

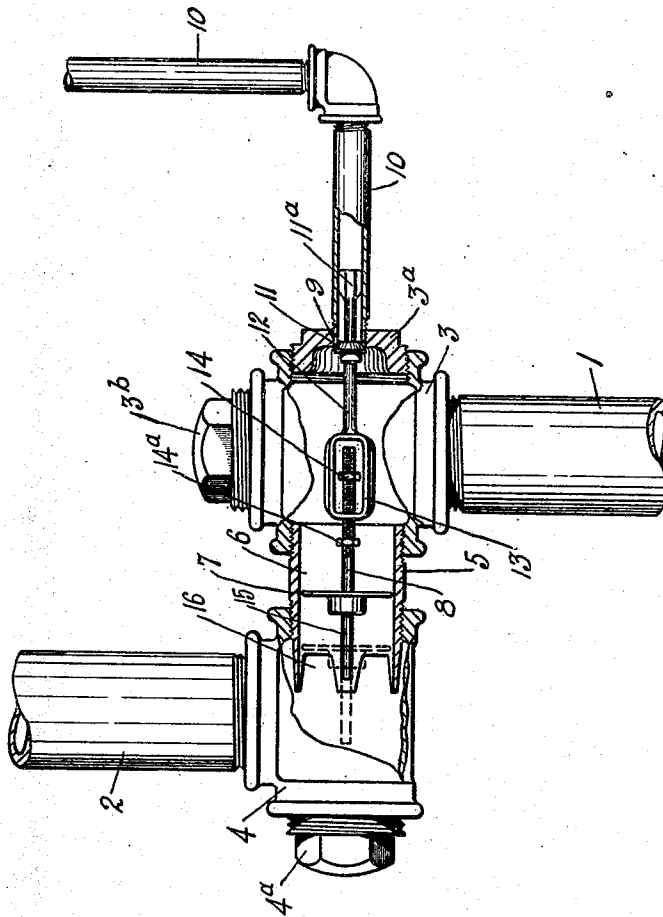
R. GRINNELL.

ALARM VALVE.

APPLICATION FILED JAN. 13, 1908.

933,173.

Patented Sept. 7, 1909.



WITNESSES

C. G. Bradley.
J. H. Thurston

INVENTOR

Russell Grinnell,
By Wilmarth C. Thurston
ATTORNEY

UNITED STATES PATENT OFFICE.

RUSSELL GRINNELL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO GENERAL FIRE EXTINGUISHER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ALARM-VALVE.

933,173.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed January 13, 1908. Serial No. 410,535.

To all whom it may concern:

Be it known that I, RUSSELL GRINNELL, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Alarm-Valves; and I do hereby declare the following specification, taken in connection with the accompanying drawings and forming a part of the same, to be a full, clear, and exact description thereof.

The invention relates to alarm valves for use in connection with automatic sprinkler systems, and which are designed to cause an alarm to be sounded when one or more of the sprinklers in the system is opened.

In a pending application of J. C. Meloan, Serial No. 410,536, a new form of alarm valve is shown and described, the characteristic feature of which is that the valve does not require to be tightly seated against a valve-seat, as was the case with previous alarm valves, but is instead in the form of a piston-valve. In the arrangements shown in said application a secondary valve is employed to control the flow of fluid from the supply-pipe through the pipe leading to the alarm mechanism, and a stuffing box is required to be employed through which the valve-stem of the alarm-valve extends to operate said second valve.

The use of a stuffing box in an automatic sprinkler system is attended with certain objections, and the object of the present invention is to provide an alarm valve of the general character of that which forms the subject of the application referred to, but in which the use of a stuffing box is avoided.

To that end the invention consists primarily in so locating the secondary valve referred to that the valve-stem of the alarm-valve does not require to extend through a stuffing box in order to reach said secondary valve and operate the same.

The invention further consists in the combinations and arrangements of parts herein-after described and claimed.

Referring to the drawings, the figure is an elevation, partly in section, of an alarm valve embodying the invention and showing the pipe connections therewith.

1 represents a pipe leading from a suitable source of supply and 2 the pipe leading to the automatic sprinkler system. These pipes 1 and 2 are arranged out of line with each other, as shown. The upper end of the pipe

1 is provided with a cross 3, and the lower end of the pipe 2 is provided with a T-piece 4. The cross 3 and T-piece 4 are connected by a nipple or cylinder 5, which constitutes a valve-chamber 6. The third opening of the cross 3 is closed by a plug 3^a and the fourth opening is closed by a plug 3^b, while the third opening in the T-piece is closed by a plug 4^a.

In the chamber 6 is a piston-valve 7, which constitutes the alarm-valve proper. This valve 7 is a loosely fitting valve, and so that the water or other fluid in the pipes 1 and 2 may flow past said piston in one direction or the other, whereby whenever any variation of pressure occurs the pressure will be equalized on both sides of said valve. The piston-valve 7 is provided with a valve-sleeve 8.

The plug 3^a is provided with a tapped opening 9 and the pipe 10, which leads to the alarm-device, such as a water-motor, a whistle, the switch of an electric alarm or other alarm mechanism (not shown), instead of leading directly from the supply-pipe, is connected with this opening 9 in the plug 3^a. The secondary valve 11 for controlling the flow of water or other fluid through the pipe 10 for operating the alarm mechanism, instead of being located in the pipe 10, is located within the cross 3 or within the plug 3^a, and so that said valve seats against the end of said pipe as shown. The secondary valve 11 thus controls the entrance of the water or other fluid from the supply-pipe into said pipe 10, and normally excludes the water or other fluid therefrom.

The secondary valve 11, which may be provided with guides 11^a, has a valve-stem 12 which is connected to the valve-stem 8 of the alarm-valve 7 for operating said secondary valve. In order to prevent false alarms when the piston-valve 7 is moved within certain limits by variation of pressure in the pipes produced by water-hammer or otherwise, it is desirable that there should be lost motion in the connection between the valve-stem 8 and the valve-stem 12, and for this purpose the valve-stem 12 is shown as provided with a yoke 13, having an opening in the end thereof, through which the end of the valve-stem 8 freely passes. The end of the valve-stem 8 is screw-threaded to receive adjusting nuts 14, 14^a, one of which nuts is located on one side of the cross-piece of the

yoke 13, and the other on the opposite side of said cross-piece. With this construction the alarm-valve 7 may move within certain limits without moving the secondary valve 11, and the extent of such movement of the valve 7 may be regulated by adjusting the position of the nuts 14 on the valve-stem 8. The first dotted line position of the valve 7 indicates the position to which the valve may move without opening the valve 11 when the nuts are adjusted as shown.

For the purpose of limiting the movement of the alarm-valve 7 when operated for the purpose of sounding the alarm, said valve is provided with a valve-stem 15 extending from the opposite side of said valve, the end of which valve-stem is adapted to come in contact with the plug 4^a, as indicated by the second dotted line position of the valve. The end of the nipple or cylinder 5 extends into the T-piece 4 and is cut away to form ports or openings 16, shown in the drawings as four in number, and leaving intervening portions 17, which constitute guides for the piston-valve 7. This construction, while providing ports or passages for the flow of the water or other fluid, serves to guide the piston-valve in its movement, and with the guides 17 of sufficient length to retain control of said valve when moved to its extreme position, as shown, the resetting of the valve will be facilitated.

The operation of the arrangement above described is as follows: As the piston-valve 7 is a loosely fitting valve, the water or other fluid in the pipes 1 and 2 may flow past said valve in either direction, and so that whenever any variation of pressure occurs the pressure will be equalized on both sides of said valve. Moreover with the construction shown the valve 7, being a piston-valve, is free to move in the valve-chamber 6 in either direction, and if any sudden increase of pressure occurs, as by water-hammer or otherwise, and which cannot be equalized by a flow of water past the valve 7, said valve may itself move in the valve-chamber until the pressure on both sides of the valve has been again equalized. By reason of the lost motion provided in the connection between the valve-stem 8 and the valve-stem 12, any movements of the piston-valve 7 within the limits provided for by such lost motion will not be accompanied by any opening of the secondary valve 11, which will remain closed by the fluid-pressure acting thereon, and thus false alarms will be prevented.

When now one or more of the sprinklers connected to the pipe 2 or to branches leading therefrom opens, the reduction of pressure in said pipe 2 and the flow of water or other fluid thereby produced will first cause the valve 7 to be moved from the position shown in full lines to the position indicated by dotted lines, and such movement of the

valve 7 and its valve-stem 8 will serve to take up the lost motion between said valve-stem 8 and the valve-stem 12. Further movement of said valve 7 will then by the engagement of the nut 14 with the cross-bar of the yoke 13, serve to move the valve 11 away from its seat and thereby permit the water or other fluid to flow into and through the pipe 10 to operate whatever alarm device may be connected with said pipe 10. Such further movement of the valve 7 will also serve to open the ports 16.

With the arrangement above described, and with the valve 11 located in the T-piece 3, and thus in the main fluid-passage, the employment of a stuffing box is avoided, said valve being in a position where it can be directly reached and engaged by the valve-stem of the alarm-valve within the fluid-passage.

It will be further seen that, with the secondary valve thus located in the main fluid-passage, the pipe which leads to the alarm-mechanism may be connected with said fluid-passage at a point where said secondary valve will serve to close the entrance to said pipe and so that said valve will be normally held closed by the fluid-pressure acting on said valve, thereby avoiding the use of a spring-actuated valve in said pipe.

While the alarm-valve arrangement above described is especially adapted for use in connection with automatic sprinkler systems, said arrangement may be employed in connection with other fluid-pressure systems where it is desired to sound an alarm when the pressure is reduced below a predetermined point.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination, with a fluid-pressure pipe, of a pipe leading therefrom to conduct fluid pressure to operate an alarm, a non-seating valve in said fluid-pressure pipe, and a valve controlling the entrance to said alarm operating pipe.

2. The combination, with a fluid-pressure pipe, of a pipe leading therefrom to conduct fluid-pressure to operate an alarm, a non-seating valve in said fluid-pressure pipe, and a valve controlling the entrance to said alarm-operating pipe and adapted to be operated by said non-seating valve.

3. The combination, with a fluid-pressure pipe, of a pipe leading therefrom to conduct fluid-pressure to operate an alarm, a non-seating valve in said fluid-pressure pipe, a valve controlling the entrance to said alarm-operating pipe, and means for operating said valve by said non-seating valve.

4. The combination, with a fluid-pressure pipe, of a pipe leading therefrom to conduct fluid-pressure to operate an alarm, a non-seating valve in said fluid-pressure pipe, a valve controlling the entrance to said alarm-

operating pipe, and means embodying lost motion for operating said valve by said non-seating valve.

5 5. The combination, with a fluid-pressure pipe, of a pipe leading therefrom to conduct fluid-pressure to operate an alarm, a non-seating piston-valve in said fluid-pressure pipe, a secondary valve controlling the entrance to said alarm-operating pipe, and
10 means for operating said secondary valve by said piston-valve.

6. The combination, with a fluid-pressure pipe, of a pipe leading therefrom to conduct fluid-pressure to operate an alarm, a non-seating piston-valve in said fluid-pressure
15 pipe, a secondary valve controlling the entrance to said alarm-operating pipe, and means embodying lost motion for operating said secondary valve by said piston-valve.

20 7. The combination, with a fluid-pressure pipe, of a valve-chamber therein, a non-seating valve in said chamber, a pipe leading from said chamber to operate an alarm, a secondary valve in said chamber adapted to

control the entrance to said alarm-operating pipe, and a connection between said valves. 25

8. The combination, with a fluid-pressure pipe, of a valve-chamber therein, a non-seating valve in said chamber, a pipe leading from said chamber to operate an alarm, a
30 secondary valve in said chamber adapted to control the entrance to said alarm-operating pipe, and a connection embodying lost motion between said valves.

9. The combination of a fluid-pressure
35 pipe formed in two sections offset to each other, a connection between said sections forming a valve-chamber, a non-seating valve in said chamber, a pipe leading from said chamber to operate an alarm, a second-
40 ary valve in said chamber adapted to control the entrance to said alarm-operating pipe, and a connection between said valves.

RUSSELL GRINNELL.

Witnesses:

W. H. THURSTON,
J. H. THURSTON.