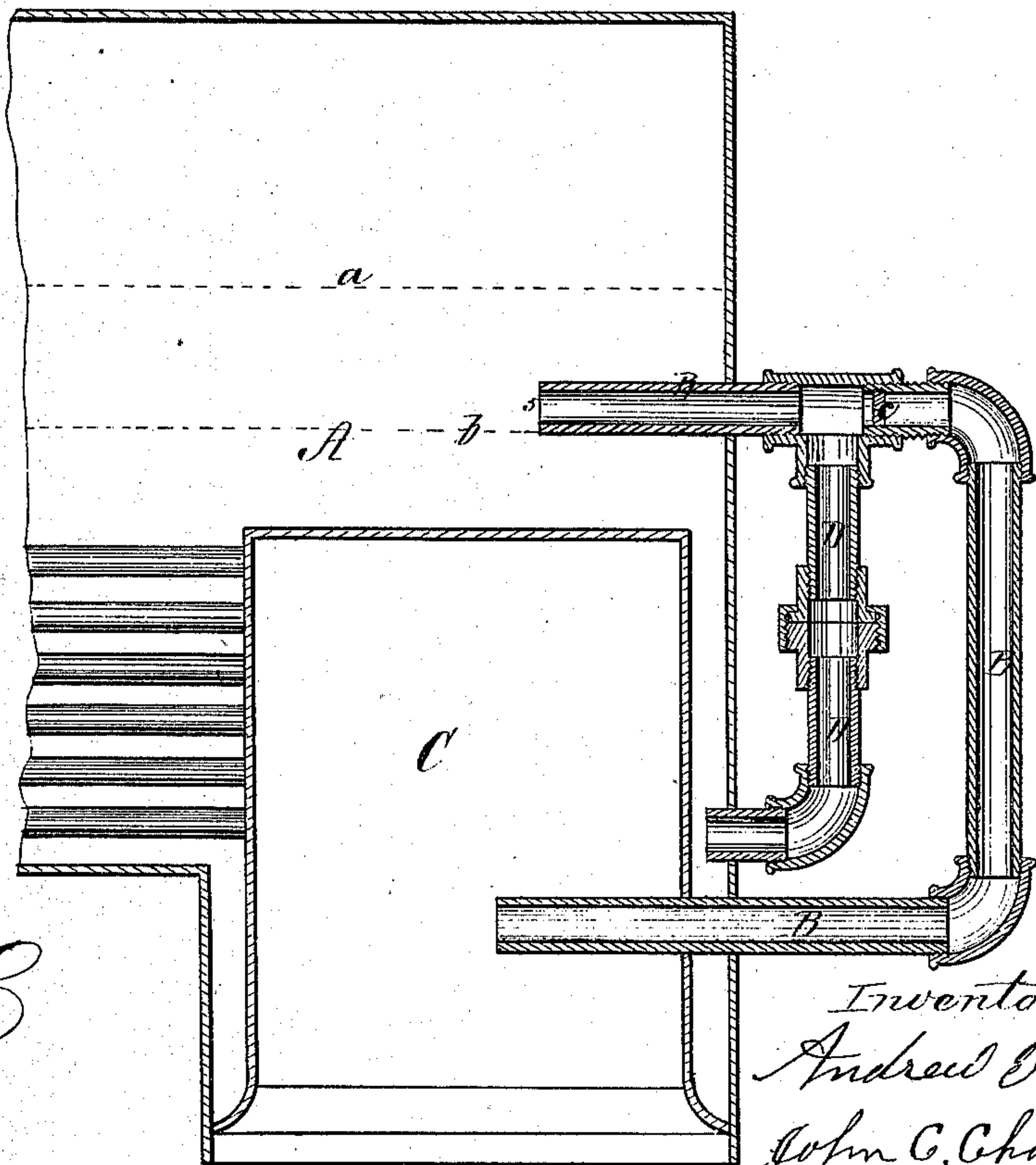
*No. 112,283.*

*Patented Feb. 28. 1871.*

*Fig. 1.*



*Fig. 2.*



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# United States Patent Office.

ANDREW ROBES, OF SOMERVILLE, AND JOHN C. CHAPMAN, OF CAMBRIDGE-  
PORT, MASSACHUSETTS.

Letters Patent No. 112,283, dated February 28, 1871.

## IMPROVEMENT IN SAFETY-PLUG ATTACHMENTS TO STEAM-BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that we, ANDREW ROBES, of Somerville, in the county of Middlesex and State of Massachusetts, and JOHN C. CHAPMAN, of Cambridgeport, in the county and State aforesaid, have invented an Automatic Apparatus for Extinguishing the Fire in Steam-Boiler Furnaces when the water in the boiler falls below the desired level, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a side elevation of our apparatus.

Figure 2 is a section through a portion of a steam-boiler having our apparatus applied thereto.

The water in steam-boilers is frequently, through carelessness, allowed to fall below the desired level, causing the crown and flue-sheets to become overheated, and when in this heated state they are liable to be injured by the sudden contact of the water which is pumped in to resupply the boiler. After this has been repeated a number of times the fibers of the iron become weakened and the strength of the crown and flue-sheets is thus seriously impaired, so that, after these sheets have been weakened from this cause, an explosion of the boiler will sometimes occur, even when the water is at the desired level.

To overcome these difficulties is the object of our invention, which consists in a pipe leading from a point within the boiler below which it would not be safe for the water to descend, to the fire-box or furnace, the passage through this pipe being closed by a plug or disk of fusible alloy, which will melt at a given temperature, and the pipe being connected with an auxiliary pipe communicating with a supply of water, whereby, when the water in the boiler descends below the desired level, steam is admitted to the pipe and the fusible plug melted, when the water is forced through the pipe into the fire-box or furnace and the fire extinguished, which thus effectually prevents the crown and flue-sheets from becoming cracked or injured, as heretofore, by pumping water into the boiler.

To enable others skilled in the art to understand and use our invention, we will proceed to describe the manner in which we have carried it out.

In the said drawing—

A represents a steam-boiler;

a, the level at which the water should stand within it; and

b, the line below which it would not be safe for the water to fall.

Through the boiler, on a level with the line b, projects one end, 5, of a pipe, B, which extends down outside the boiler, and enters the fire-box or furnace C above the fire.

The passage through the pipe B is closed by a plug or disk, c, of alloy which will fuse on steam coming into contact therewith.

Connected with the pipe B, outside the boiler, is an auxiliary pipe, D, which extends down and enters the boiler at a point which will insure its being always in communication with a supply of water.

When the water is at its proper level within the boiler it is prevented, by the plug c, from passing through the pipe B to the fire-box; but should the water be allowed, through carelessness, to descend below the level of the end 5 of the pipe B, the steam will enter this pipe and melt the plug c, when the water from the boiler will be forced up through the pipe D into the pipe B, by reason of the pressure of the steam upon the body of the water in the boiler being greater than the pressure of the steam passing through the pipe B, and aided, too, by the passing steam creating a partial vacuum above the mouth of the pipe D, and thence through the pipe B into the fire-box or furnace C, thus immediately extinguishing the fire, and notifying the person in charge that the water has descended below its proper level.

The above-described automatic apparatus is beyond the control of the engineer, and the owner of a boiler can thus feel assured that there will be no liability of its exploding or becoming injured through the neglect or carelessness of the engineer or person in charge, as, on the event of the water being allowed to descend below the proper level, it will be impossible for the exposed portions of the boiler to become overheated, as the fire will be extinguished before this can occur, and consequently no damage can result from the pumping in of water to resupply the boiler, as has frequently been the case heretofore.

Instead of the auxiliary pipe D communicating with the interior of the boiler, it may communicate with a tank or supply of water outside the boiler; but this auxiliary pipe must connect with the pipe B at some point between its extremity 5 and the fusible plug c, which may be placed at any desired point within the pipe B.

### Claim.

What we claim as our invention, and desire to secure by Letters Patent, is—

The pipe B, leading from the interior of the boiler to the fire-box or furnace, and provided with a plug or disk of fusible alloy, in combination with an auxiliary pipe, D, communicating with a supply of water, operating substantially in the manner and for the purpose described.

Witness our hands this 7th day of November, A. D. 1870.

ANDREW ROBES.  
JOHN C. CHAPMAN.

Witnesses:

P. E. TESCHEMACHER,  
L. E. BATCHELLER.