# R. E. Dibble,

## Steam-Boiler Water-Tube.

No. 7,576. Patented Aug. 20, 1850.

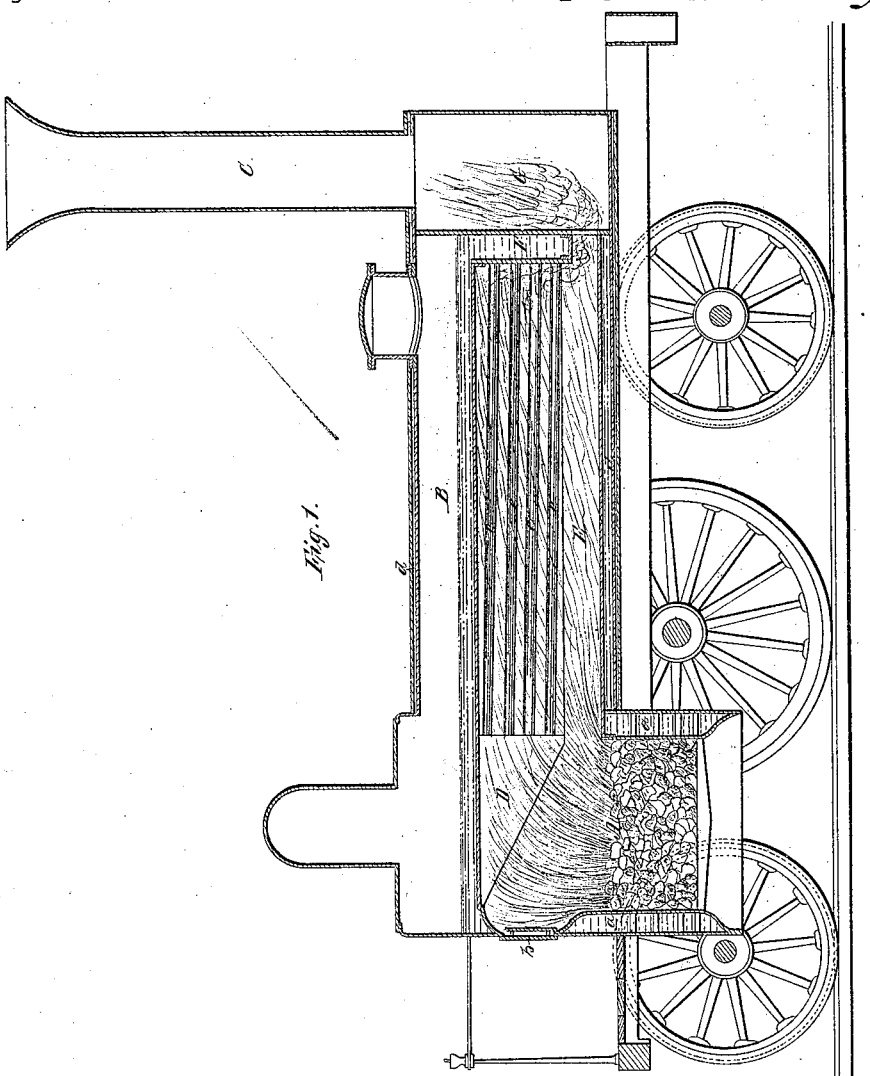


Fig. 1.

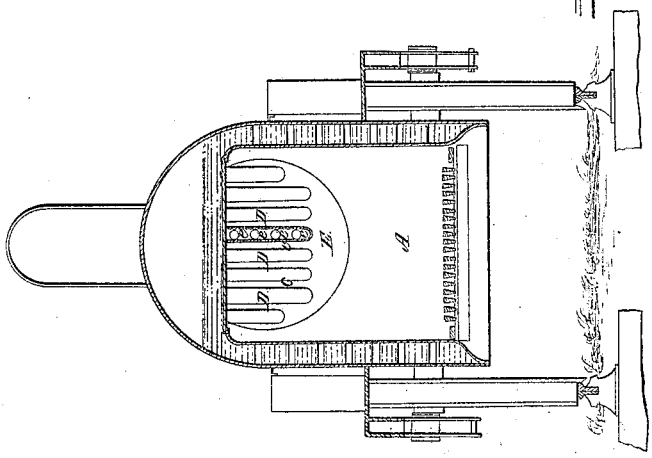


Fig. 2.

# UNITED STATES PATENT OFFICE.

RICHARD E. DIBBLE, OF NEW YORK, N. Y.

## IMPROVED STEAM-BOILER.

Specification forming part of Letters Patent No. **7,576,** dated August 20, 1850; antedated July 20, 1850.

*To all whom it may concern:*

Be it known that I, RICHARD E. DIBBLE, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 is a vertical longitudinal section of a locomotive-boiler with my improvement applied thereto, and Fig. 2 a face view of the boiler with the front of the fire-box removed.

The object of my invention is to maintain a constant and rapid circulation of the water in a tubular steam-boiler through the tubes and through a series of water-vessels, which depend from the roof of the fire-box and expose a very large surface to the direct action of the fire.

In order to exemplify my invention I will describe a boiler for a locomotive-engine constructed on the plan invented by me. The steam-generating portion of the boiler consists, mainly, of two parts, the chamber of combustion A or fire-box and the flue-cylinder B. In the former the fuel is burned and by the latter the products of combustion are conveyed to the smoke-pipe C. The fire-box is of a rectangular form and is surrounded by a water-space *a a*. Its sides are formed of plane surfaces, but its roof, instead of being flat, as is ordinarily the case with locomotive-boilers, is formed of a series of flat wedge-shaped water-vessels D, which descend into the chamber. These water-vessels are deepest at the side of the fire-box farthest from the door *b*, and thence slope upward until they meet the flat portion of the roof. They are separated from each other by spaces *c*, through which the flame is free to pass to the flue. The flue-cylinder consists of a cylindrical shell *d*, secured to the fire-box and containing a flue E, which extends from the chamber of combustion to a water-space or bridge F, depending from the top of the flue and extending to within a short distance of its bottom; the space left at the bottom being sufficient for the passage of the products of combustion from the flue into the smoke-box G. Within this flue is a series of tubes *e*. These extend from the depending bridge F to the water-vessels D, in the back plate of which they are secured.

When this boiler is in operation, the water-vessels being exposed to the direct radiation of the fire beneath are heated intensely, and if no means were provided for circulating the water through them they would probably burn out very quickly; but as they are connected by the tubes *e* with that portion of the boiler farthest from the fire, and consequently coolest, a constant circulation is maintained through them; the heated water rising in the water-vessels and its place being supplied by the cooler water rushing through the tubes. Thus a constant circulation is maintained in the tubes and water-vessels, while at the same time the latter, from their shape, expose a very great evaporating-surface to the direct radiation of the fire, and thus increase the evaporating power of the boiler. These water-vessels have also the additional advantage of forming a fire-box roof of great strength, thus enabling the constructor to dispense with the stays and beams hitherto employed to strengthen this usually weakest part of the boiler. This method of combining tubes and water-vessels also affords a ready means of removing and replacing worn-out tubes, as the extremities of the tubes terminating in the water-vessels can be easily operated upon by tools inserted in the water-vessels from the dome H above.

In order to allow the steam formed in the tubes to escape with facility and to prevent it from impeding the circulation of the water, I prefer to slope the tubes upward from the bridge F to the water-spaces D. The steam will thus naturally tend to escape in the same direction as the currents of water are moving, and will thus promote instead of retarding the circulation of the water.

Various modifications may be made in the water-vessels and tubes without affecting the principle of my invention, and I intend to make such modifications whenever circumstances may render it expedient. Thus, for example, all the sides of the water-vessels may be made to converge instead of the back and front alone. These vessels may likewise be placed obliquely across the fire-box instead of being parallel with its sides. A series of

thin water-spaces may also be substituted at the back end of the flue in place of the bridge or continuous water-space.

Having thus described my improvement, I wish it to be understood that I do not claim as my invention any one of the devices described by me in this specification when taken separately. Neither do I wish to confine myself to the precise construction and arrangement of the parts of a boiler herein set forth; but

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

The arrangement of pendent water-vessels D in the fire-box in connection with water-tubes *e*, which pass along the flue and are connected at one extremity with a water-space near the back of the boiler and at the other with the water-vessels at the fire-box, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

RICHARD E. DIBBLE.

Witnesses:
T. C. DONN,
JOHN MUGAN.