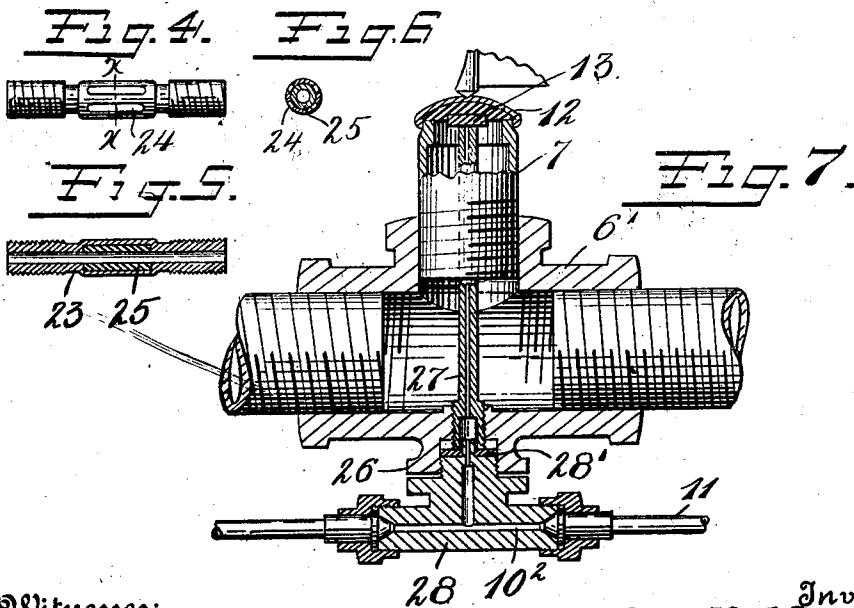
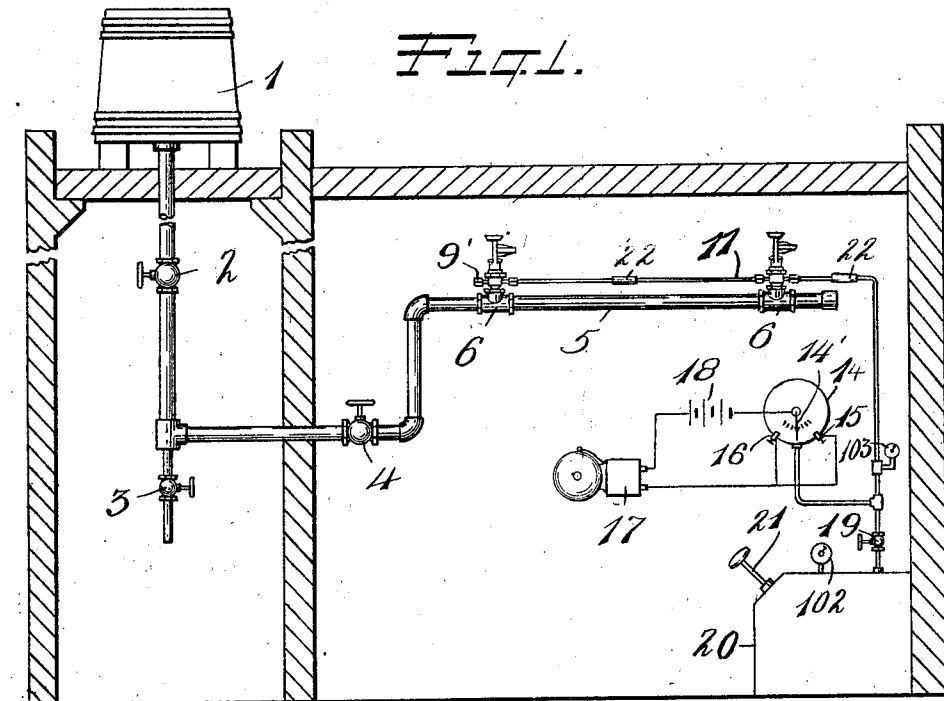


E. D. VAN NESS.
 AUTOMATIC SPRINKLER SYSTEM.
 APPLICATION FILED JUNE 17, 1911.

1,014,349.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.



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Fig. 2.

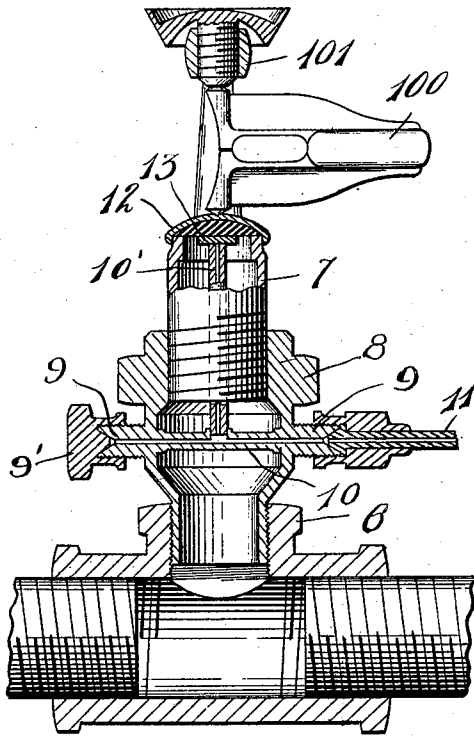
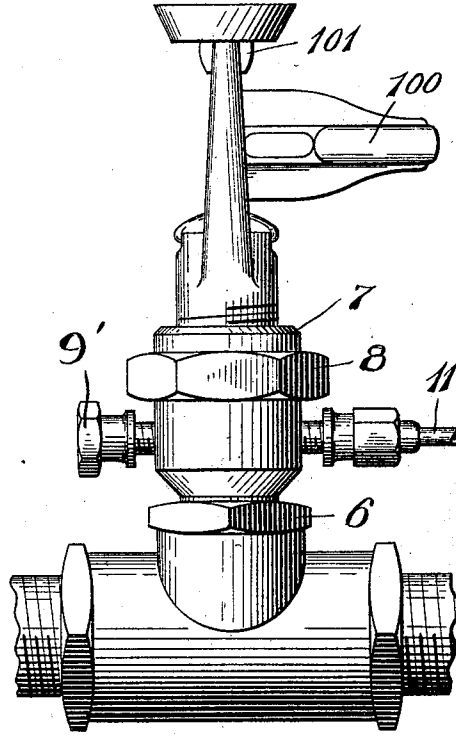


Fig. 3.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC SPRINKLER SYSTEM.

1,014,349.

Specification of Letters Patent.

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Application filed June 17, 1911. Serial No. 633,788.

To all whom it may concern:

Be it known that I, EUGENE D. VAN NESS, a citizen of the United States, residing at Hoboken, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Automatic Sprinkler Systems, of which the following is a full, clear, and exact description.

My invention relates to a water flow and leakage detector adapted to be used with automatic sprinkler systems, and has for its object to provide a water flow detector which may be used in connection with any of the standard sprinkler systems and will produce indication of conditions at a sprinkler head and an alarm whenever the closure of a sprinkler head is either partially or wholly removed, either in case of fire or by accidental disturbance, and without regard to whether water is present or absent in the system.

A further object is to provide a water flow and leakage detector which is not liable to be actuated or affected by adventitious flow of water due to water hammer or air in the pipes, or changes in pressure, whether of long or short duration, so as to produce false alarms.

Further objects are to provide a water flow and leakage detector designed so as to practically eliminate or compensate for friction loss in the sprinkler system. Also one which will not impede the functions of the sprinklers in case it should fail in its own function. Also one which will reliably report a flow or leakage of water either less than or in excess of the discharge of a single sprinkler.

A further object of my invention is to provide a water flow detector which can be used with a sprinkler system operated at a higher initial pressure than heretofore.

A further object is to provide an alarm system which will operate to give an alarm at a predetermined temperature, even though no sprinkler heads are opened.

A further object is to provide a water flow and leakage detector in which certain other of the objections of water flow detector systems now in use are eliminated.

The following is a description of an embodiment of my invention, reference being

had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a system embodying my invention. Fig. 2 is a vertical section of a single sprinkler head and additional parts combined to constitute a sprinkler, for use in embodying my invention. Fig. 3 is a side elevation of the parts shown in Fig. 2. Fig. 4 is a side elevation of a venting device forming a part of my invention. Fig. 5 is a longitudinal section of the same. Fig. 6 is a cross section of the same on the line $x-x$ Fig. 4. Fig. 7 is a longitudinal section of a modification of the sprinkler head and parts immediately associated therewith to constitute a sprinkler for use in embodying my invention.

Referring more particularly to the drawings, 1 is a tank or storage reservoir located preferably on the top of the building to be protected.

2 is a gate valve controlling the main pipe leading therefrom.

3 is a drip valve for use when it is desired to empty the tank 1 or the distributing pipes.

4 is a cut-off valve located between the point where the drip valve is connected and the sprinkler heads.

5 is distributing piping distributed in accordance with the ordinary practice in sprinkler systems.

6—6 are T-couplings.

7—7 are standard sprinkler heads of any of the ordinary types.

In one embodiment of my invention, each of these sprinkler heads, instead of being screwed directly into the T-couplings 6, as is ordinarily done, is connected through an intermediate member 8 located between the couplings 6 and the sprinkler head 7. These intermediate members have nipples 9—9 and an internal tube 10 leading to said nipples. This tube 10, being small, does not materially interfere with the opening lengthwise through the intermediate member. A tube 10' connects with the tube 10 and has its discharge end adjacent to the cap or closure 12 of the sprinkler head, closing its water discharge port. The upper end of this tube constitutes a port for a fluid water flow and leakage detector system, and may be referred

to as a subsidiary port. I provide the cap or closure 12 with a lead disk 13, preferably, though not necessarily, secured thereto, which bears against the open end of the tube 10' when the sprinkler head is in place and seals the same. The coupling 6, together with the parts carried thereby and coacting with the closure 12, I term the sprinkler body, and the same parts, together with the closure, constitute a complete sprinkler. A small copper pipe 11 about 1/16 of an inch bore, is connected to one nipple 9 of the intermediate member of the last sprinkler, the other nipple being closed by a cap 9'. The pipe 11 leads thence to a nipple 9 of a similar intermediate member, whose other nipple 9 is connected either directly or through other intermediate members with a pressure actuated indicator and circuit controller 14. This controller 14 has a low pressure contact 15 and a high pressure contact 16 connected to one terminal of an electric alarm bell 17, whose other terminal is connected through a battery 18 to the movable member 14' of the indicator 14.

19 is a cut-off valve, through which the piping 11 is connected to an air or gas tank 20.

21 is an air pump for filling the tank 20 with air or other gas under pressure.

The parts just enumerated constitute a fluid detector system. The fluid is preferably gas, the most convenient being air.

In the piping 11, heat affected vents 22 are distributed at such intervals as may be desired, so as to vent the pipe in case the temperature rises to a predetermined heat without opening any of the sprinkler heads. This venting device is of the form shown in Figs. 4, 5 and 6, and consists of a metal shell 23 tapped on its ends for connection with the piping and having at its longitudinal center openings 24 surrounding a chamber which contains a plug 25 of easily fusible metal having a bore in line with the bore passing through the tapped ends of the casing 23. The plug 25 is firmly seated at its ends, being cast in place so as to form a tight connection with the casing 23. Upon being heated, however, the plug 25 melts and runs out through the openings 24, thus venting the pipe 11 with which it is connected. The venting device thus constructed is reliable and efficient and may be subjected to hard usage without damage. Systems already installed can readily be supplied with my improvement by interpolating the intermediate parts 8 and providing the gage 14 and connections. The form shown in Figs. 2 and 3 is particularly applicable where the sprinkler heads point downward or upward.

Fig. 7 shows a modified construction of the parts associated with the sprinkler head

in carrying out my invention, being a preferred form for entirely new installations in which the sprinkler heads point upward. In this construction the sprinkler head 7 is screwed directly into a T-coupling 6'. This T-coupling 6' is specially made and is provided with a nipple 26 in which is screwed a tube 27 passing upward and abutting against the lead disk 13 sunk in the cap 12, so as to be sealed thereby. A member 28 is screwed into the outer end of the nipple 26 against a washer 28' and is provided with tapped ends connecting the passage 10² therethrough with the piping 11. The tube 27 opens into a chamber in the member 26, so that the bore of this tube is connected with the passage 10². The detector features may be applied to sprinkler systems of the dry type as well as the wet type.

In the preferred form of operation, the pipe 5 being filled with air or water, as preferred, under some 75 or more pounds pressure, and connected to the water tank 1, the valves 2 and 4 being open and the valve 3 being closed, and the water discharge ports and alarm system ports being maintained closed by the closures 12, the pump 21 is operated until the tank 20 is filled with gas, preferably air, under pressure of say 100 pounds. The valve 19 is then opened until the pipe 11 is filled with air or other gas under pressure, say of 15 pounds. At this time, the movable member of the indicator or controller 14 should be substantially midway between the contacts 15 and 16. The valve 19 is then closed. With the system in this condition, if a closure 12 is loosened from a sprinkler head either by action of heat upon the solder 100 of the ordinary strut member bearing against the closure 12 and the yoke 101, or by the pressure of water against the closure 12 weakened in any way, or by an accidental blow or malicious action, or by unscrewing the sprinkler head, the lead disk 13 will be removed from the end of the corresponding tube 10' so as to open the same. If a closure 12 is entirely removed, the end of the bore of the tube 10' will be opened and the pipe 11 will be vented so that its pressure will be reduced substantially to atmospheric pressure. In this case, the contact 14' of the controller 14 will engage the low pressure contact 15, completing the circuit through the bell 17 and battery 18. If a closure 12 becomes only partially removed so that upon the moving of the lead disk 13, the pressure at the mouth of the bore of the tube 10' is substantially the pressure within the pipe 5, air or water from the pipe 5 will enter the tube 10', with the result that pressure within the pipe 11 will increase until the contact 14' makes engagement with the high pressure contact 16, closing the circuit through

the bell 17 and the battery 18. If a sprinkler head should not open but the heat should become great enough to open the vent 22, the pipe 11 will become vented and the contact 14' will engage the low pressure contact 15, sending in an alarm. The same action takes place when the sprinkler head is constructed as shown in Fig. 7 and substituted for the sprinkler head shown in Fig. 1, the pipe 11 being vented or charged through the tube 27 in the same manner as through the tube 10'. The condition of the sprinkler head is, therefore, positively indicated independently of the flow of water. The indication is given even when only a single sprinkler head is partially or wholly open. The indication is entirely independent of any electrical contacts at the sprinkler head and an indication is given by the indicator 14 without depending upon any electrical contacts whatsoever. On account of the certainty of indication even when a single sprinkler head is only partially open, a water pressure much higher than is now used can be employed without increasing the danger of water damage.

Under some circumstances it may be sufficient not to have pressure within the pipe 11 under normal circumstances. The system will operate to indicate the full or partial dislodgment of the closure 12 under these circumstances, since, when the closure 12 is partially dislodged, the pressure within the pipe 5 will produce pressure within the pipe 11 and cause the contact 14' to engage the contact 16 and indicate trouble. In the preferred manner of operation, however, the pipe 11 is filled with gas under pressure from the tank 19 as above described. In order to indicate pressure within the tank 19, I provide an ordinary pressure gage 102. The pressure within the pipe 11 may be indicated by the gage 14 or by a supplemental gage 103.

My invention may be embodied in various modified forms without departing from the spirit thereof or the subject-matter of the appended claims, as will be evident to those skilled in the art.

What I claim is:

1. In a sprinkler for automatic sprinkler systems, a sprinkler body having two passages, said passages having separate ports, means for connecting one of said passages to a water supply system, and means for connecting the other of said passages to a fluid alarm system in combination with a removable closure, which, when in normal position, maintains both of said ports closed.

2. In a sprinkler for automatic sprinkler systems, a sprinkler body having two passages, said passages having separate ports, means for connecting one of said passages to a water supply system, means for connect-

ing the other of said passages to a fluid alarm system in combination with a removable closure, which, when in normal position, maintains both of said ports closed, and a heat affected fastening for said closure.

3. In an automatic sprinkler system, the combination of a sprinkler head having a removable closure, piping connected to said sprinkler head for conveying water thereto, an independent fluid actuated system having a port maintained closed by said closure, and an indicator connected to said independent system.

4. In an automatic sprinkler system, the combination of a sprinkler head having a removable closure, piping connected to said sprinkler head for conveying water thereto, an independent fluid actuated system having a port maintained closed by said closure, an indicator connected to said independent system, and an independent heat affected vent in said independent system.

5. In an automatic sprinkler system, the combination of a system of piping for conveying water, sprinkler heads connected thereto and having water releasing closures, intermediate members interposed between the sprinkler heads and said piping, said members having subsidiary outlets maintained closed by said closures, a pressure actuated fluid system connected to said outlets, and indicating means connected to said fluid system.

6. In an automatic sprinkler system, the combination of a sprinkler head having a removable closure, piping connected to said sprinkler head for conveying water thereto, an independent fluid actuated system having a port maintained closed by said closure, a high and low pressure indicator connected to said independent system, an electric circuit controlled by said indicator, and means for supplying said independent system with fluid under pressure.

7. In an automatic sprinkler system, the combination of a sprinkler head having a removable closure, piping connected to said sprinkler head for conveying water thereto, an independent fluid actuated system having a port maintained closed by said closure, a high and low pressure circuit controller connected to said independent system, an electric circuit controlled by said controller, and means for supplying said independent system with fluid under pressure.

8. In a sprinkler system, the combination of piping containing fluid under pressure, a heat affected vent consisting of a shell having a chamber with substantially radial openings, and a core of low melting coefficient in said chamber closing said openings and having a longitudinal passage therethrough connected with said piping.

9. In an automatic sprinkler system, a

sprinkler body having two passages, in combination with a water supply system connected to one of said passages, a fluid controlled alarm device connected to the other
5 passage, a movable closure which when in normal position closes the passage which is connected to said water supply system and

maintains said two passages separated from each other, and a strut for holding said closure in position.

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