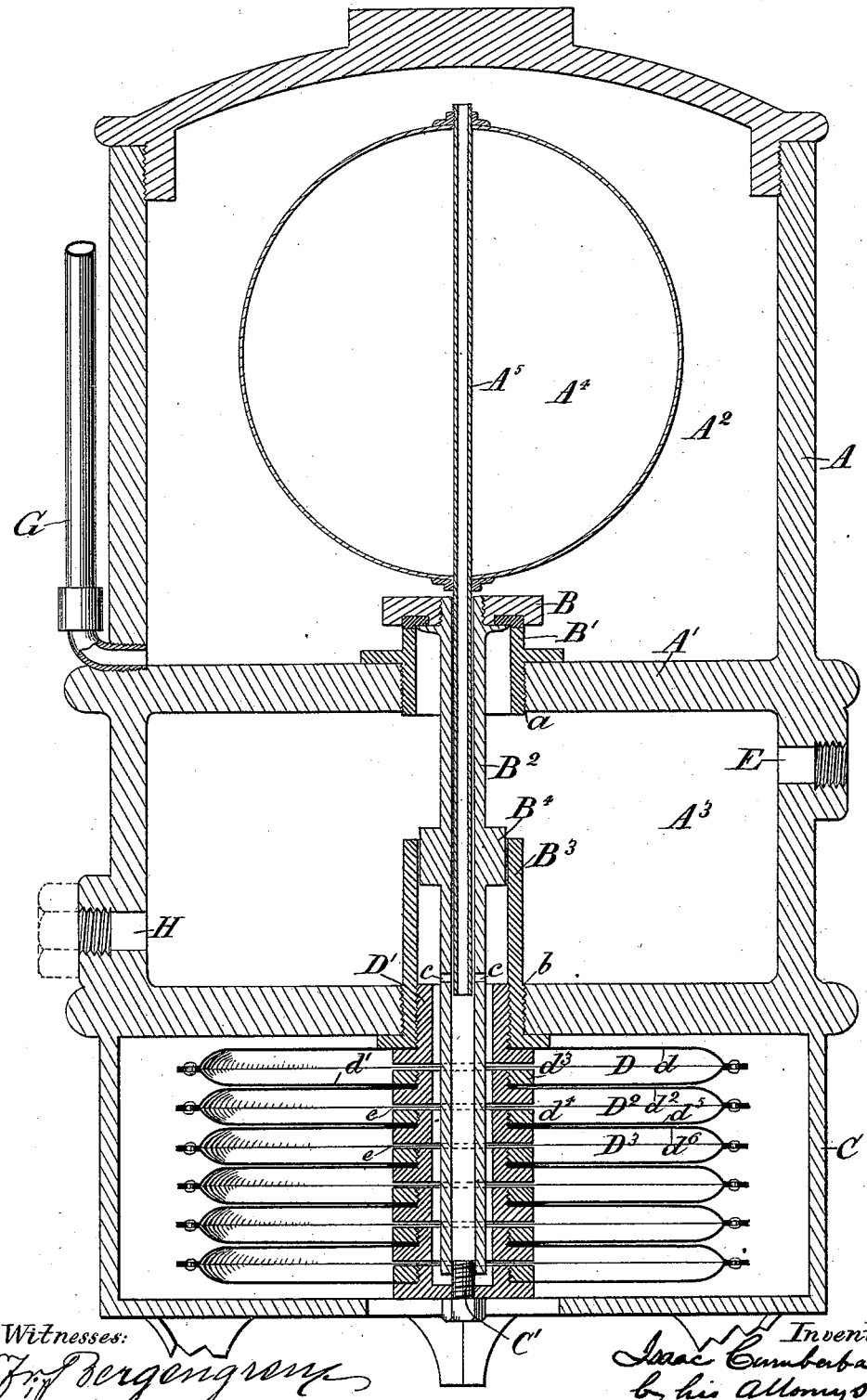
(No Model.)

I. CUMBERBATCH.

CONDENSED WATER TRAP.

No. 421,559. Patented Feb. 18, 1890.



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UNITED STATES PATENT OFFICE.

ISAAC CUMBERBATCH, OF NEWARK, NEW JERSEY.

CONDENSED-WATER TRAP.

SPECIFICATION forming part of Letters Patent No. 421,559, dated February 18, 1890.

Application filed August 23, 1889. Serial No. 321,695. (No model.)

To all whom it may concern:

Be it known that I, ISAAC CUMBERBATCH, of Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Condensed-Water Traps, of which the following is a specification.

My improvement relates to traps in which waters of condensation from a steam system are received.

I will describe in detail my improvement, and then point out the novel features in claims.

The accompanying drawing is a vertical section of a trap embodying my improvement.

A designates a case or shell. In the case or shell is arranged a diaphragm A′, which divides the same internally into two chambers A^2 A^3. In the upper of these chambers is arranged a ball-float A^4. This ball-float is arranged upon a spindle A^5, which spindle in this example of my improvement is hollow and extends diametrically through the float and is secured thereto upon opposite sides. The spindle is open at both ends.

B designates a valve. This valve is arranged in the chamber A^2, and is adapted to be seated upon the valve-seat B′, formed in a central opening *a* in the diaphragm A′. The valve B is mounted upon a valve-stem B^2. This valve-stem, as here shown, is hollow. The bottom of the chamber A^3 is provided about centrally with an opening *b*, in which is arranged an upwardly-extending tube or pipe B^3. The opening *b* is internally screw-threaded and engages a screw-thread upon the tube or pipe B^3.

Upon the valve-stem B^2 is a circumferential enlargement B^4, which extends normally into the pipe or tube B^3. This portion B^4 constitutes a plug the diameter of which is such that when within the pipe or tube B^3 it nearly closes the same, leaving but a thin annular space between it and the inner wall of the pipe or tube.

At some distance below the plug-like portion B^4 there are formed openings *c* in the wall of the valve-stem B^2, which openings communicate with the interior of the valve-stem and also with the interior of the pipe or tube B^3. The spindle A^5 of the float extends downwardly into the pipe or tube B^3 and normally past the openings *c*. The diameter of the spindle A^5 is such that it nearly closes the inner ends of the openings *c*, and it is also such that only a thin annular space is left between it and the inner wall of the valve-stem B^2. The lower extremity of the valve-stem B^2 is secured to an expansion-chamber, as shown, by means of a screw C′, which expansion-chamber is one of a number arranged within a case or shell C. These chambers are each formed of two metallic disks united at their outer edges, as shown by means of rivets. I have shown six of these chambers; but I may use more or less, as desired. These chambers are connected in series, so that they will all contract and expand in unison and uniformly upon the application of internal pressure. That one of the chambers, or D, which is nearest the chamber A^3 has its disk *d* united at its inner edge with the pipe or tube B^3 by means of a hollow externally-screw-threaded coupling-piece D′. The other disk, or *d*′, of the chamber D and the disk d^2 of the chamber D^2 are secured at their inner edges between nuts or rings d^3 d^4, having a screw-threaded connection, while the disk d^5 of the chamber D^2 and the disk d^6 of the chamber D^3 are united together by similar nuts or rings, and so on throughout the series. The valve-stem B^2 passes centrally through the central openings in the nuts or rings d^3 d^4, and an annular space is left between said valve-stem and the adjacent surfaces of the nuts or rings. Between adjacent pairs of nuts or rings are annular openings *e*, which afford free communication between the interior of the chambers D, &c., and the annular spaces between the nuts or rings and the valve-stem. It will be quite apparent that pressure introduced through said annular space will cause an expansion of the chambers D, &c., and it will be equally apparent that such expansion will cause the valve B to be held firmly seated.

Steam and water under pressure are admitted through an inlet E. The pressure will cause steam and water to be forced downwardly through the thin annular space between the plug-like portion B^4 of the valve-stem and the pipe or tube B^3. This pressure will, when sufficient water has accumulated in the expansion-chambers D, &c., and in the pipe or tube B^3, be sufficient to force water

through the openings *c* and into the interior of the valve-stem B^2, and thence upwardly through the restricted annular opening or passage between the float-spindle A^5 and the interior of the valve-stem into the chamber A^2, and will also force water upwardly through the hollow float-spindle and out at the upper end thereof above the float. The pressure has, however, been throttled by the openings *c* and the restricted opening or passage between the spindle and the valve-stem, and has accordingly been reduced.

When water has accumulated in the chamber A^2 to a sufficient height, it will raise the float A^4. As soon as the float has been raised to such a height that the float-spindle is moved past the openings *c* the pressure within the expansion-chambers, together with much of the condensed water, will pass through the hollow float-spindle and the expansion-chambers will suddenly collapse, thus raising the valve B from its seat and permitting a free outlet of pressure from the chamber A^3 into the chamber A^2, which will blow out all the water contained in the chamber A^2 through the blow-off pipe G.

Sediment which may collect in the lower part of the chamber A^3 may be drawn off through a plug-hole H.

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

1. The combination, with a case or shell divided internally into two chambers, one of which is provided with a blow-off and into the other of which steam and waters of condensation are introduced, of a float in the first-named chamber, a communication between said chambers, a valve partially closing said communication, expansion-chambers connected with the valve and communicating with the second-named chamber for closing the valve, and a normally-restricted passage between the chambers for waters of condensation and through which the water will be forced by steam-pressure, substantially as described, whereby when the water in the float-chamber causes the rising of the float to a sufficient height said opening will be enlarged to reduce the pressure in and cause the collapsing of the expansion-chambers and opening of said valve to blow out the water, substantially as described.

2. The combination of a case or shell divided internally into two chambers, one of which is provided with a blow-off and into the other of which steam and waters of condensation are introduced, a float in the first-named chamber, a communication between said chambers, a valve normally closing said communication, a tubular valve-stem, one or more expansion-chambers connected to said valve-stem and communicating with the second-named chamber, a hollow spindle on said float, extending into said tubular valve-stem and with an opening into the float-chamber, and a normally-restricted opening admitting water and pressure through and around said hollow spindle, substantially as and for the purpose specified.

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