

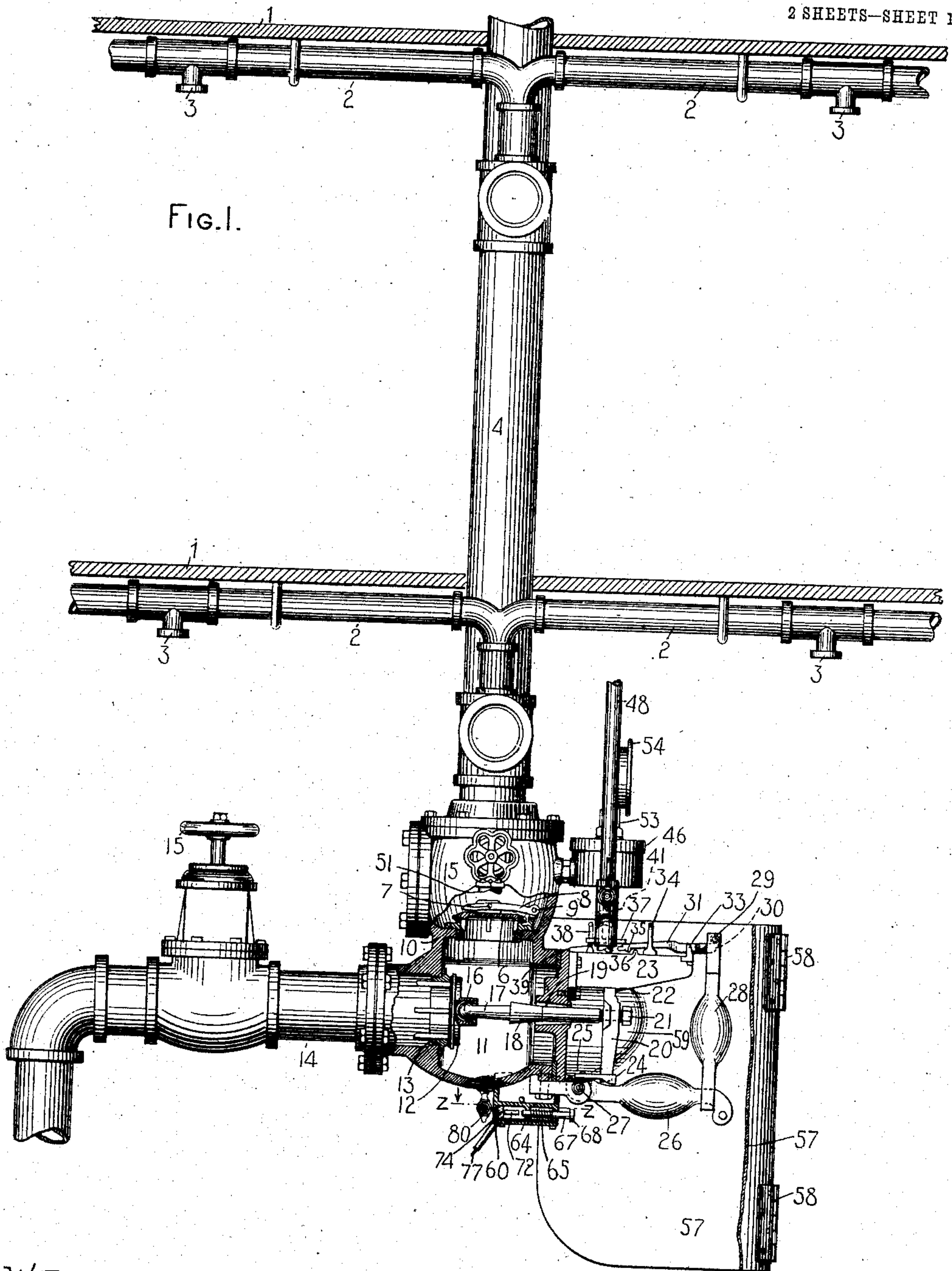
No. 864,393.

PATENTED AUG. 27, 1907.

E. L. THOMPSON.  
AUTOMATIC SPRINKLER SYSTEM.

APPLICATION FILED FEB. 15, 1902.

2 SHEETS—SHEET 1.



WITNESSES:

*E. M. Wells.*  
*Charles E. Smith*

INVENTOR

*Everett L. Thompson*

*By Jacob Feller*

HIS ATTORNEY

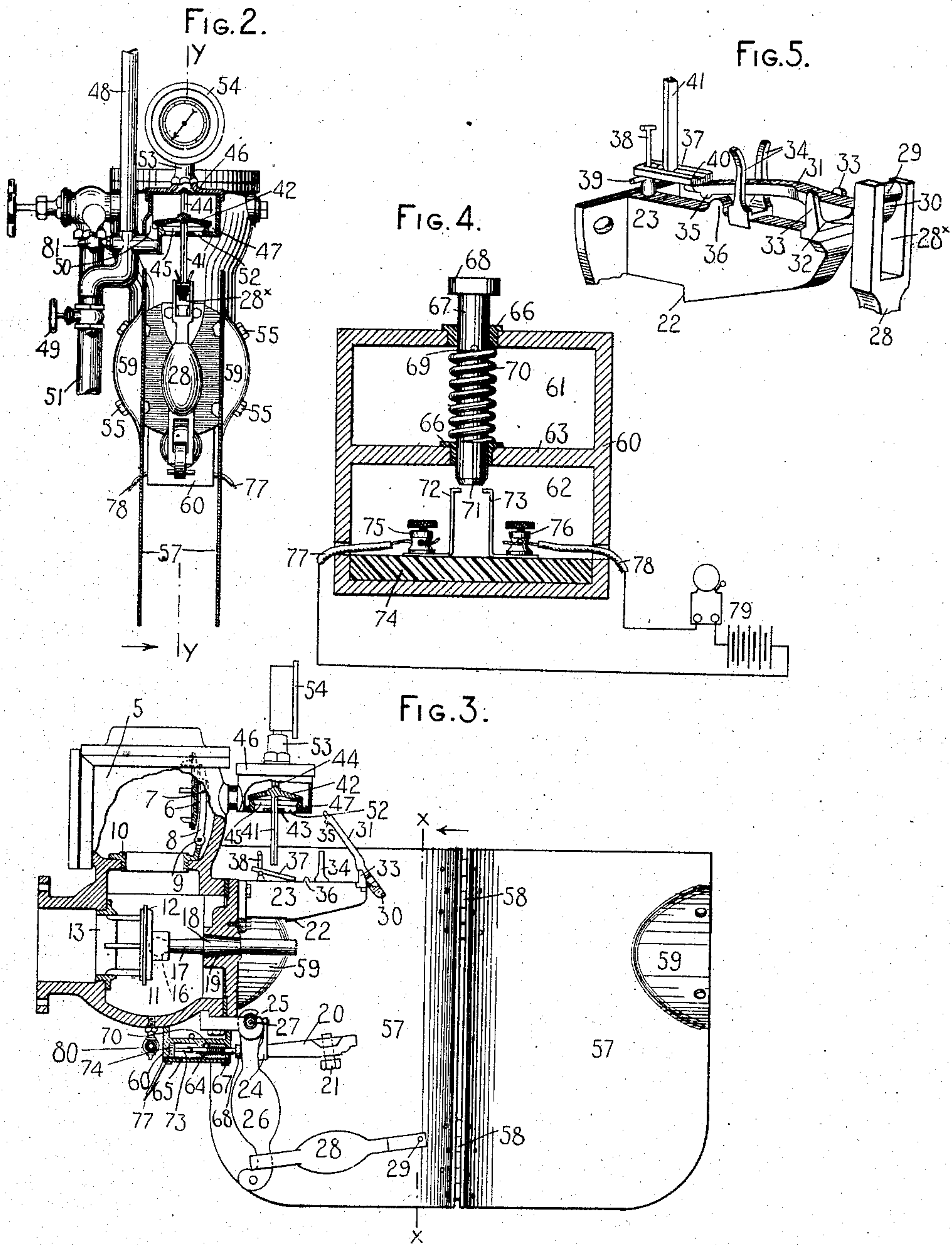
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Charles Smith

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HIS ATTORNEY



# UNITED STATES PATENT OFFICE.

EVERETT L. THOMPSON, OF NEW YORK, N. Y., ASSIGNOR TO MANUFACTURERS' AUTOMATIC SPRINKLER CO., OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

## AUTOMATIC SPRINKLER SYSTEM.

No. 864,393.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed February 15, 1902. Serial No. 94,166.

*To all whom it may concern:*

Be it known that I, EVERETT L. THOMPSON, a citizen of the United States, and a resident of Bensonhurst, borough of Brooklyn, in the county of Kings, city of New York, and State of New York, have invented certain new and useful Improvements in Automatic Sprinkler Systems, of which the following is a specification.

My invention relates to automatic sprinkler apparatus for extinguishing fires, and more particularly to that class known as the dry pipe system, and the invention is directed to improving various portions of the apparatus.

The object of the invention is to provide a simple and efficient apparatus of the character specified and one which is more reliable in operation and less liable to become deranged or broken, or to be accidentally released than like apparatus heretofore employed.

To the above ends my invention consists in the construction, arrangements and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings wherein like reference characters designate corresponding parts in the various views:—Figure 1 is a front elevation with parts broken away of a portion of an automatic sprinkler system and dry valve embodying my invention, the view showing the system installed. Fig. 2 is an end view, partly in section, of valve chambers and controlling devices; which are shown in the set position, the view corresponding substantially to a vertical sectional view taken on the line *z z* of Fig. 3 and looking in the direction of the arrow in said figure. Fig. 3 is a vertical sectional view of the same which corresponds substantially to a section taken on the line *y y* of Fig. 2 and looking in the direction of the arrow in said figure. Fig. 4 is an enlarged detail horizontal sectional view of the alarm mechanism, the view being taken on the line *z z* of Fig. 1 and looking in the direction of the arrow in said figure; and Fig. 5 is an enlarged detail perspective view of a portion of the valve controlling devices.

Referring particularly to Fig. 1 of the drawings, 1 indicates the stories of a building and to the ceiling on each story are the sprinkler distributing pipes 2 which are provided at intervals with suitable thermostatic nozzles 3 that are ordinarily closed and which are automatically opened in the usual manner by the melting of the fusible plugs which maintain them closed. The various sprinkler pipes are connected to a stand pipe 4 which terminates at its lower end at a so-called air-chamber 5. Contained within the air chamber 5 is a valve 6 which is pivoted at 7 to a link 8, the link in turn being pivoted at 9 within the air chamber. It will be observed that the link 8 extends to opposite sides of the pivot 9 so that the valve has but a slight

play with relation to the link to which it is connected. The valve 6 is adapted to a seat 10 and when the valve is closed the air chamber is separated from the so-called water chamber 11 in which is contained a valve 12 that is adapted to be seated on a valve seat 13 to close off the water chamber from the main supply pipe 14 which may be provided with a valve 15 that is adapted to cut the water off from the entire system. The valve 12 may be united by a ball and socket joint 16 to a stem 17 which is provided with a frusto-conical valve portion 18 and which extends through a tapering opening 19 that corresponds to the contour of the valve portion 18 and is adapted to be closed thereby.

A bar 20 is provided with a set screw 21 which is adapted to bear upon the free end of the stem 17 when the parts are in the positions shown in Fig. 1 and to maintain the valve 12 upon its seat. The upper end of the bar 20 is adapted to bear upon an abutment 22 formed on a fixed bracket 23 which extends from the head of the water chamber 11. The lower end of the bar coöperates with a yoke 24 which has one end thereof extended into a bifurcated portion 25 of a weighted lever 26 that is pivoted at 27 to a bracket that extends from the water chamber. The weighted lever 26 is loosely linked to a weighted arm 28 that has one end bifurcated at 28<sup>x</sup> and which is provided with a pin 29 that extends across the bifurcation so that the arm may be supported by its pin 29 on the nose 30 of a lever 31, which is supported upon a knife edge fulcrum 32 that is preferably made of non-corrosive metal. The lever may be guided in its movement by guide arms 33 and 34 which are likewise preferably made of non-corrosive metal. Near the inner end of the lever is a downwardly extending lug 35 which, under certain conditions, is adapted to coöperate with a lug 36 that extends upwardly from the upper face of the bracket 23 for purposes which will hereinafter appear. The inner end of the lever 31 is adapted to bear upon the lower side of a lever 37 which may be apertured for the reception of a fixed pin 38 having a T-shaped head and bearing arms 39. The upper face of the lever 37 may be provided with a longitudinal groove or recess 40 and in which the lower end of valve stem 41 is adapted to bear. A valve 42 is connected to the valve stem 41 and is guided thereby in a bearing 43, as well as by the stem 44 which likewise works in a suitable guide. The valve 42 coöperates with a valve seat 45 which is contained within an air cup 46 and has a circumferential groove 47 surrounding it and extending below the face of the valve seat so that any foreign matter such as sediment, rust, scales or grit which may accidentally be conveyed to the air cup, cannot rest upon the valve seat and destroy it or the face of the valve but will be caught in the groove 47 and may ultimately find its way to the outlet of said groove where it joins the anti-water column or



pipe 48. This pipe 48 extends from a point at or near the top of the stand pipe 4 with which it communicates, and extends at its lower end to a point below the air cup 46 where it is provided with a globe valve 49, which  
 5 with that portion of the pipe that extends below the lateral opening 50 to the air cup 46, constitutes a pocket for the reception of sediment, grit, mud or scales and which when the valve 49 is opened may be carried off through the pipe 51. It will be observed that the open-  
 10 ing 50 from the anti-water column extends from a point below the bottom of the air cup and communicates therewith at its lowest portion and with the groove 47 therein, as before pointed out. By these means it is almost impossible for foreign matters, which might be  
 15 conveyed through the anti-water column, to gain access to the air cup, but even if they should, they could not injure the valve or the valve seat and would be caught within the groove 47 and would eventually pass to the pocket in the lower portion of pipe 48, whence  
 20 they could be discharged through the pipe 51 when the valve 49 is opened. The lower side of the air cup is provided with openings 52 which are closed or covered by the valve 42 whereas the upper portion of the air cup communicates by a pipe 53 with a pressure gage 54, by  
 25 means of which the amount of air pressure in the entire system may be ascertained.

Secured by headed screws 55 or otherwise to the water chamber or other suitable portion of the structure is a protecting housing which in the present instance com-  
 30 prises two members 57—57, which are united by hinges 58 at their outer edges, whereas they are each shaped at 59 to conform to the bulging portion of the structure to which they are secured by the screws 55. This housing when closed incloses the valve releasing in-  
 35 strumentalities and prevents them from being knocked against and accidentally operated. The housing also prevents the placement of packing cases or other obstructions in such a position adjacent to the valve releasing devices that the latter will fail to operate  
 40 when a fire takes place and the nozzles in the distributing pipes 2 are opened.

Upon reference to Fig. 3, it will be seen that the relation of the protecting housing to the valve releas-  
 45 ing mechanism is such that the latter may operate when the housing is closed and yet the housing affords ample protection against an accidental actuation of the device, and assures the proper actuation thereof at the proper time by preventing obstructions from being placed in the path thereof. When it is desired  
 50 to set the valve releasing devices, the screws 55 at one side of the housing may be removed and that member of the housing turned on its hinges to the position represented at Fig. 3, when the parts are exposed and may be properly set.

55 Secured to the lower portion of the water chamber 11 is a housing 60 which is shown in detail in Fig. 4. This housing contains two chambers 61 and 62 which are divided by a partition 63 and are closed by a bot-  
 60 tom plate 64 that may be secured in place by suitable screws, with a sheet of rubber 65 interposed between the face of the bottom plate and the housing to make a tight joint and to prevent the sweat or moisture which might accumulate on the outside of the water cham-  
 65 60. One wall of the housing and its partition are per-

forated for the reception of insulating flanged collars or bushings 66 through which a bolt 67 slides. This bolt is provided with a head 68 and a cross pin 69 which latter contacts with one of the bushings 66 and limits the outward movement of the bolt and consti- 70  
 tutes a bearing for one end of a coiled spring 70, the other end of the spring bearing on a bushing 66 and maintaining the bolt normally in the projected posi-  
 tion. The inner end of the bolt extends through the partition 63 and into the chamber 62 and has a 75  
 tapering end 71 which is adapted to be forced between two spring contacts 72 and 73. These spring contacts are secured to an insulating block 74 by binding posts 75 and 76 respectively, and to which the wires 77 and 78 respectively are connected. These wires lead to a 80  
 suitable battery and alarm mechanism 79 and the relation of the bolt 67 (which is in fact a circuit closer) to the weighted lever 26, is such that when the valve releasing devices are released as shown in Fig. 3, said  
 lever will drop against the head of the bolt, thus forc- 85  
 ing it against the tension of its spring and between the spring contacts 72 and 73 and the electric current will flow from one contact to the other through the bolt 67 and the alarm will be sounded, thus notifying  
 every one within the building of the fire which has 90  
 effected an automatic operation of the sprinkler.

The operation of the system is as follows: Water hav-  
 ing been cut off from the entire system by the valve 15, the valve controlling devices are set in the position  
 shown in Fig. 1 and the various nozzles 3 having been 95  
 closed by their fusible plugs, air will be pumped into the entire system above the valve 6, by any suitable pump, until a pressure of say ten pounds is registered on the pressure gage 54. This pressure will maintain  
 the valve 42 on its seat, thereby causing the stem 41 100  
 of the valve to support the various parts of the releasing mechanism in the operative position with the valve 12 on its seat. The valve 15 may then be  
 opened and the ten pound air pressure in the system will, through the releasing mechanism, withstand a 105  
 one hundred pound water pressure on the valve 12. Should a fire occur one or more of the fusible plugs will be melted out, thus opening the associated noz-  
 zles 3 and the compressed air within the system will escape. The air pressure being thus lowered will no 110  
 longer press the valve 42 on its seat and the weighted levers 26 and 28 will raise it through the intermediate levers, thus permitting the outer end of the lever 31 to be depressed and the weighted levers 26 and 28 will  
 be allowed to drop to the position shown in Fig. 3. 115  
 The bar 20 dropping with the weighted levers will no longer press, through its set screw, on the valve stem 17 and the pressure of the water on the valve 12 will force it open, at the same time closing the valve open-  
 ing 19 through which the stem 17 works. The water 120  
 flowing into the water chamber 11 raises the valve 6 in the air chamber and flows up into the main or stand pipe 4 through the distributing pipes 2 and out the nozzles 3, which were opened at the point where the  
 fire occurred, and the alarm will at the same time be 125  
 sent in by the weighted lever 26 forcing the bolt be-  
 tween the contacts 72 and 73. It will be understood that if through any oversight or carelessness the valve 15 has been closed before the fire occurs, the valve re-  
 leasing mechanism will nevertheless be actuated and 130



that it will result in the alarm being sent in notwithstanding no water flows through the system, because the actuation of the alarm is controlled by the valve releasing mechanism and its actuation is entirely independent of the flow of water, but takes place when the air pressure on the valve 12 is reduced or removed.

In resetting the apparatus after a fire has occurred, it is essential that every portion of the system beyond the valve 12 be drained thoroughly and if this be not done, it is liable to result in the valve 12 not opening when a fire occurs, as will be hereinafter explained. I have provided a cock 80 at the lowermost portion of the water chamber 11 in order that any water which may leak through the valve 12 may be removed from time to time and this portion of the system be thoroughly drained.

The anti-water pipe 48, as before explained, is connected to the highest portion of the system or to the top of the stand pipe 4, and thus fills with water when the system is filled, and if the water should be allowed to remain in the pipe 48 the weight of the water on the valve 42 might prevent its operation. Thus for instance, if a column of water, say twenty feet high, be allowed to remain in the anti-water pipe 48, it will exert a pressure of ten pounds to the square inch on the valve 42 and in the event of a fire the air pressure would be released as before but the ten pound water pressure on the valve 42 would prevent an actuation of the releasing mechanism and the water would not be turned on, nor would the alarm be sent in. It will therefore be seen that it is absolutely essential that this anti-water pipe be free from water. As before explained, water may be discharged from this pipe through the valve 49 and in addition to this a test cock 81 is provided near the bottom of the pipe, and by means of which one can readily determine at any time whether or not water is contained in the pipe.

In addition to the above, I have provided means which positively prevent the setting of the valve releasing mechanism without first draining the anti-water column or pipe 48. Thus it will be seen that the construction and arrangement of the various levers and the studs or projections 35 and 36 hereinbefore described are such that the parts cannot be set in the operative position without first raising the valve stem 41, thereby unseating the valve 42, when the water contained in the air cup 46 and the pipe 48 will flow out through the openings 52 in the air cup.

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

1. In an automatic sprinkler system, the combination with distributing pipes, a water supply pipe, a valve which controls the flow of water from said supply pipe to the distributing pipes, means for holding said valve to its seat, means for automatically releasing said holding means and valve when a fire takes place, and alarm mechanism which is controlled independently of the flow of water and which is set in operation when the valve holding means and releasing mechanism is operated.

2. In an automatic sprinkler system, the combination with distributing pipes, a water supply pipe, a valve which controls the flow of water from said supply pipe to the distributing pipes, means for holding said valve to its seat, means for automatically releasing said holding means and valve when a fire takes place, and alarm mechanism which is controlled by the valve holding and releasing mechanism and is set in operation when said mechanism releases the valve.

3. In a dry pipe automatic sprinkler system, the combination with distributing pipes, a water supply pipe, a valve which controls the flow of water from said supply pipe to the distributing pipes, means for holding said valve on its seat and valve releasing means which are controlled by air pressure in the system and which includes weighted levers, and an electric circuit closer which is operated by said weighted levers to send in an alarm when the levers are released.

4. In an automatic sprinkler system, the combination of a water release valve, automatic valve releasing mechanism therefor, an air pressure pipe which communicates with said valve releasing mechanism, and means which prevent the setting of said valve releasing mechanism without first draining said air pressure pipe.

5. In an automatic sprinkler system, the combination of distributing pipes, a water release valve which controls the flow of water to said distributing pipes, automatic valve holding and releasing mechanism for said valve, an air pressure pipe which communicates with said valve holding and releasing mechanism and with the distributing pipes, and means which prevent the setting of said valve holding and releasing mechanism without first draining said air pressure pipe.

6. In an automatic sprinkler system, the combination of a water release valve, a system of levers which maintains said valve on its seat, a valve which controls the release of said levers, and means for preventing the setting of said levers without first opening said controlling valve.

7. In an automatic sprinkler system, the combination of water distributing pipes, a water release valve, a system of levers which maintains said valve on its seat, a controlling valve which is maintained seated by air pressure and which controls the release of said levers, and means for preventing the setting of said levers without first moving said controlling valve from its seat and permitting any water which tends to seat it to escape.

8. In an automatic sprinkler system, the combination of a water release valve, a system of levers which maintains said valve on its seat, a valve which controls the release of said levers, an abutment, and means cooperating therewith to prevent the setting of said levers without first opening said controlling valve and permitting any water which tends to seat it to escape.

9. In an automatic sprinkler system, the combination of a main or stand pipe, a valve which controls the flow of water thereto, distributing pipes which connect with said stand pipe, a system of levers which cooperate with said valve to maintain it seated, an anti-water column which is in communication with said distributing pipes, a controlling valve which is maintained seated by air pressure in the distributing pipes and anti-water column and which maintains the levers in the set position, and means for preventing said levers from being set without first unseating the controlling valve and permitting the water in the anti-water column to escape.

10. In an automatic sprinkler system, the combination of a main or stand pipe, a valve which controls the flow of water thereto, distributing pipes which connect with said stand pipe, thermostatic nozzles in said distributing pipes, a system of levers which cooperate with said valve to maintain it seated, an anti-water column which is in communication with said distributing pipes, an air cup in communication with said anti-water column, a controlling valve within said air cup and which is maintained seated by air pressure in the distributing pipes and anti-water column and which maintains the levers in the set position, and means for preventing said levers from being set without first unseating the controlling valve and permitting the water in the anti-water column to escape.

11. In an automatic sprinkler system, the combination of a water releasing valve, a system of levers for automatically releasing said valve when a fire takes place and a removable sectional protecting housing for preventing said levers from being accidentally released or from being blocked by obstructions when housing is in place, said housing being open at top and bottom and the sections of which are united by hinges, whereby access may be had to the levers when desired.

12. In an automatic sprinkler system, the combination



of a water releasing valve, a system of levers for automatically releasing said valve when a fire takes place, and a two-part protecting housing which surrounds said levers and open at the top and bottom thereof and the parts of which are united by hinges and are adapted to be secured in place to prevent the levers from being accidentally released or blocked by obstructions and whereby one part of said housing may be readily opened on the other to expose the levers.

10 13. In a dry pipe automatic sprinkler system, the combination with distributing pipes, a water supply pipe, a valve which controls the flow of water from said supply pipe to the distributing pipes, valve releasing means which are controlled by air pressure in the system and which includes weighted levers and an electric circuit closer which is operated by said weighted levers to send in an alarm when the levers are released, and means which prevent said levers from being set without first draining a part of the system.

20 14. In an automatic sprinkler system, the combination of a main or stand pipe, a valve which controls the flow of water thereto, distributing pipes which connect with said stand pipe, thermostatic nozzles in said distributing pipes, a system of levers which cooperate with said valve to maintain it seated, an air cup, an anti-water column which is in communication with said distributing pipes and has open communication with said air cup at the bottom thereof and which extends below said air cup, a controlling valve within said air cup and which is maintained seated by air pressure in the distributing pipes and

anti-water column and which maintains the levers in the set position, and means for preventing said levers from being set without first unseating the controlling valve and permitting the water in the anti-water column to escape.

35 15. In an automatic sprinkler system, the combination of a main or stand pipe, a valve which controls the flow of water thereto, distributing pipes which connect with said stand pipe, thermostatic nozzles in said distributing pipes, a system of levers which cooperate with said valve to maintain it seated, an anti-water column which is in communication with said distributing pipes, an air cup in communication with said anti-water column, a controlling valve within said air cup and which is maintained set by air pressure in the distributing pipes and water column and which maintains the lever in set position, a valve seat for the controlling valve within said air cup, a sediment collecting groove in said cup and around the outside of said valve seat, and means for preventing said levers from being set without first unseating the controlling valve and permitting the water in the anti-water column to escape.

Signed at borough of Manhattan, city of New York, in the county of New York, and State of New York, this 14th day of February, A. D. 1902.

EVERETT L. THOMPSON.

Witnesses:

K. V. DONOVAN,  
E. M. WELLS.