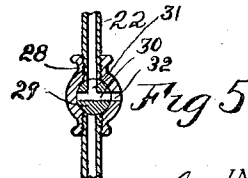
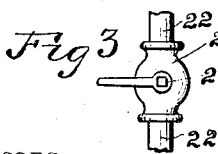
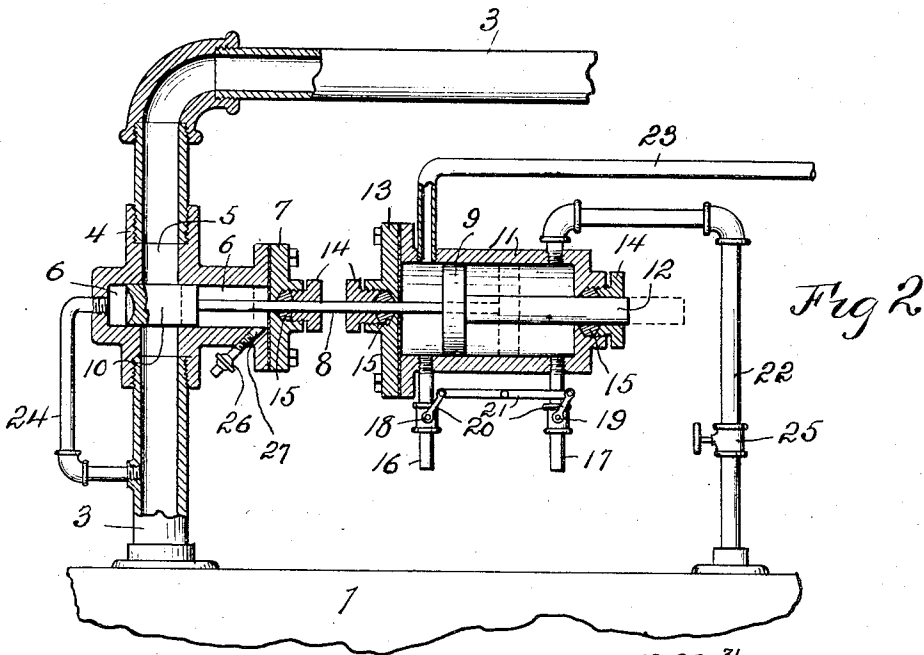
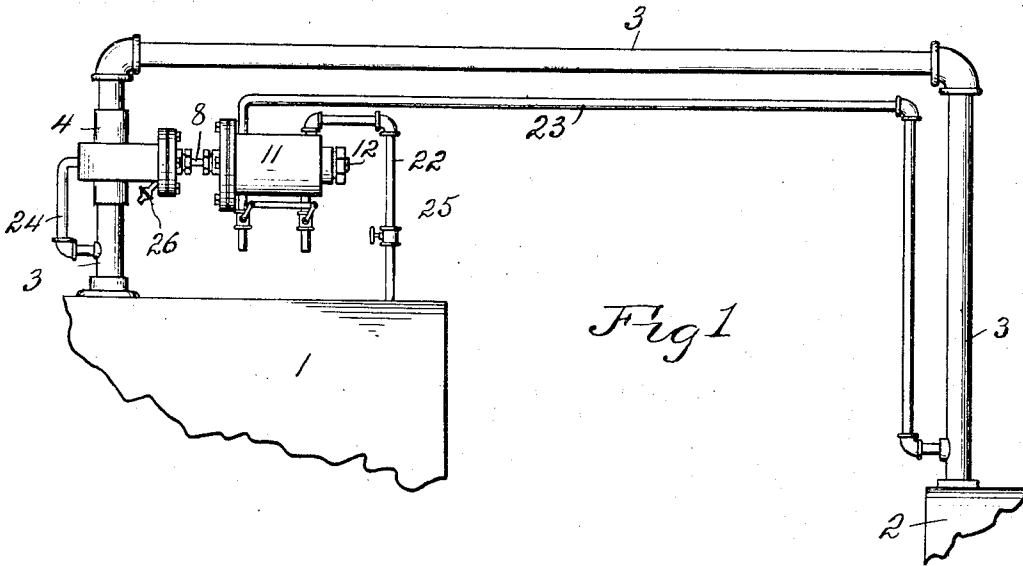


F. H. GOLDSMITH.
AUTOMATICALLY CLOSING VALVE.
APPLICATION FILED MAR. 6, 1908.

938,574.

Patented Nov. 2, 1909.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK H. GOLDSMITH, OF KANSAS CITY, MISSOURI.

AUTOMATICALLY-CLOSING VALVE.

938,574.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed March 6, 1908. Serial No. 419,515.

To all whom it may concern:

Be it known that I, FREDERICK H. GOLDSMITH, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Automatically-Closing Valves, of which the following is a specification.

My invention relates to improvements in automatically closing valves.

The object of my invention is to provide means for automatically closing valves contained in conductors carrying fluid under pressure when such conductors are accidentally broken or burst.

My invention is particularly adapted for use in steam heating systems in which piping is employed to convey steam from a boiler to a radiator.

In carrying my invention into effect, the fluid from the vessel containing the fluid, such as steam, gas, or a liquid such as water, is employed to close the valve controlling the flow of fluid through the discharge pipe connected with said vessel, whenever this discharge pipe bursts or is otherwise broken.

In the accompanying drawings which illustrate my invention, Figure 1 is a side elevation of the apparatus, a portion of a boiler and a portion of a radiator being shown. Fig. 2 is a central vertical sectional view of a portion of the apparatus shown in Fig. 1. Fig. 3 is an elevation of a modified form of shut-off valve to be used in the conductor connecting the boiler with the cylinder in lieu of the ones shown in Figs. 1 and 2. Fig. 4 is a vertical sectional view of the valve shown in Fig. 3 disposed so as to connect the boiler and cylinder. Fig. 5 is a view similar to Fig. 4, with the valve shown in a position closing the passage between the boiler and cylinder.

Similar characters of reference denote similar parts.

1 denotes a boiler, 2 a radiator and 3 a discharge conductor connecting the boiler and radiator. Included in said conductor 3 and forming a part thereof, is a fitting 4 which is provided with a vertical hole 5 which forms a portion of the passage of the conductor 3 and which is intersected at right angles by a circular hole 6 which extends horizontally partially through the fitting 4, the outer end of said hole being closed by a head 7 having a central horizontal hole in which is slidably mounted a horizontal rod

8 having secured at one end a piston 9 and at the other end a cylindrical valve 10, which is fitted in the hole 6 and slidable horizontally therein to and from a position closing the passage 5 of conductor 3. The piston 9 is reciprocative in a cylinder 11 having at one end a central horizontal hole in which a cylindrical, horizontal central extension 12 of the piston 9, is reciprocatively mounted. The opposite end of the cylinder 11 has secured to it a head 13 provided with a central horizontal hole in which is reciprocatively mounted the rod 8. The two heads of the cylinder 11 and the head 7, are each provided at their outer ends with central screw threaded recesses in which are fitted the screw threaded collars 14, the inner ends of which bear upon stuffing material 15, encircling the rod 8 and extension 12. For the purpose of withdrawing water from the cylinder 11 the under side thereof is provided with two vertical screw threaded holes in which are secured the upper ends of two conductors 16 and 17, which contain respectively valves 18 and 19. Each of said valves is provided with a crank arm 20, said crank arms being connected pivotally to a horizontal rod 21. By swinging the rod 21 horizontally to and fro, the valves 18 and 19 may be simultaneously opened and simultaneously closed.

22 denotes a conductor, one end of which is connected to the vessel or boiler 1, the other end being connected to the cylinder 11 at one end of the piston 9.

23 denotes a conductor, one end of which is connected to the cylinder 11 at the opposite end of the piston 9, the opposite end being connected to the discharge conductor 3 at a point adjacent to the radiator 2. It will be noted that the extension 12 of the piston 9 is of greater diameter than the rod 12, therefore the end of the piston 9, from which extends the extension 12, will have smaller area subjected to fluid pressure, than the other end of the piston 9. A by pass or conductor 24 has one end connected to the discharge conductor 3 intermediate the valve 10 and boiler 1. The other end of the conductor 24 is connected to the chamber or hole 6 at the inner end of said hole or chamber. A shut-off valve is located in the conductor 22, this valve may be of the ordinary "globe" valve type, such as is represented in Fig. 2 by the numeral 25.

26 denotes a draw-off cock mounted in a

hole 27 communicating with the lower side and right end, as viewed in Fig. 2, of the hole 6.

In operating my invention the valve 25 is
 5 closed and the valves 18, 19 and 26 are then
 opened. The steam or other fluid from the
 boiler or vessel 1 fills the by-pass 24 and the
 chamber 6, at the left end of the valve 10,
 as shown in Fig. 2. The pressure of the
 10 fluid in the by-pass 24 is the same as in the
 boiler 1 so that when the valve 25 is closed
 the valve 10 will be moved to the right so
 as to open the conductor 3. At the same
 time the rod 8 will force the piston 9 to the
 15 position shown in dotted lines in Fig. 2.
 The conductor 3 being opened the steam or
 fluid will pass to the radiator 2 and will
 also pass through the conductor 23 into the
 cylinder 11. The valves 18, 19 and 26 may
 20 now be closed and the valve 25 opened.
 When the valve 25 is opened the steam will
 pass through the conductor 22 from the
 boiler 1 into the cylinder 11. Inasmuch as
 the area of the end of the piston 9 which
 25 is adjacent to the conductor 22, is less than
 the opposite end of the piston, the piston
 will remain in the position indicated in
 dotted lines in Fig. 2 unless the pressure in
 the discharge pipe 3 is in any manner re-
 30 duced below a pre-determined amount rela-
 tive to the pressure in the boiler 1. If the
 conductor 3 should break or burst at any
 place intermediate the valve 10 and the ra-
 diator 2, the fluid in the cylinder 11 at the
 35 end connected to conductor 23 would pass
 from the cylinder through said conductor
 and when the pressure became sufficiently
 low at that end of the piston 9 the pressure
 of the fluid in the cylinder at the opposite
 40 end of the piston 9 will force the piston 9,
 rod 8 and valve 10 to the positions shown
 in solid lines in Fig. 2. In this position the
 valve 10 will close the conductor 3, thus
 shutting off the steam or fluid from the
 45 broken conductor so as to permit the same to
 be readily repaired.

When the form of valve shown in Figs.
 3, 4 and 5 is employed in the conductor 22,
 it will be unnecessary to open the valves 18
 50 and 19 when steam is to be admitted to the
 radiator 2. The valve shown in Figs. 3, 4
 and 5 comprises a casing 28 having a cylin-
 drical valve 29 rotatively mounted therein,
 said valve having a transverse passage 30,
 55 which is intersected by a passage 31 disposed
 at right angles thereto. When the valve 29
 is positioned as shown in Fig. 4, the passage
 30 is in alinement with the passage of con-
 ductor 22. In this position the steam will
 60 pass from the boiler 1 into the cylinder 11.
 When the valve is positioned as shown in
 Fig. 5 the passage 31 will aline with the con-
 ductor 22, while the passage 30 will register
 with a peripheral hole 32 in the valve cas-
 65 ing 28. In this position of the valve com-

munication between the boiler and cylinder
 will be cut off but air or steam may pass
 from the cylinder to the atmosphere through
 conductor 22 and passages 31 and 30. After
 a break in the conductor 3 has been repaired
 70 it is but necessary to close the valve 25.
 The steam through the by-pass 24 will then
 force the valve 10, in the manner already de-
 scribed, to the open position.

Various modifications of my invention 75
 within the scope of the appended claims,
 may be made without departing from its
 spirit.

Having thus described my invention, what
 I claim and desire to secure by Letters Pat- 80
 ent, is:—

1. The combination with a vessel adapted
 to contain fluid under pressure, of a dis-
 charge conductor connected therewith, a
 valve reciprocative to and from a position 85
 closing said conductor, means by which fluid
 from said vessel is applied at one end of
 said valve to force it to the open position, a
 cylinder, a piston reciprocative in said cyl- 90
 inder, a piston rod to which said valve and
 piston are secured, and means by which fluid
 is conveyed to said cylinder from said dis-
 charge conductor and from said vessel and
 simultaneously applied at both ends of said 95
 piston.

2. The combination with a vessel adapted
 to contain fluid under pressure, of a dis-
 charge conductor connected therewith, a re-
 ciprocative valve for closing said conductor,
 means by which fluid from said vessel is ap- 100
 plied to said valve in a direction tending to
 force said valve to the open position, a cyl-
 inder, a piston reciprocative in said cylinder
 and movable with said valve, opposite ends
 of said piston having different areas sub- 105
 jected to fluid pressure, a piston rod to
 which said valve and piston are secured,
 and means by which fluid is conveyed from
 said discharge conductor and from said vessel
 and discharged in said cylinder at opposite 110
 ends of said piston.

3. The combination with a vessel adapted
 to contain fluid under pressure, of a dis-
 charge conductor connected therewith, a
 valve for closing said conductor, means by 115
 which, when said valve is closed, fluid at a
 pressure of that contained in the vessel, is
 applied to the valve in a manner tending to
 force the same to the open position, a cyl-
 inder, a piston reciprocating in the cylinder, 120
 a piston rod to which said valve and piston
 are secured, conductors connected respec-
 tively to the discharge conductor and to said
 vessel and connected respectively to said cyl-
 inder at opposite ends of said piston, and a 125
 shut-off valve in the conductor connecting
 the cylinder and vessel.

4. The combination with a vessel for con-
 taining fluid under pressure, of a discharge
 conductor connected therewith, a valve for 130

closing said conductor, a cylinder having
two discharge openings and two inlet open-
ings, a piston reciprocative in said cylinder
intermediate said discharge openings and
5 intermediate said inlet openings, a piston rod
to which said valve and piston are secured,
means for applying to said valve a constant
pressure from said vessel tending to force
said valve to the open position, a conductor
10 connected at one end with said cylinder at
one of said inlet openings and at the other
end connected to said discharge conductor,
a conductor connected to said cylinder at

the other inlet opening and connected to said
vessel, a shut-off valve in the last named 15
conductor, two valves controlling respec-
tively the two discharge openings of said cyl-
inder, and means for simultaneously oper-
ating said two valves.

In testimony whereof I have signed my 20
name to this specification in presence of two
subscribing witnesses.

FREDERICK H. GOLDSMITH.

Witnesses:

E. B. HOUSE,

WARREN D. HOUSE.