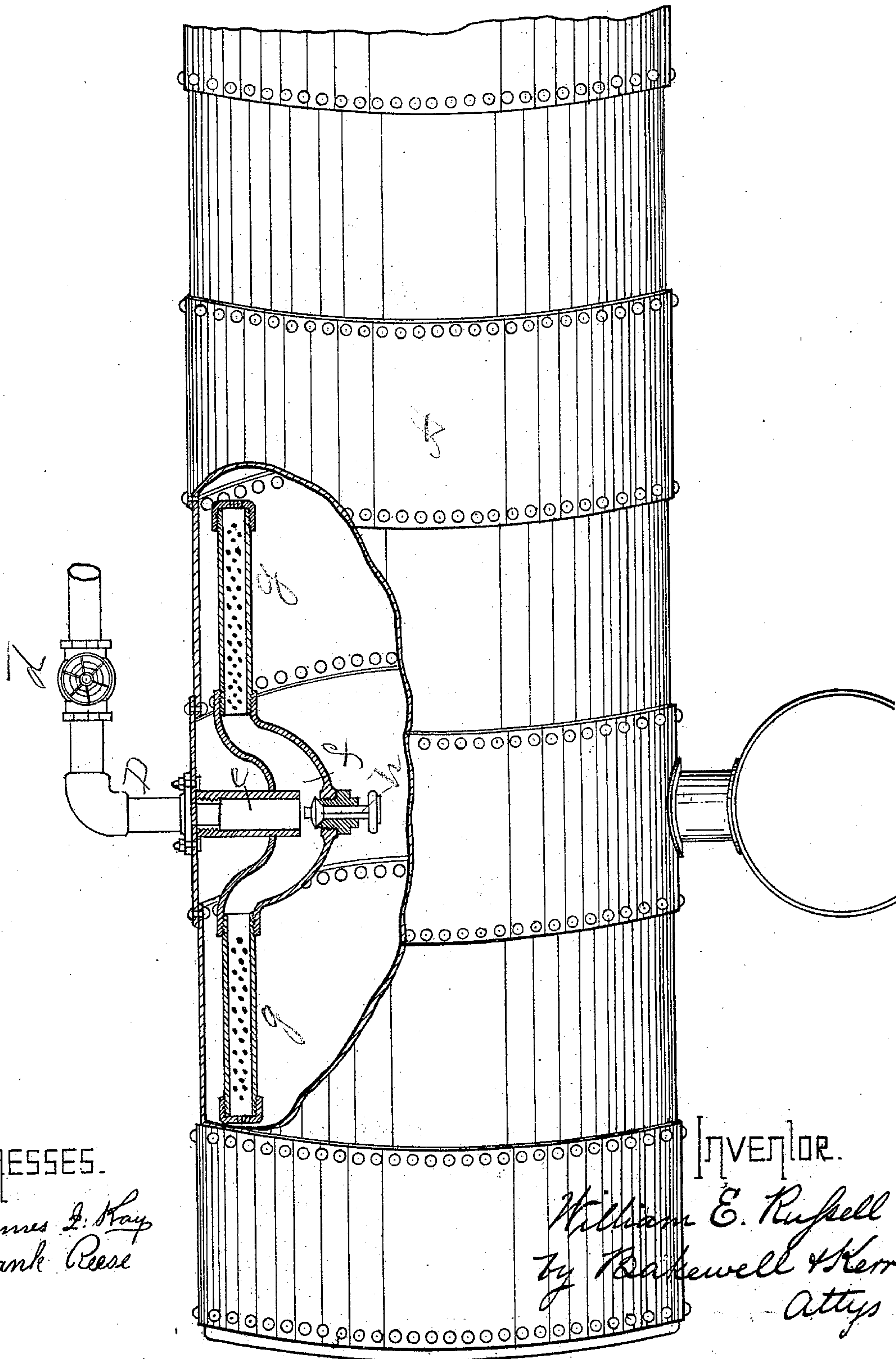


W. E. RUSSELL.

SUPPLYING FEED WATER TO BOILERS.

No. 177,160.

Patented May 9, 1876.



WITNESSES.

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INVENTOR.

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UNITED STATES PATENT OFFICE.

WILLIAM E. RUSSELL, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO
JAMES RUSSELL, OF SAME PLACE.

IMPROVEMENT IN SUPPLYING FEED-WATER TO BOILERS.

Specification forming part of Letters Patent No. **177,160**, dated May 9, 1876; application filed
February 21, 1876.

To all whom it may concern:

Be it known that I, WILLIAM E. RUSSELL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Method of Supplying Feed-Water to Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, and illustrating one set of devices for carrying out my invention.

My invention relates to the manner of and apparatus for supplying feed-water to the ordinary steam-boilers, or to that class of steam-boilers which contain a body of water, as distinguished from what are termed "flashed boilers."

The common method of supplying feed-water to the class of boilers specified is in a regular stream, and at a point near the mud-drum. As the water thus introduced is at a lower temperature than the boiler-water, it necessarily lies next the shell, and this alone is a well-known cause of injury to steam-boilers; but a more fruitful source of trouble arises from the deposits along the bottom of the boiler, left by the current established, and which is gradually increasing in temperature as it approaches the front of the boiler or the furnace end. The heavy impurities only settle upon the back plates, while mineral substances and such other impurities as are only eliminated at high temperatures are deposited along the shell between the mud-drum and the furnaces or fire-surface, or are distributed through the body of water in the boiler, giving rise to what is termed "foaming."

To overcome these objections and disadvantages I introduce the feed-water in the form of spray at a point in the steam-space over or near the mud-drum, so that the heavier impurities will be carried back and deposited in the drum by the surface-current in the boiler, which always sets away from the fire-surface and toward the mud-drum. By this means the water which lies next the shell is incapable of depositing sediment at the temperature of the boiler, and scale is therefore avoided.

I will now proceed to describe the means I

employ in carrying out my invention, so that others skilled in the art to which it appertains may apply the same.

A indicates an ordinary steam-boiler, which may be provided with the usual mud-drum and any approved furnace. On the rear of the boiler, and preferably at a point above the mud-drum, is a nipple or thimble, *c*, bolted to the shell. To this is attached the feed-water pipe *D*, provided with a cock, *d*, and within the steam-space of the boiler a section of tubing, *e*, terminating in a trap, *f*, provided with the perforated tubing or T-pipes *g g*. These perforated spray-feeders are preferably arranged in the upper part of the steam-space, close to the shell, as shown. In order to prevent the water from being blown out of trap *f* when the feed-water is shut off, and to obviate any noise when the feed-water is turned on, I place an equalizing-valve, *h*, in trap *f*, as shown.

The operation of these devices is as follows: The cock *d* being turned to admit the supply, the feed-water is discharged from the T in a spray, which, absorbing heat from the steam in the steam-space of the boiler, strikes the surface at the temperature of the boiler-water, insuring that all impurities which would be extracted at that temperature will be carried by the current and deposited in the mud-drum. When the feed-water is shut off by turning cock *d*, a vacuum is at first produced by the sinking of the water to the overflow-level of the trap, and this would generally result in the water being blown out of the trap if no means were taken to prevent it; but this is obviated by valve *h*, which is lifted from its seat by the pressure of the steam in the steam-space of the boiler, and permits the entrance of steam into vertical pipe *e* until the pressure is equalized. The same effect would also be produced when the feed-water was again turned on and the steam condensed in the vertical pipe, if the valve *h*, or a like device, were not employed.

I distinctly disclaim "flash-boilers" and subject-matter pertaining thereto; but,

Having thus described the nature of my invention, means for carrying the same into

effect, and the advantages thereof, what I claim, and desire to secure by Letters Patent, is—

In ordinary steam-boilers, or such as are constructed to contain the body of water from which the steam is to be generated— 1. The method herein described of supplying the feed-water, the same consisting in introducing the water in a finely-divided state, or spray, into the steam-space of the boiler, away from the fire-surface, and at a point near the mud-drum: 2. In combination with the boiler, a trap

spray-feed pipe arranged in the steam-space, substantially as specified: 3. In combination with the trap spray-feed pipe of a steam-boiler, the equalizing-valve, substantially as and for the purpose specified.

In testimony whereof I, the said WILLIAM E. RUSSELL, have hereunto set my hand.

WILLIAM E. RUSSELL.

Witnesses:

JAMES I. KAY,
F. W. RITTER, Jr.