(No Model.)

N. CURTIS.

STEAM TRAP.

No. 253,985. Patented Feb. 21, 1882.

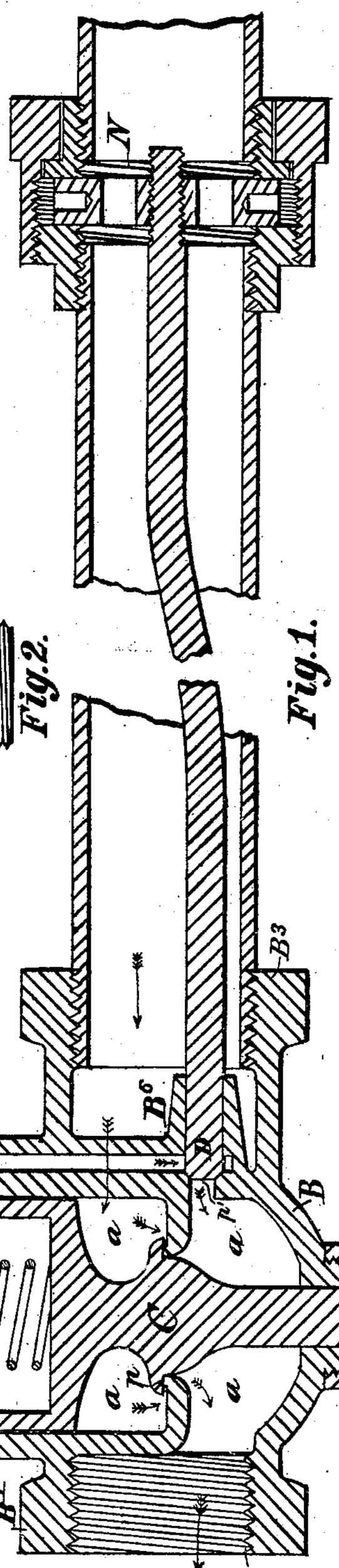

Fig. 1.

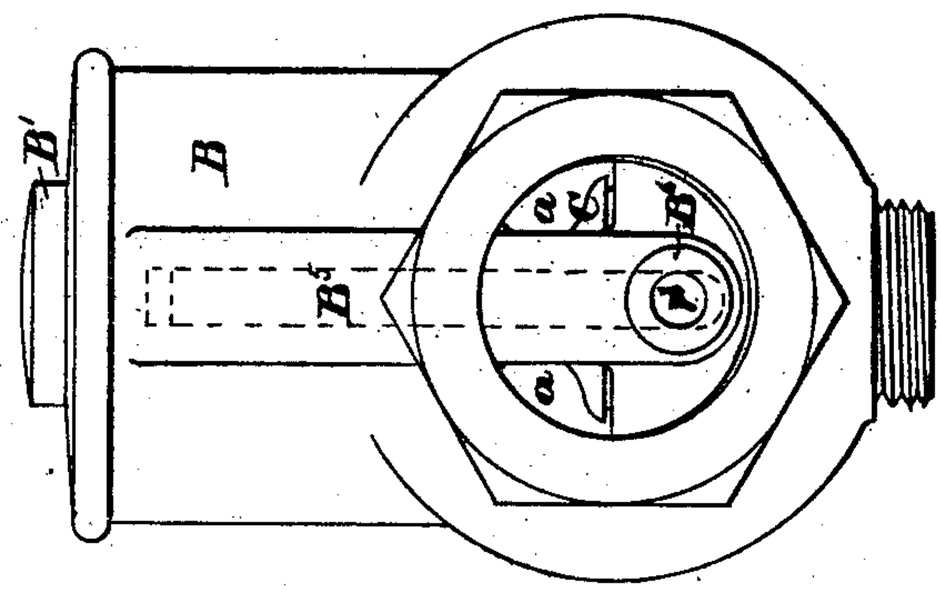

Fig. 2.

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UNITED STATES PATENT OFFICE.

NELSON CURTIS, OF NEWTON, MASSACHUSETTS.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 253,985, dated February 21, 1882.

Application filed December 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, NELSON CURTIS, of Newton, in the State of Massachusetts, have invented a new and useful Improvement in Steam-Traps, of which the following is a specification.

The invention consists in the combination of a discharge-passage and a piston-valve therein, a smaller passage connecting the two portions of the said discharge-passage which lie on either side of the port of the said piston-valve, and a thermostatic valve in said smaller passage, in combination with a steam-tight metallic water-chamber, the said valves and passages being arranged, substantially as shown, so that the piston-valve will open when the thermostatic valve opens and close when the thermostatic valve closes, and the stem of the thermostatic valve being connected with the walls of the water-chamber in such manner that the valve is operated by the difference in the rates of expansion of the metal of the valve-stem and the metal of the walls of the water-chamber.

In the drawings, Figure 1 is a sectional elevation of apparatus embodying my said invention; and Fig. 2 is an elevation of a casting embodying my said invention in part, as will hereinafter appear.

A is the water-chamber, consisting in this instance of a long pipe adapted to receive steam and water from other pipes, and having a capacity for expansion longitudinally.

B is a casting, within which is a chamber, *a*, closed above and below by caps B′ and B². It has two hollow projections, B³ and B⁴, the former screwing upon the water pipe or chamber A and the latter adapted to receive an outlet-pipe. For the purpose of this description, however, these two passages, with the chamber *a*, may be considered as themselves forming the main passage through which water is to be allowed to escape, a wall, *w*, in the said chamber containing the main port *p* and affording a seat for the piston-valve C, whose stem extends through the port *p* and into the cap B², as shown. The acting areas of the valve-port and of the piston are proportioned substantially as shown. The piston fits loosely in the chamber *a* to permit the passage of water and steam from its lower to its upper side. It is hollowed out above, as shown.

The casting B has at one side a flange, B⁵, within which is a narrow passage, *f*, connecting that part of the chamber *a* which lies above the piston with that part which lies below the port *p*.

D is a thermostatic valve having bearings in a hole bored in a boss, B⁶, which projects from the flange B⁵ within the projection B³, and sliding across the lower end of the passage *f* to open or close a port, *p′*, at the lower entrance of the passage *f* into the chamber *a*. The areas of the passage *f* and port *p′* are greater than that of the aperture formed by the loose fit of the piston in chamber *a*.

The stem of the thermostatic valve *p′* in the apparatus shown is of one piece with the said valve, but might be made of a separate piece of metal. Its free end is screwed into a perforated adjusting-nut, N, which is at the farther end of the water-chamber A and forms a packing for a union-joint, by which the said water-chamber is connected with the steam system to which it belongs. The stem of the valve D is made of metal which expands and contracts to a much greater degree than the walls of the water-chamber A under the same increase and decrease of temperature.

A spring, S, in the apparatus shown tends to keep the piston-valve closed; but the piston-valve may be of sufficient weight to do away with the need of a spring.

When the apparatus is not in use the piston-valve C is normally closed, but it is normally open when there is sufficient steam in the pipes with which the apparatus is connected to make it desirable to use the trap. The valve D is also normally open, and so remains until there is sufficient heat in the water-chamber to close it by the expansion of the valve-stem. While the valve D is open, thereby reducing the pressure upon the top of the piston, the piston-valve C also remains open, and the condensed water in the water-chamber A flows freely through the port *p*; but when the temperature in the water-chamber A is high enough to close the valve D the pressure above the piston accumulates, and, there being an unbalanced area in the top of the piston, closes the piston-valve, and thereupon no water or steam escapes from the water-chamber A.

In the description thus far it has been assumed that the water-chamber A, containing

the stem of the thermostatic valve, is on the inlet side of the casting B, water and steam passing from the water-chamber into the casting; but it is obvious that the whole apparatus, including the water-chamber and the casting, might be turned end for end when connected with the steam system to which it belongs, and be used for the same purpose and with the same advantage, the water and steam then flowing from the casting B into the water-chamber.

I claim—

A main passage for steam or other fluid under pressure and a piston-valve therein, a smaller passage connecting the two portions of the main passage which lie on either side of the port of the piston-valve, and a thermostatic valve within said smaller passage, in combination with the steam-tight water-chamber of a steam-trap, the stem of the thermostatic valve extending into and connected with said water-chamber, substantially as described, for the purpose specified.

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