

No. 743,952.

PATENTED NOV. 10, 1903.

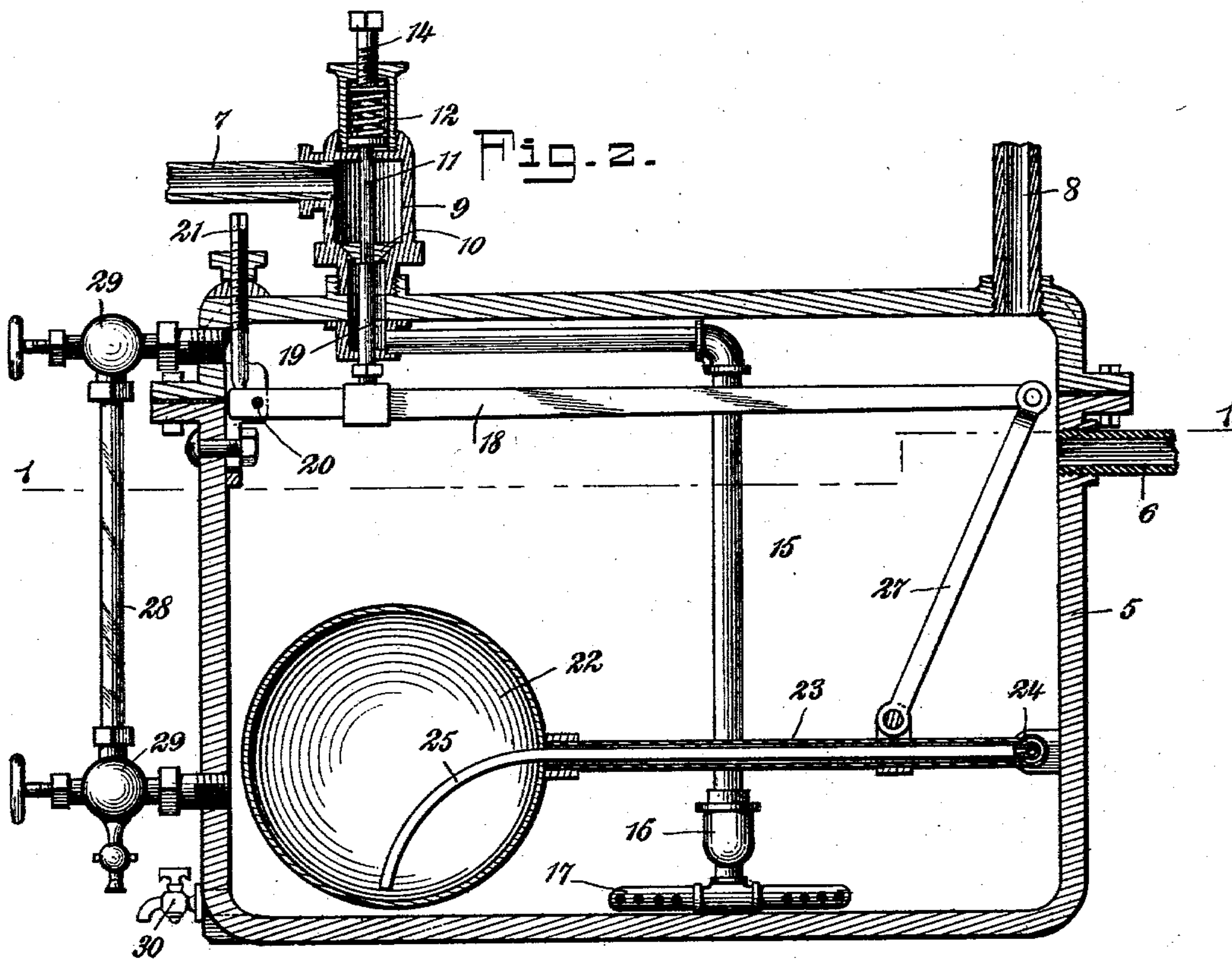
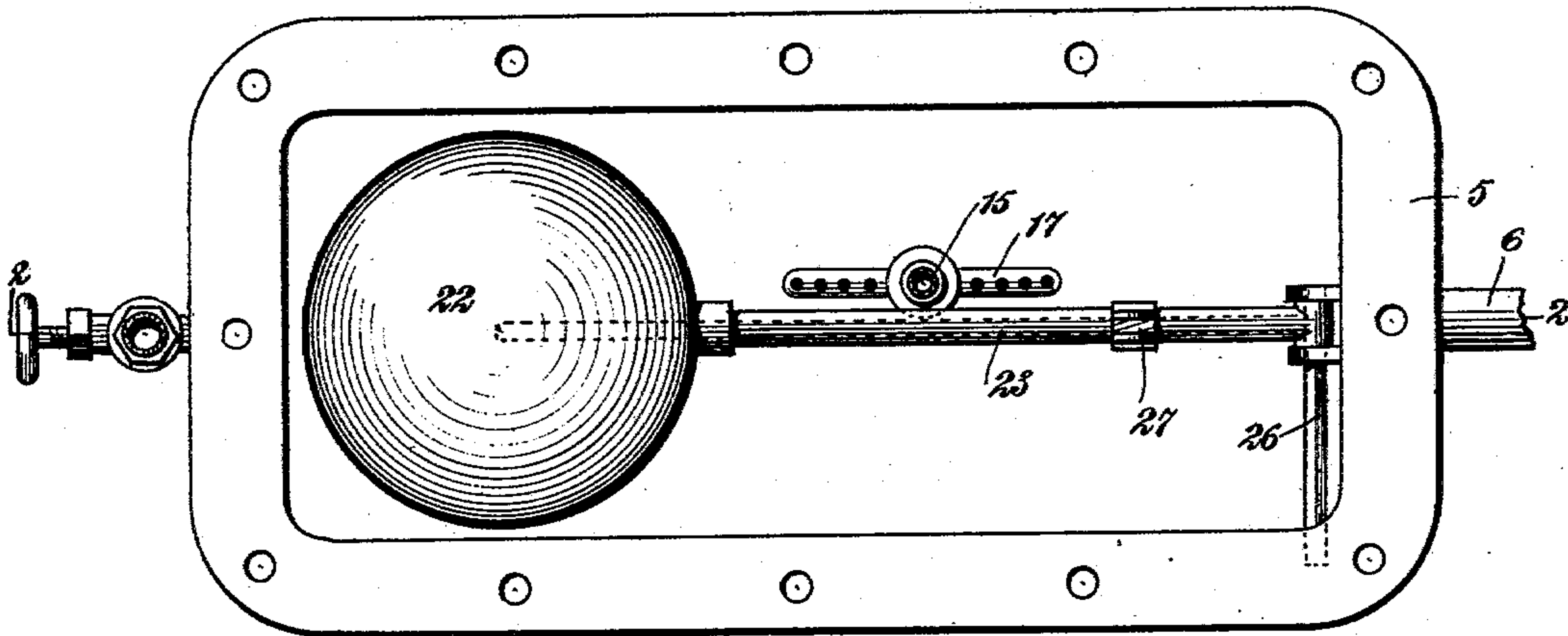
R. D. TACKABERRY.

STEAM TRAP.

APPLICATION FILED MAY 19, 1902.

NO MODEL.

Fig. 1.



WITNESSES:

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ROBERT D. TACKABERRY, OF LEWISTON, MAINE.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 743,952, dated November 10, 1903.

Application filed May 19, 1902. Serial No. 107,940. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. TACKABERRY, a citizen of the United States, and a resident of Lewiston, in the county of Androscoggin and State of Maine, have invented a new and Improved Steam-Trap, of which the following is a full, clear, and exact description.

My invention is adapted particularly to the removal of the water of condensation from the drying cans or cylinders used in cotton-mills, bleacheries, paper-mills, &c., although its application is not confined to this particular use, as will be apparent.

This specification is an exact description of one example of my invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a plan view showing the interior of the trap with parts in section on approximately the line 1 1 of Fig. 2, and Fig. 2 is a section on the line 2 2 of Fig. 1.

5 indicates the shell or receptacle forming the main body of the apparatus.

6 indicates the inlet-pipe for the steam and water of condensation, and 7 indicates the pipe for carrying off the water of condensation under the action of the steam-trap. The pipe 6 leads from the drying can or cylinder or other source of steam and water of condensation, and the pipe 7 leads to a hot-well, tank, or other receiver. These parts are not illustrated in the drawings, since they form no immediate part of my invention.

8 indicates a pipe leading into the top of the shell or casing 5 and passing from the steam-space of the drying-can or other source of steam and water of condensation, this pipe serving to equalize the pressure within the shell 5, as will be apparent hereinafter.

Communicating with the pipe 7 is a valve-casing 9, in which is arranged a valve 10, the stem 11 whereof is pressed by a spring 12, and 14 indicates a screw or other means for regulating the tension of the spring 12. By these means 12 and 14 the valve 10 is kept seated against the pressure within the shell or chamber 5. Any other means desired may be employed for holding the valve thus yieldingly seated. The casing 9 extends into the

shell 5 and communicates with a pipe 15, which passes down to the bottom of the shell 5 and has strainers 16 and 17 at its lower end, such strainers being directly above the bottom of the shell 5, so as to be always submerged by the water therein.

18 indicates a lever connected by a rod 19 with the valve 10. This lever is fulcrumed at the point 20, and its short arm is engaged by a screw 21, mounted vertically in the walls of the casing or shell 5, this screw serving to limit the downward movement of the long arm of the lever 18 and being adjustable, so as to adjust said movement of the lever.

22 indicates a ball or other float having a hollow stem 23, mounted to swing on suitable lugs or other supports 24, arranged in the shell 5, the float moving vertically in the shell.

25 indicates a tube which has one end located directly above the bottom of the float 22 and which is curved upward therefrom and passes through the hollow stem 23, this tube 25 communicating at its right-hand end with a tube 26, which passes through the axis around which the stem 23 swings and extends laterally through the wall of the shell 5 into communication with the atmosphere. The end of the tube 25 within the float 22 is open. The purpose of this tube is to carry off any water which may be forced into the float by the high pressure within the shell 5. By placing this tube in the position shown, with its open end near the bottom of the float, the superior pressure within the float will cause any water which may have leaked therein to flow out through the tube 25 to the atmosphere by way of the pipe 26, as described.

27 indicates a link connecting the stem 23 with the outer end of the long arm of the lever 18, this link being located adjacent to the pivot of the stem 23; so that the stem is transformed into a lever acting with the lever 18 to produce a compound-lever effect on the valve 10 through the medium of the rod 19.

28 indicates a gage-glass, and 29 the fixtures therefor, which enables the height of the water and its action within the shell or receptacle 5 to be observed.

30 indicates a cock for draining off the receptacle.

The steam and water of condensation entering into the shell or receptacle 5 will cause the water-level to rise steadily therein, and with this water-level will be raised the float 22. As the movement of this float begins its movement will be transmitted to the valve 10 through the elements 23, 27, 18, and 19 and the valve 10 will be unseated, opening the communication of the pipe 7 with the interior of the shell 5, and thus allowing the steam-pressure within the shell to force the water through the strainers 16 and 17 into and through the pipe 15 and out by way of the pipe 7. As the water falls the float 22 will drop and the valve 10 will be closed.

In the practical operation of steam-traps, particularly those used in connection with drying cans or cylinders, it is found that the water of condensation is discharged into the trap in sudden rushes and that these sudden discharges of water tend to create a pressure in the upper part of the shell or chamber 5 greater than in the source of steam and water of condensation. This excessive pressure in the chamber 5 tends to hold back the water of condensation, and such disadvantageous result is entirely overcome by means of the pipe 8, which establishes communication between the chamber or shell 5 and the source of steam and water of condensation, thus equalizing the pressure in both parts, so that a much better draining of the cans or other source of steam and condensation is accomplished than heretofore, when this pipe and its peculiar arrangement was not resorted to. This pipe is also of much utility in removing the air from the drying-cans when their operation is first started.

The mechanism for controlling the valve 10 may be readily adjusted, so that when a predetermined volume of water accumulates in the tank the valve is automatically unseated, thus relieving the trap. This unseating of valve 10 is therefore independent of the steam-pressure, and I am thus enabled by the aforesaid adjustments of the valve to use the trap with steam - pressures of any degree. When the water in the trap reaches the predetermined height, and therefore exerts the necessary pressure on the float, the valve is opened and then the steam-pressure forces out the water. I desire it distinctly understood that I am not limited to the precise means illustrated for holding this valve seated and that any suitable means may be employed for yieldingly seating the valve to attain the end explained. By means of the compound-lever-like arrangement of the parts 23, 27, and 18 I am enabled to open the valve 10 easily against its closing means without necessitating the employment of a cumbersome float, since this arrangement gives a great multiplication of power, as will be obvious. In the operation of float-traps under high pressures it is found that the water is frequently forced into the interior of the floats either through the joints of the parts

or in cases of high pressure through the metal itself. This water reduces the buoyancy of the float and prevents the perfect action of the trap. I provide for this contingency by means of the pipe 25 and the peculiar manner in which this pipe is arranged with respect to the float. By curving the pipe downward, so that its open or receiving end is directly above the bottom of the float, I am enabled to draw off therefrom all of the water which accumulates therein. Devices have heretofore been provided seeking this end; but they have failed to draw off the entire or any more than approximately one-half of the water which accumulates.

Various changes in the form and details of my invention may be resorted to at will without departing from the spirit of my invention. Hence I consider myself entitled to all forms of the invention as may lie within the intent of my claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A steam-trap, comprising a shell or chamber having inlet and outlet orifices, a valve commanding the outlet, adjustable means for holding the valve yieldingly seated, and float-actuated devices for opening the valve against the pressure of said means for seating the valve.

2. A steam-trap, comprising a shell or chamber with inlet and outlet orifices, a valve commanding the outlet, adjustable means for holding the valve yieldingly seated, and means controlled by the height of the water within the shell for opening the valve against the pressure of said means for seating the valve.

3. A steam-trap, comprising a shell or chamber, means for leading the steam and water of condensation to the shell or chamber, means for controlling the exit therefrom, and an additional means, said additional means establishing a communication between the interior of the shell or chamber and the steam-space of the source of steam and water of condensation whereby to equalize the pressures in the manner described.

4. A steam-trap, comprising a shell or chamber having inlet and outlet orifices, a valve controlling the outlet, means for operating the valve, and means establishing communication between the interior of the shell or chamber and the steam-space of the source of steam and water of condensation supply, whereby to equalize the pressures in the manner described.

5. The combination of a float, a hollow stem joined to and communicating therewith above the bottom of the float and mounted to swing, and a discharge or drain pipe having one end open and located in the float directly above the bottom thereof, said pipe extending upward from the bottom of the float into and through the hollow stem and communicating with the atmosphere.

6. A steam-trap, comprising a shell or cas-

ing provided with inlet and outlet orifices, an outlet-pipe communicating with the outlet-orifice and having its receiving end located directly above the bottom of the shell, a valve commanding said outlet-pipe, a float, a connection between the float and valve to operate the same, a drain-pipe located in the float to carry off the water therefrom, said drain-pipe extending from the float and communicating with the atmosphere, and means establishing communication between the interior of the shell or chamber and the steam-space of the source of steam and water of condensation supply, whereby to equalize the pressures in said parts.

7. A steam-trap, comprising a shell or chamber having inlet and outlet orifices, a valve commanding the outlet, means for yieldingly holding the valve on its seat, means for varying the pressures of said means for yieldingly holding the valve, and means controlled by the height of water within the shell for opening the valve against the pressure of said means for seating the valve.

8. A steam-trap, comprising a shell with inlet and outlet orifices, a valve commanding the outlet, a spring pressing the valve to hold the same on its seat, a screw working against the spring to vary the tension thereof, and means controlled by the height of water within the shell, for opening the valve against the pressure of the spring.

9. The combination of the shell of a steam-trap, a source of steam and water of condensation, means for leading the steam and water of condensation to the shell, means for controlling the exit of the water therefrom, and an additional means, said additional means extending between the shell and the steam-space of the said source of steam and water of condensation, whereby to equalize the pressures in the manner described.

10. The combination with a shell, of a float, a stem connected to the float above its bottom and mounting the float to swing, a tube

leading from the bottom of the interior of the float upward into the stem and extending to the pivoted end of the same, and a second tube communicating with the first tube and extending to the exterior of the shell, said second tube lying coincident to the axis of the swinging movement of the stem.

11. A steam-trap, comprising a shell or casing provided with inlet and outlet orifices, the latter at the upper portion of the shell, an outlet-pipe communicating with the outlet-orifice and having its receiving end located directly above the bottom of the shell, a valve located at said outlet to command the same, and means controlled by the height of the water within the shell for operating the valve.

12. In a steam-trap, the combination of a shell having an outlet at its upper portion, a valve controlling the outlet, a lever fulcrumed in the upper portion of the shell and acting on the valve at a point on the lever intermediate the ends thereof, a link connected to the free end of the lever and extending downward, a stem pivoted at one end in the lower portion of the shell and having the link connected thereto intermediate the ends of the stem, and a float in connection with the end of the stem.

13. In a steam-trap, the combination of a shell having an outlet-valve, a lever connected with the valve at a point intermediate the fulcrum of the lever and one end thereof, a link attached to said end of the lever, a float, a stem on which the float is mounted to swing, said link having connection with the stem, and an adjustable member bearing on the other end of the lever to regulate the throw thereof.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT D. TACKABERRY.

Witnesses:

WALTER H. SAWYER,
SAMUEL W. KINGSTON.