(No Model.)

W. E. HALL.

STEAM TRAP.

No. 432,269. Patented July 15, 1890.

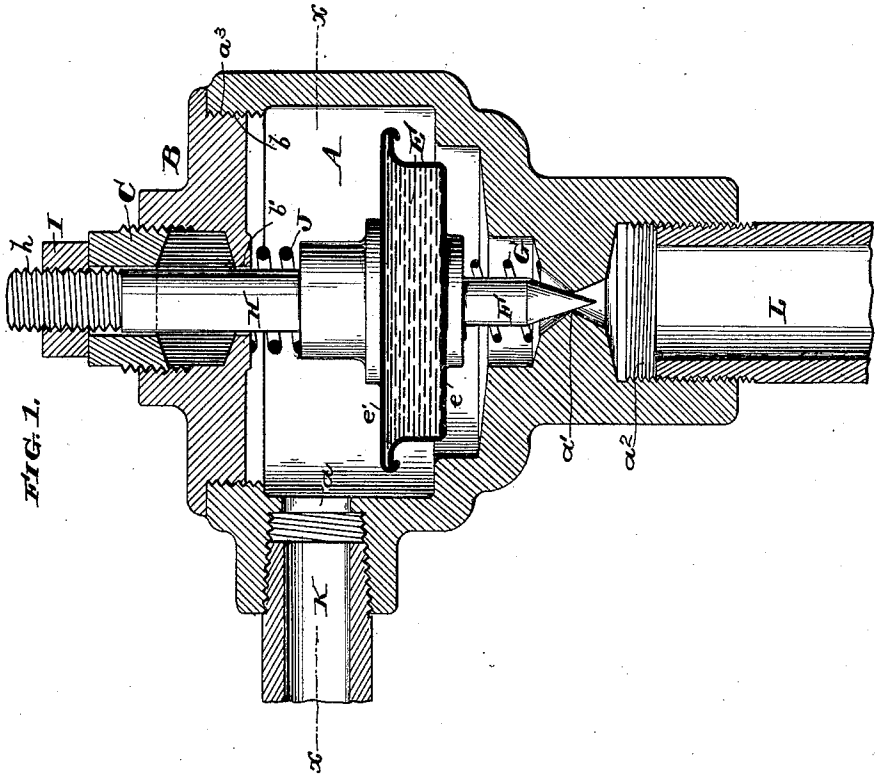

FIG. 1.

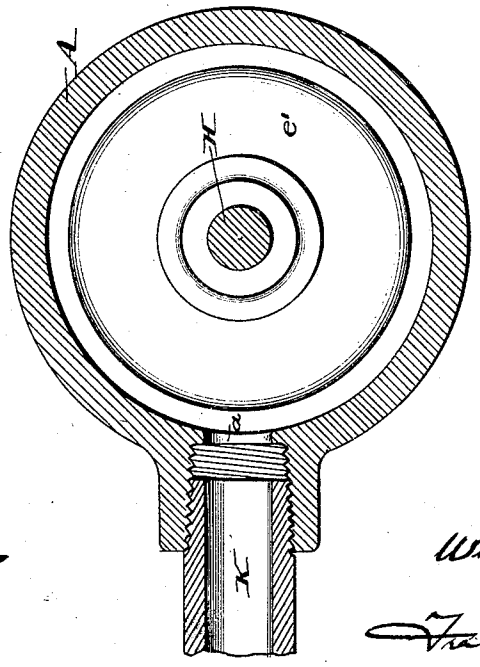

FIG. 2.

Witnesses:
Henry Bruns
Jesse Heller

Inventor:
Willis E. Hall
by his attorney
Francis T. Chambers

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIS E. HALL, OF ALTOONA, PENNSYLVANIA.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 432,269, dated July 15, 1890.

Application filed May 22, 1890. Serial No. 352,770. (No model.)

To all whom it may concern:

Be it known that I, WILLIS E. HALL, of Altoona, county of Blair, State of Pennsylvania, have invented a certain new and useful Improvement in Steam-Traps, of which the following is a true and accurate description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to steam-traps, and has for its object to provide a new steam-trap which will be sensitive in its operation, while at the same time it is simple and durable in its construction.

The nature of my invention will be best understood as described in connection with the drawings, and the novel features which I desire to protect by Letters Patent are hereinafter clearly stated in the claims.

In the drawings, Figure 1 is a central longitudinal section through my steam-trap, and Fig. 2 a cross-section on the line X X of Fig. 1.

A is the casing of the steam-trap, provided with an entrance-passage a and an outlet-passage a^2, a valve-seat a' being formed in the outlet-passage. The top of the casing A is open and internally threaded, as shown at a^3.

B is the lid or cover of the casing, externally threaded, as shown at b, so as to screw into the top of the casing, and formed with a passage b' through it.

C is a stuffing-box screwing into the top of the lid or cover B.

E is an elastic or expansible box, the top and bottom of which are formed of parallel elastic diaphragms e e', and which box is filled with some fluid which expands under the influence of heat. To the diaphragm e, which is situated above the outlet-passage of the casing, is screwed a valve F, extending down into the outlet-passage and adapted to seat itself at a'. To the upper diaphragm e' is screwed a spindle H, which extends through the perforation in the cover B, and is threaded at its upper end h.

I is a nut screwing on the end of the spindle H, and by which the said spindle and the expansible box E, attached to it, are adjusted in proper operative position, the said nut resting against the stuffing-box C, as shown in the drawings.

J is a spring arranged between the top or cover B of the casing A and the box E, or a projection from the spindle H, so that it will press the spindle and its connective box down as far as the stop-nut I will permit it to go.

G is a spring of lighter power than the spring J, which is arranged, as shown, between the bottom of the casing and the diaphragm e of the box E.

K is a pipe leading into the casing at a, and through which steam and condensed water enter the casing, and L is a pipe leading from the outlet-passage in the casing.

The operation of my steam-trap is as follows: The box E having been carefully adjusted in position, steam entering through the pipe K comes in contact with and surrounds the box E, heating its contents and causing it to expand so as to force the diaphragms e e' away from each other. The diaphragm e', being held in position by the spindle H and spring J, remains stationary, and the diaphragm e therefore moves down toward the outlet-passage, compressing the spring G and forcing the valve F down until it comes in contact with the valve-seat a' and closes the outlet-passage. Water from the condensation of the steam gradually fills the casing A, and as it rises around the box, the said water being colder than the steam, causes the box to contract and the valve F to be withdrawn from its seat, permitting the water to escape.

In its general character and mode of operation my improved steam-trap is very similar to many now in use; but by providing the spring J to hold the expansible box in position I overcome a defect existing in similar traps, and after the valve F is seated the further expansion of the box E takes place by an upward movement of the diaphragm e', the said upward movement being accompanied by the compression of the spring J. The use of this spring and of the stop-nut I in connection with it constitute the novel and improved features of my device. The spring G is useful in insuring the prompt opening of the valve, as it causes the diaphragm e to move up as rapidly as the fluid in the box E permits it to do so.

I have described the box E as having an elastic top and bottom e' e; but it must be understood that the particular construction

of this box is not of the essence of my invention. It is only necessary that it should be expansible and that quality can be secured in any convenient way.

Having now described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. A steam-trap having, in combination, a closed casing with inlet and outlet ports, an expansible box E, situated over the outlet-port, a valve F, secured to the side of box E over the outlet-port and arranged to close said port when the box expands, a spindle H, secured to the opposite side of the box E and extending through a stuffing-box in the casing, a stop, as I, arranged to prevent the box E from approaching the outlet-port beyond a determined distance, and a spring J, acting to press the box E toward the outlet-port, all substantially as and for the purpose specified.

2. A steam-trap having, in combination, a closed casing with inlet and outlet ports, an expansible box E, situated over the outlet-port, a valve F, secured to the side of box E over the outlet-port and arranged to close said port when the box expands, a spindle H, secured to the opposite side of the box E and extending through a stuffing-box in the casing, a stop, as I, arranged to prevent the box E from approaching the outlet-port beyond a determined distance, and a spring G, arranged to press the side *e* of box E away from the outlet-port.

WILLIS E. HALL.

Witnesses:
LISLE STOKES,
H. F. GRAYBILL.