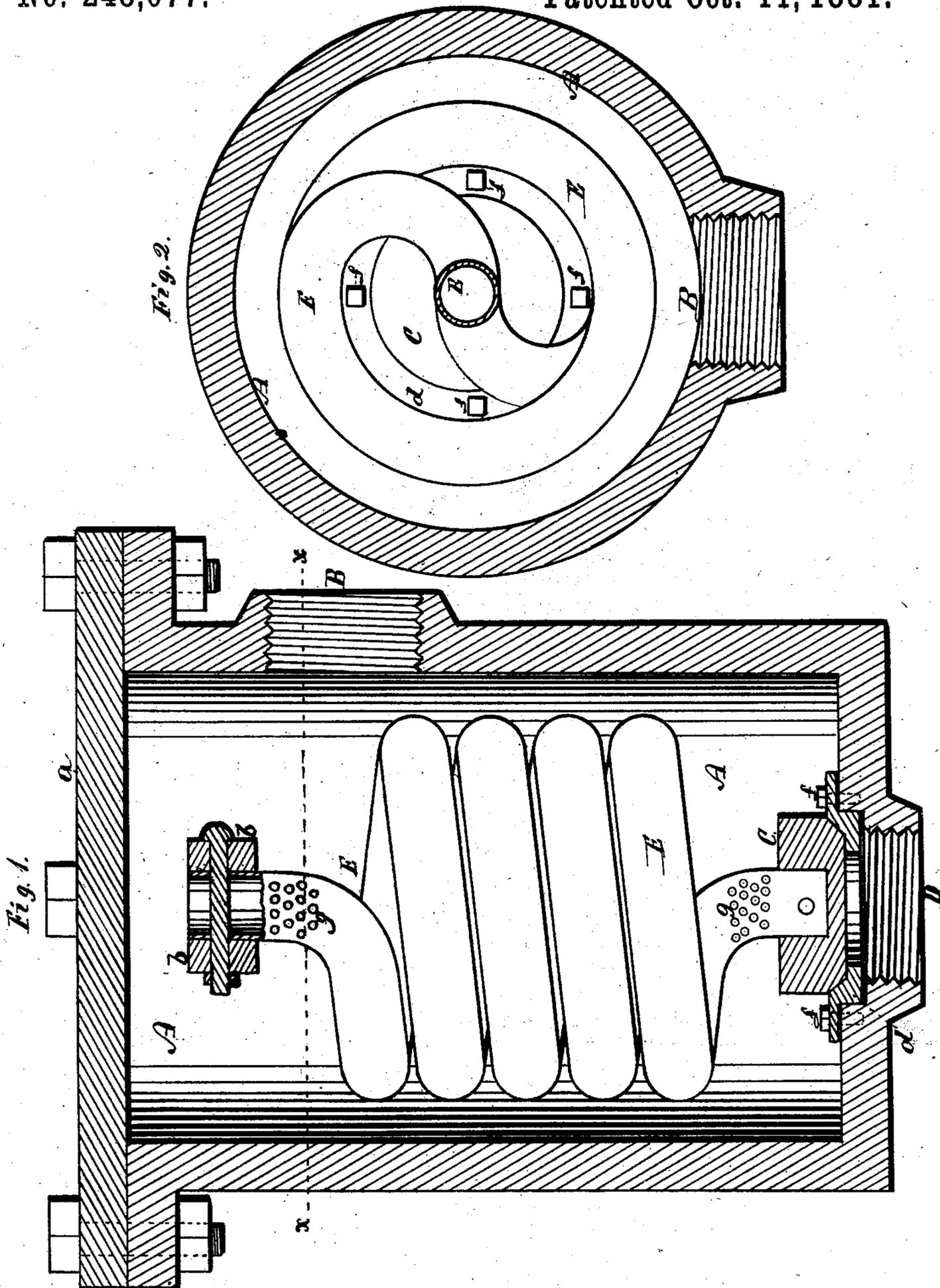


(No Model.)

W. O. WHITE.
STEAM TRAP.

No. 248,077.

Patented Oct. 11, 1881.



WITNESSES
S. C. Day
James Wright

INVENTOR
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UNITED STATES PATENT OFFICE.

WILLIAM O. WHITE, OF LAKE VILLAGE, NEW HAMPSHIRE.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 248,077, dated October 11, 1881.

Application filed April 2, 1881. (No model.)

To all whom it may concern:

Be it known that I, W. O. WHITE, of Lake Village, in the county of Belknap and State of New Hampshire, have invented an Improved Steam-Trap; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a central vertical section of the improved steam-trap; Fig. 2, a horizontal section thereof in a plane indicated by the line *x x*, Fig. 1.

Like letters designate corresponding parts in both figures.

In the drawings, A represents a closed hollow cylinder, or equivalent vessel, which forms the body of the trap. Into this vessel an inlet-passage, B, opens from the steam pipes or heater, from which the trap is designed to collect and discharge the water of condensation. In the bottom is a valve, C, which closes an outlet, D, to a pipe that carries away the water discharged from the trap. The containing-vessel A has a steam-tight cap, *a*.

My invention consists in a new means of automatically opening the valve C to discharge the water when it has collected in the vessel A to a certain height, and of again closing the valve as quickly as possible after the water has been discharged.

The principle on which my invention is based is that a metallic rod or tube will, when immersed in the water of condensation, have a lower temperature, and consequently will be shorter, than when it is in an atmosphere of steam, so that by using such a rod or tube of proper length sufficient expansion and contraction of the metal, and consequent lengthening and shortening of the rod or tube, will take place in the two different immersing mediums to alternately open and close the valve, as desired.

In order to secure the required length of rod or tube in a compact space, and capability of self-adjustment under greater or less variations of temperature in the vessel A, I prefer to apply it in the form of a spiral, E, though I do not confine myself to the spiral form, provided an equivalent is produced, though this form is the best now known to me. I apply this spiral substantially as shown in the drawings—that is, the lower end of the spiral is at-

tached to the valve C, and the upper end thereof is secured in any suitable way to a cross-bar, *b*, or other sufficient support in the upper part of the vessel A, so that when the spiral is contracted in length it will lift the valve C from its seat, and when it is expanded in length it will force the valve and hold it down on its seat *d*, which is, or may be, adjustable to the valve by one or more set-screws, *ff*. To make this spiral most efficient it should be tubular, with the walls thereof thin, so that it may quickly receive and give out the heat, and a metal, such as copper, which is a good conductor of heat is, of course, best. In addition to this I further increase the sensitiveness and quickness of action of the device by making small apertures *g g* through the walls of the tube, or the upper and lower parts thereof, so that the steam and water can circulate through the interior thereof, and act both on its inner and outer surfaces.

From the above description the operation of this spiral regulator is obviously inferred. It is so adjusted that before the water of condensation fills the vessel A the spiral will, by being immersed therein, be sufficiently cooled and shortened to raise the valve C from its seat and allow the water to escape through the pipe D. Then, almost instantly after the water has been expelled, the steam which rushes into the vessel to supply the place of the water so heats and expands the spiral tube as to again close the valve down upon its seat there to remain until the vessel is filled with water to the height which causes the lifting of the spiral and the valve.

Steam-traps have before been made composed of an outer tube of a less expansible metal and an inner tube of a more expansible metal for closing and opening a valve, the said tubes being straight. Such traps require not only tubes of metals differing in expansibility, but of very considerable length, to effect the purpose, and, moreover, they must have means for the yielding of the valve or the inner tube in case of excessive expansion; otherwise the apparatus will be broken.

By my invention the use of a coiled tube or rod enables me to make a very compact trap, as the operation does not depend on the length of the case; neither does it require different metals for the different parts; and what is of

great consequence, I require no yielding device to prevent damage from excessive expansion, the coiled tube itself yielding to any extent ever required; and I can obtain any amount
5 of expansion and variation by increasing the number or size of the coils. Moreover, the variation in expansion by the immersion of a whole coil at once is very rapid, both in the expansion and contraction.
10 I will further remark that a spiral tube has been used in connection with a steam-trap, the tube acting simply as a spring against the weight of the trap itself, which varies according to the amount of condensed water therein.
15 Such a spiral located outside of and not affected by the heat in the trap evidently operates on a principle entirely different from my invention.

What I claim as my invention, and desire to secure by Letters Patent, is— 20

1. A steam-trap composed of a close vessel, A, having a water-discharge valve, C, and an inclosed coiled pipe or rod, E, fixed at one end and bearing the valve C on the other end, operating substantially as and for the purpose
25 herein specified.

2. The combination, with the water-discharging valve C, of a perforated spiral tube, E, operating substantially as and for the purpose
30 herein specified.

The foregoing specification signed by me this 19th day of February, 1881.

WILLIAM O. WHITE.

Witnesses:

S. B. COLE,
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