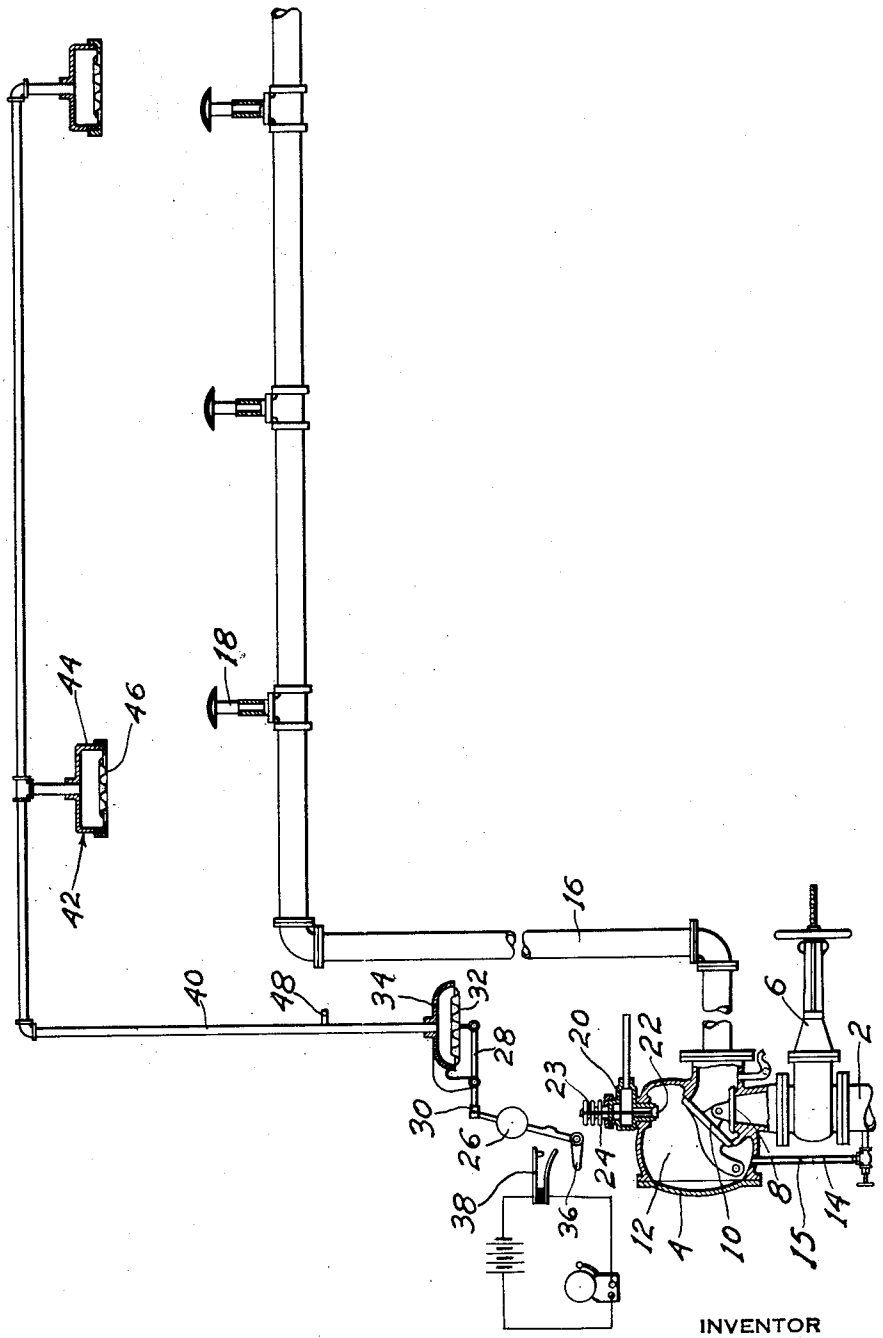
Jan. 2, 1934. E. A. LOWE 1,941,700

DUAL ACTION DELUGE VALVE

Filed July 17, 1930



INVENTOR
Ernest A. Lowe
BY
Townsend & Decker
ATTORNEYS

Patented Jan. 2, 1934 1,941,700

UNITED STATES PATENT OFFICE

1,941,700

DUAL ACTION DELUGE VALVE

Ernest A. Lowe, Cleveland, Ohio, assignor to Automatic Sprinkler Company of America, Cleveland, Ohio, a corporation of Delaware

Application July 17, 1930. Serial No. 468,491

3 Claims. (Cl. 169—17)

This invention relates to improvements in fire extinguishing apparatus.

It is one of the primary objects of the invention to provide an apparatus of this character which will be responsive to fire conditions as well as to unusual pressure conditions in a protected area for automatically supplying fire extinguishing fluid in such area.

More specifically the invention relates to the provision of a control unit of a heat absorbing character placed in the protected area and having a portion thereof constructed to respond to pressure changes.

The above and other objects will appear more fully from the following description when considered in connection with the drawing in which the figure illustrates one form which my invention may adopt.

In the drawing there is indicated a usual source of fire extinguishing fluid comprising a water main 2 normally held closed by the differential valve 4. A gate valve 6 is provided so that whenever desired the fluid distributing device may be closed on the source of fluid supply.

The valve 4 may be made of any usual construction that shown comprising a closure disk 8 supported from the valve disk 10 the former closing the outlet from the main 2 and the latter closing communication between the differential chamber 12 and the passageway leading to the distributing pipes. The valve 8 is normally held in its closed position by the superior pressure upon the rearward face of the valve disk 10 by means of bypass pressure supplied through the pipe 14 provided with the restriction 15.

The fluid distributing pipes 16 associated with each valve 4 include one or more sprinkler outlets 18 in the protected area, these outlets being shown as typical normally open outlets, although obviously fuse controlled normally closed outlets may be employed where such are desired.

Release of pressure from the chamber 12 to cause the opening of the main valve 8 is provided in the present instance through the relief valve 20 which includes a closure 22 and an operating stem 23 extended above the same and secured by means of the usual flexible or collapsible casing 24. The closure 22 normally seals the interior of the chamber 12 but when the valve stem 23 is depressed the bypass pressure is permitted to escape through the relief valve and discharge tubing shown whereby the valve automatically opens.

The means employed herein for opening the relief valve 20 comprises a pivoted weighted lever 26 positioned to engage and depress valve stem 23 when released. The lever 26 is normally held in its elevated or inactive position by means of a pivoted control lever 28 having a transverse projection 30 positioned to engage a similar projection on the end of lever 26. The opposite end of lever 28 is connected with the central portion of the flexible diaphragm 32 formed on the pressure responsive element 34. The position of the projection 30 with respect to lever 26 is such that either an increase or decrease of pressure within the unit 34 causes the projection 30 to move to non-obstructing position thus permitting the weighted lever to fall as described above. The lever 26 may be provided with an extension 36 for closing switch 38 to close the alarm circuit shown in case such alarm is desired.

Increase or decrease of pressure is conveyed to the element 34 through the tubing 40 extended from the element 34 to the protected area or areas. The heat responsive units placed in the fire zone for creating the valve actuating pressure are of a novel construction. Each of these units 42 comprises a rigid hollow metallic shell 44 the interior of which communicates with the tubing 40. The body portion 44 of each unit is of a flat or elongated character so as to readily absorb the exterior heat and expand the air therein and also for the purpose of providing a relatively large open face for receiving the diaphragm 46. The diaphragm 46 which closes the face of the unit and which is also preferably formed of heat absorbing metal may be secured with respect to the body portion 44 in any suitable manner as by means of the screw-threaded ring shown. In order to prevent gradual changes of pressure from affecting the device where such changes are gradual and result, for example, from natural temperature or barometric changes the tubing is provided with a restricted vent 48 constituting a leak sufficient to accommodate slow pressure changes within or without the tubing.

In the operation of the apparatus the occurrence of a fire in the protected area causes an expansion of the air in the units 42 this pressure being transmitted through the tubing 40 to the diaphragm 42 which on being depressed releases the weighted lever 26 and permits valve 8 to open and the fire extinguishing fluid to be supplied at the corresponding outlets 18. If the fire should be preceded by an explosion resulting in either an increase or decrease of pressure adjacent the units 42 such increase or decrease of pressure would cause the diaphragm 46 to be flexed and produce either a corresponding increase or decrease of

pressure in the tubing 40 with the consequent movement of the diaphragm 32 and opening of the valve 8.

By means of the above described devices many sudden and disastrous fires may be prevented where the same are preceded by minor explosions which do not ordinarily produce sufficient heat to actuate the heat controlling device. This pressure does, however, represent a condition of danger sufficient to justify the supplying of fire extinguishing fluid to the outlets 18 and the creating of an alarm in view of the second and more serious explosions which often succeed the initial primary explosions.

Having now described my invention, I claim:

1. In a fire extinguishing apparatus, a source of fire extinguishing fluid, means for releasing the same and means for controlling said releasing means comprising an element responsive to increase or decrease of pressure, means for actuating said element comprising a heat absorbing unit placed in a fire zone and connected by pressure transmitting tubing to said element, said unit being formed with means for transmitting exterior increase or decrease of pressure to the interior thereof.

2. In a fire extinguishing apparatus, means for supplying fire extinguishing fluid to a fire zone, means for controlling said fluid supply means and comprising a device responsive to increase or decrease of pressure for actuating said supply means and a unit, operatively associated with said device, positioned in the protected area and formed with means for producing either an increase or decrease of pressure therein on the occurrence of a predetermined heat, pressure or suction condition adjacent said unit.

3. In a fire extinguishing apparatus, a source of fire extinguishing fluid, means actuated by an increase or decrease in pressure for producing a flow of said fluid, means for producing a pneumatic pressure change comprising a heat absorbing unit placed in a fire area and formed with pressure responsive means for transmitting exterior increases or decreases in pressure to the interior of said unit and means associated with said pressure actuated and pressure producing means for compensating for normal temperature and pressure variations.

ERNEST A. LOWE.