T. Sault,

Steam Trap,

No 27,343 Patented Feb. 28, 1860.

Fig: 1.

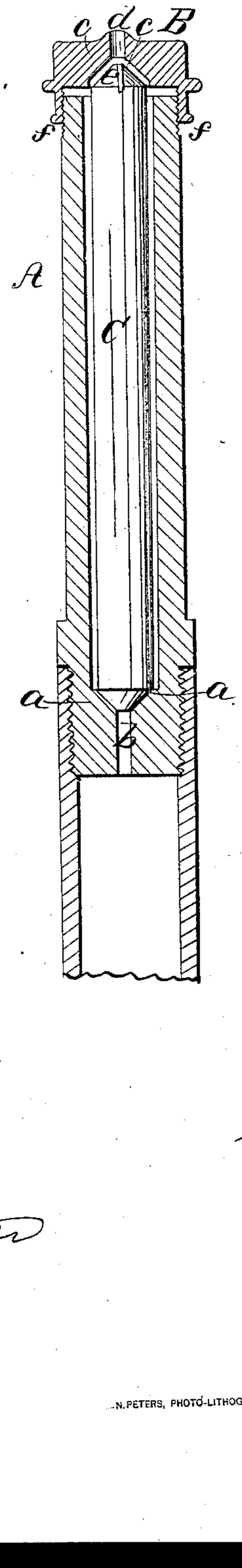
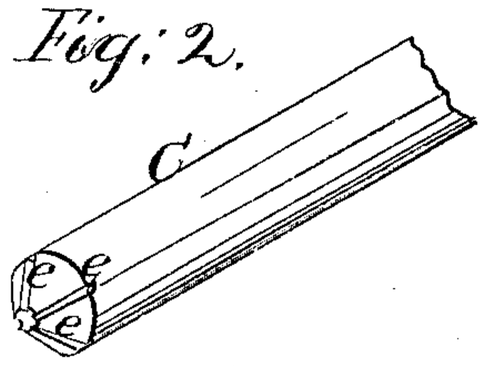


Fig: 2.



Witnesses;

J. W. Coombs

R. S. Spencer

Inventor;

T. Sault

by

Munn & Co

attys

UNITED STATES PATENT OFFICE.

THOMAS SAULT, OF SEYMOUR, CONNECTICUT.

AIR-TRAP FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 27,313, dated February 28, 1860; Reissued March 24, 1863, No. 1,441.

To all whom it may concern:

Be it known that I, THOMAS SAULT, of Seymour, in the county of New Haven and State of Connecticut, have invented a new and Improved Air-Trap for Steam Apparatus; 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, forming a part of this specification, in which—

Figure 1 is a central section of my improved air trap. Fig. 2 is a perspective view of a portion of the valve.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists in a valve of hard vulcanized india rubber, so applied within a box, of metal or other material attached to a radiator for heating a building or apartment, or to any apparatus heated by steam, as to provide, by the agency of its vastly greater capability of contraction and expansion, with changes of temperature, as compared with the metal, or material of which the box is made for the escape of any air that may have collected within the steam space before it has been filled with steam, or when the steam has condensed therein, but to prevent the escape of steam therefrom.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, is the valve box, consisting of a long cylinder of cast iron or other metal attached at its lower end to the steam pipe or radiator, or other steam heating apparatus, and provided at its upper end with a cap B, which is screwed on to a screw thread *f*, cut on the exterior. In the bottom of the said box, there is a hollow conical seat *a*, terminating in an orifice *b*, which forms a communication with the steam space, and in the cap B, there is a similar seat *c*, terminating in an orifice *d*, which forms a communication with the atmosphere.

C is the valve consisting of a long cylinder, or spindle like piece of what is known as hard vulcanized india rubber or vulcanite, having its external diameter, smaller than the internal diameter of the box A, and having its ends formed like the faces of conical or puppet valves to fit respectively the two seats *a*, and *c*. The upper end or face of the said valve, is provided with a series of radial grooves *e*.

The operation of the valve C is as follows: The cap B having been so adjusted on the screw thread *f*, of the box, while the box and valve are cold as to leave a little play, say about one sixtieth (1/60) of an inch or more or less according to its length; between the valve and the two seats *a*, and *c;* when steam is generated in the boiler, and rises into the steam space, it drives the air before it toward the valve C, and such air only having a small surface exposed to the steam cannot be quickly heated thereby and therefore cannot quickly cause the expansion of the valve, but is forced by the pressure of the steam, against the valve and caused to lift the latter, which is very light, from its seat *a*, and hold it against the seat *c*, and hence the air is allowed to pass through the orifice *b*, between the seat *a*, and the lower end or face of the valve, up between the sides of the valve and box, and through the grooves *e*, *e*, of the upper face of the valve to the orifice *e*, and thence to the atmosphere, but when all the air has been expelled, and steam enters the box, the valve becomes quickly heated, and notwithstanding that the box is heated also, the valve, owing to the greater expansive property of the substance of which it is composed, soon increases so much in length as to fit tightly between the two seats *a*, and *c*, thus closing the orifice *b*, and shutting in the steam. When steam goes down again, the valve contracts lengthwise, more than the box, and so provides for the expulsion of air when the steam begins to rise again.

In radiators of some constructions, it is desirable to admit air to prevent them collapsing by the formation of a vacuum when they cool and the steam condenses within them; and in applying my air trap to admit air to such radiators, the grooved end of the valve should be downward, so that when the valve is loose and rests on its lower seat *a*, air may pass the said seat to enter the orifice *b*. In such case when the valve is expanded by the heat of the steam, it closes tightly in the seat *c*, but in this application of the trap, it will only serve to admit air and not provide for its escape unless made heavy enough to overcome the pressure of the steam.

The advantage possessed by this air trap, consists in the very highly expansive and contractile property developed in hard vulcanized india rubber, as compared with almost all other substances under given changes of temperature.

The box A, instead of being made of metal, may be made of any other material which expands and contracts under the influence of changes of temperature, in a sufficiently less ratio than vulcanized india-rubber. I have contemplated making the box of glass, which I believe to be very suitable for the purpose.

I, do not claim broadly, the use in an air trap of a valve operating by expansion and contraction, under changes of temperature. But

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

The air trap composed of a valve of hard vulcanized india-rubber, constructed and applied to operate substantially as described between two opposite seats and orifices, in a box of metal or other material whose expansibility by heat is less than that of the valve.

THOS. SAULT.

Witnesses:
C. B. Holland,
Saml. L. Bronson.