H. MITCHELL.

Steam-Trap.

No. 224,600. Patented Feb. 17, 1880.

Fig. 1.

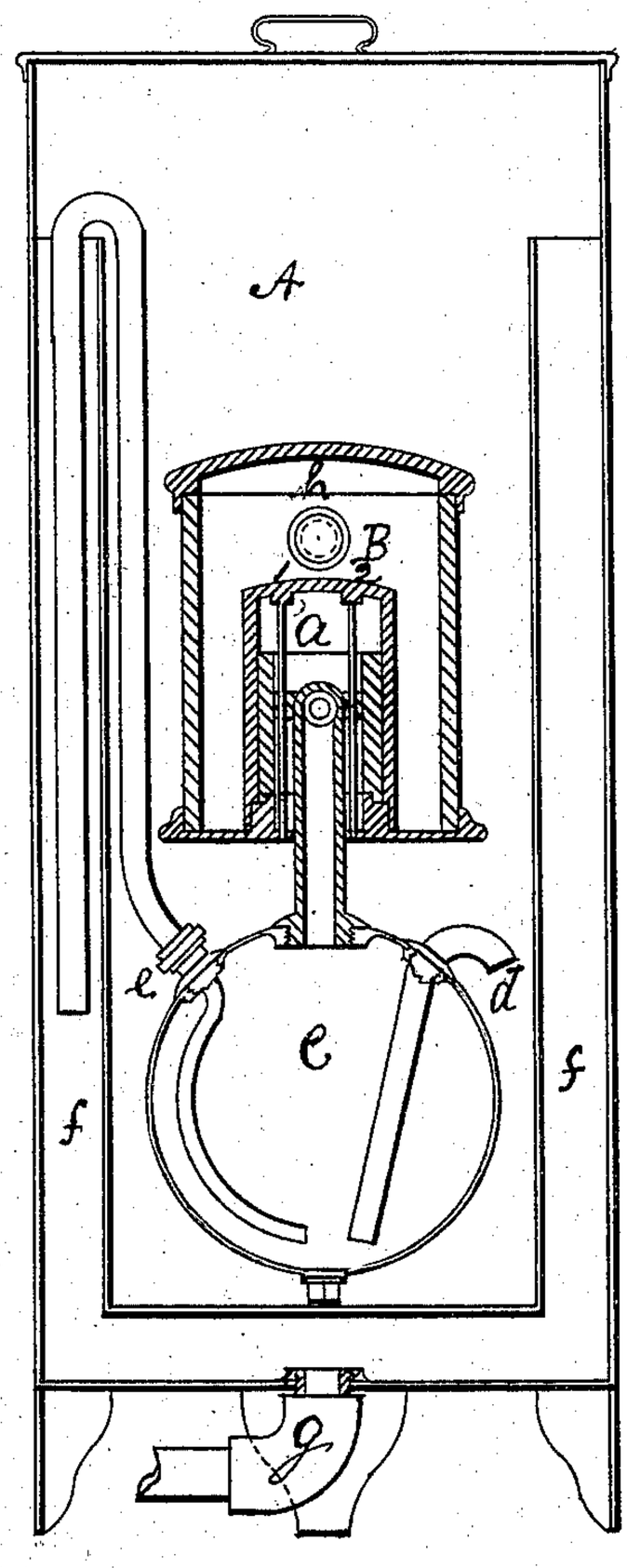
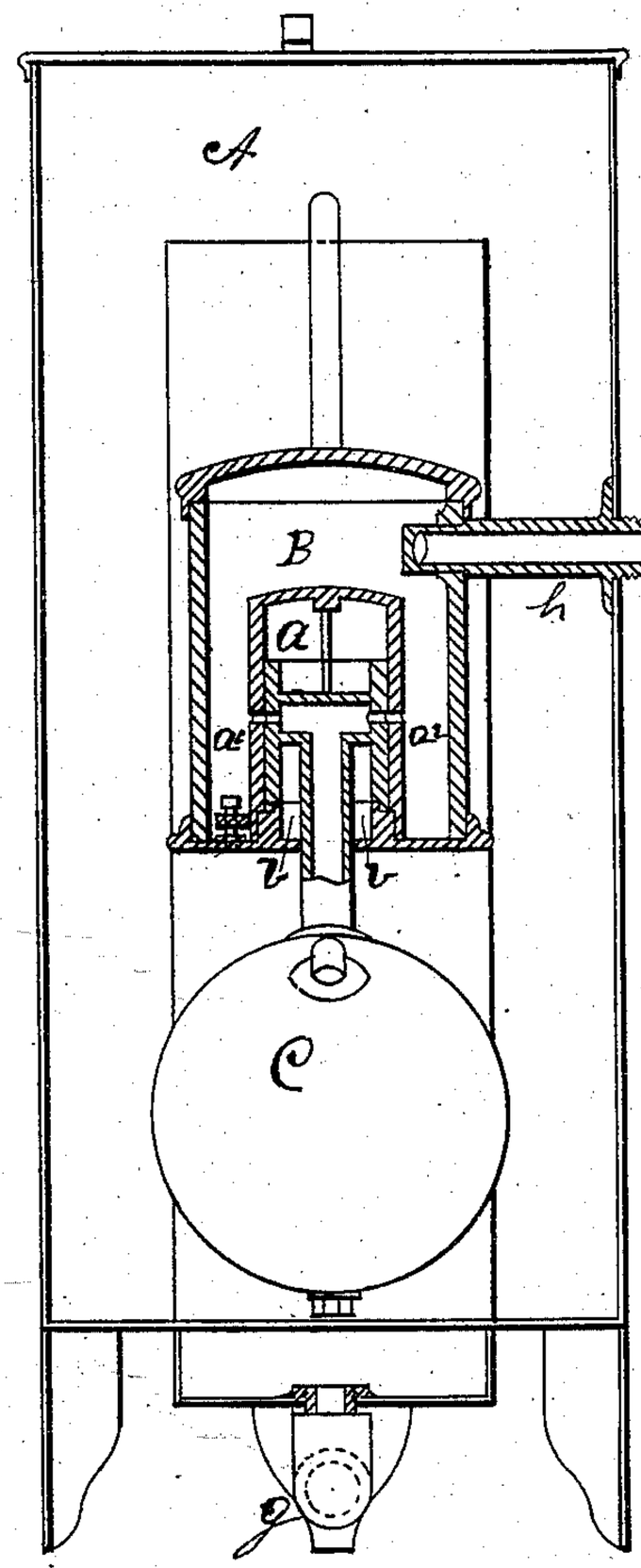


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY MITCHELL, OF PATERSON, NEW JERSEY.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 224,600, dated February 17, 1880.

Application filed May 3, 1879.

To all whom it may concern:

Be it known that I, HENRY MITCHELL, of the city of Paterson, county of Passaic, and State of New Jersey, have invented a new and useful Improvement in Steam-Traps, of which the following is a specification.

The object of my invention is to provide a steam-trap constructed so as to procure equal expansion of the valve on all sides; and the invention consists in a hollow slide-valve which is arranged in a metal case. The valve and case encircling the valve have corresponding steam-ports to admit the steam and water of condensation through the valve to a metal ball which is located directly under the valve, and with which the stem of the valve connects. The valve, being cylindrical in form, is kept from turning by two wires, which run through a flange on the lower end of the valve, the wires being fastened at the bottom to a plate that is screwed on a plate on the bottom of the steam-chest.

The valve is located in the steam-chest, it being secured to the bottom plate of the steam-chest, and works therein. The steam-chest is held in position in a water-tank by a supply-pipe which is secured to the side of the water-tank, in which all are arranged.

The space between the outer case of the valve is open and unobstructed, so as to let the steam and water of condensation circulate freely all around the valve-case, whereby equal expansion is secured to all sides of the valve. The valve expands agreeably with the expansion of the valve-case under the influence of the steam and water of condensation encircling the valve-case in the steam-chest. Thus all the parts expanding equally secures to the valve greater uniformity of action with greater certainty of its performing its functions by its being entirely free from obstructions, which would be otherwise if equal expansion of the parts were not secured; and the invention further consists in a metal ball to which the stem of the valve is connected by being screwed therein. The ball, being located under the valve, works the valve. The ball is provided with two pipes that are screwed therein. The pipes are curved at the outer ends, the short curved pipe being an ingress and egress pipe, while the long curved one is an overflow and vent pipe.

The long curved pipe is arranged in overflow-tubes arranged on each side of the water-tank, into which tank the trap is arranged. In the bottom of the water-tank there is arranged a discharge or waste pipe, by which the water is discharged from the ball through the tubes on the tank into which the long curved pipe is arranged. The overflow-tube conducts the water of condensation to the discharge or waste pipe, by which the water may be conducted away by attaching thereto a pipe for that purpose.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a front view, showing the general arrangement of pipes, &c. Fig. 2 is an end view, showing the manner of connecting the steam-chest with the water-tank by means of supply-pipe.

A indicates the water-tank. B indicates the steam-chest; *a a*, valve. 1 and 2 are wires, which pass down through the valve to keep the valve from turning. *b b* indicate the chamber formed between the valve-case and steam-chest for the circulation of steam and water of condensation. *c* indicates the ball. *d* indicates the ingress and egress pipe. *e* indicates the overflow and vent-pipe; *f f*, overflows in the tank. *g* indicates the discharge or waste pipe. *h* indicates the supply-pipe. *a'* a^2 indicate steam-ports.

The operation of my device is as follows: The water of condensation and steam from the pipes enter the stem-chest B through the pipe *h*, enter the ports *a'* a^2, and are conducted through the valve *a* to the ball *c*, and when the pipe *d* has inducted sufficient water into the ball *c* from the tank A to cause the ball *c* to sink and the valve *a* to slide down, and the port in the valve to present itself opposite the ports *a'* a^2, the steam enters and expels the water from the ball *c*, and as soon as the water is expelled from the ball *c* the same becomes light and buoyant and rises and forces the ports in the valve *a* past the ports *a'* a^2 in the valve-case, thereby preventing the further escape of steam until the ball *c* becomes again charged from the ingress-pipe *d*, which is al-

ways below the water-level in the tank A, as shown in Fig. 1. The overflow or vent pipe being arranged in one of the overflow-tubes *f f* in the tank A, as seen in Fig. 1, gives free vent for the speedy induction of water from the tank A through the ingress-pipe *d* into the ball *c*.

By this method the ports are presented for the action of the water and steam every few seconds, securing thereby a reliable automatic action without the escape of steam, except what is sufficient to expel the water from the ball *c*, as before stated. The vent-pipe *e* also acts as a siphon, which, when the steam is turned off and the trap placed lower than the lowest point of the steam-pipes, will siphon or conduct the water of condensation which may run from the pipes into the ball *c*, also all of the water from the tank A down to the mouth of the egress-pipe *d*, acting thus as a guard against freezing by leaving plenty of space for expansion in the tank and ball. The overflow-tubes *f f* conduct all the water from the ball to the waste-pipe *g* after it has been expelled from the ball by the action of the steam, as before stated, or when siphoned out by the overflow or vent pipe *e*.

What I claim as new, and desire to obtain by Letters Patent, in a steam-trap, is—

1. The hollow slide-valve *a*, the valve being provided with wires 1 and 2, which keep the valves from turning, the valve having a case encircling it, the valve and case having corresponding steam-ports, through which the steam and water of condensation pass to the ball *c*, in combination with the steam-chest B, secured to tank A by pipe *h*, substantially as and for the purpose set forth.

2. The combination of the ball *c* and valve *a*, the ball being provided with pipes *e* and *d*, with the tank A, the tank having overflow-tubes *f f* and waste-pipe *g*, substantially as and for the purpose set forth.

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Witnesses:
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