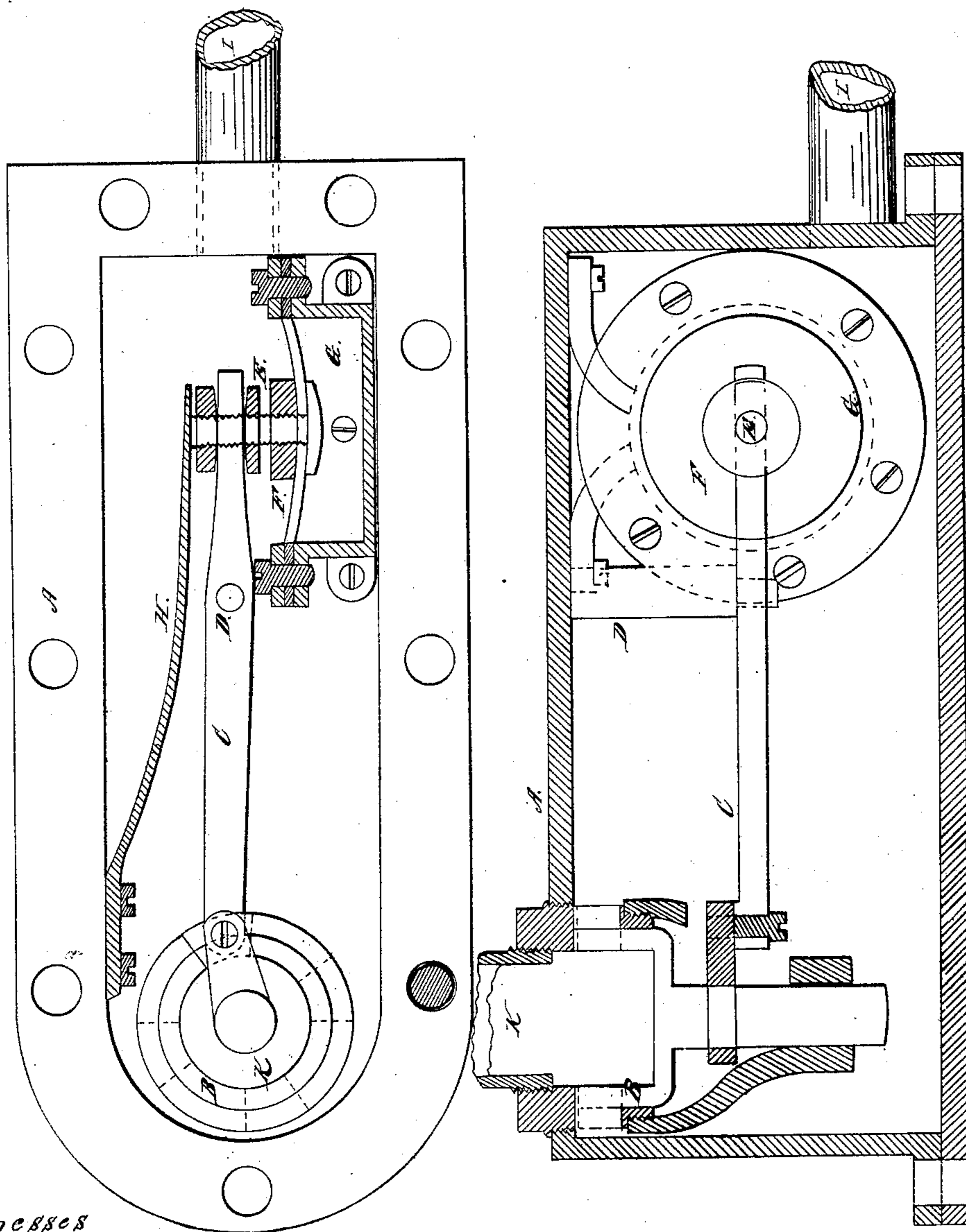


J. W. Hoard,

Steam Trap.

No 21,472,

Patented Sep. 7, 1858.



Witnesses

*J. S. Tappan
& Clark*

Inventor:

J. W. Hoard

UNITED STATES PATENT OFFICE.

J. W. HOARD, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO HIMSELF AND G. B. WIGGIN,
OF SAME PLACE.

STEAM-TRAP.

Specification of Letters Patent No. 21,472, dated September 7, 1858.

To all whom it may concern:

Be it known that I, J. W. HOARD, of the city of Providence, county of Providence, and State of Rhode Island, have invented a new and Improved Steam-Trap Valve; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, representing the same and making part of this specification.

This invention consists in a certain combination with the outer case or chamber A of a mercury holder—diaphragm—lever—valve—and openings.

To enable others to make and use my invention I will proceed to describe its construction and operation.

A, represents the outer case; B, a rotary valve; C, a lever attached to the valve, and also to the diaphragm by a rod or bolt.

D, is the fulcrum, to which the lever is attached.

E, is the bolt or rod connecting the lever with the diaphragm.

F, is the diaphragm.

G, is a mercury holder; H, a spring to force the diaphragm back as the mercury cools.

I and K are the inlet and outlet.

The operation is as follows: When the steam from the boiler first enters the steam pipes the cool surfaces of the pipes cause a considerable amount of condensation and the water of condensation in the descending pipes running down into the chamber A escapes through the openings in valve B. But as soon as the pipes become heated sufficiently to prevent condensation the steam reaching the chamber A, and surrounding the mercury holder G, heats its liquid contents and causes their expansion to such a degree as to exert a force sufficient upon the diaphragm to move the lever C, which closes the valve B and thus prevents the escape of steam. When steam is no longer generated in the boiler, or when at any time condensation takes place in the pipes, the water of

condensation reaching the mercury holder G, cools its contents and causes its contraction to such a degree as to enable the spring H, to force the diaphragm back, and thus open the valve, and permit the escape of the water.

In the patents granted to John Avery, Jr., in April, 1857, and to J. W. Hoard in May, 1858, the diaphragm is the valve,—or closes directly against the inlet pipe. In Avery's and Hoard's machines referred to, after they commence work in the morning, the actual falling away or dropping of the diaphragm caused by the cooling of the liquid is very slight indeed, and in the passage of steam and water through the circulating pipes, there is always more or less foreign matters, such as hard pieces of red lead, iron scales, &c., which in passing through get wedged between the diaphragm and inlet pipe of Avery's and Hoard's trap valves, and causes a continuous leak of steam. Now by my improved arrangement as will be seen by reference to the drawings a slight movement of the diaphragm caused by the expansion of the liquid in the mercury holder will move the lever sufficient to always open wide the valve, the capacity or openings of which will be sufficient to free it from all foreign matter.

This trap valve is very simple in its construction and is found in practice to be certain in its operation, and not liable to get out of order.

I make no claim to any of the parts separately. But

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

The combination with the outer case, or chamber A of the valve B, lever C, diaphragm F, mercury holder G, and openings I and K, constructed and operating as above described, for the purpose set forth.

J. W. HOARD.

Witnesses:

HENRY MARTIN,
ALBERT M. HEWITT.