

(No Model.)

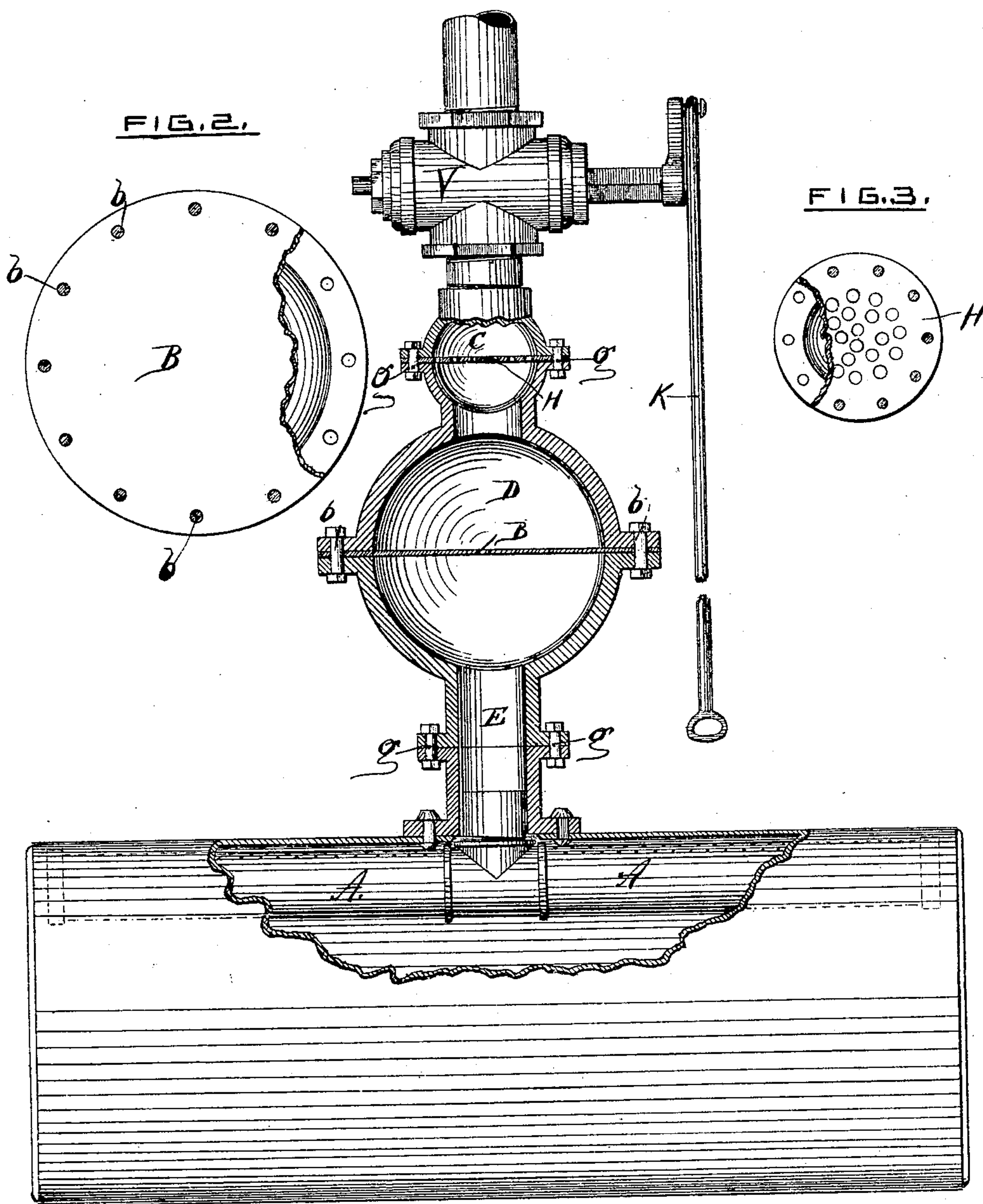
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SAFETY ATTACHMENT FOR BOILERS.

No. 275,091.

Patented Apr. 3, 1883.

FIG. 1.



WITNESSES,

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# UNITED STATES PATENT OFFICE.

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## SAFETY ATTACHMENT FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 275,091, dated April 3, 1883.

Application filed May 9, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL SULLIVAN, of the town of Lincoln, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Steam Generators and Boilers; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This invention relates to safety attachments for steam generators and boilers; and it consists of certain novel devices, hereinafter more fully described, which become important adjuncts to the boiler, and are designed to supplement the safety-valve in case the latter should fail in its proper functions.

To those skilled in the art it is well known that the principal cause assigned for boiler explosions, assuming that the material and workmanship are of good quality, is overpressure. Overpressure may be induced by the safety-valve being overweighted, by its sticking on its seat, or by the inadequate size of the communication between the boiler and valve, and all these causes may be attributed either to ignorance or to a want of skill in the care and management of the boiler.

The object of this invention is to provide certain mechanical means whereby the safety of the boiler shall be secured against a worthless steam-gage and safety-valve and the ignorance or carelessness of the person in charge. It is evident that if an explosion occurs the boiler will give way at that point in the steam area which is weakest; or, in other words, the resistance of a boiler to steam-pressure must be measured by its weakest point. My invention seeks to provide such a weak point, which consists of a metallic plate of reduced working strength, located outside the boiler proper, but connected thereto by means of a flue and a perforated pipe extending longitudinally in the steam-area within the boiler.

In the drawings, Figure 1 represents an ordinary steam-boiler with a portion of the shell broken away, the perforated pipe in the steam-room, a vertical section of the flues, globes, and plates, and an ordinary valve. Fig. 2 represents a metal plate that bisects the larger

globe horizontally, partly in section; and Fig. 3 represents a perforated metal plate, partly in section, that bisects the smaller globe.

Similar letters of reference indicate corresponding parts.

A is a perforated pipe, located in the steam-space and longitudinally of the boiler. The perforations are made in the top and extend along the entire length.

E is a flue, that connects the perforated pipe with the globe D, through which the steam is conducted into the lower half of said globe. The flue E is made up of a short pipe riveted to the boiler, having communication with the perforated pipe A and the nozzle-extension of the globe-hemisphere. The steam is arrested in the larger globe by the plate B, which bisects said globe horizontally, and constitutes the weak point of the boiler, and is that part in which the collapse takes place should the steam-pressure exceed the tensile pressure of said plate. The resistance of the plate B to the steam-pressure is intended to be somewhat greater than the statical pressure in the boiler—that is, the pressure which would be required to raise a perfectly-working safety-valve from its seat—and considerably less than the estimated working strength of the boiler.

The globe D, for convenience of construction, is made in two hemispheres, with flanges formed at the line of contact, when put together, to make steam-tight seams, and each hemisphere terminates in flanged nozzles. The flanges on the nozzles afford suitable means to receive bolts to connect the parts. The smaller globe C is bisected with a perforated plate, H, and is part of the detail of my invention. This globe is formed by enlarging the nozzle of the upper hemisphere of the globe D for the lower half, and the lower part of the neck of the valve above for the upper half of said globe. The perforations in the plate within the globe C serve as outlets for the steam after the collapse of the plate B. Above the globe C, and attached to it, is an ordinary valve, V, with handle K, by which it may be opened and closed at pleasure. The valve should be kept open and locked to avoid any contingency of its being closed, because it affords the only exit for the steam, which relieves the boiler from overpressure. The handle K



places the valve under control of the attendant, which should be closed to confine the steam when reduced to a safe working load.

The pipe A is perforated the entire length, 5 that the steam and water in the boiler may not rush through in a body, and that all parts of the boiler shall be relieved of pressure simultaneously after the collapse of the plate B. The perforated plate H breaks the force of the 10 steam in its passage through the valve. The plate B, bisecting the larger globe D, is a circular piece of homogeneous metal (steel preferred) of any given tensile strength, which will be determined by the load the boiler is 15 intended to carry. These plates are made of different thicknesses, which will be capable of resisting different degrees of pressure, so that when the limit of strength is known or determined on it will be necessary only to select the 20 plate that corresponds to the required resistance.

The method of applying the safety attachment is as follows: The steam rises from the boiler and passes through the perforations of 25 the pipe A, through the flue E into the lower half of the globe D, and fills the space below the plate B, exerting the same pressure on said plate as on the other parts of the boiler. If the safety-valve should fail to release the steam 30 when the boiler is overloaded—that is, sustaining a pressure from the steam in excess of what should raise the valve in a normal condition—then it is intended that the plate should collapse or burst, and the steam would pass 35 out through the valve V, which affords the relief that the imperfect safety-valve failed to provide. At the proper time the valve can be closed by the handle K, and the boiler may be then used as before, or until a new plate is sub- 40 stituted for the one that collapsed.

The chambers C and D, which I have represented and designated as “globes” may be of other forms; but the spherical form is preferable, because it can be made cheaper, better 45 joints can be obtained, and less space will be required.

While the globe C, perforated plate H, and the valve V are important factors to the perfect working of my invention, I do not regard these elements indispensable to the organiza- 50 tion. If these features were omitted, the outlet at the top of the globe D should be smaller than when these appliances are put to use. The same general result would be attained if the outlet of the globe D were covered with a 55 perforated plate, properly secured thereto. A still better result would follow by a valve like V, attached to the globe D; but to obtain the best results I am persuaded that all the elements as described and illustrated should be 60 employed.

I am aware that bursting-plates have been used before my invention; but with these no provision was made for escape of the steam beyond the walls of the small chamber in which 65 the bursting-plate was located. Of necessity the relief thus afforded could be but temporary, and must be measured by the capacity of such chamber.

Having thus described my invention, I claim 70 as new and desire to secure by Letters Patent—

1. In combination, substantially as specified, a steam-boiler, perforated pipe located in the steam-space, bursting-plate, chamber D, and a suitable device, substantially as de- 75 scribed, for releasing the steam from the boiler.

2. The combination of a steam-boiler and a safety attachment, consisting of a perforated pipe located in the steam-space of the boiler, a globe bisected horizontally with a homoge- 80 neous metal plate calculated to possess less resistance to steam-pressure than the boiler to which it is attached, a smaller globe bisected by a perforated plate and a valve-outlet for the steam, substantially as specified. 85

3. A perforated pipe located in the steam-space, for the purpose specified, substantially as described and illustrated.

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Witnesses:

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