No. 870,792. PATENTED NOV. 12, 1907.

J. McALEAR.

ATTACHMENT FOR SPRINKLER SYSTEMS.

APPLICATION FILED NOV. 18, 1905.

2 SHEETS—SHEET 1.

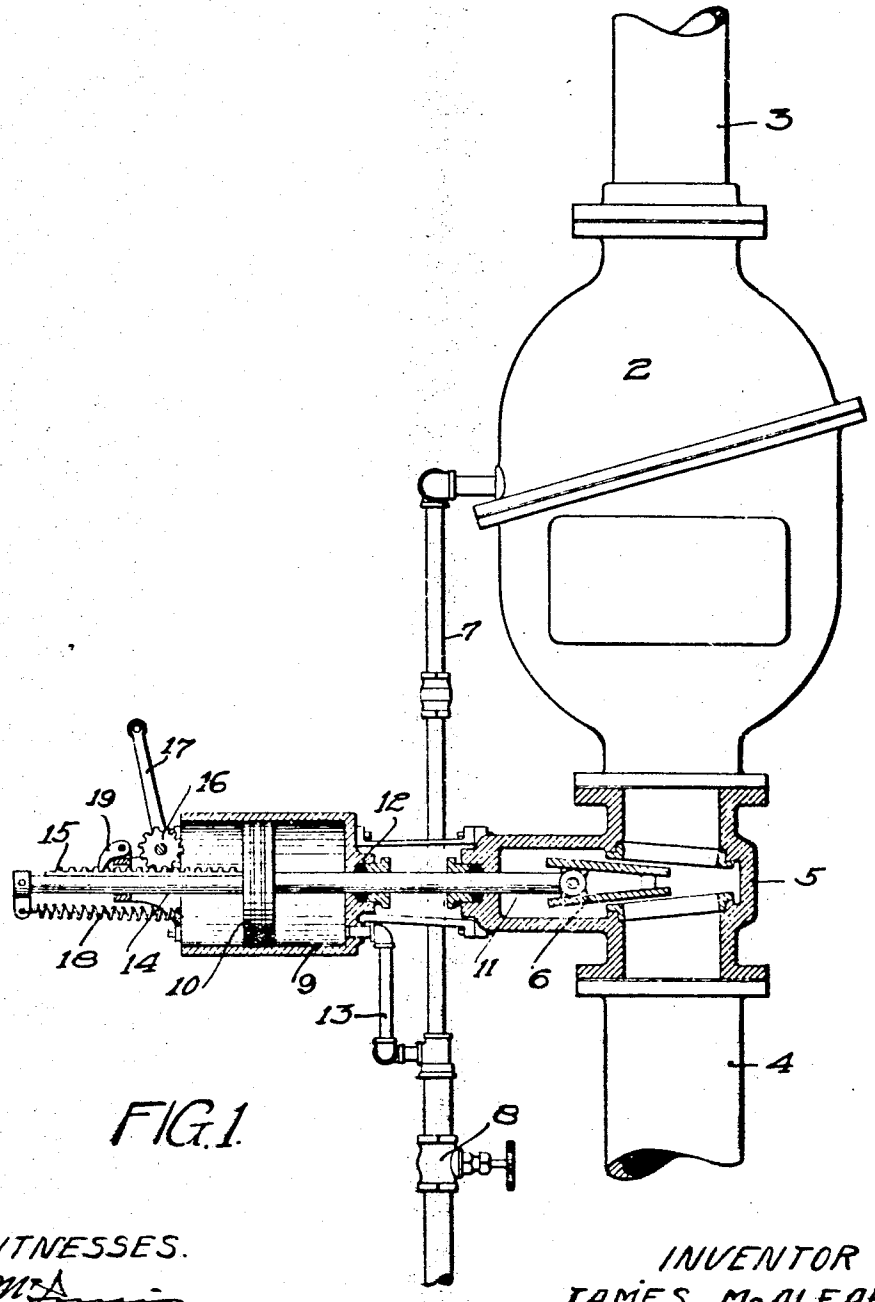

FIG. 1.

WITNESSES.

M. McAmis

C. Mannamara

INVENTOR

JAMES McALEAR.

BY Paul & Paul

HIS ATTORNEYS.

No. 870,792. PATENTED NOV. 12, 1907.

J. McALEAR.

ATTACHMENT FOR SPRINKLER SYSTEMS.

APPLICATION FILED NOV. 18, 1905.

2 SHEETS—SHEET 2.

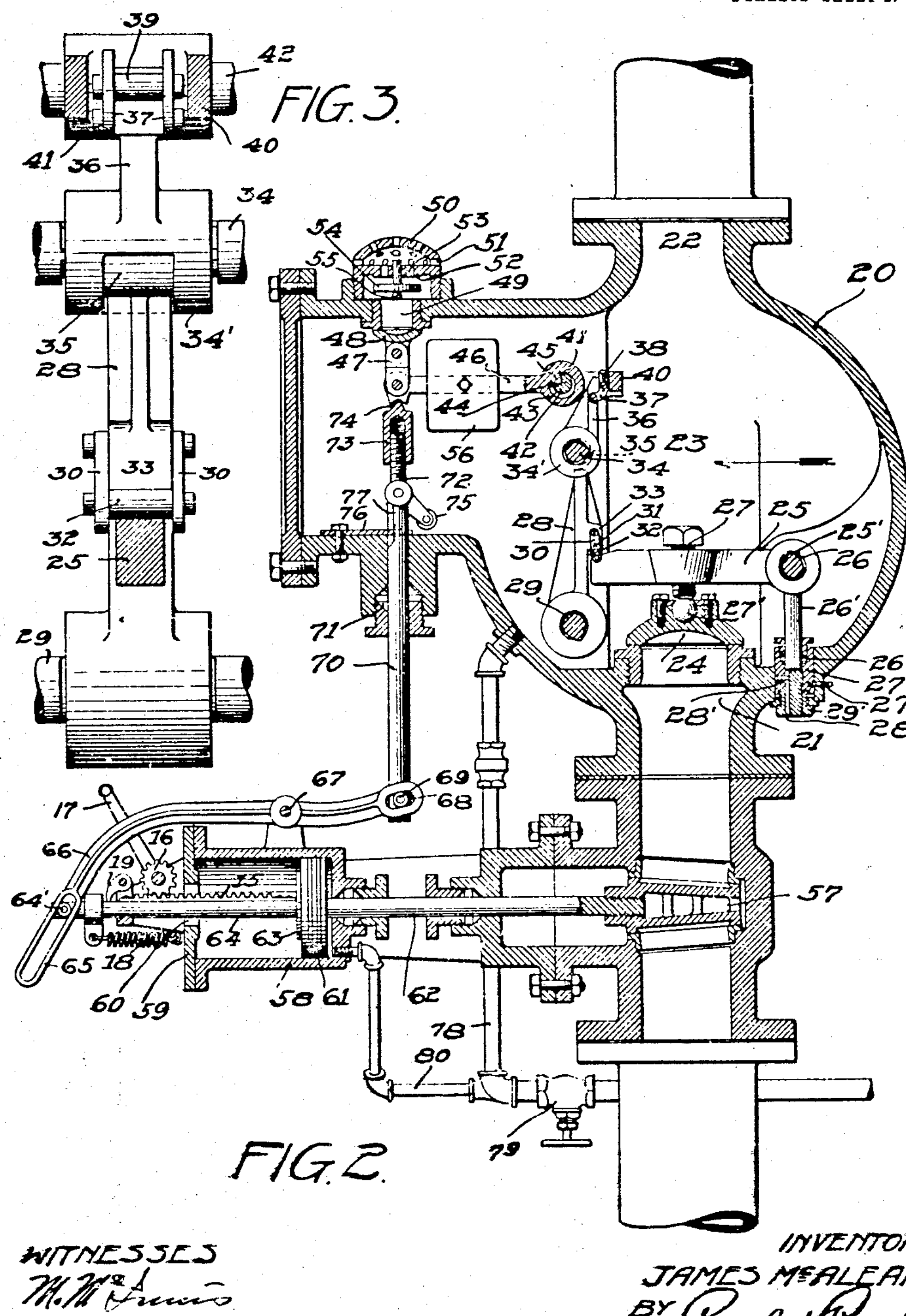

FIG. 3.

FIG. 2.

WITNESSES

INVENTOR

JAMES McALEAR

BY Paul & Paul

HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES McALEAR, OF ST. PAUL, MINNESOTA.

ATTACHMENT FOR SPRINKLER SYSTEMS.

No. 870,792. Specification of Letters Patent. Patented Nov. 12, 1907.

Application filed November 18, 1905. Serial No. 287,993.

To all whom it may concern:

Be it known that I, JAMES McALEAR, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Attachments for Sprinkler Systems, of which the following is a specification.

In putting a sprinkler system in working order, after a fire, it is customary to replace the burned-out heads, close the valve leading to the system, admit air under pressure thereto if it is a dry pipe system, and, finally, open the water inlet valve so that as soon as the pressure is relieved in the system by the opening of a head, the sprinkler valve will open automatically and allow the water to rush in. It sometimes happens, however, in the haste of putting the system in order, that the operator will set and close the sprinkler valve and turn the pressure on the system and the sprinkler heads, but forget to open the water inlet valve and go away leaving this valve closed and the system, consequently, entirely inoperative so far as being a preventative of fire is concerned.

The object, therefore, of my invention is to provide means, whereby when pressure is admitted to the system, the water inlet valve will be automatically opened and the system thereby rendered operative.

The invention consists, generally, in providing means connected with the inlet valve and with the system for automatically opening the valve when the pressure enters the system.

In the accompanying drawings forming part of this specification, Figure 1 represents a side elevation of a sprinkler system valve showing my invention and the water inlet valve in section applied thereto. Fig. 2 is a sectional view of a sprinkler valve normally in communication with the system and having an automatic attachment for opening the water inlet valve. Fig. 3 is an enlarged detail view of the valve-locking mechanism looking in the direction of the arrow in Fig. 2.

In the drawing, 2 represents the sprinkler system valve, of any suitable construction.

3 is a pipe leading to the sprinkler system, 4 the water inlet pipe, and 5 a casing having a gate valve 6 which controls the flow of water to the sprinkler valve and the system.

7 is a drip pipe connected with the system for drawing off the water therefrom after a fire.

8 is a valve provided in the drip pipe which is normally kept in a closed position.

9 is a cylinder closed at one end and open at the other to the atmosphere, and having a piston 10 provided with a rod 11 which forms the stem of the gate valve 6 and passes through suitable stuffing boxes 12 in the closed end of said cylinder and the casing 5 of the water inlet valve. A branch pipe 13 connects the closed end of the cylinder with the pipe 7 above the valve 8. A rod 14 is connected with said piston and has a rack bar 15 engaged by a pinion 16 provided with an operating crank 17. A spring 18 normally draws the piston 10 toward the closed end of said cylinder, and a dog 19 engages the teeth of the rack bar 15 and locks the piston and bar against movement toward the closed end of the cylinder, or to close the water inlet valve.

The attendant having drained the sprinkler system and closed the sprinkler and drip valves, will admit air to the system, and as it flows down through the pipe 7 into the cylinder, the piston will be actuated automatically to open the water inlet valve, the dog 19 slipping over the teeth of the rack bar and allowing the piston to be moved to open the valve, but positively locking it against movement in the other direction to close the valve.

It will, of course, be necessary before draining the system after a fire to shut the water inlet valve, and this is accomplished automatically in the following manner. As soon as the drip valve is open the water will flow down past the branch pipe 13 from the sprinkler system and form a suction which will exhaust the air from the closed end of the cylinder and allow the atmospheric pressure on the other side of the piston to move it toward the right, after the dog has been raised by hand, and close the water inlet valve. This may also be done by hand by raising the dog 19 and operating the crank 17. It will not be possible, however, to close this valve by accident or design while the system is in working order, as the pressure on the right hand side of the piston will be too great to be overcome by the operation of the pinion and rack bar mechanism. No mischievous or maliciously inclined person could therefore tamper with the valve and render the system inoperative.

In Fig. 2 I have shown the application of my automatic attachment to a type of valve where the pressure is normally in the valve which communicates directly with the sprinkler system in distinction from the type shown in Fig. 1, where the sprinkler valve is normally cut off from communication with the system. The water inlet valve is shown closed in this figure, while it is open in Fig. 1.

Referring to the drawing, 20 represents the valve casing having an inlet port 21 opposite a port 22 which leads to the system, the passage between these ports being straightway and unobstructed. A chamber 23 is provided within the valve 20 in communication with the sprinkler system through the port 22. A valve 24, which I will hereinafter designate as the main valve, closes the port 21, and a lever 25 pivoted at 26 on the casing 20 has a screw 27 provided with a ball and socket

bearing 27′ on the disk 24. One end of the lever 25, on one side of the port 21, has a knife-edge bearing 25′ in the upper end of a rod 26′, the lower end of which is threaded and projects down through a stuffing box 26″ in a bushing 27″ that is locked by a pin 27‴. A pin 28′ enters a slot 28″ in the rod 26′ and locks it against rotation but permits its longitudinal movement. A nut 29′ on the end of the rod 26′ allows longitudinal adjustment of said rod to increase or decrease the pressure of the lever 25 on the valve 24 without opening the valve casing. A lever 28 is pivoted at 29 on the other side of the port 21, and is provided with links 30 having slots 31 wherein a roller 32 is loosely mounted and adapted to bear on the end of the lever 25 opposite the rod 26′. A lug 33 on the lever 28 above the roller 32 limits upward movement of the same and forms a surface on which the said roller moves when the lever 28 is operated. A rock shaft 34 is mounted in the casing 20 above the lever 28, and is provided with an oscillating hub 34′ having a recess 35 to receive the end of said lever. The hub 34′ has an arm 36 and links 37 pivoted thereon and provided with a slot 38 wherein a roller 39 is mounted. A yoke 40 is mounted on a hub 41 and the arm 36 is inserted between the yoke and hub with the roller 39 contacting with the yoke on one side and with the arm 36 on the other. A shaft 42 projects through an opening 43 in the hub 41, and has a recess 44 to receive a lug 45 on said hub. The recess is of sufficient size to allow a limited rocking movement of the hub thereon. An arm 46 projects horizontally from said hub 41 on the opposite side thereof from the yoke 40, and is pivotally connected by a link 47 with a valve 48 which closes a port 49 leading to the atmosphere in the wall of the casing 20 at one side of the port 22 and which I will designate as the auxiliary valve. A cap 50 having a series of perforations 51 is provided over the port 49, and a horizontal inner wall 52 is provided with holes 53 adapted to be closed by a vertically moving valve 54 located above the port 49 and limited in its downward movement by a pin 55. The valve 54 will normally remain open by gravity and permit air to pass through the holes 53. As soon, however, as the valve 48 is opened the valve 54 will be raised by the pressure flowing through the port 49 to close the holes 53 and prevent the escape of air or water therethrough. When, therefore, the system is made operative by the opening of the inlet valve and the water flows therein, pressure will immediately close the valve 54 and prevent the water from flowing out of the sprinkler valve through the port 49. The valve 48 will be normally held against its seat by the air pressure in the chamber 23, but as soon as this air pressure is relieved a weight 56 carried by the arm 46 will pull the valve 48 away from its seat and open the port 49. When the arm 46 drops down the hub 41 will be oscillated, raising the yoke 40 and releasing the arm 36 which will swing in toward the valve 24 and push the lever 28 off the end of the lever 25; whereupon the valve 24 will be released and the water entering the inlet valve 57 will raise the valve 24 and rush into the chamber 23, and from thence to the sprinkler system.

It is desirable in a valve of this kind to provide some means for locking the auxiliary valve on its seat after the closing and setting of the main valve and until the air pressure is turned on the system, and for automatically moving said locking means to release said valve when the pressure is admitted to the system, and the water inlet valve opened. I therefore provide a cylinder 58 having a head 59 with a port 60, and a piston 61 connected by a stem 62 with the inlet valve 57 and having a seat 63 arranged to contact with the head 59 and close the port 60 and prevent leakage of air around the piston when the water inlet valve is open and the system is in use. The presence of the port 60 in the end of the cylinder will prevent the leakage around the piston when the valve is closed from forming a cushion in the rear of the piston and interfering with its operation.

A stem 64 is provided with a rack bar and pinion mechanism similar to the one described with reference to Fig. 1, and also has a roller 64′ fitting within a slot 65 in a lever 66 pivoted at 67 on the cylinder 58. The opposite end of the lever 66 from the slot 65 is provided with a slot 68 to receive a roller 69 on the lower end of a rod 70 which slides vertically in a stuffing box 71 and carries a bell crank 72 on its upper end. One arm of said bell crank is threaded, and a cap 73 is adjustably mounted thereon and has a bearing 74 on its upper end in the arm 46. The other arm of the bell crank 72 is provided with a roller 75 which when the rod 70 is drawn down will engage the wall of the casing 20 and swing the bell crank on its pivot out of the path of the arm 46. Rotary movement of the rod 70 is prevented by a guide 76 fitting within a slot 77 in said rod. A drip pipe 78 is connected with the chamber 23, and has a valve 79 and a branch pipe 80 leading from said pipe to the end of the cylinder 58.

The compound lever mechanism between the main and auxiliary valves of this case, is substantially the same as that shown and described in my co-pending applications 287,991 and 287,992, of even date herewith and I have not therefore, in this application claimed specifically this mechanism except in connection with novel features of the apparatus not disclosed in said applications.

To put the apparatus shown in Fig. 2 in working order, the main and auxiliary valves are closed and the locking levers adjusted to hold the main valve 24 on its seat. The rod 70 is then raised until the bearing 74 engages the arm 46 to hold it in its raised position and the auxiliary valve against its seat to close the port 49. The casing 20 is then closed and air pressure admitted to the system, and until the pressure is sufficient to hold the valve 48 against its seat it will be locked by the engagement of the bearing 74 with the arm 46. As the air fills the chamber 23 it will flow down through the pipes 78 and 80 into the cylinder 58 and open the inlet valve 57 in the manner described with reference to Fig. 1. The longitudinal movement of the stem 64 will rock the lever 66 and draw down the rod 70 until the roller 75 contacts with the casing 20 and swings the cap 73 to the left out of the path of the arm 46. The valve 48 will then be free to drop by gravity as soon as the air pressure thereon is relieved. If it is found after closing the casing 20 that the valve 24 should be tightened, a wrench may be applied to the nut 29′ and the lever 25 drawn down to increase its pressure on the valve. In case of fire and the fusing

of a sprinkler head, the pressure in the system will immediately be reduced, the valve 48 will drop down by gravity aided by the weight 56 and the compound lever mechanism between the auxiliary and main valves will be operated to release the main valve and allow the water to flow into the system. The pressure of the water will immediately close the valve 54 and prevent any leakage of water at that point. In draining this type of valve, after the drip valve has been opened, the cylinder piston will be operated and the water inlet valve closed in much the same way as heretofore described with reference to Fig. 1.

I claim as my invention:

1. A sprinkler system having sprinkler heads and containing a fluid pressure, a water inlet valve and means whereby when said system is charged with fluid pressure the said inlet valve will surely and positively be opened.

2. The combination with a sprinkler system and the water inlet valve, of means for automatically opening said valve when air pressure is admitted to the water distributing pipes, substantially as described.

3. The combination, with a sprinkler system having a water inlet valve and a drip pipe valve, and means for locking said inlet valve in its open position, of mechanism whereby when said drip pipe valve is opened to drain the system and said locking means is released said inlet valve will be automatically closed, substantially as described.

4. The combination, with a sprinkler system having a water inlet valve and a drip pipe valve and means for locking said water inlet valve in its open position, of mechanism whereby when said drip pipe valve is opened and said locking means is released said water inlet valve will be automatically closed by atmospheric pressure.

5. The combination with a dry pipe sprinkler system and its water inlet valve, and a drip pipe having a suitable valve, of a cylinder having a piston connected with said inlet valve, and a branch pipe leading from said drip pipe to said cylinder on one side of said piston, substantially as described.

6. The combination with a sprinkler system and its water inlet valve, of means whereby said valve will be automatically opened when pressure is admitted to the sprinkler heads, and manually-operated means for closing said valve, substantially as described.

7. The combination with a sprinkler system and its valve, of means whereby said valve will be opened automatically when pressure is admitted to the sprinkler heads, and mechanism for opening or closing said valve by hand.

8. The combination with a sprinkler system and the inlet valve, of a cylinder closed at one end and open at the other and having its piston connected with said valve, and said system having a drip pipe and valve, and a branch pipe leading from said drip pipe to the closed end of said cylinder between said drip pipe valve and the system, substantially as described.

9. The combination with a sprinkler system and its valve, and means whereby said valve will be automatically opened when pressure is admitted to sprinkler heads, and means for locking said valve in its open position.

10. The combination with a sprinkler system and the water inlet valve and the steam drip pipe having a valve, of a cylinder having its piston connected with said valve, and a pipe leading from said cylinder to the system drip pipe, and a rack and pinion mechanism having a suitable dog connected with said piston, substantially as described.

11. In a dry pipe sprinkler system, the combination with a casing having ports for connection to the system and to the water supply, and also having an auxiliary port leading to the atmosphere, of main and auxiliary valves, the latter closing said auxiliary port and being held normally in its closed position by the pressure in the system, and the former controlling the admission of water to the system, mechanism actuated by the opening of said auxiliary valve for releasing said main valve, mechanism for locking said auxiliary valve in its closed position when said casing is relieved of pressure, a water inlet valve, and means whereby said inlet valve will be opened and said auxiliary valve will be released by its locking mechanism when pressure is admitted to said casing.

12. The combination with a valve casing having a drip pipe and valve and ports for connection with the water supply and sprinkler system, and an auxiliary port leading to the atmosphere, of main and auxiliary valves, the former normally closing said water supply port and the latter closing said auxiliary port, the port leading to the sprinkler system being open to admit pressure to said casing, and said auxiliary valve being held in its closed position by said pressure when the system is in use, mechanism for locking said auxiliary valve in its closed position when said casing is relieved of pressure, a lever mechanism connecting said auxiliary valve and said main valve, a water inlet valve, a cylinder connected with said valve drip pipe and having its position attached to the stem of said inlet valve, and operative connections provided between said piston and said auxiliary valve locking mechanism, substantially as described.

13. The combination with a valve casing having a drip pipe and valve and ports for connection with the water supply and with the sprinkler system and an auxiliary port leading to the atmosphere, of main and auxiliary valves, the former normally closing said water supply port and the latter closing a port leading to the atmosphere, the port leading to the sprinkler system being open to admit pressure to said casing, and said auxiliary valve being held when the system is in use by said pressure in its closed position, mechanism for locking said auxiliary valve in its closed position when said casing is relieved of pressure, a compound lever mechanism connecting said auxiliary valve and said main valve, a water inlet valve, a cylinder connected with said valve drip pipe and having its piston attached to the stem of said inlet valve, and a lever mechanism connecting said piston and said auxiliary valve-locking mechanism, substantially as described.

14. The combination with a casing having ports communicating respectively with the water supply and with the sprinkler system, of main and auxiliary valves, said main valve normally closing said inlet port and said auxiliary valve closing a port leading to the atmosphere, the port leading from said casing to the sprinkler system being open and said auxiliary valve being normally held on its seat by the pressure within said casing, mechanism for locking said auxiliary valve in its closed position when the pressure is relieved in said casing, a compound lever mechanism connecting said auxiliary valve and said main valve, a water inlet valve and mechanism for automatically opening said water inlet valve and releasing said auxiliary valve when pressure is admitted to said casing, substantially as described.

15. The combination with a valve casing having inlet and discharge ports for connection with the water supply and the sprinkler system and an auxiliary port leading to the atmosphere, of main and auxiliary valves, said discharge port being open, a lever mechanism connecting said main and auxiliary valves and arranged to lock said main valve in its closed position, and means projecting through the wall of said casing for adjusting said mechanism to regulate the pressure on said main valve, substantially as described.

16. In a sprinkler system valve, the combination with a casing having a main inlet port, of a valve arranged to close said port, a lever mechanism for locking said valve in its closed position, a rod connected with said lever mechanism and having a threaded end projecting through the wall of said casing, a suitable stuffing box for said rod, and a nut provided on said threaded end and whereby the pressure of said lever mechanism on said valve can be increased or decreased, substantially as described.

17. A dry pipe sprinkler system containing fluid under pressure and having a water inlet valve and means whereby when the sprinkler heads are closed and said fluid pressure is admitted to the distributing pipes said inlet valve will be automatically opened.

18. A sprinkler system having a water inlet valve and means whereby when pressure is admitted to the distributing pipes upon the closing of the sprinkler heads said inlet

valve will be positively operated, substantially as described.

19. A dry pipe sprinkler system having sprinkler heads and containing air under pressure, a water inlet valve, and means whereby when said system is charged with air pressure and the sprinkler heads are closed the said inlet valve will surely and positively be opened.

20. A sprinkler system having sprinkler heads and containing a fluid pressure, a water inlet valve, and means for admitting water to said system when the pressure falls below a predetermined point, and means whereby when said system is charged with fluid pressure the said inlet valve will surely and positively be opened, substantially as described.

In witness whereof, I have hereunto set my hand this 9th day of November 1905.

JAMES McALEAR.

Witnesses:
RICHARD PAUL,
C. MACNAMARA.