(No Model.)

2 Sheets—Sheet 1.

# O. GASSETT.

## STEAM TRAP.

No. 508,300. Patented Nov. 7, 1893.

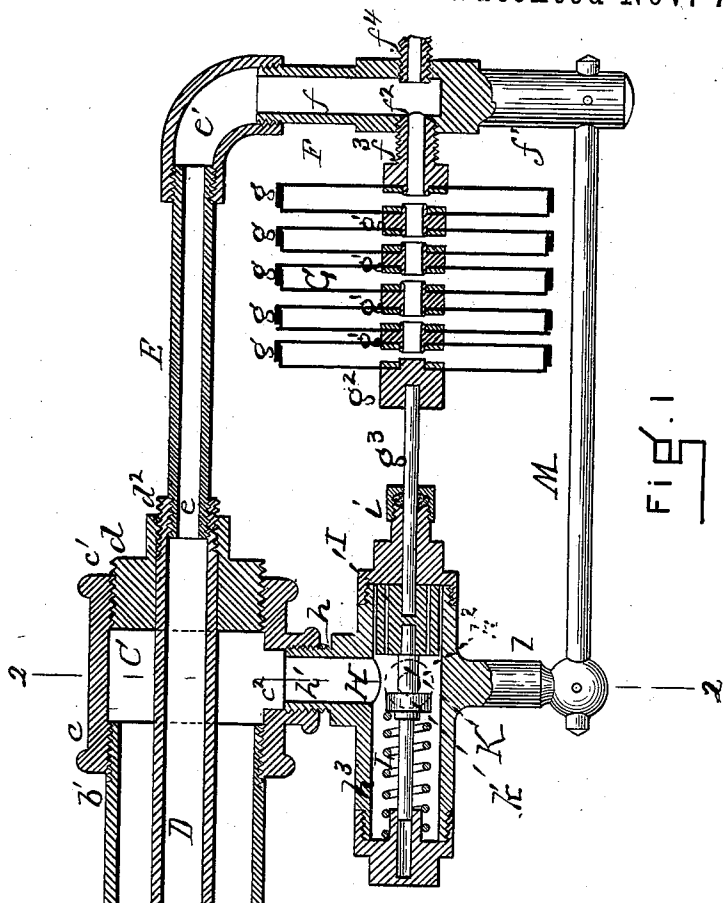

Fig. 1

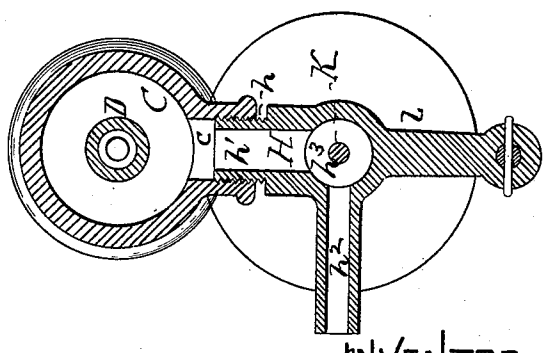

Fig. 2

WITNESSES

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INVENTOR

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per W. H. Singleton, atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.)

2 Sheets—Sheet 2.

# O. GASSETT.

## STEAM TRAP.

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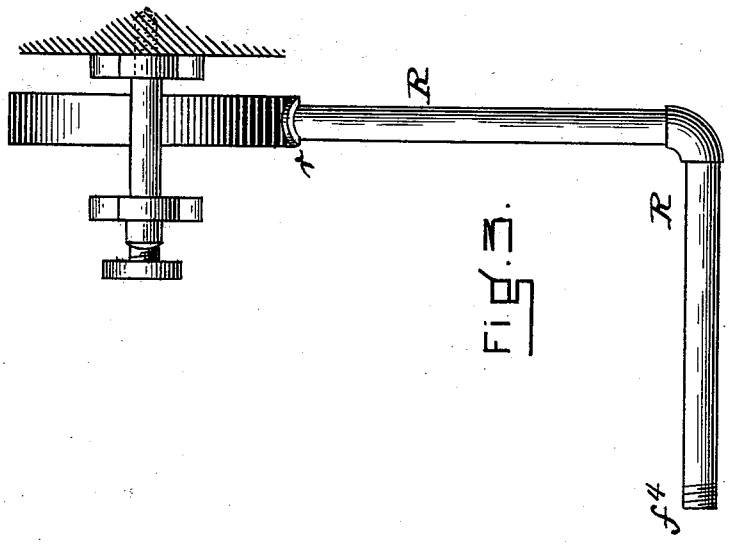


Fig. 3.

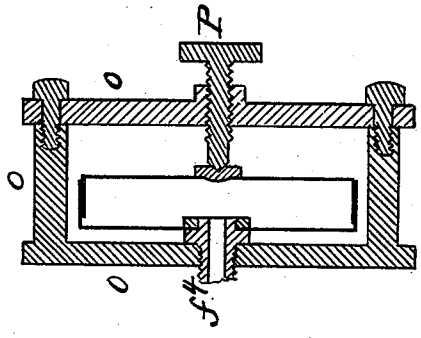


Fig. 1a.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

OSCAR GASSETT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE CROSBY STEAM GAGE AND VALVE COMPANY, OF SAME PLACE.

## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 508,300, dated November 7, 1893.

Application filed July 23, 1892. Serial No. 440,972. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR GASSETT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Steam-Traps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The present invention relates to an improved steam trap wherein condense water is received and discharged, and the object of the invention is to obtain a large opening for a trap valve and by the combination of several cells, as shown, the desired movement, or opening, is obtained, but it is also desirable to have the cells away from the direct action of steam on account of the injurious effect it has upon the joined parts of the cells. The expansion chamber, G, as shown, can never become hot, so that it is necessary to have the chamber or pipe, D, where it will be under the influence of steam and water; and some of the fluid it contained will, when hot, find its way into chamber, G, but the chamber does not operate by the direct action of steam as in other traps.

In the annexed drawings: Figure 1 is a longitudinal section of the trap, and Fig. 2 is a section on line 2—2, Fig. 1. Fig. 3 is a side view of the diaphragm chamber. Fig. $1^a$ is a sectional view of such chamber.

Referring to the drawings, the letter A indicates a coupling by which the trap is to be secured to the steam pipe carrying the condense water to the trap. To the coupling, A, is secured the pipe or shell, B, there being a foraminous diaphragm, *b*, where they join to intercept scale. This shell, B, at its other end, *b'*, joins a T, C, at *c*. In the opening, *c'*, of the T, C, opposite the opening, *c*, is a plug, *d*, in which is secured a pipe, D, which passes down into the shell, B, nearly to the diaphragm, *b*, and has its inner end, *d'*, closed. Its outer end, $d^2$, is open, and into this end, $d^2$, fits the end, *e*, of a connection pipe, E, which by an elbow, *e'*, is connected with a pipe, F, at a right angle to the shell, B. This pipe, F, need only be hollow for a portion of its length as at *f*, the extension, *f'*, of the pipe being solid. At the side toward the shell, B, this pipe, F, has an aperture, $f^2$, in which is secured a nozzle, $f^3$, and opposite this nozzle, $f^3$, a plug, $f^4$, projects into the bore, *f*, of the pipe, F. To this nozzle, $f^3$, is secured one of a number of hollow collapsible cells, *g*, which are connected together by couplings, *g'*, having bores by which the cells communicate one with another, all of them forming a pressure chamber, G, as will be explained. To the cell farther from the nozzle, $f^3$, is fastened a solid end piece or stud, $g^2$, to which is secured a rod, $g^3$, projecting outwardly therefrom as shown.

Secured to the opening, $c^2$, of the T, C, is the nipple, *h*, of the valve chamber, H, which has the inlet port, *h'*, the outlet port, $h^2$, at a right angle thereto, and the bore, $h^3$, at a right angle to both ports. The bore, $h^3$, is on a line with the rod, $g^3$, which passes down through a stuffing box, *i*, and is secured to one end of the valve, I, which fits the bore, $h^3$. In the other end of the valve, I, loosely fits a rod, K, having the collar, *k*, the other end of this rod, K, fitting into the end of the chamber, H. Around the rod, K, between this end of the chamber, H, and the collar, *k*, is placed a spiral spring, L. Projecting from the chamber, H, is an arm, *l*, and from this arm, *l*, a brace, M, runs to the end, *f'*, of the pipe, F, so as to brace the trap. For use, the plug, $f^4$, is removed and an expansible oil such as petroleum or fluid to the required amount poured into the trap, running into the collapsible cells, *g*, and the several pipes, *f e'* E and D, and the plug, $f^4$, is replaced.

The operation of the trap is as follows: When the trap is cold, the fluid is contracted, and the pressure chamber, G, is collapsed, thus allowing the spring, L, to push back the valve, I, to the end of the bore, $h^3$, of the chamber, H, thus leaving the port or outlet, $h^2$, Fig. 2, open, but when steam enters the trap it heats the fluid in pipe, D, and expands it, causing the cells, *g*, of the pressure chamber, G, to be expanded, which causes the end piece or stud, $g^2$, to push on the rod, $g^3$, moving the valve, I, and closing the port, $h^2$, Fig. 2, which will remain closed until enough water has accumulated in the trap to cool down the fluid

in pipe, D, so as to allow the cells to collapse by the fluid contracting in the pipe, D, when the spring, L, will press back the valve, I, enough to allow more water to run out and until steam heats the fluid in pipe, D, enough to shut the valve again.

The advantage of the diaphragm pressure chamber is, that the several cells connected are capable of making a greater movement than any other hermetically sealed chamber. Steam traps in an exposed place frequently become useless because the opening of the trap valve is too small, *i. e.*, there is not a wide opening such as should be in order to prevent the dripping water as it slowly reaches the valve port (where it is coldest) from freezing. If the valve opening is narrow, it soon becomes filled with ice, even in a large valve, as experience has shown on railroad cars, where steam is frequently shut off, thereby causing a vacuum in the steam pipes; then as the trap opens, cold air rushes in through the trap, it being the only way to get in, and the water on reaching the valve becomes frozen. Hence the necessity for a large, wide opening such as is shown in the drawings; in order to get a wide opening, it requires a pressure chamber such as is shown.

On Sheet 2 of the drawings is shown an attachment to the steam strap. Fig. 1[a] is a sectional view of a diaphragm chamber or collapsible cell held in place by frame, O O O, which connects with pipe, *f*, at $f^4$, Fig. 1, and which is regulated by the screw, P, Figs. 1[a] and 3. Fig. 3 is a side view of the diaphragm chamber placed on the wall at a distance from the trap and connected by pipe, R R, at the bottom side at *r*. The other end of the pipe is to connect with pipe, *f*, at $f^4$, Fig. 1.

The object of the diaphragm chamber as shown is to supply more fluid with which it is filled to the pipe, D, and pressure chamber, G, Fig. 1, whenever needed to increase the pressure and to lessen the pressure when not needed, so as to govern the trap at will in accordance with the varying pressure of steam which may be used as hereinafter described. As steam rapidly rises in temperature as the pressure increases, it will cause the fluid in pipe, D, to expand more than it would if the pressure of steam was low. Now if the adjustment regulating the trap is set so that a certain amount of steam pressure will keep the pipes leading to the trap clear of water, it will, if the steam pressure is increased, cause water to accumulate to a considerable extent and so continue until the same has cooled down to the degree of temperature that was required to operate the trap at the beginning. The reason is, the condense water from high pressure steam is hotter than water from low pressure, and causes the fluid in pipe, D, Fig. 1, to remain expanded longer than low pressure will. In order, therefore, to regulate the amount of water in the trap it requires the pressure of the fluid in the trap to be reduced, which may be done by turning the adjusting screw, P, Fig. 3, so as to allow some of the fluid from pipe, D, to flow into diaphragm chamber or collapsible cell, N, until the required amount of fluid remains in pipe, D, Fig. 1, and pressure chamber, G, Fig. 1, to control the accumulation of water. When an even pressure of steam is maintained, or nearly so, the adjusting chamber is not required.

Having thus described my invention, what I claim is—

1. A steam trap provided with a collapsible pressure chamber, a valve chamber and condense water shell communicating with each other, the valve in the valve chamber being connected with the collapsible pressure chamber, and a closed pipe within the shell, the interior of said pipe communicating with the interior of said collapsible pressure chamber, as set forth.

2. A steam trap provided with a collapsible pressure chamber, a valve chamber and condense water shell communicating with each other, the valve in the valve chamber being connected with the collapsible pressure chamber on one side and having a spring on the other side, and a closed pipe within the shell, the interior of said pipe communicating with the interior of said collapsible pressure chamber, as set forth.

3. A steam trap provided with a collapsible pressure chamber, a valve chamber and condense water shell communicating with each other, the valve in the valve chamber being connected with the collapsible pressure chamber, and a closed pipe within the shell, the interior of said pipe communicating with the interior of said collapsible pressure chamber, and having an expansible fluid in said pipe, pressure chamber, and the communication between them, as set forth.

4. A steam trap provided with a pressure chamber consisting of several collapsible cells, a valve chamber and condense water shell communicating with each other, the valve in the valve chamber being connected with the pressure chamber, and a closed pipe within the shell, the interior of said pipe communicating with the interior of said pressure chamber, as set forth.

5. The combination of a steam trap provided with a collapsible chamber to contain an expansible fluid, with a collapsible regulator, containing a fluid the interior of which is connected with the interior of the collapsible chamber, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

OSCAR GASSETT.

Witnesses:
JOSHUA H. MILLETT,
RALPH W. FOSTER.