

No. 740,882.

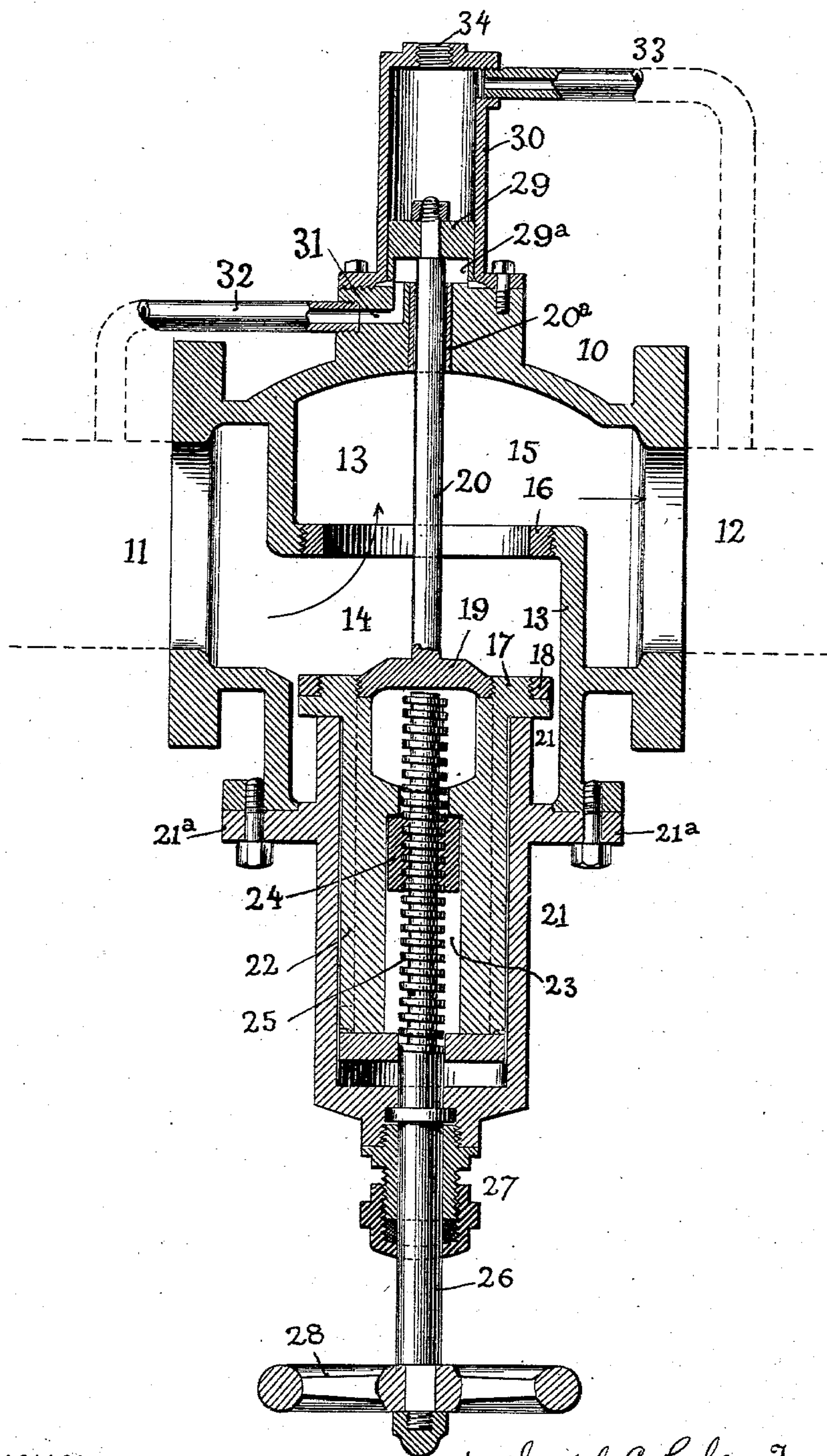
PATENTED OCT. 6, 1903.

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## COMBINED HAND AND AUTOMATIC SHUT OFF VALVE.

APPLICATION FILED DEC. 19, 1902.

NO MODEL.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## COMBINED HAND AND AUTOMATIC SHUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 740,882, dated October 6, 1903.

Application filed December 19, 1902. Serial No. 135,853. (No model.)

*To all whom it may concern:*

Be it known that I, NATHANIEL C. LOCKE, of Salem, Essex county, Massachusetts, have invented certain new and useful Improve-  
5 ments in a Combined Hand and Automatic Shut-Off Valve, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of valves which are automatically  
10 actuated by a fluid-pressure so as to close when there is a break in the conduit beyond the valve; and the object of my invention is to produce an extremely simple valve which has the aforesaid function, to make the valve  
15 as simple and positive as possible, so that it will work with certainty, to arrange and counterbalance the valve so that it will be accurate and not close under too slight pressure variations, and to produce a simple hand at-  
20 tachment by which without any preliminary adjustment the valve can be at once closed by hand, if desired, like an ordinary hand-operated valve.

Another object of the invention is to pro-  
25 vide an extension to the valve which will serve to hold the valve open and serve to steady it and act to retard the closing until the flow of steam through the valve is rapid, which rapidity is induced by a considerable  
30 reduction of pressure upon the low-pressure side of the valve.

With the object above mentioned in view my invention consists of certain features of construction and combinations of parts, which  
35 will be hereinafter described and claimed.

Reference is to be had to the accompanying drawing, forming part of this specification, in which similar figures of reference refer to similar parts throughout the view set forth.

40 The figure is a central vertical section of the valve embodying my improvements.

The valve has a suitable casing 10, having the inlet 11 on one side and the outlet 12 on the other, while the partition 13 divides the  
45 valve-casing into two chambers 14 and 15, these being separated by an essentially horizontal portion of the partition, in which is placed the valve-seat 16, this being preferably a seating-ring screwed into the parti-  
50 tion, so that when worn or injured it can be

easily replaced. The valve 17, which is arranged on the under side of the seat 16, moves vertically and is preferably provided with a seating ring or nut 18, and it has a center piece 19, which is screwed into it for conven-  
55 ience in making, this center piece being rigid on the piston-rod 20, which extends upward through the opening in the seat 16 and through the packing 20<sup>a</sup> in the top of the casing 10, where it connects with a piston, as hereinaf-  
60 ter described.

The casing 10 has a chamber or slideway 21, which extends upward into the casing and downward below it, the walls of the chamber 21 having a flange 21<sup>a</sup>, which is attached to  
65 the bottom of the casing 10; but this peculiar form of structure is for convenience, and the shape of the casing can, of course, be departed from. The top of the chamber-wall 21 forms a seat for the back of the valve 17  
70 when the latter is wide open.

It will be noticed that the upper surface of the valve 17 is convex and nearly conical, the purpose of which is to prevent the rapid flow  
75 of steam from causing the valve to close. If the valve were left flat, a partial vacuum might be created on one side in the case of a sudden reduction of pressure which would cause the valve to close when it should be  
80 open.

On the back or under side of the valve 17 is a long extension 22, which slides in the way or wall 21. This extension is important, as it serves for a counterbalance to the valve  
85 17 and balances in a measure the piston 29, to be hereinafter referred to, so that the piston will not rise too easily. This extension 22 also serves to hold down the valve and keep it open unless the flow of steam is more rapid,  
90 caused by a considerable reduction of pressure on the side of the valve toward the outlet. It will be evident that the means for actuating the valve by means of this extension can be omitted and the extension used solely  
95 to perform its office of weighting the valve.

In the extension of the valve 17 is a slide-  
way 23, in which is held the nut 24, this nut being adapted to slide but not turn in the  
extension 22. The nut 24 engages the screw-  
100 thread 25 on the valve-stem 26, which ex-



tends through the stuffing-box 27, and is provided with a handle 28, which can be of any usual form.

It will be seen that if the valve 17 is raised 5 by the piston-rod 20 it rises without reference to the valve-stem, the extension 22 sliding on the nut 24; but if, on the contrary, it is desired to operate the valve by hand the valve-stem on being turned engages the nut 10 24 and the latter lifts the extension 22 and valve 17, or if the stem is turned in the opposite direction the valve is permitted to drop.

The piston-rod 20 extends up through the top of the casing 10 and is attached to the 15 piston 29, which works in the cylinder 30, the said cylinder connecting at its lower end with a duct 31, which communicates with the high-pressure-steam pipe 32, and the cylinder 30 at its upper end has a pressure-pipe 33 and 20 an opening 34, which may afford a pipe connection, if desired.

It will be observed that the piston 29 has a depending ring 29<sup>a</sup> formed integrally therewith, and this construction gives the piston 25 a large surface next the cylinder and causes it to set itself closely over the duct 31, so as to prevent the high-pressure steam from passing up around the piston and cutting away any of the parts of the piston and cylinder.

30 In practice the valve is preferably arranged in a vertical position, and the pipe 32 is connected with the fluid-pressure, as with a conduit connecting with the battery-boilers, for instance, on the inlet side of the valve, and 35 the pipe 33 is connected with the conduit on the outlet side of the valve, and the connection is preferably at a point near the engine.

It will be seen that the pressure near the engine might be considerably lower than at 40 a point near the boiler, and for this reason the counterweight or extension 22 to the valve 17 is provided, as otherwise the temporary reduction in pressure in the pipe 33 might permit the piston 29 to rise slightly, and if 45 started the valve 17 would be lifted, so as to receive the full steam-pressure, and then it would be forced closely to its seat. In this connection it will be observed that the opening through the valve is made large and that 50 the valve 17 is also of large area, so that when it is desired to close the valve it will receive the full steam-pressure and being of large area will seat itself firmly.

From the foregoing description it will be 55 observed that I have provided a very simple and positive valve adapted to be operated either automatically or manually.

I have described and shown a piston for working the valve; but I wish it understood 60 that a diaphragm might be used as an equivalent for the piston, and in the claims while I use the term "piston" I intend to cover an equivalent, such as a diaphragm.

Having thus described my invention, what 65 I claim as new, and desire to secure by Letters Patent, is—

1. In a shut-off valve of the kind described, the combination of a casing having a channel for the passage of a fluid, a closing-valve adapted to close the said channel, a piston 70 working in a suitable closed cylinder, the said cylinder being provided at its ends with pressure-pipes, said pipes adapted to be connected with the valve-conduit on opposite sides of the said shut-off valve, a piston-rod connect- 75 ing the said piston and closing-valve, and a manually-operated valve-stem connected with the said closing-valve by means of a connection moving longitudinally of said closing-valve and adapted to engage it at the limit 80 of its movement.

2. The combination with the piston-operated valve provided with a way, of a nut movable longitudinally in said way, a threaded valve-stem engaging said nut and adapted 85 to bring it into operative contact with the extremities of said way, and hand-operated means for actuating the said valve-stem.

3. In a valve of the kind described, the combination with the piston-operated valve hav- 90 ing an extension thereon, said extension being provided with a way, of a nut fitting in the way so that the extension and nut may slide but not turn in relation to each other, and a threaded valve-stem fitting the nut. 95

4. The herein-described apparatus comprising a valve-casing having a suitable inlet and outlet, an essentially central partition provided with a valve-opening and dividing the casing into two chambers, a way 100 in the lower part of the casing, a single valve held below the valve-opening and provided with an extension extending into the aforesaid way, a nut held in the extension so as to slide but not turn in relation thereto, a 105 threaded valve-stem engaging the nut, a cylinder on the upper side of the casing, said cylinder having pressure connections at its upper and lower ends, a piston sliding in the cylinder, and a piston-rod connecting the 110 piston with the valve.

5. In a shut-off valve of the kind described, the combination of a casing having a channel for the passage of a fluid, a closing-valve adapted to close the said channel, and a piston 115 working in a suitable closed cylinder, the said cylinder being provided at its ends with pressure-pipes connected with the valve-conduit on opposite sides of the said shut-off valve and a piston-rod passing through the 120 channel in the casing connecting said piston and closing-valve and being adapted to automatically close the said closing-valve upon the reduction of the pressure on one of the sides of the said piston. 125

6. In a valve of the kind described, the combination of the casing, the steam-actuated valve therein, a chamber behind the valve, a guiding extension secured rigidly to the valve and sliding in the aforesaid chamber, and 130 hand-operated mechanism connecting with the said extension to move the valve, said



mechanism forming a sliding connection limited by the distance of travel of the steam-actuated valve.

5 7. A valve of the kind described, comprising a casing, a steam-actuated valve therein, a chamber below the valve, and a weighted extension secured to the valve and sliding in the aforesaid chamber.

10 8. A valve of the kind described, comprising a casing, a steam-actuated valve therein, a chamber in the casing below the valve, and a weighted extension secured to the valve and sliding in the chamber of the casing to prevent the closing of the valve when there  
15 is a slow flow of steam.

9. A valve of the kind described, comprising a casing, a steam-actuated valve therein, a chamber in the casing below the valve, a weighted extension secured to the valve and hanging in the chamber in the casing, and 20 means in the chamber for guiding the extension, said extension serving to restrain the valve when there is a slow flow of steam.

In witness whereof I have signed my name to this specification in the presence of two 25 subscribing witnesses.

NATHANIEL C. LOCKE.

Witnesses:

ALBERT N. LOCKE,  
FRANK E. LOCKE.