G. MATSUSHITA
AUTOMATIC FIRE EXTINGUISHER

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FIG. 3.

FIG. 4.

FIG. 5.

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This invention relates to fire extinguishing apparatus and particularly to that type which is automatic in its nature, and among the various purposes, features and advantages thereof are the following:—

The main purpose of the invention is to provide an apparatus responsive to the draft caused by the rising of the heated and smoke laden gases resulting from a fire in a room or other compartment.

Other features and advantages reside in the particular construction and arrangement of elements specifically pointed out in the following specification.

In the accompanying drawings,

Figure 1 is a side view of the apparatus, certain parts being shown in section.

Figure 2 is an end view thereof looking in the direction of the arrows.

Figure 3 is a central vertical sectional view through the automatic sprinkler; and

Figure 4 is a longitudinal sectional view through the motor controlled service pipe valve.

Figure 5 is a detail section through a tubular portion of the sprinkler.

Referring now more particularly to the drawings by numerals of reference, 2 and 4 indicate respectively the ceiling and one wall of a room or other compartment which is to be protected with my fire extinguisher, the ceiling being provided with an opening 6 communicating with a chimney or draft duct 8 which in turn is in communication with a trunk conduit 10 into which may lead chimneys or draft ducts from other rooms equipped with my apparatus.

Pivoted upon a pin 12 fixed in the wall of the chimney or duct 8 is a valve 14, the area of which is slightly less than the cross sectional area of the chimney so that it effectively closes the passage there through but will move on its pivot under pressure of draft and against the action of a relatively weak coiled spring 16, which later tends to normally hold it in a closing position as shown in Fig. 1.

The valve 14 is provided exterior of the chimney with a rigid depending arm 18 carrying an electrical contact 20 adapted to be moved upon actuation of the valve into and out of electrical contact with a relatively fixed contact 22 on a metallic arm 24 arranged in an electric circuit 26, in which is included a small electric motor 28, mounted upon a base 30 on the upper face of the ceiling.

The shaft 31 of the motor is provided with a worm 32 in mesh with a segmental worm gear 34 arranged through 90 degrees of the circumference of a disk 36 fixed on a spindle 38 at right angles to the shaft 31 of the motor. This spindle carries a spherical valve 40 oscillatable within a valve casing 42, said valve and casing being respectively provided with ports 44 and 46 adapted to be moved into and out of registry upon actuation of the spindle 38, which latter is journaled at one end in a step bearing 48 while the other passes through the wall of a coupling sleeve or union 52 arranged in a water supply pipe line 54. A torsion spring 56 on the spindle 38 and fixed at its ends respectively in the coupling or union and in the spindle is for the purpose of assisting the return of the valve to closed position when the motor ceases to operate and the motor shaft is turned in a reverse direction by hand. The spring also serves as a stabilizer for preventing the valves from turning too far when the worm arrives at the end of the set of teeth upon the worm wheel.

The pipe line 54 has an extension 59 which passes downwardly through the ceiling and into the room or other compartment, and is provided upon its lower end with an automatically operated rotary sprinkler indicated generally at 60.

Specifically this rotary sprinkler comprises a hollow rotary head 62 provided with a plurality of radial and preferably upwardly extending distributing nozzles 64. The head is rigidly carried at the lower portion of a tubular casing 65 preferably formed in sections 68 and 69 united by threaded couplings 70 the upper of said sections 68 being provided with an inwardly extending annular flange 72, which cooperates with an outer annular channel 74 on the lower end of the extension 59 of the pipe line 54 to constitute a raceway for an annular series of ball bearings 78.

For the purpose of rotating the sprinkler head when the valve 40 is opened, I arrange within the casing 65 a water wheel or motor 80 having the lower end of its shaft 82 rigid with a supporting spider 84 the arms of which are fixed to the inner wall of said casing. The upper end of the shaft 82 (cont.)
is journaled for rotation in a spider 86 fixed within the extension 59.

In operation, the head 62, and with it, the tubular casing 85 and water wheel 80 rotate on the ball bearings with respect to the pipe line extension 59.

I also desire to place in the electric circuit an audible alarm, consisting of a boll 88, which will be actuated upon closing of the circuit by the valve operated switch.

From the foregoing description of the construction of my improved apparatus, it will be seen that I have provided a simple, inexpensive and efficient means for carrying out the objects of the invention, and while I have particularly described the means best adapted to perform the functions set forth, it is obvious that various changes in form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

Having thus described my invention, what

I claim as new and desire to secure by Letters Patent is:

1. In combination with a compartment provided with a vertically disposed flue upon its ceiling wall, fire extinguishing apparatus comprising a valve member pivoted to the flue and having an end portion disposed therein, spring means for holding said end portion of the valve member transversely of the flue, a motor mounted exteriorly of the compartment, a contact member mounted upon the compartment and having a terminal portion located adjacent a movable part of the valve member, an open electric conductor connected with the flue, and the motor and connecting the motor with said terminal, a pipe located exteriorly of the compartment and having an end portion entering the same, a sprinkler located within the compartment and communicating with said pipe, a valve connected with the pipe and means for operating said valve from the motor shaft.

2. In combination with a compartment having a flue mounted upon the ceiling wall thereof fire extinguishing apparatus comprising a valve member having angularly disposed end portions, said valve member being pivoted to the flue and having one end portion located within the flue and the other end portion exteriorly thereof, spring means for holding the inner end portion of the valve member approximately transversely of the flue, a terminal mounted upon the compartment and having an end portion disposed opposite and normally spaced from the outer end portion of the valve member, a motor mounted upon the compartment, a conductor connecting the motor with the terminal, an electric conductor connected with the motor and the flue, a worm carried upon the shaft of the motor, a worm wheel, having an interrupted set of teeth normally meshing with the worm, a pipe located exteriorly of the compartment and, leading into the same, a valve controlling the pipe and a spring pressed stem connecting the valve with the worm wheel.

In testimony whereof I affix my signature.

GENTARO MATSUSHITA.