No. 649,028. Patented May 8, 1900.

J. WREN.

VALVE.

(Application filed Apr. 3, 1899.)

(No Model.) 2 Sheets—Sheet 1.

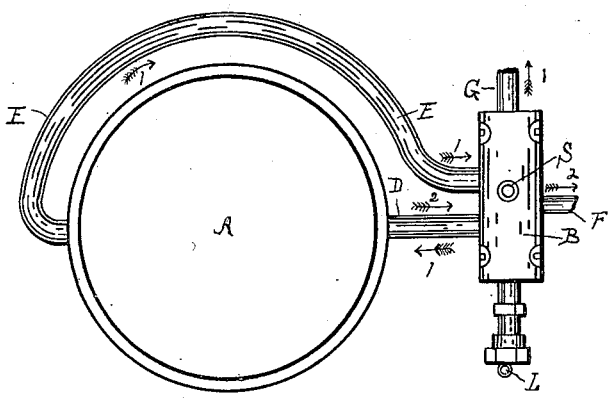

Fig. 1.

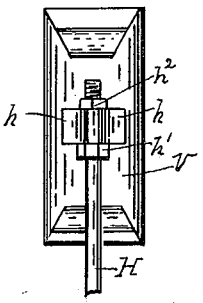

Fig. 5.

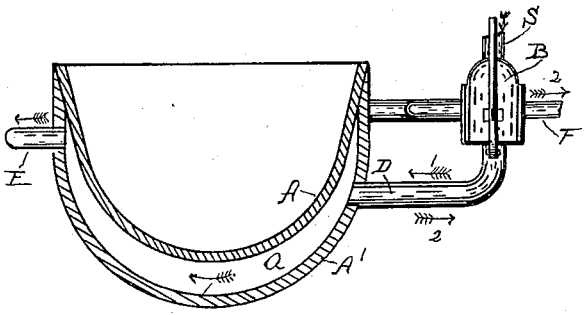

Fig. 2.

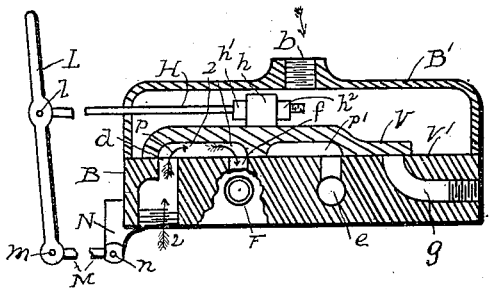

Fig. 3.

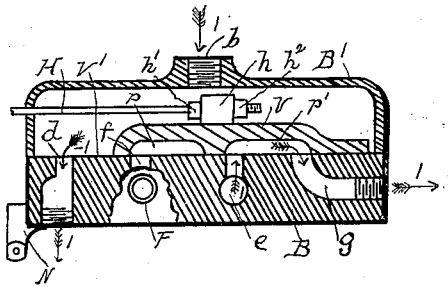

Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

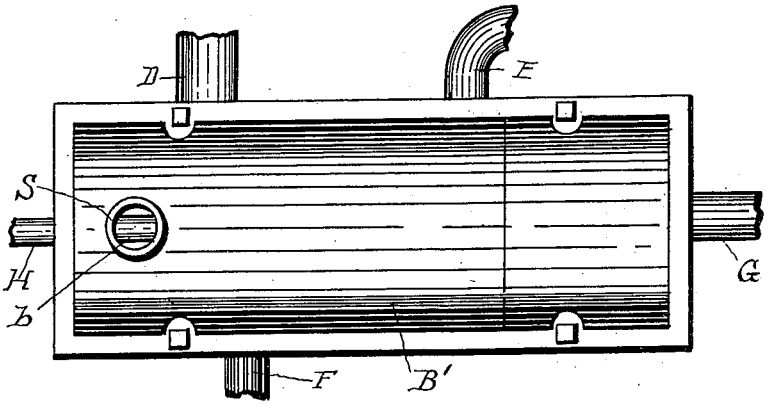

Fig. 6.

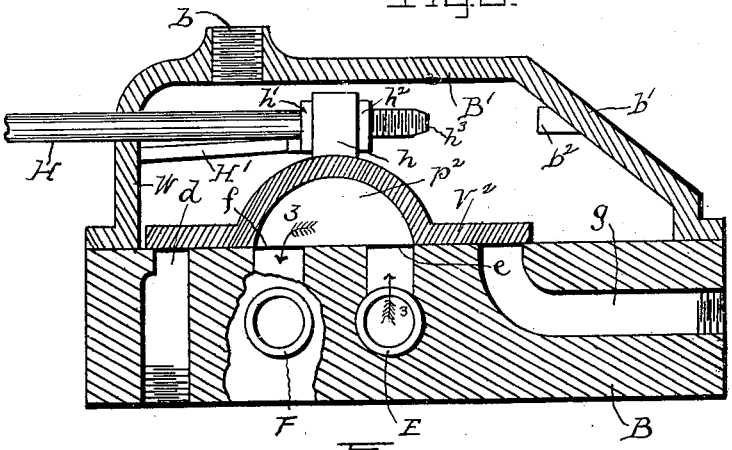

Fig. 7.

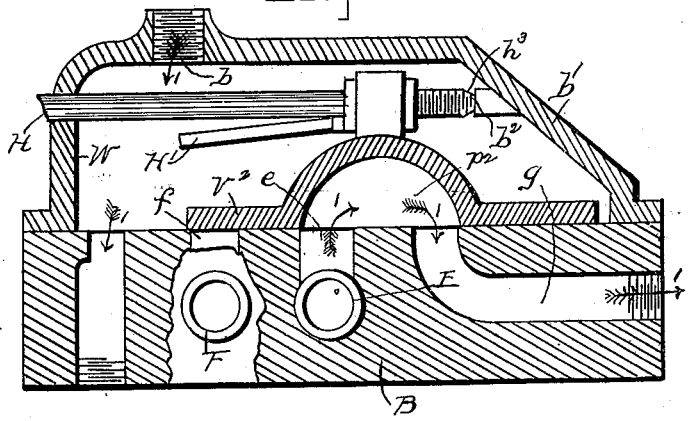

Fig. 8.

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UNITED STATES PATENT OFFICE.

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VALVE.

SPECIFICATION forming part of Letters Patent No. 649,028, dated May 8, 1900.

Application filed April 3, 1899. Serial No. 711,509. (No model.)

To all whom it may concern:

Be it known that I, JAMES WREN, a citizen of the United States, residing at Bloomington, county of McLean, State of Illinois, have invented certain Improvements in Valves, of which the following is a specification.

This invention relates to improvements in valves for controlling steam for heating vacuum-pans, retorts, steam-jacketed kettles, and the like, where heretofore it has been necessary to use a plurality of valves. In the devices now employed for controlling the steam for such purposes there is a valve in the steam-pipe, one in the exhaust-pipe, and one in the return-pipe, and whenever the steam is let on or cut off each of these valves must be opened or closed, as the case may be. In this specification my improvement is shown and described in connection with a steam-jacketed kettle for boiling candy of various kinds, in which these valves must be opened or closed every fifteen or twenty minutes. This work is usually assigned to young men or boys, who are apt to become careless in handling the valves, and consequently in the steam connections now in use one or more of said valves are liable to be left partially open, causing a waste of steam or preventing the necessary pressure in the jacket to properly cook the goods.

One object of my invention is to open or close all these pipes, as the case may be, with a single valve, whereby a movement of the same forward or back will control the passage of steam through all of said pipes.

A second object of my invention is to hold the valve firmly to its seat by the action of the steam from the boiler without the aid of any special mechanism for that purpose.

In this specification I have shown and described two forms of a construction embodying my invention.

The invention consists in the construction and combination of the various parts, as hereinafter fully described and then pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a top plan view of a steam-jacketed kettle, showing my invention applied thereto; and Fig. 2, a vertical section of said kettle and an end view of the steam-chest. Fig. 3 is a vertical longitudinal section of the steam-chest and valve, the valve being shown in the position occupied thereby when the outlet-port is closed and the exhaust-port is open; and Fig. 4, a similar section, but showing the outlet-port and the return-ports open, the escape-port being closed. Fig. 5 is a top plan view of the connection between the valve-rod and the valve. Fig. 6 is a top plan view of a modified construction of the steam-chest; Fig. 7, a vertical longitudinal section thereof, the outlet-port and the return-port being closed; and Fig. 8, a similar section, but showing the outlet-port and the return-port open, the exhaust-port being closed.

Similar letters indicate like parts throughout the several views.

Referring to the details of the drawings, Figs. 1 to 5, A indicates the kettle, A′ the jacket, and *a* the steam-chamber between the kettle and the jacket.

B indicates the steam-chest, having five ports *b*, *d*, *e*, *f*, and *g*.

b indicates the inlet-port, through which the steam-chest and the boiler are connected by inlet-pipe S. Outlet-port *d* is connected with steam-chamber *a* by pipe D, wherethrough steam is fed to said chamber. A pipe E is connected with the steam-chamber on the side thereof opposite to that on which pipe D enters the same, and from its point of connection with the steam-chamber said pipe E is carried around the outside of the steam-jacket and connects with intermediate port *e*.

F is the exhaust-pipe and is connected with exhaust-port *f*.

G is a pipe connected with return-port *g* and is the pipe through which the steam is returned to the boiler or to a trap, neither of which is shown or described, as they do not form any part of my invention.

V indicates a slide-valve having two arched cavities *p* and *p′*, each of which is adapted to connect two of the ports in valve-seat V′. On the back of valve V are two oppositely-located lugs *h*, between which is engaged the inner end of valve-rod H, having screwed thereon a sleeve provided at its ends with seminut-shaped bosses *h′* and *h²*, which bear, respectively, against the opposite edges of

lugs h. The valve-rod extends out through one end of the steam-chest and through suitable packing-boxes (not shown) to a lever L, with which it is pivotally connected at l. The lower end of lever L is pivoted at m to the outer end of a link M, the other end whereof is pivotally connected at n with a hanger N, formed on the adjacent end of the steam-chest.

As will be seen in Fig. 4, when the valve is pushed back and uncovers port d the steam entering steam-chest B through inlet-pipe S and port b passes through said port d, through pipe D, to and through steam-chamber a, to and through pipe E and intermediate port e, arched cavity p' of valve V, and return-port g and pipe G to the boiler or to a trap, the course of this movement of the steam being indicated by arrows 1. When the valve V is drawn forward, as shown in Fig. 3, so that ports d and f are connected by arched cavity p of said valve, the steam escapes from steam-chamber a through pipe D, port d, said cavity p, port f, and escape-pipe F, as indicated by arrows 2.

In Figs. 6, 7, and 8 is shown a modified construction, which I prefer. In this construction inlet-port b is located over or approximately over outlet-port d, so that when the valve is pushed back the passage of the steam is direct from the inlet to the outlet port. The back end of the top B′ of the steam-chest. is beveled, as shown at b', and has on the inner face of said bevel a vertical shoulder b^2, located in line with the valve-rod H. The ports are arranged precisely as in the construction first shown and described; but the valve V^2 has but one arched cavity p^2, placed about at the center of the valve. As will be seen in Fig. 8, when the valve is pushed back and uncovers port d the steam follows precisely the same channels as in the first construction, the course followed being shown by arrows 1; but when the valve V^2 is drawn forward, as shown in Fig. 7, so that port d is closed, ports e and f are connected by cavity p^2, and the course of the escaping steam is through pipe E, intermediate port e, cavity p^2, escape-port f, and pipe F. The steam thus passes through pipe E and intermediate port e in the same manner as when it is to be returned to the boiler or to a trap; but it is cut off from return-port g by the valve and deflected to the escape-port f by arched cavity p^2, as shown by arrows 3.

By the construction just described it will readily be seen how the inlets and outlets of a steam-chamber and of a steam-chest, through which steam is supplied to said chamber, are regulated by a single valve.

In Figs. 7 and 8 a forwardly-projecting tongue H′ is secured to the valve-rod H, adjacent to the sleeve on said rod, and the free end of tongue H′ is depressed, so as to strike the front wall W of the top B′ and limit the forward movement of the valve. In like manner a projection h^3 of the inner end of valve-rod H engages shoulder b^2 of bevel b' to limit the inner movement of the valve.

With the construction shown in Figs. 3 and 4 the movement of the valve is limited by the engagement of the ends thereof with the end walls of the top B′, whereby the end of the valve opposite that striking one of said end walls is apt to be raised from its seat. This possible raising of the end of the valve is prevented by the construction shown in Figs. 7 and 8, where the tongue H′ and the projection h^3 of valve-rod H, being in line or approximately in line with the force exerted through said valve-rod, act directly against said force by their engagement, respectively, with the front wall W of top B′ and with shoulder b^2.

I do not restrict myself to the details of construction herein shown and described, as it is obvious that many alterations may be made therein without departing from the principle and scope of my invention.

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

1. The combination, with a steam-chamber, and a steam-chest having an outlet-port connected with the steam-chamber, a port through which steam is returned from said chamber to the steam-chest, and a port wherethrough steam is returned from said steam-chest to the boiler or a trap, of a valve adapted to open said outlet-port and to connect the port through which steam is returned from said chamber to the steam-chest with the port wherethrough steam is returned from the steam-chest to the boiler or a trap.

2. The combination, with a steam-chamber, and a steam-chest having a plurality of ports, whereby said chest feeds steam to the steam-chamber, the steam is returned from the steam-chamber to the steam-chest, and the steam is exhausted from the steam-chest, of a valve adapted to cut off the feeding of steam from the steam-chest to the steam-chamber and to connect a port wherethrough steam is returned from the steam-chamber to the steam-chest with a port through which steam is exhausted from said steam-chest.

3. The combination, with a steam-chamber, and a steam-chest having a plurality of ports, whereby said chest feeds steam to the steam-chamber, the steam is returned from the steam-chamber to the steam-chest, the steam may be returned to the boiler or a trap, or the steam may be exhausted from the steam-chest, of a valve adapted by a movement in one direction to open a port through which steam is fed to the steam-chamber and to connect a port through which steam is returned from said chamber to the steam-chest with a port in said chest wherethrough steam is returned to the boiler or a trap and by a movement in the other direction to cut off the feeding of steam from the steam-chest to the steam-chamber and to connect a port wherethrough steam is returned from the steam-chamber to

the steam-chest with a port through which steam is exhausted from said steam-chest.

4. The combination, with a steam-chamber, and a steam-chest having an outlet-port connecting said chest with the steam-chamber, a port through which steam is returned from said chamber to the steam-chest, a port wherethrough steam is returned from the steam-chest to the boiler or a trap, and an exhaust-port, of a valve having a single cavity and adapted by a movement in one direction to open said outlet-port and to connect the port through which steam is returned from said chamber to the steam-chest with the port in said chest wherethrough steam is returned to the boiler or a trap and by a movement in the other direction to close said outlet-port and to connect the port through which steam is returned from said chamber to the steam-chest with the exhaust-port of said chest.

5. The combination, with a steam-chamber, and a steam-chest having an inlet-port in the top thereof, a valve-seat having an outlet-port, a port by which steam is returned to the steam-chest from the steam-chamber, a port by which steam is returned to the boiler or a trap, and an exhaust-port, of a valve adapted by a movement in one direction to connect the inlet-port and the outlet-port and to connect a port by which steam is returned to said steam-chest from the steam-chamber with a port by which steam is returned from the steam-chest to the boiler or a trap and by a movement in the other direction to cut off the connection between the outlet-port and the inlet-port and to connect a port by which steam is returned to said steam-chest with the exhaust-port.

6. The combination, in a steam-chest, of a slide-valve, a tongue on the valve-rod adapted to engage a stop on one side of the valve, and an extension of said valve-rod and adapted to engage a stop on the other side of the valve, for the purpose specified.

JAMES WREN.

Witnesses:
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J. S. WREN.