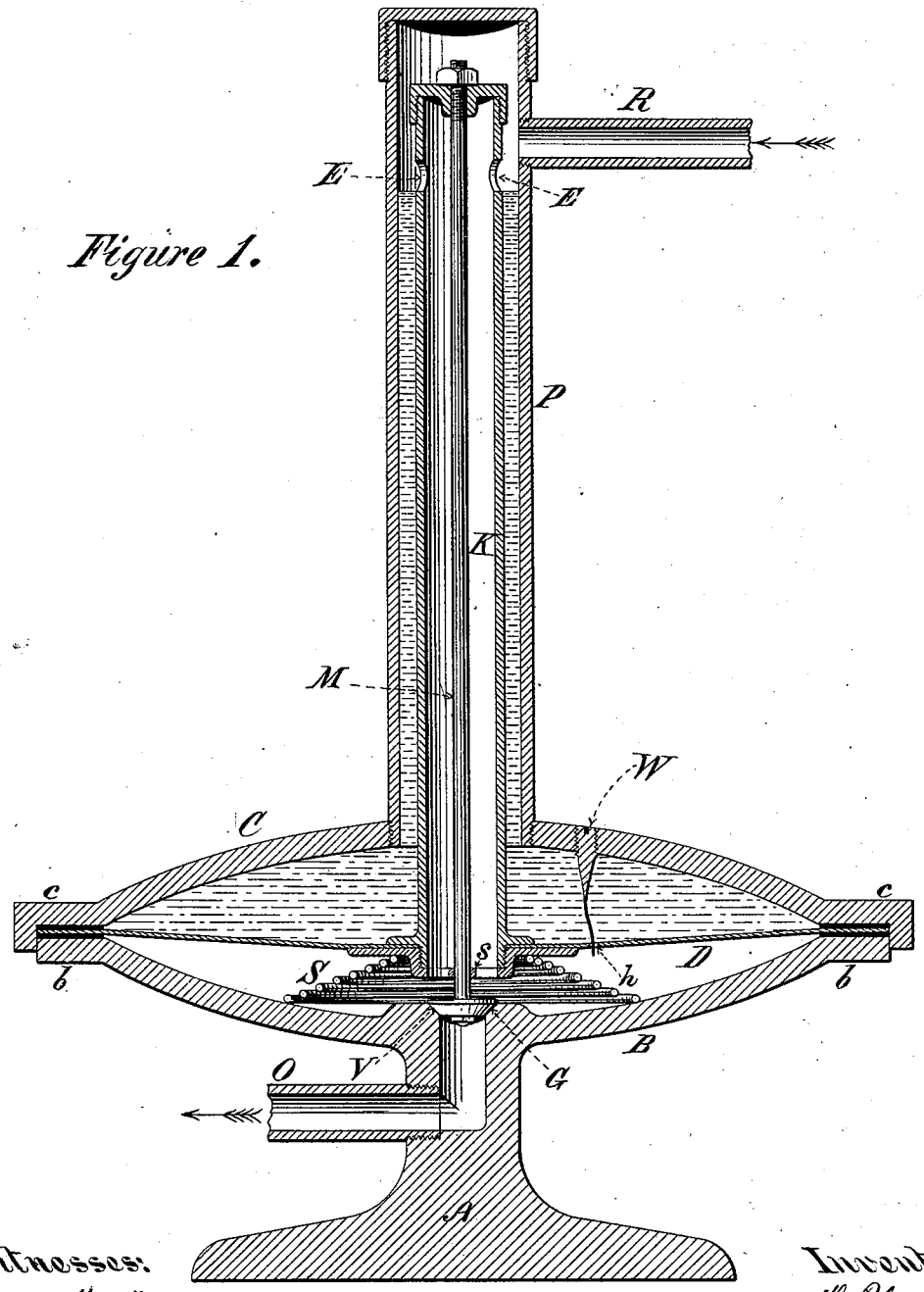
J. H. BLESSING.

Drain-Trap.

No. 207,482. Patented Aug. 27, 1878.

Figure 1.



Witnesses:
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Geo. H. Evans

Inventor:
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By his Attorney
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2 Sheets—Sheet 2.

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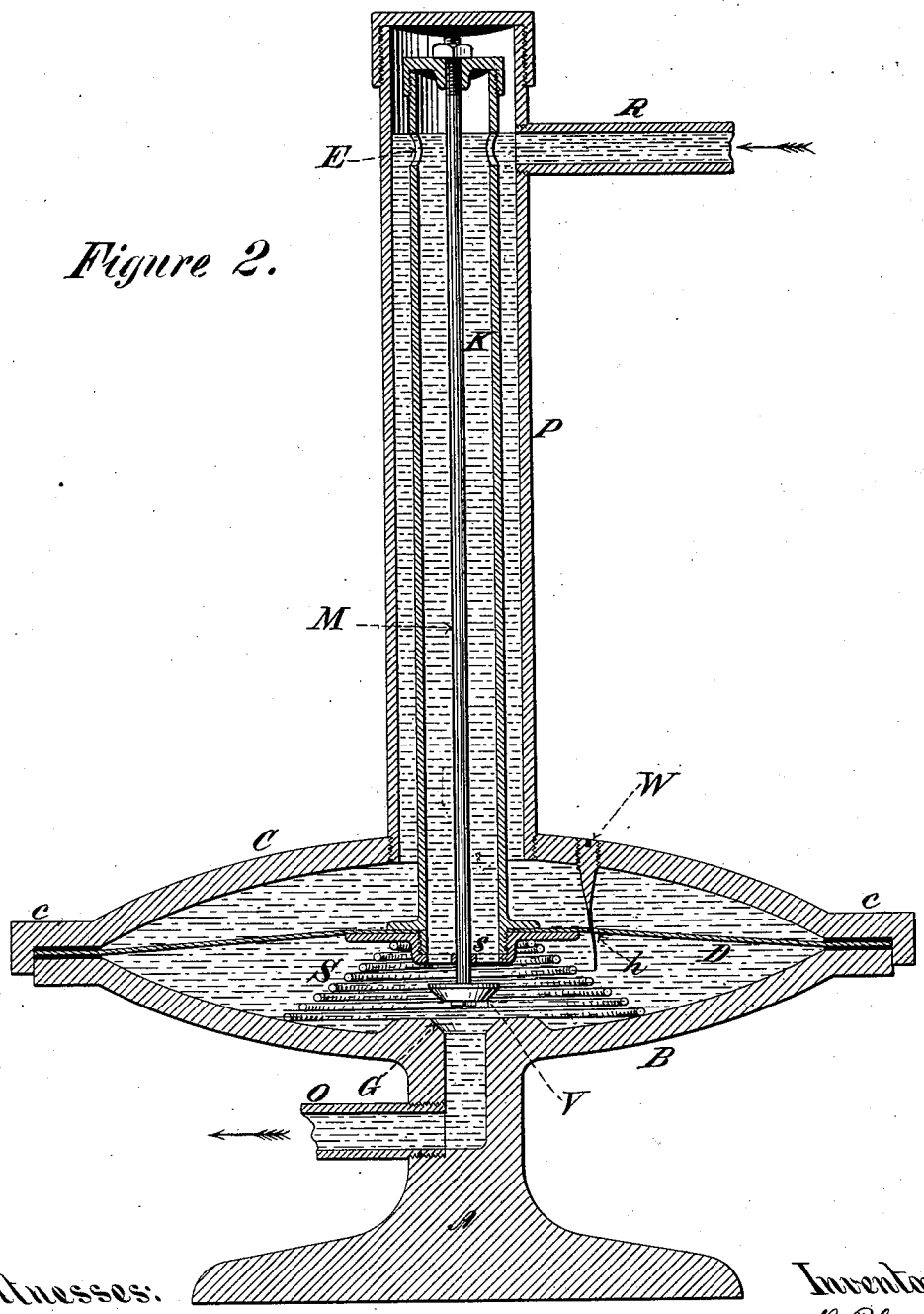
Figure 2.



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UNITED STATES PATENT OFFICE.

JAMES H. BLESSING, OF ALBANY, NEW YORK.

IMPROVEMENT IN DRAIN-TRAPS.

Specification forming part of Letters Patent No. **207,482**, dated August 27, 1878; application filed December 29, 1877.

To all whom it may concern:

Be it known that I, JAMES H. BLESSING, of the city and county of Albany, and State of New York, have invented a new and useful Improvement in Drain-Traps, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

My invention is specially applicable to apparatus by means of which buildings are heated by steam, and in which no direct return to the boiler is provided. It has been found to be a matter of great difficulty to maintain a continuous circulation through the heating-coils of a house back to the boiler. Therefore, in many cases, no attempt is made to return directly to the boiler the water condensed in the coils; but such water is allowed to drain into a tank or hot-well, whence it is pumped back into the boiler by means of a force-pump. Wherever apparatus of this kind is employed it is obviously necessary that only the condensed water escapes into the hot-water tank, and that the following steam be shut off; otherwise there would be a free passage for the steam through the coils and to the external air.

The object of my invention is to allow the condensed water to pass into the hot-tank, from whence it is returned to the boiler, and to prevent the escape of any steam. This I accomplish by means of the floating-power of water acting upon a diaphragm, which diaphragm controls a valve, through which the condensed water passes to the hot-tank.

My invention can be readily understood from the accompanying drawings, in which Figure 1 represents a vertical cross-section through my apparatus, showing the drain-valve closed. Fig. 2 is the same view showing the drain-valve open.

B and C represent two flanged saucer-shaped vessels, of which the lower one, B, is provided with the stand A, and with the drain-pipe O, closed by the valve V. Tapped into the upper vessel, C, is the stand-pipe P, closed at its upper end, near which the return-pipe R enters it. This return-pipe R is connected with the return from the coils.

Packed between the flanges of the vessels B and C is the diaphragm D, attached to the center of which is the pipe K, which is concentric with the pipe P. The pipe K is attached to the diaphragm by means of collars or flanges above and below said diaphragm, as is clearly shown by the drawings. Attached to the pipe K by means of the stem M is the valve V, which enters the seat G, formed in the vessel B, so that the rising and falling of the diaphragm D cause the valve V to open and close. As here shown, the lower end of the valve-stem M is supported in a skeleton or support, *s*, whereby the valve V is maintained central in respect to the rest of the apparatus.

Surrounding the valve V, and bearing against the vessel B beneath, and the collar beneath the diaphragm D above, is the coiled spring S, which spring more than counterbalances the weight of the diaphragm D, pipe K, and connections, and, in case the apparatus is emptied of water, will open the valve and elevate the diaphragm to the position shown in Fig. 2.

Pierced through the diaphragm D, which I prefer to make of Muntz metal, is a small perforation, *h*. Through this hole or perforation *h* is passed a flexible wire, W, which is attached to the vessel C. By means of this wire W the perforation *h* is kept free and clear, since the elevation or depression of the diaphragm forces the wire W through the perforation and removes from it any dirt which may have lodged therein. The use of the perforation *h* will be presently explained. Passing through the upper part of the pipe K are the perforations or holes E.

The course of the entering water is indicated by the arrows.

The operation of my machine can now be understood. Water enters the apparatus by means of the pipe R, connected with the coils, and fills, first, the annular space between the pipes K and P, above the diaphragm D, when the apparatus is in the position shown in Fig. 1. Then, continuing to flow in, it passes through the port E, and fills the space below the diaphragm D and within the pipe K. Then the apparatus comes into the position shown in Fig. 2. The diaphragm D is now in equilibrium, there being two equal columns of water, one tending to depress and the other to elevate. Therefore the spring S elevates it, thereby opening the valve V, when the water from the return can

pass freely through the pipe R, port E, and pipe K, past the valve V, through the pipe O, into the hot-water tank, and the valve V will continue open so long as water continues to enter the pipe R. But suppose that water should cease to flow through said pipe and that steam should follow it, then the pipe K, being empty or partially emptied of water, the water without said pipe and between it and the pipe P will press upon the upper surface of the diaphragm D, and compress the springs S and close the valve V, thus preventing any escape of steam; and the valve V will only open after water has again filled the space below the diaphragm D and raised the level in the pipe K to such a point that the water below the diaphragm D, together with the spring S, will raise said diaphragm. In case, however, air was present in the radiator and filled the pipe K and space below the diaphragm D, such air would evidently prevent the entrance into the apparatus of any more water until such air was removed. I accomplish the removal of this air in the following way: Suppose the apparatus to be in the position shown in Fig. 1, water without the pipe K and air within it. Then it is obvious that no water can enter through the pipe R, and the valve V being closed, it could not escape beneath. It becomes necessary, therefore, to open the valve V, so that the contained air can escape through the pipe O and water again fill this space. This result is accomplished by means of the perforation *h*. This perforation allows the water contained between the pipe K and the pipe P to gradually fill the space below the diaphragm D, until at length the level of the water without the diaphragm and within is nearly the same, when it is obvious that the spring S will raise the diaphragm D and open the valve V, when the air within the apparatus will escape through the pipe O. Water will once more enter the apparatus through the pipe R, and the operation of the apparatus will recommence.

It will be observed that the passage of the water through this apparatus is in a direct line, which insures certainty and rapidity of operation.

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

1. A drain-trap constructed substantially as described, operated by means of a rising and falling floating diaphragm, adapted to close a valve when water ceases to flow into the trap, and open it on the access of more, substantially as described.

2. A drain-trap provided with a float or diaphragm operating an escape-valve, and constructed substantially as described, which allows the escape of water and air, but prevents the escape of steam.

3. A drain-trap provided with a rising and falling diaphragm, D, to which a drain-valve, V, is attached, which diaphragm is counterbalanced by means of a spring, S, substantially as described.

4. A drain-trap provided with a rising and falling diaphragm, D, operating the valve V, and having the equalizing-perforation *h*, substantially as described.

5. A drain-trap provided with a rising and falling diaphragm, D, having the perforation *h*, through which perforation the clearing apparatus W operates, substantially as described.

6. A drain-trap provided with a rising and falling diaphragm, D, and the two water-chambers, one above and one below such diaphragm, whereby the entering water elevates the diaphragm D, while the following steam allows the water within the upper vessel to close the drain-valve V, substantially as described.

JAMES H. BLESSING.

Witnesses:
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