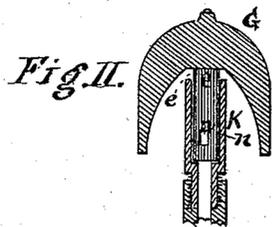
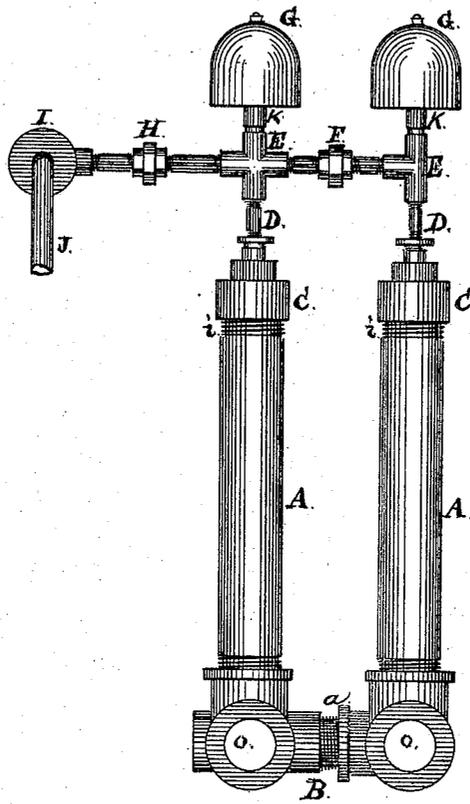


E. C. FERNALD.
Safety-Valves.

No. 137,540.

Patented April 8, 1873.

Fig. I.



Witnesses.
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EDWARD C. FERNALD, OF FLATBUSH, NEW YORK.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. 137,540, dated April 8, 1873; application filed January 8, 1873.

To all whom it may concern:

Be it known that I, EDWARD C. FERNALD, of Flatbush, in the county of Kings and State of New York, have invented new and useful Improvements in Safety-Valves for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

My invention has for its object to construct a steam-boiler and provide the same with a large number of small safety-valves distributed over the steam space according to the size of the boiler, so that, in case of an excess of steam, it will, by means of the several safety-valves, have abundant means of escape, thereby making the boiler comparatively safe from explosion.

The nature of my invention consists chiefly in the novel and peculiar construction of a safety-valve adapted to use, as above set forth, upon a steam-boiler, which, constructed as I prefer, is principally composed of small tubes in combination with any number of separate and independent safety-valves, the number depending on the size of steam-boiler. The tubes of the boiler are set in a vertical position, and a safety-valve is placed upon the top of each tube, and are so constructed as to operate automatically without the employment or use of weighted levers.

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

Figure I represents a side elevation of my invention, showing only two of the tubes composing a boiler and their connections with the safety-valves located on the top of the tubes. Fig. II is a longitudinal vertical sectional elevation of the safety-valve and its connection with the tube or boiler.

Letters of like name and kind indicate like parts in each of the figures.

A may represent any number of vertical tubes, of any desired size or diameter and length, and B the lower connecting mud-pipe joined by a strong screw-thread, as seen at *a*. At *o o* is shown where other sections of the

boiler are attached or connected; and in the same manner additional sections may be connected to form any size of boiler desired. At C I provide thimbles, which are secured to the top of the tubes by means of screw-threads *i i*. D D represent smaller tubes, which connect with the thimble C by means of screw-threads; also to the T-pipes E E, the latter of which are connected by means of the couplers F. At G are shown the safety-valves, which are made of solid cast metal; the top is spherical, and the under side is made with a cavity, at the bottom of which a seat may be made to fit closely on the top of the tube K, which is set in the upper branch of the T-pipe E, so as to make it steam-tight. In the center of the valve-seat is a valve-stem, *e*, of proper length, that passes down into the tube K to support and steady the valve as it is acted upon by the steam. I prefer to make a steam-seat at the bottom of valve-stem *e*, as shown in Fig. II. The valve-stem *e* is made with a cavity in the lower end, or in the form of and at the bottom of the cavity is an opening, *n*, for the steam to escape through when the valve is raised to a certain point, when said opening *n* will correspond with a similar opening through tube K. H represents a steam-pipe that connects with the steam-drum I, and J is the pipe that connects with and conducts the steam to the engine. To prevent the safety-valve from blowing off the top of the tube, a pin is inserted into the valve-stem, which works through a slot in the tube, so that, when the valve is raised so that the orifice or opening in the valve-stem comes in a corresponding position with the orifice or opening in the tube, the valve comes to a stop until the excess of steam is blown off, when the valve again settles down upon the valve-seat, each working independent of the other.

The advantages of my invention will be seen from the fact that by my plan one large safety-valve is virtually divided into a number of small ones, and the same located upon different parts of the boiler, so that sudden expansion of steam, from whatever cause, will be vented in the immediate vicinity of the point of generation; and by the further fact that, in dispensing with valve-levers, much

friction is avoided, and, by dividing the valve-weight into a large number of lesser weights, facility of action will be secured by the diminished proportionate inertia of the valve-weight.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

A safety-valve constructed with a weight,

G, and a stem, *e*, combined with a tube, K, fitted with a seat for said stem *e*, and provided with steam-vent *n*, substantially as shown and described, and for the purpose set forth.

EDWARD C. FERNALD.

Witnesses:

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