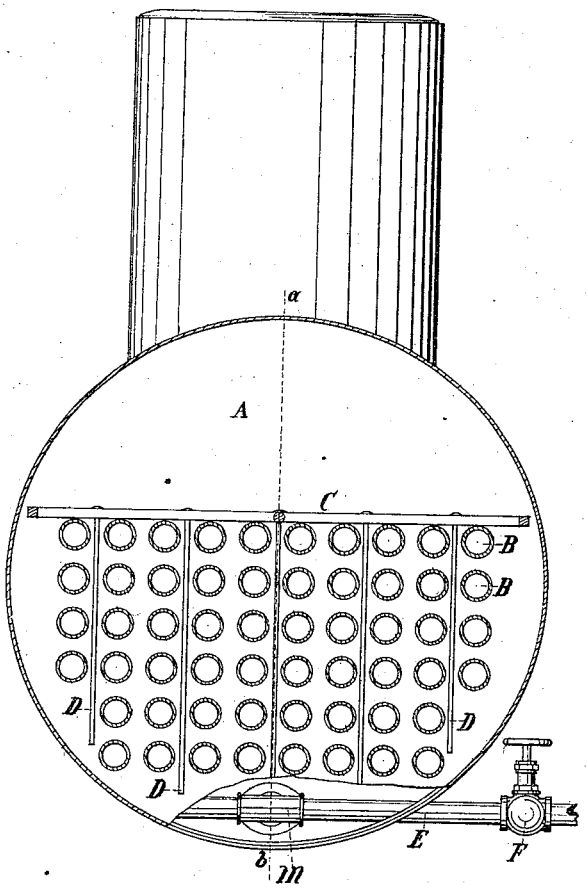
2 Sheets--Sheet 1.

G. SELDEN.

Means for Preventing Boiler Explosions.

No. 161,709. Patented April 6, 1875.

Fig. 1



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Inventor:
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2 Sheets--Sheet 2.

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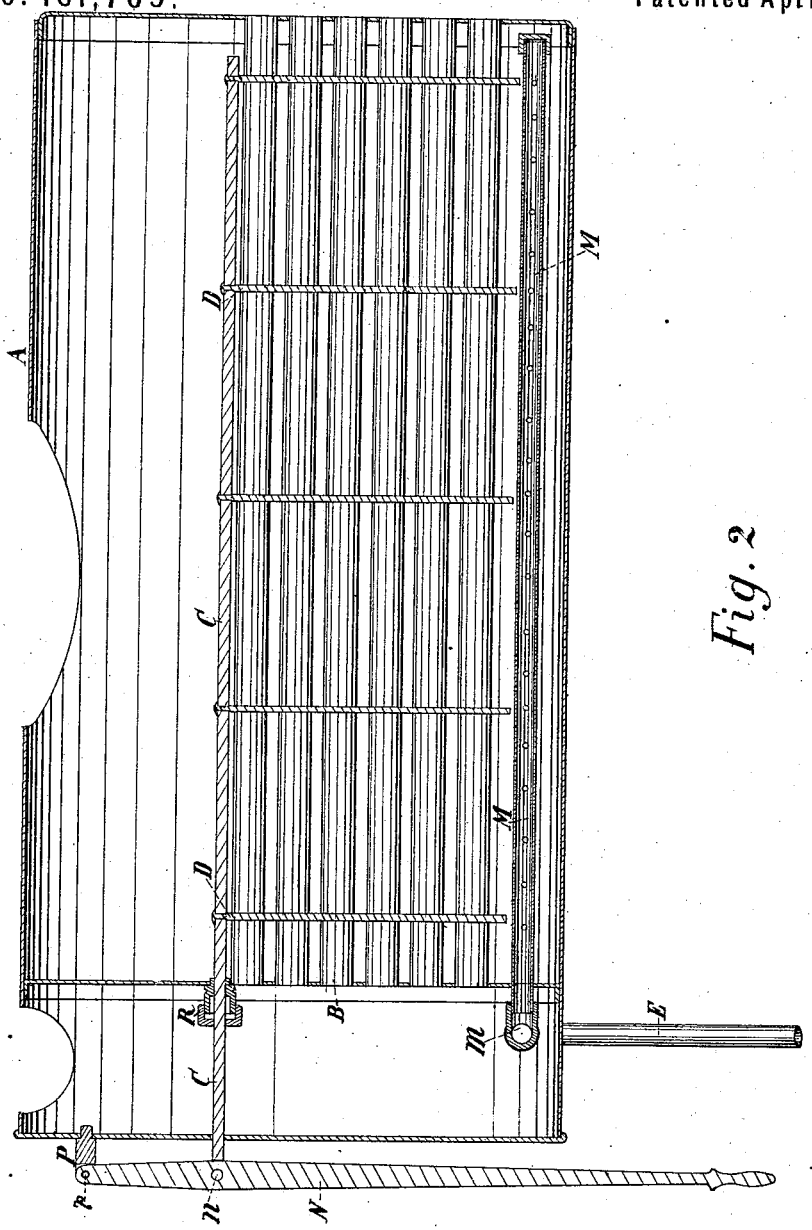

Fig. 2

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UNITED STATES PATENT OFFICE.

GEORGE SELDEN, OF ERIE, PENNSYLVANIA.

IMPROVEMENT IN MEANS FOR PREVENTING BOILER-EXPLOSIONS.

Specification forming part of Letters Patent No. **161,709**, dated April 6, 1875; application filed May 18, 1874.

To all whom it may concern:

Be it known that I, GEORGE SELDEN, of Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Means for Preventing Boiler-Explosions; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to the prevention of the explosion of steam-boilers; and consists in preventing the deaeration of the contained water of a boiler while it is at rest, and at the same time subjected to the action of heat.

In the drawings, Figures 1 and 2 represent two of many mechanical contrivances whereby my invention might be carried into effect.

I discriminate between an explosion and the bursting of a boiler as follows: When a boiler bursts it is simply ruptured at its weakest part from a natural and gradually-increasing pressure that might have been withstood and prevented by greater strength or better construction, but when an explosion occurs the conditions and phenomena are entirely different. In an instant, and without any premonitory signs, there is created within the boiler a pressure or expansive force that shivers alike its strongest and weakest portions, and that is practically irresistible. Statistics show that explosions generally occur when the engine has been started, or the water in the boiler in some other way disturbed, after resting quite a considerable length of time, and subjected, meanwhile, to the action of heat. At the time of these explosions it is not unfrequently the case that there is an abundance of water in the boiler and but a moderate head of steam being carried.

It is a well-known fact that water freed of its air can be raised to a temperature 100° Fahrenheit and more above its ordinary boiling-point without ebullition. In this condition it has an enormous excess of heat stored up, and now, when it boils, ebullition is converted into explosion. While the engine is not in operation, and the water in the boiler is at rest, if this condition is sufficiently continued, ebullition will cease within the boiler, and the heat will act not only to deaerate but also to superheat the water, while the steam above it will remain at a much lower temperature. If the water be not disturbed in any manner it will continue to become deaerated and superheated until the maximum limit is reached and spontaneous explosion results; but if, at any time during this deaerated and superheated state, the water be disturbed by starting the engine, injecting fresh water, or otherwise, explosive ebullition will take place.

It is obvious that explosion cannot occur if one of its essential provoking causes be removed or prevented; and my invention has for its object the prevention of the deaeration of the contained water of a steam-boiler while the same is subjected to the continued action of heat during the time of its repose. This I accomplish either by injecting air into the said contained water, thus preventing the superheating and deaeration which are dependent one upon the other, and which combine to form one of the essential conditions of an explosion.

In carrying out my invention, as above set forth, a pipe, E M, as shown in Figs. 1 and 2, may be inserted at or near the bottom of the boiler, and provided with suitable perforations for the exit of air. Through the pipe E M air is injected in any suitable manner, and thus will the water in the boiler A be both agitated and aerated.

I claim as my invention—

As a means of preventing steam-boiler explosions, the method herein described, consisting in forcing or injecting air into the contained water of the boiler at or near the bottom thereof while the said water is at rest and subjected to the action of heat.

In testimony that I claim the foregoing, I have hereunto set my hand this 18th day of May, 1874.

GEORGE SELDEN.

Witnesses:

LEVERETT L. LEGGETT,

E. C. WEAVER.