No. 880,889. PATENTED MAR. 3, 1908.

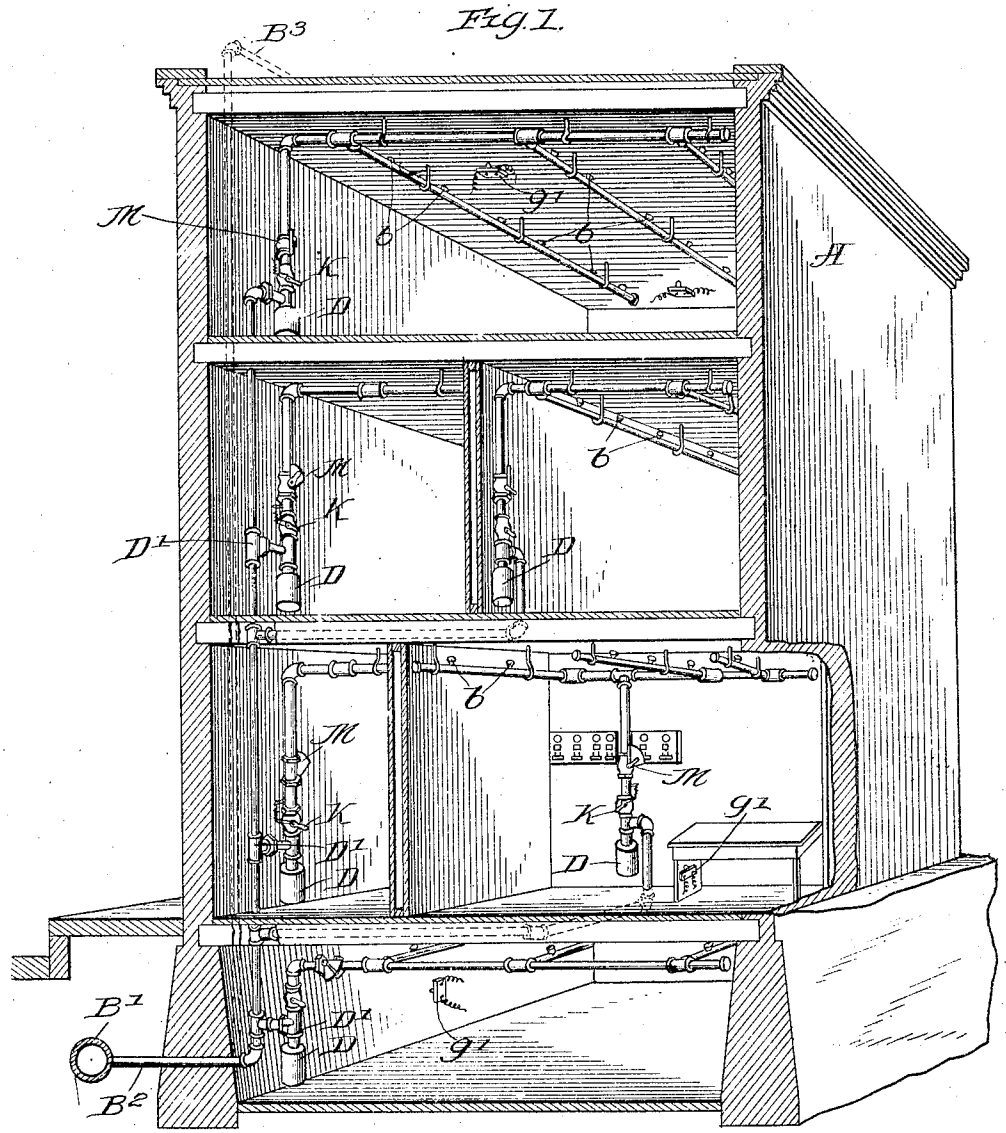
C. A. JACOBY.

AUTOMATIC SPRINKLING AND FIRE ALARM SYSTEM.

APPLICATION FILED MAR. 11, 1907.

3 SHEETS—SHEET 1.

Fig. 1.



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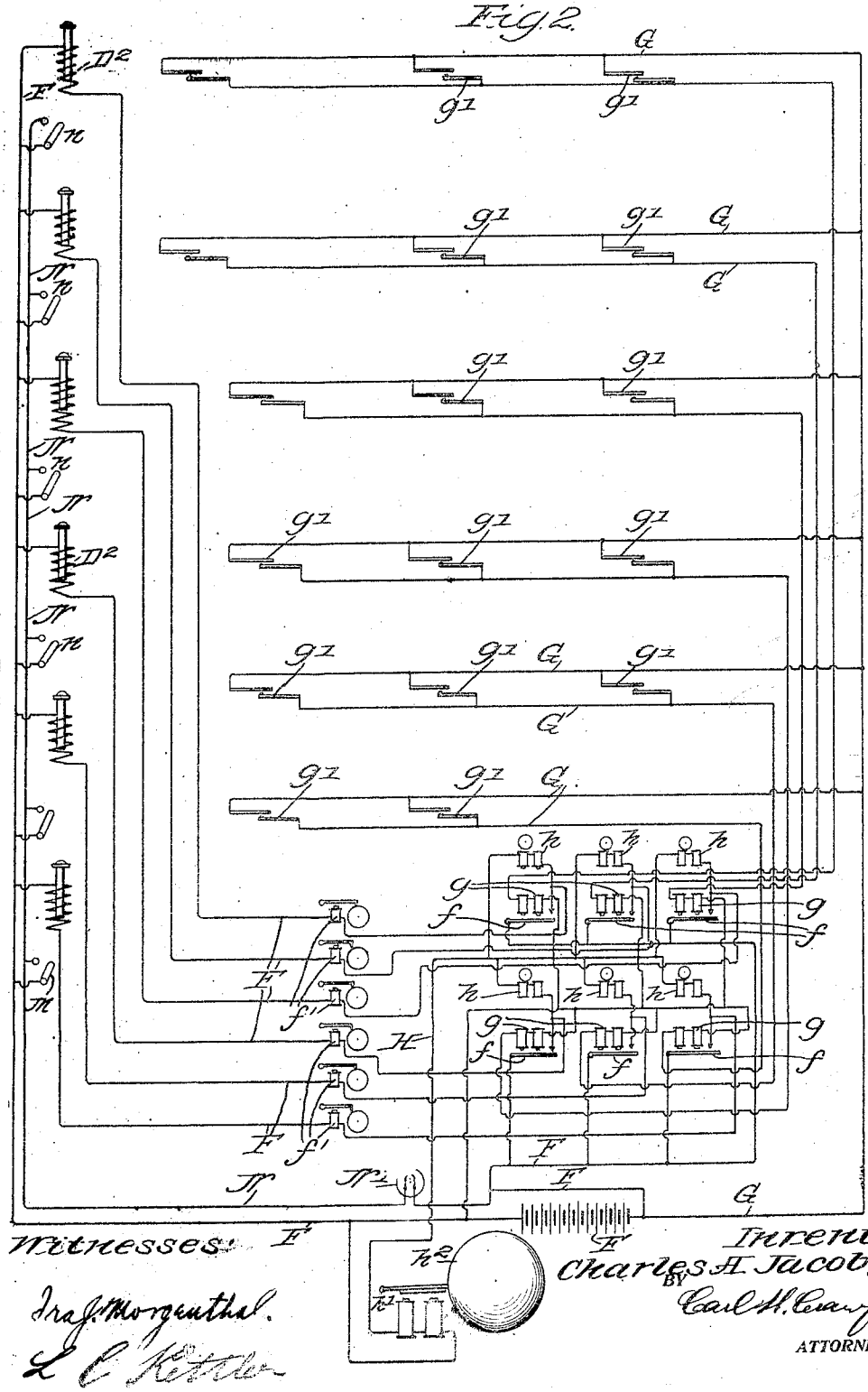
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

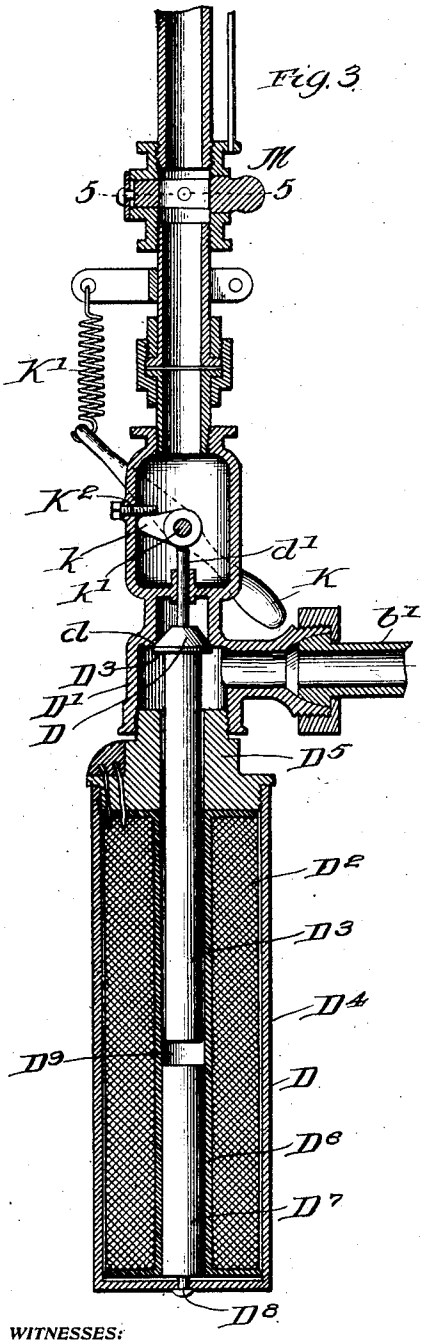


Fig. 4.

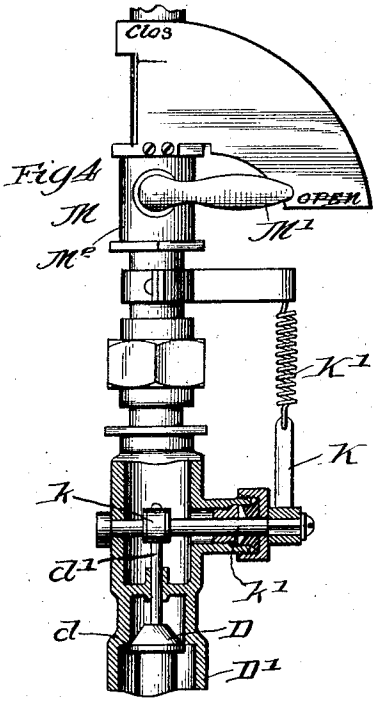
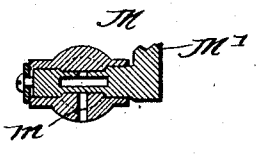


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES A. JACOBY, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-THIRD TO MICHAEL FARRELL AND ONE-THIRD TO JOHN L. FRUIN, OF NEW YORK, N. Y.

AUTOMATIC SPRINKLING AND FIRE-ALARM SYSTEM.

No. 880,889. Specification of Letters Patent. Patented March 3, 1908.

Application filed March 11, 1907. Serial No. 361,706.

To all whom it may concern:

Be it known that I, CHARLES A. JACOBY, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Automatic Sprinkling and Fire-Alarm Systems, of which the following is a specification.

My invention relates to improvements in sprinkler and fire alarm systems and apparatus for buildings.

The object of my invention is to provide an automatic, electric magnet valve controlled, thermostatic, sprinkler and fire alarm system and apparatus for buildings, of a simple, efficient, safe, reliable and durable construction, in which the valves may be electrically operated by magnets or solenoids included in electric circuits having thermostats for automatically closing the circuits by a rise of temperature, and to open the same and close the valves by a fall of temperature, and in which the valves may also be opened or closed by hand, and in which the efficiency and operativeness of the apparatus may be at any time tested without danger of flooding or injuring the building or its contents, and in which the action of the apparatus and each and every circuit portion thereof may be indicated or recorded.

My invention consists in the means I employ to practically accomplish this object or result. That is to say, it consists in the novel construction of parts and devices and in the novel combinations of parts and devices therein shown or described.

In the accompanying drawings forming a part of this specification, Figure 1 is a perspective view partly in vertical section of a sprinkler and fire alarm system embodying my invention. Fig. 2 is a diagram view of the apparatus illustrating the electric circuits. Fig. 3 is a detail vertical section through one of the electromagnet valves. Fig. 4 is a detail section on line 4—4 of Fig. 3 and Fig. 5 is a detail cross section on line 5—5 of Fig. 3.

In the drawing, like letters of reference indicate like parts in all the figures.

In the drawing, A represents a building, B a system or set of water pipes in the building furnished with rose heads or sprinkler nozzles b at various points throughout the rooms of the building as may be desired. The sprinkler pipes B are connected with a water main B^1 in the street by a connecting pipe B^2 or with an overhead tank (not shown) by a connecting pipe B^3 or with other source of water supply under pressure. The system of water pipes B is furnished at intervals with a number of electromagnet valves D, one of these valves being provided ordinarily for each room or floor or section of the building as may be desired or required. Each of the valves D has a valve shell D^1 furnished with a valve seat d against which the valve D closes, and communicating by a branch pipe b^1 with a water supply pipe.

The valve D is automatically operated by an electro-magnet or solenoid D^2, the soft iron core or plunger D^3 of which is preferably secured directly to the valve. The solenoid D^2 is contained in a closed case D^4 connected by a screw plug or coupling D^5 with the valve shell D^1. The spool D^6 of the solenoid is preferably of brass and the case or shell D^4 and plug D^5 are preferably of soft iron so as to serve as part of the magnet circuit. The spool D^6 is closed liquid tight at its lower end by a soft iron core D^7 affixed by a pin or screw D^8 to the shell D^4 which serves to cause the magnet to hold the movable core D^3 with great power in the open position of the valve, while at the same time the movable core is given the necessary range of movement. The solenoid coil D^2 for operating each valve D is connected in an electric circuit F having a battery or other source of power F^1 and leading therefrom to the armature f of a relay g included in the thermostat circuit G, and thence through the coil of a recorder magnet f^1 thence to the coil D^2 of the solenoid, and thence back to the battery or other source of power. The valve circuit F is automatically closed by the relay g, in a thermostat circuit G. Each of the thermostat circuits G has included therein one or more thermostats g^1 which operate to close the thermostat circuit by an abnormal rise of temperature in the room, or section of the building where the thermostat is located, and thus closes the valve circuit F at the relay g and opens the valve D through the action of its operating solenoid.

The thermostat circuit G leads from the battery F^1 to the thermostat or thermostats g^1 included therein, and thence through the relay g and thence back to the battery or

source of power. The relay g in the thermostat circuit by operating the armature g in the valve circuit, also closes a fire alarm circuit H having a bell or other alarm device h therein, and also having included therein the relay h^1 which actuates the city fire alarm device h^2. The fire alarm circuit H leads from the battery F^1 or source of power through the relay h which operates the city fire alarm, thence through the fire alarm device h and thence to the armature f and back along the circuit wire F to the battery.

To adapt the valve D to be also opened by hand, it is furnished with a stem d^1 engaged by a cam k on a rock shaft k^1 operated by a hand lever K. A spring K^1 returns the hand lever to its normal position against a stop K^2.

To enable the automatic electro magnet operation of the valve to be tested without flooding the building or injuring its contents, I provide a supplemental valve M having a handle or lever M^1 for closing the same. The valve M is preferably located just above the valve D. Through the valve shell M^2 of the valve M, I provide a small hole m through which a small quantity of water may escape when the valve D is opened and the valve M closed. To guard against any possibility of the valve M being left closed and thus shutting off the supply of water from the sprinkler nozzle b when the valve D is opened, I provide the system or apparatus with a test or indicator circuit N having one or more test or indicator devices N^1 included therein and which test circuit is opened by the valve M or its handle when said valve is opened, and which circuit is closed when the valve M is closed. The test or indicator circuit N leads from the battery or other source of power to a switch n, which is operated by the turning of the valve M, thence through the indicator device N^1, and thence back to the battery.

It is apparent that when the handle M^1 is turned to cause the valve M to cut off the passage of water thereby, the electrically operated valve D may then be opened without danger of flooding the premises from the rose heads or sprinkling nozzles, for the valve M will at this time cut off the flow of water from said sprinkler heads, a small jet of water may however pass from the small valve M and out of the small hole m. This small jet of water is sufficient to show that the electrically operated valve is working properly, but there is not sufficient volume to this jet of water to cause any damage, and the water that does escape may be caught in a suitable receptacle if desired. The purpose of having the switches "n" operated by the turning of the valve M, is to cause the indicating device "N^1" to show that the valve "M" is closed. This is to prevent this valve from being accidentally left closed, for it is apparent that the proper operation of the electrically operated valve D would accomplish nothing if the manually operable valve had been closed to cut off the flow of water to the sprinkler heads.

The movable solenoid core or plunger D^3 moves freely in the metallic spool D^6 and the water under pressure enters the chamber D^9 of the spool and holds the valve D normally closed by the fluid pressure thereon. The valve D may also, if desired, be provided with a spring, or it may be arranged to close by gravity when the circuit is broken through the solenoid coil D^2.

One or more electro magnet valves D are located on each floor of the building and in each room or section thereof as may be desired, each controlling the supply of water to a set or series of rose heads or sprinkler nozzles b. Each electro magnet valve D has its own individual circuit F and thermostat circuit G for automatically opening and closing the same by the rise or fall of temperature; and each thermostat circuit G also has its own individual fire alarm circuit G and common test or indicator circuit N and switch n so that a fire in any part of the building will automatically open the electro magnet valve, and its extinguishment, automatically close the same and so that the operativeness of each electro magnet valve D may be independently tested without injury to the building or its contents by flooding.

I claim:

1. The automatic sprinkler and fire alarm system and apparatus for buildings, comprising in combination, a system of water supply pipes furnished with sprinkler nozzles, a series of electro magnetic valves for controlling the supply of water of the nozzles, a series of solenoids for automatically opening said valves, a series of valve circuits in which said solenoids are included, a series of thermostats and thermostat circuits furnished with relays or magnets for automatically closing the valve circuits, a series of fire alarm circuits closed by the magnets in the thermostat circuits and furnished with fire alarm devices, a test or indicator circuit and stop valves having small test openings in their shells and switches operated by the turning of said valves substantially as specified.

2. An automatic sprinkler and fire alarm system and apparatus, comprising in combination, a system of water supply pipes, having a series of sprinkler nozzles, a series of electro magnet operated valves, a series of solenoids for operating said valves, a series of valve circuits including therein said solenoids, a series of thermostats and thermostat circuits having relays therein for closing said valve circuits, and a series of fire alarm circuits closed by the relays in the thermostat circuit, and having fire alarm devices there-

in, said water supply pipe being furnished with hand operated valves shutting off the water from the sprinkler nozzles to test the operation of the electro-magnet valves and a test or indicator electric circuit having an electric indicator device therein, said test or indicator circuit having a switch closed by the closing of said hand operated valve to prevent the hand operated valves being accidentally left closed, substantially as specified.

3. In an automatic sprinkling system, the combination with a system of water supply pipes of sprinkling nozzles located in said water supply pipes, valves located in said water supply pipes, the stems of said valves being electrically actuated, a manually operable member adapted to actuate said valves independently of the electrical means for actuating said valves, stop valves located in the pipes between the electrically operated valves and the sprinkler nozzles, there being a small outlet port which establishes communication between the interior of the supply pipe and the exterior of the stop valve casings when said stop valves are turned to cut off communication between the electrically operated valves and the sprinkler nozzles, electrical valve circuits in which the electrically operated valves are located, and means for opening and closing said circuits, said means being controlled by variations in temperature.

4. In an automatic sprinkling system, the combination with a plurality of water supply pipes of sprinkler heads carried by said water supply pipes, electrically operated valves adapted to control the flow of water through said water supply pipes, a plurality of independent valve circuits in which said valves are located, a plurality of thermostats and thermostat circuits having relays therein for closing said valve circuits, an independent test circuit for each of the valve circuits, and an indicating device in said test circuit.

5. In an automatic sprinkling system, the combination with a plurality of water supply pipes of sprinkler heads carried by said water supply pipes, electrically operated valves adapted to control the flow of water through said water supply pipes, a plurality of independent valve circuits in which said valves are located, a plurality of thermostats and thermostat circuits having relays therein for closing said valve circuits, an independent test circuit for each of the valve circuits, an indicating device in said test circuit, stop valves located between the electrically operated valves and the sprinkler heads and means for closing the test circuit when said stop valves are closed.

6. In an automatic sprinkling system, the combination with a plurality of water supply pipes of sprinkler heads carried by said water supply pipes, electrically operated valves adapted to control the flow of water through said water supply pipes, a plurality of independent valve circuits in which said valves are located, a plurality of thermostats and thermostat circuits having relays therein for closing said valve circuits, an independent test circuit for each of the valve circuits, an indicating device in said test circuit, stop valves located between the electrically operated valves and the sprinkler heads, means for closing the test circuit when said stop valves are closed, there being a port formed in the stop valve casings adapted to establish communication between the interior of the water supply pipes and the exterior of the valve casings when the stop valves are closed.

7. In an automatic sprinkling system, the combination with a plurality of water supply pipes of sprinkler heads carried by said water supply pipes, electrically operated valves adapted to control the flow of water through said water supply pipes, a plurality of independent valve circuits in which said valves are located, a plurality of thermostats and thermostat circuits having relays therein for closing said valve circuits, an independent test circuit for each of the valve circuits, an indicating device in said test circuit, stop valves located between the electrically operated valves and the sprinkler heads, means for closing the test circuit when said stop valves are closed, there being a port formed in the stop valve casings adapted to establish communication between the interior of the water supply pipes and the exterior of the valve casings when the stop valves are closed and a series of fire alarm circuits closed by the relays in the thermostat circuits and having fire alarm devices substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES A. JACOBY.

Witnesses:

CARL H. CRAWFORD,

IRA J. MORGENTHAL.