

**April 12, 1955**

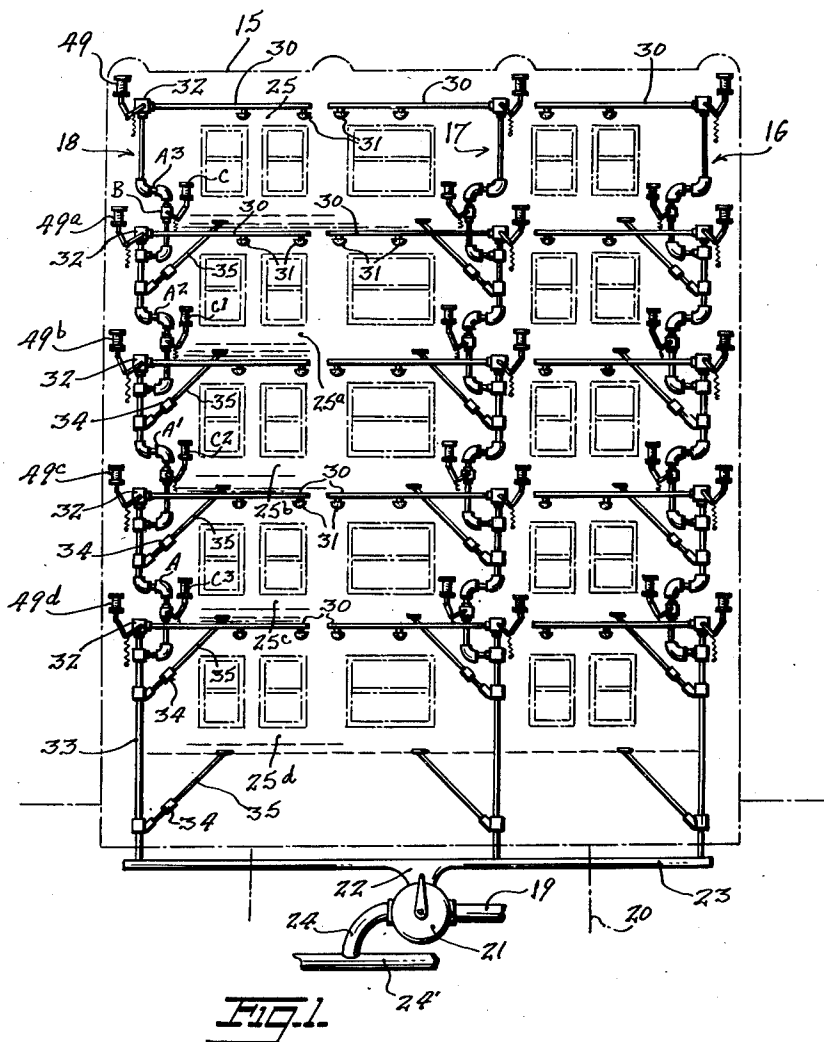
A. VALENTE

**2,706,006**

## FIRE EXTINGUISHING SYSTEM

Filed March 19, 1952

3 Sheets-Sheet 1



INVENTOR.  
ANTONIO VALENTE  
BY *Julian Polachek*  
ATTORNEY

April 12, 1955

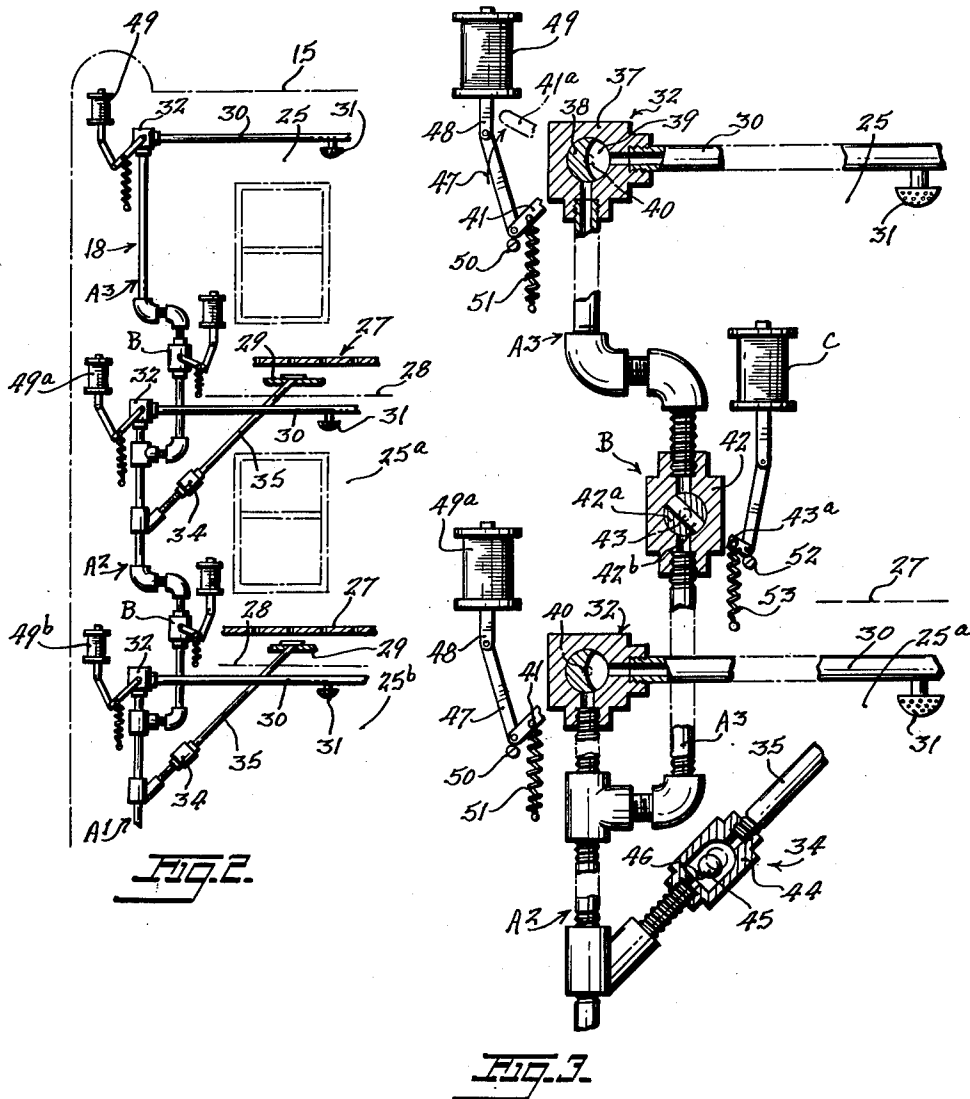
A. VALENTE

2,706,006

FIRE EXTINGUISHING SYSTEM

Filed March 19, 1952

3 Sheets-Sheet 2



INVENTOR.  
ANTONIO VALENTE  
BY *John Polach*  
ATTORNEY

April 12, 1955

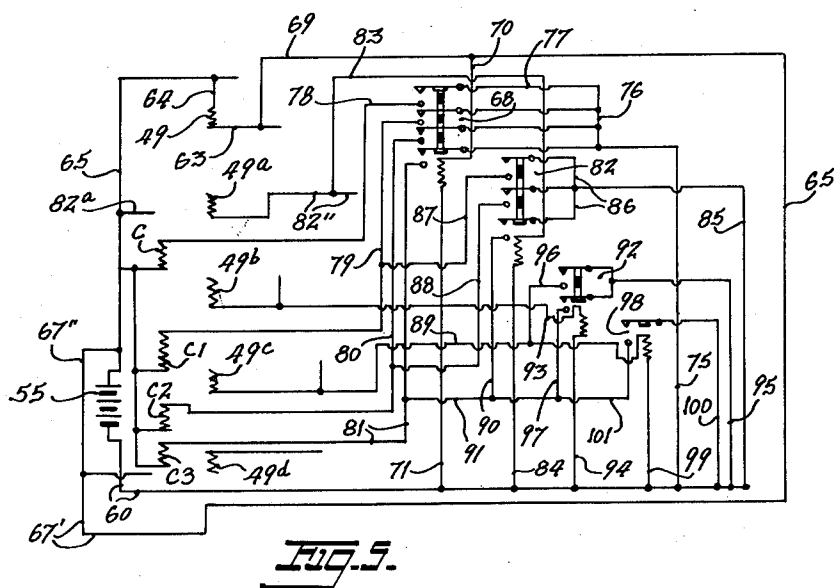
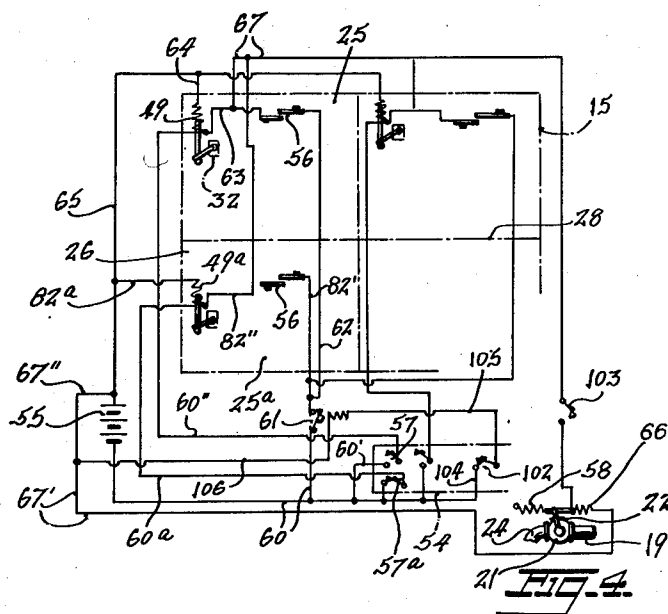
A. VALENTE

2,706,006

FIRE EXTINGUISHING SYSTEM

Filed March 19, 1952

3 Sheets-Sheet 3



INVENTOR.  
ANTONIO VALENTE  
BY *John H. Polach*  
ATTORNEY

1

2,706,006

## FIRE EXTINGUISHING SYSTEM

Antonio Valente, Albany, N. Y.

Application March 19, 1952, Serial No. 277,434

12 Claims. (Cl. 169—16)

This invention relates to new and useful improvements in fire extinguishing systems, and, more particularly, the aim is to provide an improved system of this kind, for installation in a building of any size and type, which system is characterized by features providing unique safety advantages to be herein first summarized and then explained in detail in connection with the disclosure of a now favored one of the many possible and apparently widely different embodiments of the invention.

For one thing, the new system, which may be and preferably is of the sprinkler kind having water supply pipes variously leading to a plurality of rose-heads or sprinkler nozzles, may have as many of these nozzles as desired, and placed anywhere desired in the premises being protected, and at the same time all or several of said nozzles may be turned on manually at will, from a central station, as one in a public hallway or at the office or living quarters of the superintendent or caretaker for the building.

Another feature of the new system is that, with the same arranged for operation as just described, some or all of the sprinkler nozzles will automatically start discharging water in the usual way in a room or rooms where a fire has started, consequent upon operation of thermostatic means due to the attainment of a critical degree of heat adjacent to said means at one or more locations in the building.

A further feature of the invention is that as soon as a conflagration has been ended, the premises wetted may be rid of the sprinkled water, quickly, efficiently and practicably—except, of course, for such drenching as is suffered by rugs, carpets, furniture, draperies, stored goods and the like. In other words, all water which would otherwise be pooled in the premises for effecting in the future the most serious damage is drained off, and by novel means forming one of the most important aspects of the invention as the latter is now appraised.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 frontally shows a building, as an apartment house, equipped with the said now favored embodiment of the present invention; in this view, which is patterned generally upon Fig. 1 of U. S. patent to me No. 1,760,385, dated May 27, 1930, and which therefore is more schematic than otherwise, the elevational outline of the building is indicated in dot and dash and various windows and floor levels are indicated in broken lines.

Fig. 2 is an enlarged replica of the upper left-hand portion of Fig. 1, for the clearer showing of further details as repeated at and relative to each of the fifteen various subdivisions of the building indicated in Fig. 1 as included therein—said building assumed, for example, to be an apartment house, with, consequently, each of said fifteen subdivisions assumed to be a different apartment; with at each side of the building each of five of said apartments assumed to be opposite each pair of vertically elongate windows and with at the middle of the building each of the remaining five of said apartments assumed to be opposite each horizontally elongated window.

Fig. 3 is a further enlarged detail view, for showing in greater detail various of the elements repetitively indi-

2

cated in Fig. 1 as provided for and in connection with each of various of the apartments, these elements being more especially those illustrated in Fig. 2.

Fig. 4 is a diagrammatic view illustrating a primary portion of a combination of circuits which may be present and a centrally stationed group of typical manual controls which may also be present, all pursuant to the invention.

Fig. 5 is a view similar to Fig. 4, for illustrating circuit arrangements auxiliary to those shown in Fig. 4; with here enough of the connections of Fig. 4 included to permit ready understanding of all the circuit combinations of these two views.

Referring now to the drawings more in detail, and by reference numerals, a building 15 of any type or construction is intended here to be indicated; with the same shown, for example, as equipped with a sprinkler system including subdivisions 16, 17 and 18 installed in said building and adapted to be supplied with water under pressure from a branch line 19 diverted from a water main; said branch line shown in Fig. 1 as passing through the cellar 20 of the building and at that location being fitted with a valve 21. Said valve, which may be of any standard or other type, is so constructed that it is operable in such manner that in one setting thereof water from said main is delivered to a conduit 22 leading upward to what may be called a manifold 23 for serving all said sprinkler system subdivisions, and in another setting thereof the communication between the branch line 19 and the manifold 23 is cut off and at the same time said manifold is connected to a drainage conduit 24 going to a soil pipe 24' connected in the usual way to a sewer line.

As indicated in Fig. 1 and as very clearly shown in Fig. 2, here particularly in the case of the sprinkler system subdivision 18, and with special regard to those parts of the premises (hereinafter assumed, for example, to be different apartments in a multi-family dwelling) which in Fig. 1 are respectively marked 25, 25<sup>a</sup>, 25<sup>b</sup>, 25<sup>c</sup> and 25<sup>d</sup>, special provisions are made for each pair of apartments which is made up of one apartment and another directly therebelow; for example, such a pair of apartments as (Figs. 2 and 3) the apartments 25 and 25<sup>a</sup>.

The floor between a pair of upper and lower apartments, indicated as already stated merely by a broken line in Fig. 1, may be of any kind or material; but, as shown by way of example in Fig. 2, said floor, designated 27, is illustrated as having water drainage perforations at suitable intervals thereover. Also in Fig. 2 the ceilings of the two lower ones of the three apartments 25, 25<sup>a</sup> and 25<sup>b</sup> there shown, are represented merely by a dot and dash line 28. If desired, further, a downwardly dished basin, as of sheet metal or any suitable material or mode of construction, may be below each such floor 27 as indicated at 29 in Fig. 2; for facilitating, as will become clear later, drainage off of all pooled water in an apartment after a fire therein has been put out.

The overhead sprinkler pipes are marked 30; and the sprinkler nozzles 31 may be arranged, for example, as indicated in Fig. 1. Near the ceiling level of each apartment, one of said pipes is horizontally extended from its said sprinkler system subdivision 18.

Associated with each sprinkler pipe 30 included in said sprinkler system subdivision 18, and placed at the junction of that pipe with said subdivision is a normally closed main valve 32. There are thus five such valves, one for each of the five pipes 30 respectively for serving the five apartments 25, 25<sup>a</sup>, 25<sup>b</sup>, 25<sup>c</sup> and 25<sup>d</sup>, see Fig. 1. The valve 32 for the sprinkler pipe 30 for the lowermost apartment 25<sup>d</sup> is between the last-named pipe and a riser 33 from the manifold 23. At a point along the riser 33 just below the last-named valve 32 a by-pass conduit A branches off and extends upwardly to the location of the valve 32 for the sprinkler pipe 30 for the next higher apartment 25<sup>c</sup>. At a point along said conduit A just below the last-named valve 32 a by-pass conduit A<sup>1</sup> branches off and extends upwardly to the location of the valve 32 for the sprinkler pipe 30 for the next higher apartment 25<sup>b</sup>. At a point along said conduit A<sup>1</sup> just below the last-named valve 32 a by-pass conduit A<sup>2</sup> branches off and extends upwardly to the location of the

3

valve 32 for the next higher apartment 25<sup>a</sup>. And at a point along said conduit A<sup>2</sup> just below the last-named valve 32 a by-pass conduit A<sup>3</sup> branches off and extends upwardly to the location of the valve 32 for the uppermost apartment 25.

In each of said by-pass conduits A, A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> is a normally closed secondary valve B.

Also included in said sprinkler system subdivision 18 is a valve 34 included in a drainage means for each of the five apartments served by that subdivision. Each of said valves 34 is interposed in an inclined drain-pipe 35 the upper end of which is in open communication with the basin 29 or equivalent below the floor of an apartment directly above that drain-pipe. The drain-pipe 35 from the floor of the apartment 25<sup>a</sup> leads to the riser 33; the drain-pipe 35 from the floor of the apartment 25<sup>c</sup> also leads to the said riser 33; the drain-pipe 35 from the floor of the apartment 25<sup>b</sup> leads to the by-pass conduit A; the drain-pipe 35 from the floor of the apartment 25<sup>a</sup> leads to the by-pass conduit A<sup>1</sup>; and the drain-pipe from the floor of the apartment 25 leads to the by-pass conduit A<sup>2</sup>.

Each of the valves 32 and B is illustrated (Fig. 3) as incorporating a rotary valve member; in aid of simplicity and reliable operation.

In the case of a valve 32, the casing (Fig. 3) of which is marked 37, its said valve member and the latter's port are respectively designated 38 and 39. Said valve member has at opposite ends in the customary way a pair of trunnion studs such as the one indicated in broken lines at 40; with, desirably, the nearer and unseen one of said studs in Fig. 3 of non-circular cross-section for having keyed thereon a valve-operating arm 41. Said arm, when the valve 32 is to be opened, is swung to the location shown at 41<sup>a</sup>.

In the case of a valve B, the casing (Fig. 3) of which is marked 42, its said valve member and the latter's port are respectively designated 42<sup>a</sup> and 42<sup>b</sup>. Said valve member has at opposite ends in the customary way a pair of trunnion studs such as the one indicated in broken lines at 43; with, desirably, the nearer and unseen one of said studs in Fig. 3 of non-circular cross-section for having keyed thereon a valve-operating arm 43<sup>a</sup>.

Each valve 34 is (Fig. 3) a check valve: that is, a one-way valve for permitting water freely to flow downward along a drain-pipe 35 but to prevent water from being driven upwardly into such pipe from the sprinkler subdivision 18. Each valve 34 has in its casing 44 a chamber having therein a ball valve 45 arrested in normal, valve opening position by a cross-pin 46.

A link 47 operatively connects the arm 41 of the main valve 32 at the top of the by-pass conduit A<sup>3</sup>, with the armature 48 of a solenoid 49; a stop 50 being provided as shown. A retractile spring 51 is connected with said arm 41; whereby, with said solenoid normally deenergized, said spring acts to hold the parts as shown in Fig. 3.

In regard to the four other main valves 32 each associated with a different one of the four apartments below the apartment 25, the solenoids corresponding to the solenoid 49 and individual to the apartments 25<sup>a</sup>, 25<sup>b</sup>, 25<sup>c</sup> and 25<sup>d</sup> are respectively marked, in regular order downward, 49<sup>a</sup>, 49<sup>b</sup>, 49<sup>c</sup> and 49<sup>d</sup>.

Operatively associated with the secondary valve B interposed in the by-pass conduit A<sup>3</sup> is a solenoid C. This solenoid has its armature connected to the operating arm of said valve B as shown; while a stop 52 and a retractile spring 53, corresponding respectively to the stop 50 and the spring 51, are provided, whereby with said solenoid C normally deenergized, the spring 53 acts to hold the parts as shown in Fig. 3.

In regard to the three other secondary valves B, each interposed in a different one of the by-pass conduits A<sup>2</sup>, A<sup>1</sup> and A, the solenoids corresponding to the solenoid C and individually interposed in, respectively, said conduits A<sup>2</sup>, A<sup>1</sup> and A are marked C<sup>1</sup>, C<sup>2</sup> and C<sup>3</sup>.

In Fig. 4 at 54 is indicated a central station for installation of a number of normally open hand-switches, one relative to each of all the solenoids corresponding to a solenoid 49 or equivalent (as a solenoid 49<sup>a</sup>, 49<sup>b</sup>, 49<sup>c</sup> or 49<sup>d</sup>) included in the system, one such solenoid being provided for each valve 32 or a valve corresponding thereto. In said Fig. 4, a suitable source of current is designated 55; and as indicated in this view each apartment has suitably installed therein a thermostat of the

4

kind familiar in fire extinguishing sprinkler systems as operative to open up adjacent sprinkler nozzles on the occurrence of a fire—said thermostat for serving the apartment 25 being marked 56. That one of the just referred to switches appropriate to the apartment 25 is designated 57.

The remaining elements of the apparatus, these chiefly if not wholly electrical connections and electrical devices, will from now on, in aid of brevity without sacrifice of clarity, be described in connection with an explanation of the new system's operation:

Normally, that is, in the absence of a fire to be extinguished at any place in the building, the valve 21 (Fig. 1), by action of a spring 58 (Fig. 4), is in such condition that connection is cut off between the branch line 19 from the water main and the conduit 22 leading to the manifold 23.

With said valve 21 thus conditioned, and considering, for example, the apartment 25, suppose now that a fire starts in said apartment 25.

In the usual way the thermostat 56, from the heat developed in said apartment, will act to close a circuit which may be traced as including the current source 55, the lead 60, the normally closed contacts of a relay 61, a lead 62, said thermostat, a lead 63, the coil of the solenoid 49, and leads 64 and 65; thereby energizing said solenoid 49 to open wide the said valve 32 of the sprinkler pipe 30 serving said apartment 25.

Simultaneously a solenoid 66 is energized; this then pulling on the operating arm for the valve member of the valve 21 to throw this valve to its setting whereat connection is made between the manifold 23 and the branch line 19 from the water main, thereby to terminate the previously existing connection between said manifold 35 and the soil pipe 24' or the like. Energization of said solenoid 66 is effected by way of a circuit including, beyond the said lead 63, a lead 67, the coil of said solenoid, and leads 67' and 67''.

Should the superintendent of the building or any other person note the existence of said fire in apartment 25 before it has progressed far enough to render said thermostat 56 effective, this person closes the hand-switch 57; thereby energizing the solenoid 49 of said apartment 25, by way of a circuit including the lead 60, a lead 60', said switch 57, a lead 60'', the coil of said solenoid and the leads 64 and 65.

In either of these cases, provided that at this time also all four of the secondary valves B are opened, water under pressure will be supplied from the water main to the manifold 23 (Fig. 1), and thence to the riser 33 of the sprinkler system subdivision 18. This water will reach the sprinkler pipe 30 of the apartment 25, and said apartment will receive the sprinkler water.

In order to provide that at this time all said four valves B are opened, a relay 68 (Fig. 5) is provided. Said relay 68 is energized, simultaneously with the energization of the appropriate solenoid 49, by way of a branch circuit from the now closed circuit for energizing said solenoid 49; this branch circuit including the lead 63, (Figs. 4 and 5), leads 69 and 70, (Fig. 5), the coil of said relay, lead 71, and leads 67' and 67''. As a result, simultaneously with the energization of the main valve-operating solenoid 49 for said apartment 25 where the fire is now under way, all the four solenoids C, C<sup>1</sup>, C<sup>2</sup>, and C<sup>3</sup> for acting when energized to open all the four secondary valves B in the four by-pass conduits, are energized.

Said solenoid C is now energized by way of a circuit including the lead 60, leads 75, 76 and 77, the top pair of contacts of the relay 68, and a lead 78.

At the same time the solenoid C<sup>1</sup> is now energized by way of a circuit including said leads 60 and 75—77, the next lower pair of contacts of the relay 68, and a lead 79.

Also at the same time, the solenoid C<sup>2</sup> is now energized by way of a circuit including said leads 60 and 75—77, the next to the lowermost pair of contacts of the relay 68, and a lead 80.

Further at the same time, the solenoid C<sup>3</sup> is now energized by way of a circuit including said leads 60 and 75—77, the lowermost pair of contacts of the relay 68, and a lead 81.

With the fire in the apartment 25<sup>a</sup>, the master water supply solenoid 66 will, as is always the case with the fire anywhere in the building, be energized; and with the fire in said apartment 25<sup>a</sup>, there will at the same time

5

be energized the solenoid 49<sup>a</sup> for opening the main valve 32 for the sprinkler pipe 30 for said apartment 25<sup>a</sup>, and also a relay 82, the latter for opening the three secondary valves B one in each of the three by-pass conduits A<sup>2</sup>, A<sup>1</sup> and A.

The circuit including the thermostat 56 in said apartment 25<sup>a</sup> for energizing said solenoid 49<sup>a</sup> may be traced (Fig. 4) as including the current source 55, the lead 60, the contacts of the relay 61, a lead 82', said thermostat, a lead 82'', the coil of the solenoid 49<sup>a</sup>, a lead 82<sup>a</sup> and lead 65. Said solenoid 66 is now energized by way of a circuit including, beyond the lead 82'', a lead 83<sup>b</sup>, the lead 67, the coil of said solenoid and leads 67' and 67''. The circuit including a hand-switch 57<sup>a</sup>, assigned to said apartment 25<sup>a</sup>, for energizing said solenoid 49<sup>a</sup>, may be traced as including the lead 60, the lead 60<sup>a</sup> and the leads 82<sup>a</sup> and 65.

The energization of said relay 82 is by way of a branch circuit from the now closed circuit for energizing said solenoid 49<sup>a</sup>; this branch circuit beyond the energized coil of said solenoid including the lead 82'', a lead 83, the coil of said relay, and the lead 84. As a result, simultaneously with the energization of said solenoid 49<sup>a</sup>, the solenoids C<sup>1</sup>, C<sup>2</sup> and C<sup>3</sup> are all energized, and thereby the said three secondary valves B in the three by-pass conduits A<sup>2</sup>, A<sup>1</sup> and A are all opened.

Said solenoid C<sup>1</sup> is now energized by way of a circuit including the lead 60, leads 85 and 86, the top pair of contacts of the relay 82, and a lead 87.

At the same time the solenoid C<sup>2</sup> is now energized by way of a circuit including said leads 60, 85 and 86, the next lower pair of contacts of the relay 82 and leads 88 and 80.

Also at the same time, the solenoid C<sup>3</sup> is now energized by way of a circuit including said leads 60, 85 and 86, the lowermost pair of contacts of the relay 82, and leads 90, 91 and 81.

With the fire in the apartment 25<sup>b</sup>, a relay 92 will be energized, simultaneously with energization of the master water supply solenoid 66, accompanied by energization of the solenoid 49<sup>b</sup> for opening the main valve 32 for the sprinkler pipe 30 for said apartment 25<sup>b</sup>; these two last-named energizations being effected by way of a circuit analogous to that already described as including a thermostat (as the thermostat 56) in the apartment where a fire occurs, or by way of a circuit analogous to that already described as including a hand-switch (as the switch 57, or 57<sup>a</sup>, Fig. 3) assigned to said apartment where a fire occurs.

Said relay 82 is energized by way of a branch circuit from the said circuit for energizing said solenoid 49<sup>b</sup>; this branch circuit including the associated lead 63, a lead 93, the coil of said relay, and a lead 94. As a result, simultaneously with the energization of said solenoid 49<sup>b</sup>, the solenoids C<sup>2</sup> and C<sup>3</sup> are both energized, and thereby the said secondary valves B in the two by-pass conduits A<sup>1</sup> and A are both opened.

Said solenoid C<sup>2</sup> is now energized by way of a circuit including the lead 60, a lead 95, the upper pair of contacts of the relay 92, and leads 96 and 89.

At the same time the solenoid C<sup>3</sup> is now energized by way of a circuit including said leads 60 and 95, the lower pair of contacts of the relay 92, and leads 97, 91 and 81.

With the fire in the apartment 25<sup>c</sup>, a relay 98 will be energized, simultaneously with energization of the master water supply solenoid 66, accompanied by energization of the solenoid 49<sup>c</sup> for opening the main valve 32 for the sprinkler pipe 30 for said apartment 25<sup>c</sup>; these two last-named energizations being effected by way of a circuit analogous to that already described as including a thermostat (as the thermostat 56) in the apartment where a fire occurs, or by way of a circuit analogous to that already described as including a hand-switch (as the switch 57, or 57<sup>a</sup>, Fig. 3) assigned to said apartment where a fire occurs.

Said relay 98 is energized by way of a branch circuit from the said circuit for energizing said solenoid 49<sup>c</sup>; this branch circuit including the lead 89, the coil of said relay, and a lead 99. As a result, simultaneously with the energization of said solenoid 49<sup>c</sup> for the apartment where the fire is now under way, the solenoid C<sup>3</sup> is now energized by way of a circuit including the lead 60, a lead 100, the contacts of the relay 98, and leads 101, 91 and 81.

With the fire in the apartment 25<sup>d</sup>, that is, in the

6

lowermost apartment, all that is required is energization of the master water supply solenoid 66, accompanied by energization of the solenoid 49<sup>c</sup> for opening the main valve 32 for the sprinkler pipe 30 for said apartment 25<sup>d</sup>; these two last-named energizations being effected by way of a circuit analogous to that already described as including a thermostat (as the thermostat 56) in the apartment where a fire occurs, or by way of a circuit analogous to that already described as including a hand-switch (as the switch 57, or 57<sup>a</sup>, Fig. 3) special to said apartment where a fire occurs.

In the case of a fire in said apartment 25<sup>d</sup>, none of the by-pass conduits A, A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> are used; and so no relay will be needed for energizing any of the solenoids C, C<sup>1</sup>, C<sup>2</sup> and C<sup>3</sup>.

#### *When the fire is extinguished*

Any person nearby may, by manually opening a single normally closed hand-switch 102 (Fig. 4), effect deenergization of the solenoid 49, 49<sup>a</sup>, 49<sup>b</sup>, 49<sup>c</sup> or 49<sup>d</sup> now energized and so effect immediate closing of the valve 32 previously opened for discharging water via the appropriate sprinkler pipe 30 into the apartment which was on fire, and at the same time cause restoration of the valve 21 to its normal condition to shut off the supply of water to the manifold 23 from the water main and connect the drain-off conduit 24 from said manifold to the soil pipe 24', and, further, at the same time, to effect re-closing of the one or more of said by-pass conduits A, A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> which were opened.

Said person will also, if the supply of sprinkling water was effected by manual closing of the appropriate one of the hand-switches 57, 57<sup>a</sup>, etc., open that switch.

The re-closing of the any one or more of said by-pass conduits A, A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> as were previously opened, follows from the fact that said opening of said normally closed switch 102 effects deenergization of the previously energized relay 68, 82 or 92 (if any of them was previously energized) as the case may be. This last is so, because the opening of said switch 102 results in deenergization of the relay 61; by way of a circuit including leads 60, 104 and 105, the coil of said relay, and leads 106 and 67''.

The opening of the contacts of said relay 61 consequent upon its said deenergization also, incidentally, breaks the supply of current to the particular thermostat (as the thermostat 56) in the apartment where the fire has been extinguished; so that, even with said thermostat still highly heated, the main valve 32 for the sprinkler pipe 30 of that apartment will be closed. Said valve 32 will be closed due to deenergization of the solenoid 49, 49<sup>a</sup>, 49<sup>b</sup>, 49<sup>c</sup> or 49<sup>d</sup> previously energized to maintain that valve open. Also, even with said thermostat still highly heated, the one or more of said by-pass conduits A, A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> as were previously opened by opening of the valve or valves B therein, will now be closed by closing of said valve or valves B. Said valve or valves B will now become closed due to deenergization of the one or more appropriate solenoids C, C<sup>1</sup>, C<sup>2</sup> and C<sup>3</sup> previously energized to maintain said valve or valves B open. As will be recalled, the solenoid or solenoids last-named were energized by energization of some one of the relays 68, 82 and 92.

If, for energization of the solenoid (49, 49<sup>a</sup>, 49<sup>b</sup>, 49<sup>c</sup> or 49<sup>d</sup>) which was energized for opening the valve 32 of the sprinkler pipe 30 for the apartment where the fire occurred and also for energization of the solenoid or solenoids (C, C<sup>1</sup>, C<sup>2</sup>, C<sup>3</sup>) required to be energized to cause opening of the valves B in the one or more by-pass conduits having to be opened properly to meet the situation arising from the location of the fire in a particular apartment—an appropriate hand-switch (as the switch 57, or 57<sup>a</sup>, Fig. 4) was closed—the manual opening of that switch as mentioned in the third preceding paragraph effected deenergization of the solenoid or various solenoids last referred to, and so caused closing of all valves previously opened by energization of said solenoids.

#### *Drainage off of the sprinkler water*

It will be noted from Fig. 4 that interposed in the circuit for the solenoid 66 associated with the main water supply valve 21 is a normally closed switch 103; this a hand-switch, desirably placed at or adjacent to the central location 54 for the hand-switches 57, 57<sup>a</sup>, etc.

Following manual opening of the switch 102 as mentioned in the seventh preceding paragraph (and also following opening of that one of the hand-switches 57, 57<sup>a</sup>, etc. which was previously closed to cause operation of the sprinkler system as mentioned in the sixth preceding paragraph), the just referred to switch 103 is opened.

This opening of said switch 103 conditions matters so that on the happening of the next thing to be done, the solenoid 66 will remain deenergized, as it was deenergized by said opening of the switch 102; thereby to permit spring 58 to continue holding the main water supply valve 21 to its normal setting such that communication is cut off between the manifold 23 and the branch line 19 from the water main and consequently so that said manifold is connected to the drainage conduit 24.

Said switch 103 having thus been opened, said next thing to be done is now done, to wit, a re-closing of the switch 102, and a re-closing also of the hand-switch parenthetically referred to in the second preceding paragraph.

Now, consequently, the main valve 32, and the secondary valve or valves B in the one or more by-pass conduits A, A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> which were first opened to supply the sprinkler water for extinguishing the fire, will be re-opened; with the result that the accumulated water to be drained from the apartment where the fire has just been extinguished will be drained therefrom by way of the appropriate drain-pipe 35, and thence, through any of said by-pass conduits intervening between the floor of that apartment and the riser 33, to said riser, and so through the drainage conduit 24 (Fig. 1) to the soil pipe 24' connected to a sewer line. In this connection, it is to be recalled that the valve 34 in said pipe 35 is a check valve equipped with a ball valve member (as that shown at 45 in Fig. 3) in such manner that, while water cannot pass upwardly along said pipe 35 beyond said valve, water can readily pass through said valve in spilling downwardly along said pipe.

At the conclusion of a time interval sufficiently prolonged to allow draining off of all said accumulated water, and a time interval sufficiently prolonged, also, to allow cooling of a previously heated thermostat to a safe extent, the system is restored to normal condition, by re-closing the switch 102.

It is to be understood that there may be a duplicate of the switch 57 in the apartment 25, suitably wired into the system, for being manually closed by any one in that apartment on the occurrence of a fire therein; and in each of the other apartments there may be a switch duplicating the switch like the switch 57 assigned to that apartment at the central station 54 and similarly suitably wired into the system.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and valve-controlled drainage-off means relative to the water delivered by any of said extensions leading to the main supply line, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

2. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions leading to the main supply line, the last-named means incorporating valve-controlled drain-off conduits each for particularly serving one of said premises parts, the valve control for said

drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

3. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions leading to the main supply line, the last-named means incorporating valve-controlled drain-off conduits each for particularly serving one of said premises parts, said manually operable means being all at a centralized single station, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

4. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions leading to the main supply line, the last-named means incorporating valve-controlled drain-off conduits each for particularly serving one of said premises parts, said manually operable means being all at a centralized single station, there also being a thermostatically functioning means at each of said premises parts and operative connections between each of the last-named means and a particular one of said extensions at the same premises part for effectuating the last-named extension for water sprinkling, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

5. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions leading to the main supply line, the last-named means incorporating valve-controlled drain-off conduits each for particularly serving one of said premises parts, said manually operable means being all at a centralized single station, at said station there also being a separate manually operative means for actuation when a fire is extinguished thereby to effect a shunting off of the water supply to said last-named extension, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

6. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions leading to the main supply line, the last-named means incorporating valve-controlled inclined drain-off conduits each for particularly serving one of said premises parts, said manually operable means being all at a centralized single station, there being valve-controlled means for preventing the entry of water from said supply line into any of said drain-off conduits for rise to the upper end of such conduit, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

7. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions, the last-named means incorporating valve-controlled drain-off conduits each for particularly serving one of said premises parts, said manually operable means being all at a centralized single station, there also

being a thermostatically functioning means at each of said premises parts and operative connections between each of the last-named means and a particular one of said extensions at the same premises part for effectuating the last-named extension for water sprinkling, at said station there also being a separate manually operative means for actuation when a fire is extinguished thereby to effect a shutting off of the water supply to said last-named extension, there being means for preventing the entry of water from said supply line into any of said drain-off conduits for rise to the upper end of such conduit, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

8. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions, there being a main valve interposed between (a) a main water supply connection as from a water main and (b) a drainage connection as to a city sewer and (c) said sprinkler installation, spring-controlled means for normally holding said valve to maintain communication between said sprinkler installation and said drainage connection, and means operating with any of said manually operable means for conditioning said valve to substitute for the communication stated a communication between said sprinkler installation and said supply connection including a solenoid operatively connected to the main valve.

9. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions, there being a main valve interposed between (a) a main water supply connection as from a water main and (b) a drainage connection as to a city sewer and (c) said sprinkler installation, spring-controlled means for normally holding said valve to maintain communication between said sprinkler installation and said drainage connection, and means operating with any of said manually operable means for conditioning said valve to substitute for the communication stated a communication between said sprinkler installation and said supply connection including a solenoid operatively connected to the valve, said sprinkler installation including in regard to a plurality of said premises parts in vertical columnar relation a common water supply riser, the drain-off conduits for all said premises parts leading down to communication with said riser.

10. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions, there being a main valve interposed between (a) a main water supply connection as from a water main and (b) a drainage connection as to a city sewer and (c) said sprinkler installation, spring-controlled means for normally holding said valve to maintain communication between said sprinkler installation and said drainage connection, and means operating with any of said manually operable means for conditioning said valve to substitute for the communication stated a communication between said sprinkler installation and said supply connection including a solenoid op-

eratively connected to the valve, said sprinkler installation including in regard to a plurality of said premises parts in vertical columnar relation a common water supply riser, the drain-off conduits for all said premises parts leading down to communication with said riser, there being a plurality of by-pass conduits associated with said riser, a normally closed valve in each of said by-pass conduits, and means operating with any of said manually operative means for opening a suitable plurality of the last-named valves according to an arrangement whereby sprinkler water is supplied only to the premises part where a fire is occurring regardless of the relative height in such column of the last-named premises part.

11. In a fire extinguishing system, the combination, with a main water supply line for a sprinkler installation, of sprinkler extensions from said supply line each for affording sprinkler protection to a particular part of a premises, a plurality of manually operable means each for rendering a selected one of said extensions operative, and drainage-off means relative to the water delivered by any of said extensions, there being a main valve interposed between (a) a main water supply connection as from a water main and (b) a drainage connection as to a city sewer and (c) said sprinkler installation, spring-controlled means for normally holding said valve to maintain communication between said sprinkler installation and said drainage connection, and means operating with any of said manually operable means for conditioning said valve to substitute for the communication stated a communication between said sprinkler installation and said supply connection including a solenoid operatively connected to the valve, said sprinkler installation including in regard to a plurality of said premises parts in vertical columnar relation a common water supply riser, the drain-off conduits for all said premises parts leading down to communication with said riser, there being a plurality of by-pass conduits associated with said riser, a normally closed valve in each of said by-pass conduits, and solenoid-controlled means operating with any of said manually operative means for opening a suitable plurality of the last-named valves according to an arrangement whereby sprinkler water is supplied only to the premises part where a fire is occurring regardless of the relative height in such column of the last-named premises part, there further being means including a manual actuator for conditioning the system, following the extinguishment of said fire, to cause all said by-pass conduits in which are the last-named plurality of the last-named valves, and said riser, to become included in said drainage-off means.

12. A fire extinguishing system comprising, in combination, a main water supply line, a main valve controlling said main supply line, means for actuating said main valve, a riser pipe connected to said main supply line, horizontally disposed branch sprinkler pipes connected to said riser pipe for affording sprinkler protection to a particular part of a premises, valves interposed between the riser pipe and said branch pipes, solenoids associated with said latter valves for actuating the same, electric means for energizing said solenoids including a switching device, thermostatically actuated means for closing said switch device, and means for draining said premises including a pipe having one end open and located in said particular part of the premises and its other end connected to said riser pipe, the valve control for said drainage-off means including a valve interposed between a main water supply line connection and a drainage connection to a sewer.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

898,465	Hadley	Sept. 15, 1908
1,760,385	Valente	May 27, 1930