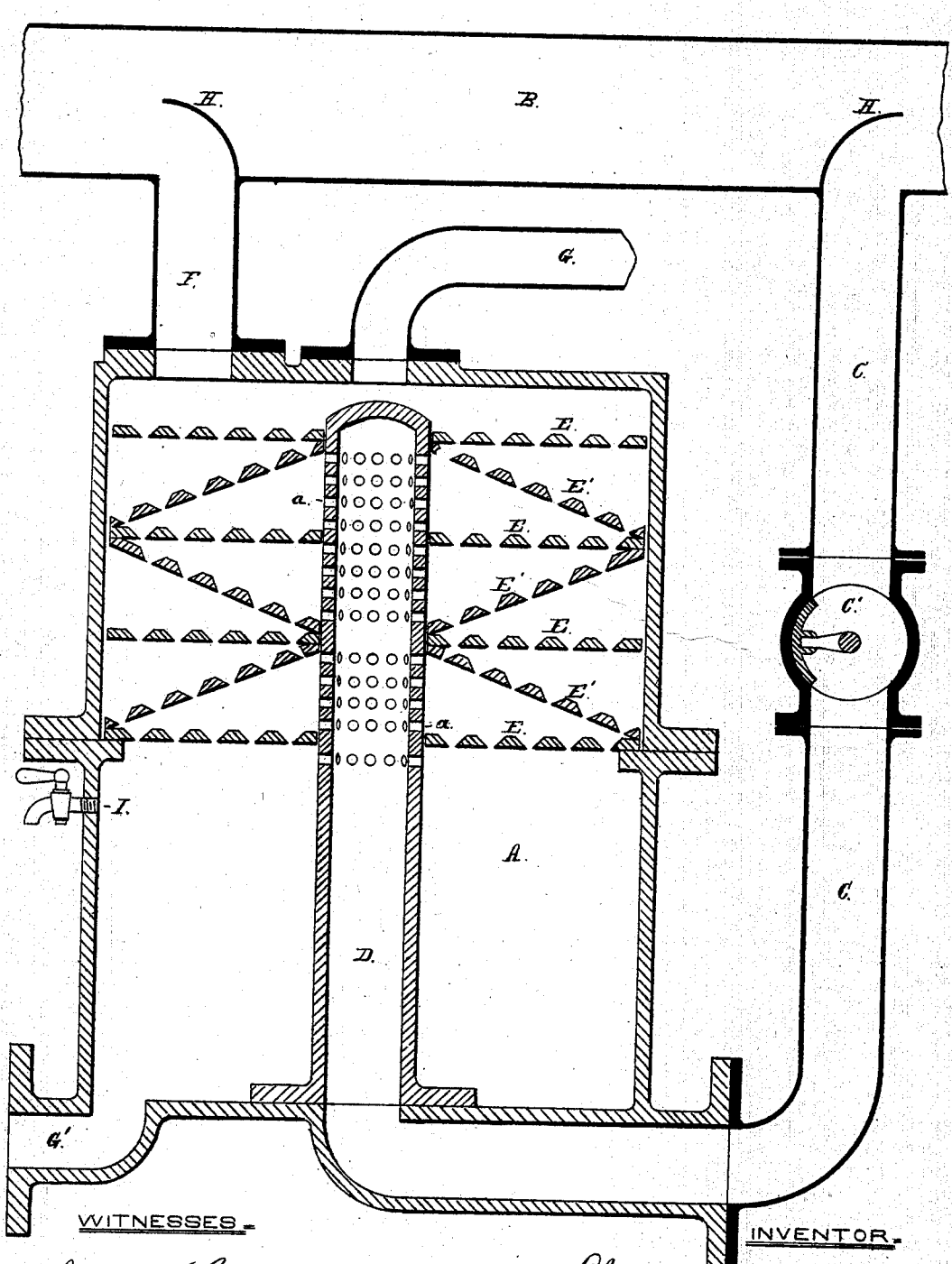
C. E. FRAZIER.

Feed-Water Heaters.

No. 139,665. Patented June 10, 1873.



WITNESSES.

Joseph Cruzz.

Woodruff W. Wheaton.

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UNITED STATES PATENT OFFICE.

CHARLES E. FRAZIER, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **139,665**, dated June 10, 1873; application filed February 6, 1873.

To all whom it may concern:

Be it known that I, CHARLES E. FRAZIER, of the city of Baltimore and State of Maryland, have invented certain Improvements in Feed-Water Heaters, of which the following is a specification; and I do hereby declare that the same is a full, clear, and exact description of my said invention, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to a heater in which the feed-water used to supply the boiler is heated by coming in contact and being mixed with a portion of the exhaust steam from the engine, the main exhaust remaining unimpaired; and consists in the features hereinafter fully set forth and described.

The accompanying drawing, forming a part of this specification, is a vertical section of a heater embracing my improvements, and showing the manner in which the said heater is connected with the main exhaust-pipe of the engine.

A is a cylindrical heater in two parts, provided with suitable flanges, through which the two parts are bolted together. B is the main exhaust-pipe of the engine. C is a branch exhaust-pipe, connecting the main pipe B with the heater at or near the bottom thereof, and is provided with the valve C′, by which the flow of steam may be regulated. D is an extension of the branch exhaust-pipe, bolted or cast to the interior surface of the lower head of the heater, and extends vertically to near the upper head of the same. The pipe D is slotted or perforated, in the manner shown in the drawing, the said perforations, which are represented by *a*, commencing near the upper end of the pipe, which is closed, and extending to a point corresponding nearly to the horizontal center of the heater. E E are flat grated plates of a diameter slightly less than that of the interior of the heater, and placed within the same at regular distances apart. E′ E′ are also grated plates, but conical in form, and occupy the spaces between the plates E. This series of plates rests upon projections cast on the interior surface of the heater, and may be increased or diminished in number, as may be found necessary, and are used to form an obstruction to the cold water injected into the heater, and divide the same into small streams for the purpose of increasing the surface exposed to the action of the steam. F is the heater exhaust-pipe, leading from the upper portion of the heater to the main exhaust-pipe B. G is the cold-water feed-pipe, through which the water to be heated is admitted, and is situated at some point above the plates E and E′. G′ is the hot-water feed-pipe, which conveys the heated water to the pump of the engine, by which it is forced into the boiler. H H are deflectors placed in the main exhaust-pipe B, and designed to assist in guiding the steam to and from the heater.

The manner in which the temperature of the water is raised in my improved heater is as follows: The cold water flowing into the heater through the pipe G, and divided into small streams in passing through the grated plates E E′, comes in contact with the exhaust steam admitted through the perforations *a* in the pipe D. A partial condensation of the steam then ensues, and the heat contained in the steam before condensation is transmitted to the condensing water which falls to the bottom of the heater to be delivered to the pumps for the purpose of supplying the boiler. Any steam not condensed by the inflowing cold water passes through the heated exhaust-pipe F into the pipe B. A cock, represented by I, is placed in the heater at a point designed to be the maximum height to which the water may rise, and in case more water is delivered into the heater than can be used by the pump, to act as an overflow.

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

The heater A, having the plates E E′, surrounding the perforated pipe D, in combination with the main exhaust-pipe B, branch exhaust-pipes C and F, deflectors H, and feed-pipes G and G′, substantially as and for the purpose herein set forth and described.

In testimony whereof I have hereto subscribed my name, in the city of Baltimore, this 1st day of February, in the year of our Lord 1873.

CHARLES E. FRAZIER.

Witnesses:
WM. T. HOWARD,
JNO. MCKIM.