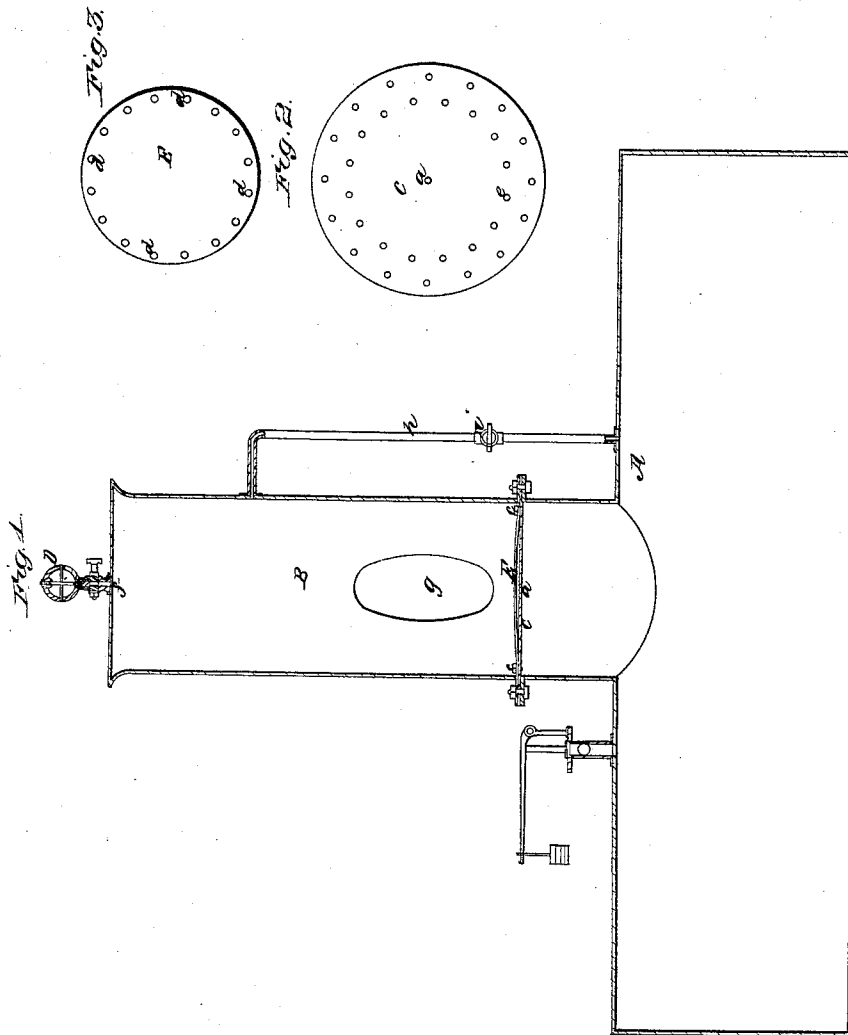


H. Waterman,
Steam Safety Valve.
N^o 9,509. Patented Dec 28, 1852.



UNITED STATES PATENT OFFICE.

HENRY WATERMAN, OF WILLIAMSBURG, NEW YORK.

SAFETY APPARATUS FOR STEAM-BOILERS.

Specification of Letters Patent No. 9,509, dated December 28, 1852.

To all whom it may concern:

Be it known that I, HENRY WATERMAN, of Williamsburg, in the county of Kings and State of New York, have invented certain new and useful Improvements in Means of Obviating the Danger of Explosions in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a longitudinal vertical section of a cylindrical steam boiler, with my improvements applied. Fig. 2, is a plan of the perforated plate, which is placed between the safety chamber and the boiler. Fig. 3, is a plan of what I term the safety plate.

Similar letters of reference indicate corresponding parts, in each of the several figures.

The nature of this invention consists mainly in furnishing a steam boiler with what I term a safety chamber and safety plate. The safety chamber is placed on or above the boiler, and is intended to be of about the same internal capacity as the steam space in the boiler; and it is separated from the boiler, by the safety plate, which is a plate of metal of such strength, that it will bear the maximum pressure the boiler is intended to carry, but will burst, if the pressure is increased above that point, and allow the steam to escape into the safety chamber, and thus cause its pressure to be reduced very considerably by expansion and by the condensation caused by its coming in contact with the cool surface of the safety chamber. An alarm whistle is attached to the chamber, to call the attention of the engineer or superintendent, to the bursting of the plate. Suitable means are provided to prevent the foaming or throwing up of the water into the safety chamber, when the plate bursts, so that the working of the boiler will not be interfered with, but may go on as usual till it is convenient to renew the safety plate.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, is the boiler.

B, is the safety chamber, which is in the form of a vertical cylinder, placed on the top of the boiler, and has a manhole, *g*, at one side.

C, is a plate separating the boiler, and

safety chamber, and only allowing communication between the two, through a small hole or perforation, *a*. The plate, C, is of the same strength as the boiler.

E, is the safety plate, which is secured above the plate C, by bolts, *c, c*, passing through holes, *d, d*, and screwing into holes, *e, e*, in the latter plate; it is fitted closely to the plate, C, but the pressure of the steam will raise it slightly from the latter plate, and make a steam space between them; it may be made thinnest in the center. Copper is the most suitable metal for this plate. At the top of the safety chamber there is an opening, *f*, over which is placed the alarm-whistle, D.

When the boiler is in operation, the full pressure of the steam acts upon the safety plate, E. If the pressure is allowed, through accident, or carelessness, to increase beyond the highest safe point, or beyond what the safety plate is capable of bearing, the latter will burst or tear apart, and allow the steam to escape into the safety chamber, until the pressure is the same in it as in the boiler, by which the boiler will be relieved, and the danger at end.

The alarm being sounded by the small jet of steam escaping at, *f*, apprises the engineer or superintendent, of the bursting of the plate; and, at the earliest opportunity, he allows the steam to escape, and then proceeds to remove the manhole cover, *g*, and take off the burst plate, and replace it by a new one. One or more spare safety plates should always be kept on hand; and then the burst plate can be removed and replaced in a short space of time.

The chief object of this invention is to provide a means, beyond the control of the engineer, of relieving the boiler of dangerous pressure, without a dangerous escape of steam, and without materially interrupting its proper operation until a convenient time. If the boiler is on a steam-vessel, the vessel may run to the nearest landing, or be placed under suitable circumstances, before stopping to renew the plate. The reason for using the plate, C, and not leaving the safety plate, E, exposed, without any interposed plate, to the pressure of the steam, is that, in the latter case, on the bursting of the safety plate, the water as well as the steam would foam up into the steam space and chamber, in such quantities as to prevent the proper working; but, by admitting

the steam to act on the safety plate, through a small opening only, this is prevented, and the safety plate still exposed to the full pressure of the steam on all parts of its surface.

- 5 Instead of one opening, *a*, a number of minute perforations may be used. In order to expel any condensed water from the safety chamber, before the safety plate is put on, and cause it to fall back into the
10 boiler, a steam pipe, *h*, is provided, communicating from the boiler to the chamber, and furnished with a cock, *i*.

What I claim as my invention, and desire to secure by Letters Patent, is—

- 15 1. The safety chamber, *B*, and safety plate, *E*, combined with the boiler, in any way substantially as described, whereby the

bursting of the plate, by the too high pressure in the boiler, causes the chamber to be filled, and the pressure in the boiler to be 20 reduced, by the expansion of the steam.

2. The plate, *C*, placed, substantially as described, between the boiler and the safety plate, *E*, having one or more small openings, *a*, through which the steam is allowed to 25 pass, to act on the safety plate, and fill the safety chamber, whereby the water is prevented from priming, or foaming, and being carried up by the steam, when the safety plate bursts.

HENRY WATERMAN.

Witnesses:

S. H. WALES,
S. WATERMAN.