Oct. 18, 1932. W. GERLACH ET AL 1,883,780

AUTOMATIC SPRINKLER

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Fig. 1.

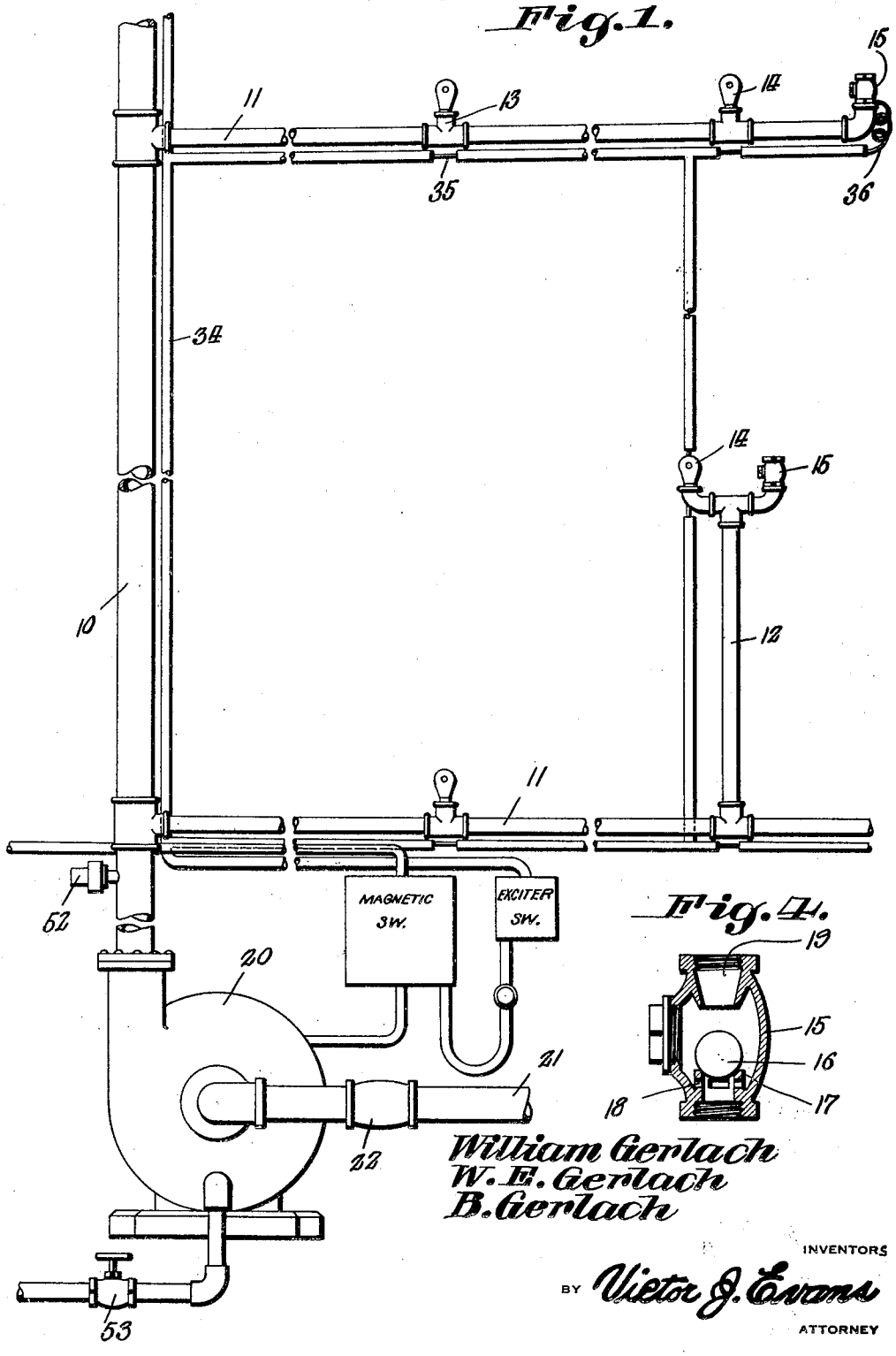


Fig. 4.

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Fig. 2.

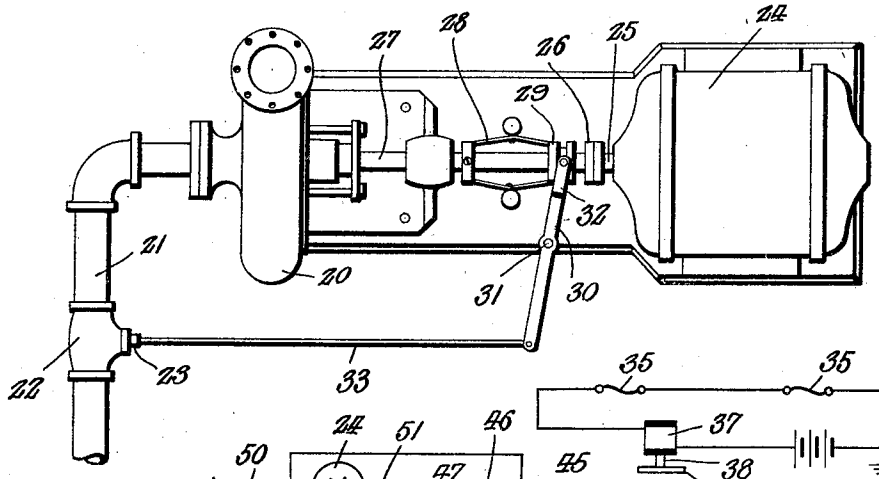


Fig. 3.

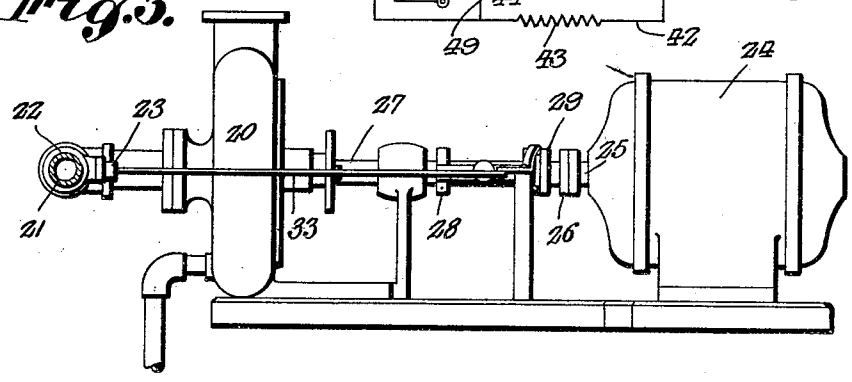


Fig. 6.

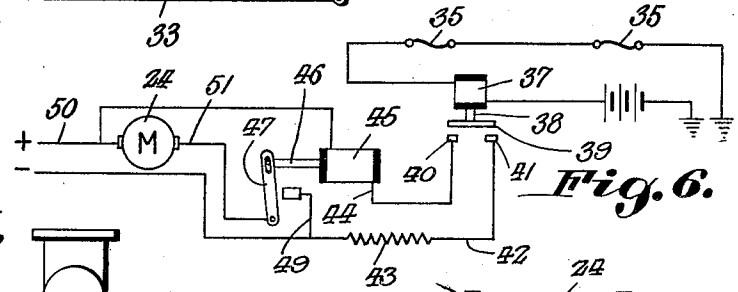
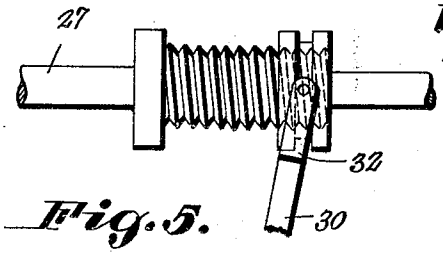


Fig. 5.



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UNITED STATES PATENT OFFICE

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AUTOMATIC SPRINKLER

Application filed April 23, 1930. Serial No. 446,644.

This invention relates to a new and improved form of sprinkler system of the dry automatic themostatically controlled type.

One of the principal objects of the invention consists in the provision and arrangement of an auxiliary thermostatically controlled system having a lower actuating temperature than the sprinkler heads whereby the water will be forced through the system in advance of the melting point for the sprinkler head governors in order that the latter will be actuated under ordinary conditions when such temperature is reached.

More specifically stated the system is provided with vent valves at the dead ends of the system to facilitate drainage of same to obviate freezing.

With the above and other objects in view, the invention further consists of the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claim.

In the drawings:

Figure 1 is an elevation of our form of sprinkler system.

Figure 2 is a top plan view of the motor and force feed water supply mechanism.

Figure 3 is a side elevation of the arrangement disclosed in Figure 2.

Figure 4 is a longitudinal sectional view taken through one of the vent valves.

Figure 5 is a fragmentary side elevation of a modified form of water valve actuating mechanism.

Figure 6 is a diagrammatic plan view of the several circuits and electrically operated appliances for automatically setting the system in motion.

Referring to the drawings in detail wherein like characters of reference denote corresponding parts, the reference character 10 indicates generally a pipe line preferably disposed in a vertical plane and having successions of horizontally disposed branch lines 11 connected therewith at points corresponding to that of the ceiling levels of a building structure. In the case of factories, ware houses and the like, it may be also desirous to arrange vertical branch lines, such as indicated at 12, which may be disposed immediately adjacent tanks or receptacles of highly inflammable material. In each case, couplings of conventional formation and as indicated at 13 carry the ordinary type of thermostatically controlled sprinkler nozzles or heads 14. The dead ends of each of the horizontal branch lines or vertical branch lines 12 are provided with vent valves of the design and nature shown in Figure 4 of the drawings and identified by the reference numeral 15. These valves are provided with balls 16 normally disposed upon elevated seats 17 which in turn are provided with openings 18 therebeneath whereby air may normally pass through ports 19 in the other ends of the valves, and through the openings 18, branch lines and pipe line 10 to facilitate drainage of the entire system whereby the latter will be normally dry or otherwise free from moisture to obviate any possibility of the system freezing. Reference will be had again in the following description of the invention with relation to the vent valves 15.

A water pump 20 having connection at its discharge end with the remaining extremity of the pipe line 10 is connected at its inlet end with a pipe line 21 leading from the local filtration or pumping station. The pipe line 21, in advance of the water pump 20 is broken by a cut-off valve 22 having a plunger operated form of seat 23. A motor or other source of power indicated as at 24 has the shaft 25 thereof in communication with the pump impeller blade shaft 27 through the employment of a coupling 26. A governor such as indicated at 28 of conventional construction is carried upon the shaft 27; having one end fixed for simultaneous rotation thereon whereas the collar 29 therefor is rotatably mounted for rectilinear oscillatory movement thereon.

An operating lever 30, pivotally mounted as at 31, has a fork extremity 32 operatively connected within the groove of the collar 29 and operable at its other end to open and close the valve 22 through the employment of a rod connection 33 therebetween.

If desired the valve operating mechanism shown in Figure 5 of the drawings may be

substituted in lieu of the governor arrangement previously described.

As mentioned in the foregoing, it is our desire to incorporate an auxiliary form of thermostatically controlled operated mechanism operable in advance of the melting point for the fusible elements of the sprinkler heads whereby the water will be forced into the system ready for use before the sprinkler head fusible elements are melted.

The aforementioned construction primarily resides in the provision and arrangement of conduits 34 preferably disposed in juxtaposition to the branch lines 11 and 12 in such manner that the fusible elements 35 therefor will have a melting point at least ten degrees lower than the fusible elements for the sprinkler heads. The ground circuit for the auxiliary thermostatically controlled operating system is grounded as at 36 upon the immediate portion of the branch lines, substantially as illustrated in Figure 1. The other end of the normally closed electric thermostatically controlled auxiliary operating system is in connection with what may be termed an exciter switch and which may be in the nature of a solenoid coil, indicated as at 37 in Figure 6 of the drawings. In view of the fact that the aforementioned circuit is normally closed, the core 38 for the solenoid is normally held up in order that the disk like outermost extremity 39 for the core is normally spaced from the contacts 40 and 41 of a second circuit about to be traced. A lead wire 42 having connection with the contact 41 and a resistance coil 43 may be connected with a negative terminal of the ordinary house current voltage. A conducting wire 44 leading from the contact 40 has connection at its opposite end with an electro-magnetic coil 45 having a linkage connection 46 with a switch arm 47 designed for selective engagement with a contact 48. A branch wire 49 establishes connection between the contact 48 and the lead wire 42. A wire 50 leading from the positive terminal of the source of electrical energy is in communication with one post of the motor 24 which is in turn connected with a remaining binding post or extremity of the coil windings of the electro-magnetic coil 45.

A lead wire 51 completes the circuit by establishing connection between the pivoted end of the switch arm 47 and the remaining post of the motor 24. The switch arm 47 is normally open. When any one of the plurality of fusible elements 35 are melted, the auxiliary circuit will be broken, the solenoid coil 37 will be deenergized from its particular source of current which is of low voltage and allow the core 38 therefor to drop whereby the disk like extremity 39 therefor will bridge the gap between the spaced contacts 40 and 41. Such action will cause the circuit to be closed between the source of current and the electro-magnetic coil 45 whereby the switch arm 47 will be shifted to occupy a position to engage the contact 48. The closing of this circuit will set the motor 24 into action as well as the pump 20 and the particular form of governor arrangement employed. As the velocity of the motor increases the governor will expand and impart rectilinear oscillatory rotary motion to the collar 29 whereby the operating lever 30 will swing upon its pivot and withdraw the rod 33 and the seat 23 whereby the valve 22 will be open. Water will then flow through the pipe 21, the valve 22 into the pump 20 whence it will be forced upwardly through the pipe 10 and branch lines 11 and 12 to close the vent valves 15 by seating the balls 16 therefor within the ports 19. The back pressure of the water throughout the system will then pass or become otherwise discharged through a blow-off or relief valve 52 until such time as the sprinkler heads will be rendered active, that is, ten degrees warmer.

After the fire has been extinguished, the motor circuit is opened and the valve 22 will be automatically closed incident to the relaxing of the governor. The relieving of the water pressure throughout the entire system will close the relief valve 52. A drain valve 53 having communication with the water pump 20 is then open to facilitate draining of the entire system. Upon the release of an appreciable amount of the water from the system the ball valves 16 will again seat themselves in the manner suggested in Figure 4 of the drawings and allow air to follow through the pipe lines as an aid in the discharge of the water whereby no dead ends will be formed at the ends of the branch lines. After the entire system has been drained, the drainage valve 53 is closed and the melted fusible elements 35 replaced.

The invention is susceptible of various changes in its form, proportions and minor details of construction, and the right is herein reserved to make such changes as properly fall within the scope of the appended claim.

Having described the invention what is claimed is:

A sprinkler system comprising a motor driven pump, a normally empty pipe connected with the pump and having an open end, thermostatically controlled sprinkler heads mounted upon said pipe, said thermostatically controlled heads including elements fusible at a temperature corresponding to fire conditions, thermostatically controlled operating mechanism including elements fusible at a lower melting point than the elements of the sprinkler heads, and located in the zones protected by said sprinkler heads, a normally open valve located at the open end of the pipe constructed and arranged to close the pipe when subjected to pressure from within the pipe, a normally open electrical supply cir-

cuit connected with the motor, means for closing said circuit when one or more of the fusible elements of the operating mechanism melt, a valve controlled water supply pipe connected with the pump and means operable by the operation of the pump for controlling the valve of said supply pipe.

In testimony whereof we affix our signatures.

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