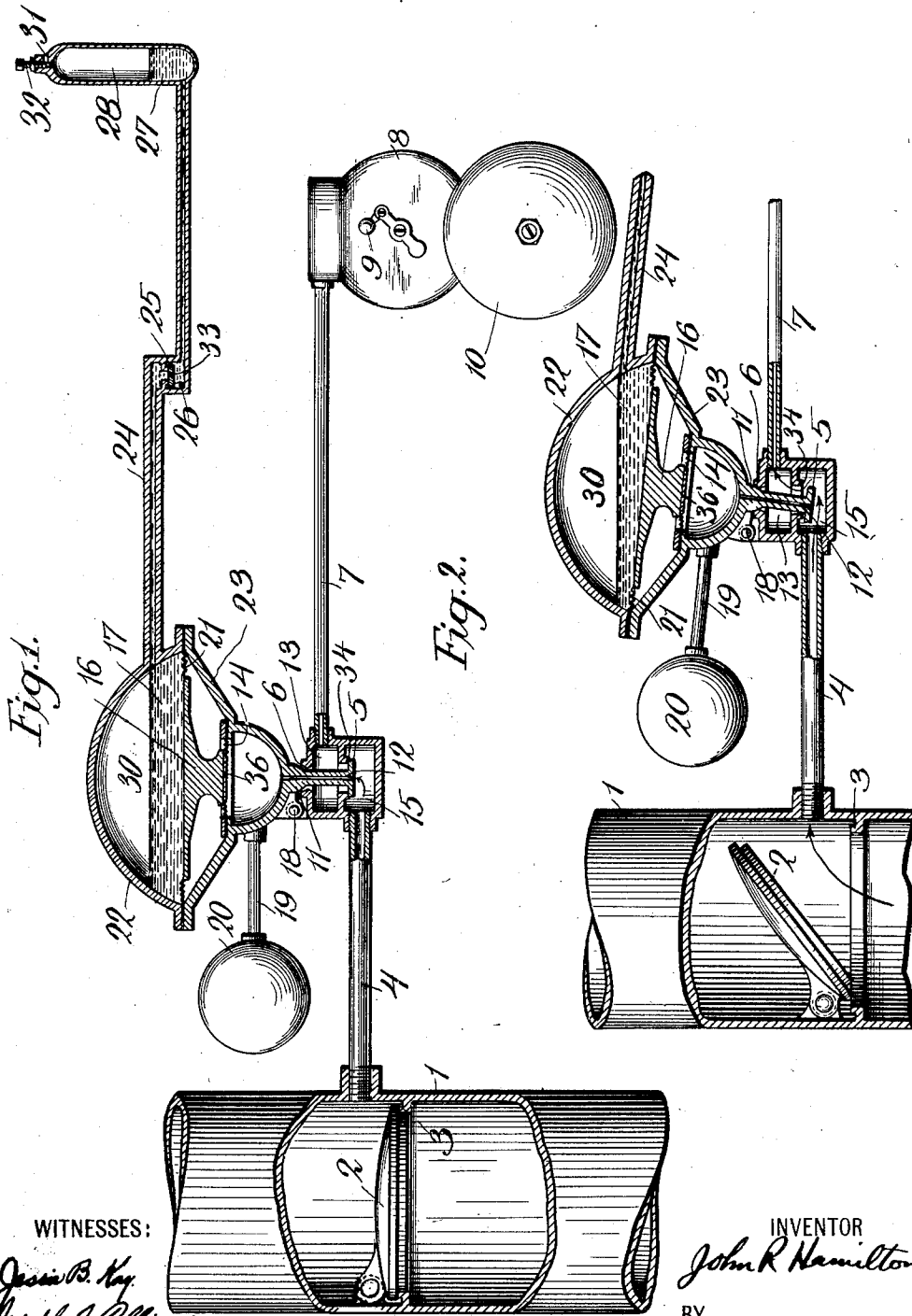


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 SPRINKLER ALARM APPARATUS.

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SPRINKLER-ALARM APPARATUS.

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To all whom it may concern:

Be it known that I, JOHN R. HAMILTON, a citizen of the United States, and resident of Mount Kisco, in the county of Westchester and State of New York, have made a certain new and useful Invention in Sprinkler-Alarm Apparatus, of which the following is a specification, taken in connection with the accompanying drawings, forming part of the same.

This invention relates to sprinkler alarm apparatus and relates especially to apparatus for quickly and reliably giving an alarm in the event of the normal fire operation of the sprinkler heads of an automatic system while the alarm substantially accommodates itself to accidental pressure changes so as to have increased sensitiveness and reliability.

In the accompanying drawings showing diagrammatically an illustrative embodiment of this invention, Figure 1 is a partial vertical section. Fig. 2 is a similar view showing the parts in emergency position.

In the illustrative embodiment of this invention diagrammatically indicated in the drawings, the supply pipe 1 which of course communicates with the usual distributing system and sprinkler heads, may be provided with a suitable check valve 2 loosely pivoted as indicated. The pipe 4 may communicate with the supply pipe adjacent the check therein and communicate with the valve chamber 15 having the alarm seat 34. The casing 21 may be movably mounted or suspended in any desired way and may be pivoted as diagrammatically indicated about the pivot 18 so as to have bodily movement with respect thereto. This casing may carry the alarm valve 12 so as to cooperate with the seat 34 and the desired distribution of weight with respect to the point of suspension may be secured by a rod 19 and weight 20 secured to the casing.

As indicated, the casing may be provided with a differential valve of the diaphragm type, the valve 16 secured to the diaphragm 21 being of considerably larger area than the opposed valve face 36 secured to the diaphragm 14, although, of course, these two valves should be properly secured together so as to move simultaneously, and operate in any desired way the movable counterbalance means compensating for the pressure variations in the system. This counter-

balance may be in the form of a fluid, such as mercury, within the chamber 30 with which the receiver 28 is connected through the tubular arm 24 if desired which also serves to support the receiver from the casing. The movement of this counterbalance fluid may be controlled by a suitable vent 31 in the receiver which may be adjusted by the threaded needle valve 32 and also when desired by the check valve 25 cooperating with the seat in the arm passage and mounted loosely when desired about the pivot 26, this valve being preferably formed with a suitable throttled opening 33. The alarm of any desired form may, of course, be operated by the pressure or fluid flow in the alarm chamber 13. This chamber as indicated in Fig. 1 is normally kept at atmospheric pressure by the plug 11 being maintained out of engagement with the seat 6 but when in emergency position indicated in Fig. 2 the plug tightly engages this seat so as to close the opening and the alarm valve 5 moving away from its seat 34 the fluid from the supply pipe passes through the pipe 4, the valve chamber 15, alarm chamber 13 and alarm pipe 7 so as to operate the water motor 8 if that is the type of alarm employed and bring the hammer 9 into engagement with the bell 10 so as to give the alarm.

Of course, the parts are so adjusted that when under normal pressure conditions the alarm valve 5 is held firmly against its seat by the fluid pressure in the valve chamber, although when this pressure is diminished by the opening of one or more sprinkler heads under service conditions the decrease in pressure on the alarm valve is sufficient so that the casing and arm descend and the parts assume the emergency position indicated in Fig. 2 so as to operate the alarm. If when the parts are in the normal position indicated in Fig. 1 the pressure in the supply pipe increases momentarily for any cause, such as water hammer, this increase of pressure is communicated through the pipe 4 to the valve chamber and operates to hold the alarm valve still more firmly against its seat. The fluid from the valve chamber 15 passes through the restricted passage 12, however, and acting on the valve 36 forces this differential valve upward and thereby moves the mercury or other movable counterbalance means so that it exerts a greater

force, tending to open the alarm valve, the mercury forced out into the receiver at the end of the arm 24 having a very considerable leverage and tending to swing the arm and connected casing about its pivot so as to open the alarm valve. The parts are preferably given such proportions that the increased closing pressure on the alarm valve caused by an increased fluid pressure in the valve chamber is substantially counterbalanced and neutralized by the movable counterbalance fluid so that even under conditions of water hammer the alarm valve will open just about as quickly and reliably on the service operation of the sprinkler heads and give the alarm.

Having described this invention in connection with an illustrative diagrammatic embodiment of the same, to the details of which this invention is not, of course, to be limited, what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims.

1. In sprinkler alarm apparatus, a supply pipe having a check valve therein, a valve chamber connected to said supply pipe adjacent said check valve, an alarm chamber adjacent said valve chamber and separated therefrom by a seat, a movable pivoted casing having an alarm valve connected therewith coöperating with said seat, there being a restricted passage through said alarm valve, a differential valve in said casing operated by the pressure of fluid passing through said restricted passage, a hollow arm and receiver connected with said casing and having counterbalance fluid therein controlled by said differential valve, a check valve having a restricted opening in said arm, an adjustable vent in said receiver and an alarm connected with said alarm chamber.

2. In sprinkler alarm apparatus, a supply pipe having a check device therein, a valve chamber connected to said supply pipe adjacent said check device, a normally open alarm chamber adjacent said valve chamber and separated therefrom by a seat, a movable pivoted casing having an alarm valve connected therewith and coöperating with said seat, there being a restricted passage through said alarm valve and communicating with the interior of said casing, a differential valve in said casing operated by the pressure of fluid passing through said restricted passage from said valve chamber, a hollow arm and receiver connected with said casing, counterbalance fluid in said casing, arm, and receiver controlled by said differential valve, a check valve having a throttled opening in said arm, a plug on said casing to close said alarm chamber and an alarm connected with said alarm chamber to be operated on the opening of said alarm valve.

3. In sprinkler alarm apparatus, a supply pipe having a check device therein, a valve chamber having a seat therein and connected to said supply pipe adjacent said check device, a pivoted casing having an alarm valve connected therewith coöperating with said seat, an arm and receiver connected to said casing and provided with a throttled passage, a differential valve within said chamber operated by the fluid pressure on said alarm valve and counterbalance fluid in said casing and receiver operated by said differential valve.

4. In sprinkler alarm apparatus, a supply pipe having a check device therein, a valve chamber provided with a seat and alarm and connected to said supply pipe adjacent said check device, a movable casing having an alarm valve connected therewith and coöperating with said seat, a receiver supported by said casing and connected therewith through a throttled passage, counterbalance fluid in said casing and receiver, and means including a restricted passage to move said counterbalance fluid by the fluid pressure on said alarm valve.

5. In sprinkler alarm apparatus, a valve chamber having a seat and adapted to be connected with a distributing system comprising a check valve, a movable pivoted casing having an alarm valve connected therewith and coöperating with said seat, a receiver supported by said casing and connected therewith through a throttled passage, counterbalance fluid in said casing and receiver and means controlling said counterbalance fluid from the fluid pressure on said alarm valve.

6. In sprinkler alarm apparatus, a valve chamber provided with a seat and adapted to be connected with an alarm, a movable casing having an alarm valve connected therewith and coöperating with said seat, a receiver supported by and connected with said casing, counterbalance means in said receiver and casing and means comprising a restricted passage to operate said counterbalance means from the fluid pressure on said alarm valve.

7. In sprinkler alarm apparatus, a valve chamber provided with a seat and adapted to be connected with an alarm to operate the same and to be connected with a distributing system, a movable casing having an alarm valve connected therewith and coöperating with said seat, a receiver connected with said casing, counterbalance means in the said casing and receiver, devices to retard the movement of said counterbalance means from said receiver to said casing, and means comprising a restricted passage to control the movement of said counterbalance means from the fluid pressure on said alarm valve.

8. In sprinkler alarm apparatus, a valve

chamber provided with a seat and adapted to be connected with and operate an alarm and to be connected with a checked distributing system, a movable casing having an alarm valve connected therewith and co-operating with said seat, a receiver connected with said casing, counterbalance means in said receiver and casing and means to operate said counterbalance means from the fluid pressure on said alarm valve.

9. In sprinkler alarm apparatus, a valve casing having a seat and adapted to be connected with and operate an alarm and to be connected with a checked distributing system, a movable casing having an alarm valve connected therewith and coöperating with said seat, said valve being normally held closed by the fluid pressure in said valve chamber and movable counterbalance means controlled by the pressure in said valve chamber to exert an increased opening force on said alarm valve when the pressure in said valve chamber increases.

10. In sprinkler alarm apparatus, a valve chamber provided with a seat and adapted to be connected with and operate an alarm and to be connected with and operated by a checked distributing system, a movable casing provided with an alarm valve co-operating with said seat and normally held in inoperative position by the fluid pressure in said chamber and movable counterbalance means controlled by the pressure in said chamber to substantially neutralize the increased closing force on said alarm valve caused by increased pressure in said chamber.

11. In sprinkler alarm apparatus, a chamber adapted to be connected with and operate an alarm and to be connected with and operated by a checked distributing system, movable alarm means in said chamber normally held in inoperative position by the pressure therein and movable counterbalance means controlled by the pressure in said chamber to exert an increased operating force on said alarm means when the pressure in said chamber increases.

12. In sprinkler alarm apparatus, a chamber adapted to be connected with and operate an alarm and to be connected with and operated by a distributing system in which a difference of pressure is maintained on the commencement of flow therethrough, movable alarm means in said chamber normally held in inoperative position by the pressure therein and movable counterbalance means controlled by the pressure in said chamber to exert an increased operating force on said alarm means when the pressure in said chamber increases.

13. In sprinkler alarm apparatus, a supply pipe having therein means to maintain a difference of pressure in said pipe upon the commencement of flow therethrough, a

valve chamber provided with a seat to communicate with an alarm, said valve chamber being connected to said supply pipe adjacent said means, a movable casing having an alarm valve connected therewith and co-operating with said seat, a receiver supported by said casing and connected therewith through a throttle passage and counterbalance fluid in said casing and receiver and means including a reciprocated passage to move said counterbalance fluid by the fluid pressure on said alarm valve.

14. In sprinkler alarm apparatus, a valve chamber provided with a seat and adapted to be connected with and operate an alarm and to be connected with and operated by a distributing system in which a difference of pressure is maintained on the commencement of flow therethrough, a casing provided with an alarm valve coöperating with said seat and normally held in inoperative position by the fluid pressure in said chamber and movable counter balance means controlled by the pressure in said chamber to substantially neutralize the increased closing force on said valve caused by the increased pressure in said chamber.

15. In sprinkler alarm apparatus, a valve chamber provided with a seat and adapted to be connected with and operate an alarm and to be connected with a distributing system in which a difference of pressure is maintained on the commencement of flow therethrough, a casing having an alarm valve connected therewith and coöperating with said seat, a receiver connected with said casing, counterbalance fluid in said receiver and casing and means to operate said counterbalance fluid from the fluid pressure on said alarm valve.

16. In sprinkler alarm apparatus, a valve casing having a seat adapted to be connected with and operate an alarm and to be connected with a distributing system in which a difference of pressure is maintained on the commencement of flow therethrough, a casing having an alarm valve connected therewith and coöperating with said seat, said valve being normally held closed by the fluid pressure in said valve chamber and movable counterbalance fluid controlled by the pressure in said valve chamber to exert an increased operating force on said alarm valve when the pressure in said valve chamber increases.

17. In sprinkler alarm apparatus, a chamber to be connected with an alarm and to be connected with a distributing system in which a difference of pressure is maintained on the commencement of flow therethrough, movable alarm controlling means in said chamber normally held in operative position by the pressure therein, and means controlled by the pressure in said chamber to substantially neutralize by its weight the in-

creased holding force on said alarm controlling means caused by an increase of pressure in said chamber.

18. In sprinkler alarm apparatus, a chamber to be connected with an alarm and to be connected with a distributing system in which a difference of pressure is maintained on the commencement of flow therethrough, movable alarm controlling means in said chamber normally held in inoperative posi-

tion by the pressure therein, and means controlled by the pressure in said chamber to substantially neutralize the increased holding force on said alarm controlling means caused by an increase of pressure in said chamber.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."