No. 782,778. PATENTED FEB. 14, 1905.

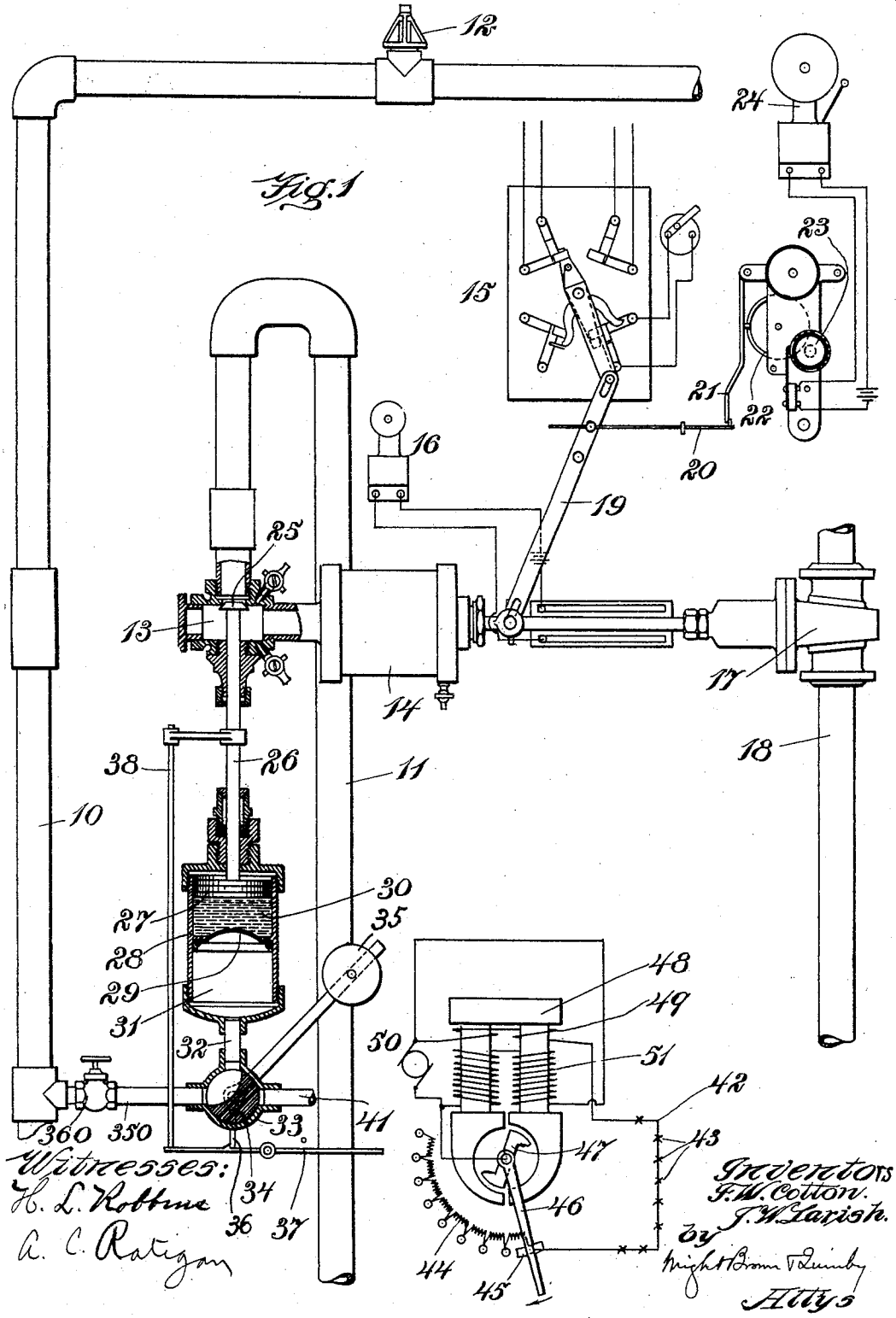
F. W. COTTON & J. W. LARISH.

EMERGENCY FIRE APPARATUS FOR BUILDINGS.

APPLICATION FILED JUNE 4, 1904.

2 SHEETS—SHEET 1.

Fig. 1



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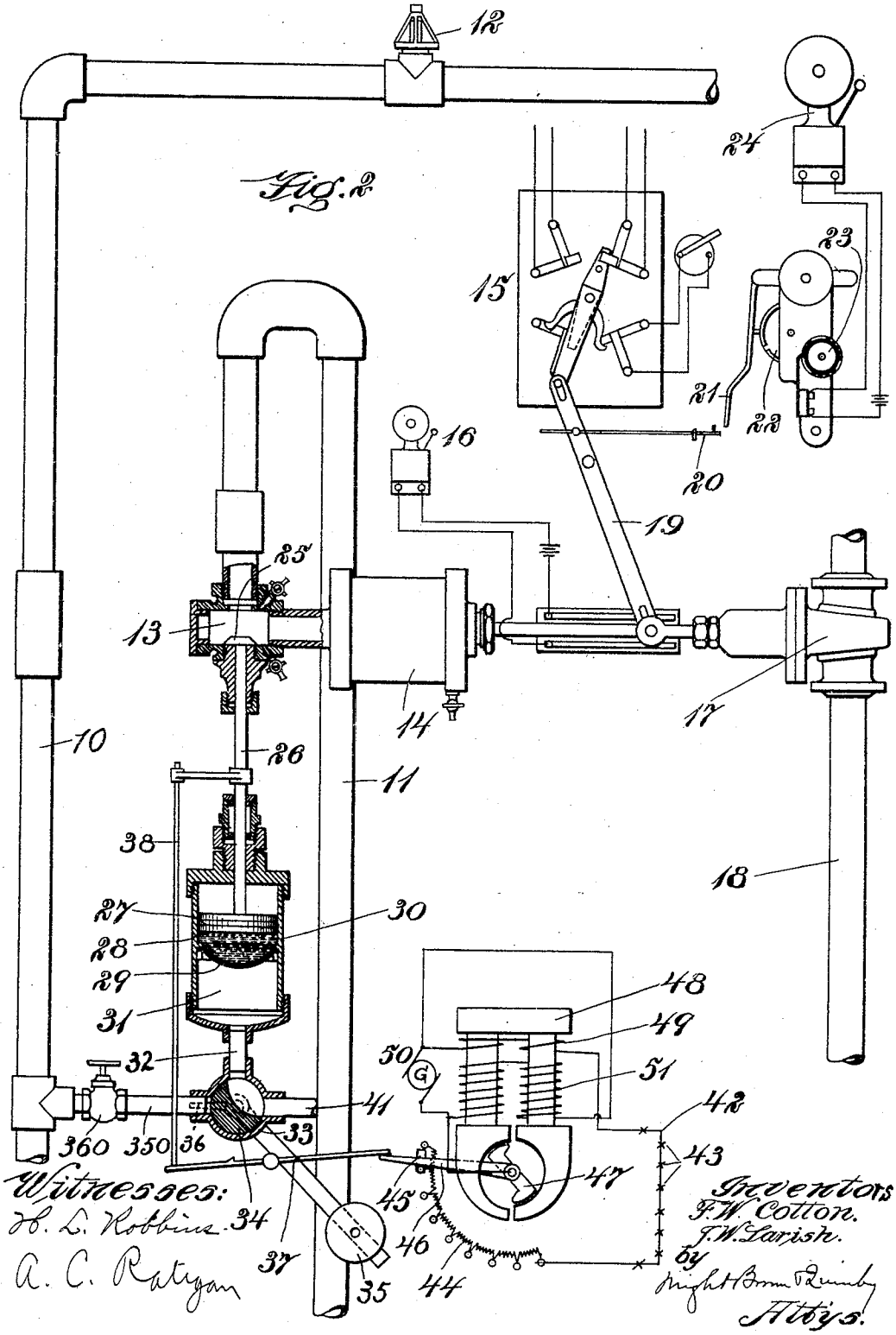
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2 SHEETS—SHEET 2.

Fig. 2.



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No. 782,778. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

FREDERICK W. COTTON, OF DEDHAM, AND JOSEPH W. LARISH, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO GAS AND ELECTRIC PROTECTIVE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

EMERGENCY FIRE APPARATUS FOR BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 782,778, dated February 14, 1905.

Application filed June 4, 1904. Serial No. 211,192.

To all whom it may concern:

Be it known that we, FREDERICK W. COTTON, of Dedham, in the county of Norfolk, and JOSEPH W. LARISH, of Boston, in the county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Emergency Fire Apparatus for Buildings, of which the following is a specification.

This invention relates to apparatus for protecting a building and contents or occupants in case of fire by giving an alarm and automatically instituting emergency measures, such as throwing off the main electric lighting-circuit of the building and operating an emergency lighting-circuit, cutting off the gas-supply of the building, &c. Devices of this character are shown in a copending application of Frederick W. Cotton, Serial No. 158,336, for cut-out and alarm apparatus operating in conjunction with a sprinkler system, the water from the sprinkler-pipes or house-pipes being employed to operate a motor, such as a cylinder and piston, to actuate the emergency devices when the sprinklers operate.

The present invention relates particularly to improved means for controlling a hydraulic or other motor, such as the cylinder-and-piston motor of the aforesaid application; and the objects of the present invention are, first, to provide improved means whereby an excessive current in the electric lighting system of the building, such as might arise from crossed wires, will automatically operate the devices for controlling the hydraulic or other motor, which in turn controls the emergency device, alarms, &c.; second, to provide improvements in such motor-controlling means whereby the latter may be caused to operate with greater certainty and whereby the effects of water-hammer are overcome, and, third, to furnish means whereby said motor-controlling devices may be jointly controlled through the operation of the sprinkler system and through the operation of the electric regulating means.

Of the accompanying drawings, Figure 1 represents a diagrammatic view with parts in section and elevation, showing emergency fire apparatus embodying our invention, the parts being shown in the position which they have during normal conditions. Fig. 2 represents a similar view with the parts in the position which they assume when said parts become operative for performing their designed functions.

The same reference characters indicate the same parts in both figures.

In the drawings, 10 11 represent pipes adapted for connection with the street water-main, the pipe 10 having one or more sprinkler-heads 12, designed to automatically operate when a predetermined temperature is reached and sprinkle water in the building, the pipe 11 connecting into a valve-chamber 13, which communicates with the interior of a cylinder 14. The latter contains a suitable piston, whose stem by means of proper connections actuates a switch mechanism 15 for cutting out the main lighting-circuit of the building and establishing an emergency lighting-circuit to illuminate exits, elevators, &c., a building-alarm 16 and a valve 17 in the gas-main 18, which supplies the building with gas, all as described in the aforesaid application, Serial No. 158,336. Piston-rod of motor-cylinder 14 also acts through lever 19 and sliding rod 20 upon a trip-lever 21, which releases a clock-train 22 for propelling a circuit-controller 23, the latter controlling the circuit of an alarm 24, which may be at fire headquarters. The particular construction of these various devices controlled by motor-cylinder 14 is not a part of the present invention.

The communication between pipe 11 and valve-casing 13 is controlled by a suitable seating-valve 25, attached to a stem 26, on whose lower end is fixed a piston 27, operating in a cylinder 28. One head of said cylinder is formed by a flexible diaphragm 29, between which and the piston is a body of non-freezable liquid 30, such as oil, glycerin, or the like. Below the cylinder 28 is a chamber 31, communicating through passage or conduit 32 with the casing 33 of a rotary plug-valve 34. Said casing also communicates through pipe 350, containing stop-valve 360, with the

sprinkler-pipe 10. A weight 35, attached to the valve, has a tendency to rotate the valve clockwise, which is normally resisted by a lug 36 on the valve-trunnion engaged by trip-lever 37. Said lever is adapted to be tripped by the descent of piston-rod 26 through the trip-rod 38, connected with said piston-rod.

The arrangement of parts thus far described is normally as represented in Fig. 1, with the valve 34 establishing communication between pipe 350 and chamber 31, and so held by trip-lever 37 and the valve 25 closed against its seat by the superior upward pressure due to the greater area of piston 27. Should any of the sprinklers 12 open, this will cause a decrease in pressure in the pipe 10 and in chamber 31 which will cause the valve-stem 26 to drop slightly. This trips the lever 37 and allows the weight 35 to rotate valve 34 and connect chamber 31 with waste-pipe 41. The chamber 31 is accordingly emptied, and the pressure above valve 25 fully opens the latter and establishes communication between pipe 11 and motor-cylinder 14. The piston in said cylinder is therefore pushed out, as represented in Fig. 2, with the result of operating the various alarms and other emergency devices hereinbefore described. Arrangement is further made for tripping the lever 37 through an abnormal increase in current in the lighting-circuit or other circuit of the building.

42 is a circuit representing the lighting or other circuit of the building and containing translating devices, such as lamps 43, and also a sectional rheostatic resistance 44, controlled by a traveler 45 on an arm 46, whose upward movement increases the resistance in said circuit. Arm 46 is connected to the armature 47 of a bipolar electromagnet 48, whose cores have a winding 49 in series with the circuit 42, the generator 50 for supplying said circuit, and the rheostat-brush 45 and winding 51 in shunt connection with the generator 50 and the main circuit 42. This device is described and claimed in a copending application of Joseph W. Larish, Serial No. 211,115. Its operation is such that should there be an abnormal increase of current in the circuit 42—as, for instance, when said circuit is crossed by a more powerful circuit or short-circuited—the magnetic field due to the winding 49 will be increased and arm 46 will insert increased resistance in the main circuit, thereby tending to keep the current in said circuit uniform. The increase of resistance shunts some of the current from the shunt-winding 51 and tends to impart a steady movement to the arm 46. Should the increase in current be so great as to move the arm 46 to the limit of its range, as seen in Fig. 2, the lever 37 will be tripped and the valve 34 released, with the result of emptying the chamber 31 and opening the valve 25. The emergency devices and alarms are thereby operated, as hereinbefore described.

It will be observed that the valve-rod 26 is subjected to opposing pressures on valve 25 and piston 27. The effect of water-hammer in the pipes 10 11 is thereby overcome, for the momentary impulses of the water-hammer are imposed in opposite directions upon the valve-stem 26, and therefore are unable to open valve 25 and effect an undesired operation of the emergency and alarm devices.

We claim—

1. In fire-protective apparatus, the combination of a sprinkler system, a motor for operating an emergency device, an electric circuit, and mechanism controlled both by the pressure in the sprinkler system and by the strength of current in said circuit for controlling said motor.

2. In fire-protective apparatus, the combination of a sprinkler system, a motor actuated by the fluid supplied to said system for operating an emergency device, a motor-valve controlling said motor, means actuated by a pressure variation in the sprinkler system for partially operating said motor-valve, and mechanism actuated by such partial operation of the valve for effecting a further operation thereof.

3. In fire-protective apparatus, the combination of a sprinkler system, a motor actuated by the fluid supplied to said system for operating an emergency device, a motor-valve controlling said motor, a fluid-chamber controlling said motor-valve and connected with said system, a valve for exhausting said chamber, and a trip device actuated by said motor-valve for controlling said chamber-exhausting valve.

4. In fire-protective apparatus, the combination of a sprinkler system, a motor for operating an emergency device, a motor-valve controlling said motor, a fluid-chamber controlling said motor-valve and connected with the system, a chamber-exhausting valve, an electric circuit, and a trip device controlling said chamber-exhausting valve and controlled both by the motor-valve and by the strength of current in said circuit.

5. In fire-protective apparatus, the combination of a sprinkler system, a motor actuated by the fluid supplied to said system, an electric circuit, and means controlled automatically by the strength of current in said circuit for varying the resistance of said circuit, said means having provisions for producing the operation of said motor.

6. In fire-protective apparatus, the combination of a sprinkler system, a motor actuated by the fluid supplied to said system, a fluid-chamber connected with said system for controlling said motor, a chamber-exhausting valve, a trip device controlling said valve, an electric circuit, and means controlled automatically by the strength of current in said

circuit for varying the resistance of the circuit, said means having provisions for actuating said trip device.

7. In fire-protective apparatus, the combination of a sprinkler system, a motor for operating an emergency device, connections for actuating said motor by the fluid supplied to said system or by independent fluid, a motor-controlling valve, an electric circuit, and devices for controlling said valve both by the pressure in the sprinkler system and by the strength of current in said circuit.

In testimony whereof we have affixed our signatures in presence of two witnesses.

FREDERICK W. COTTON.
JOSEPH W. LARISH.

Witnesses:
R. BULLOCK,
A. C. RATIGAN.