May 8, 1934. E. TYDEN 1,958,287

ACCELERATOR.

Filed Nov. 28, 1932 3 Sheets-Sheet 1

Fig. 1.

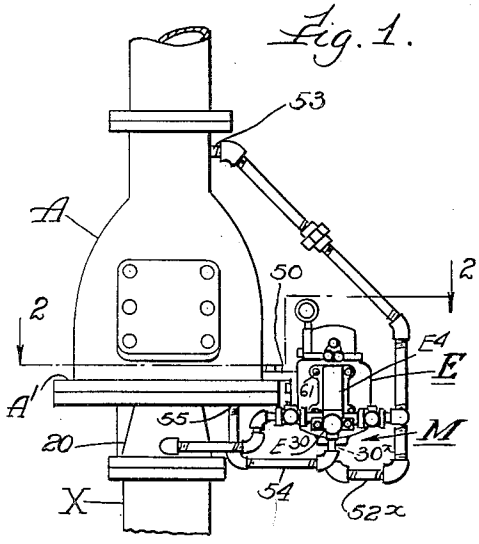


Fig. 2.

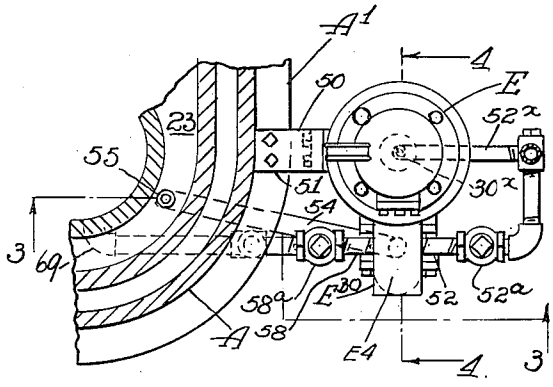


Fig 5

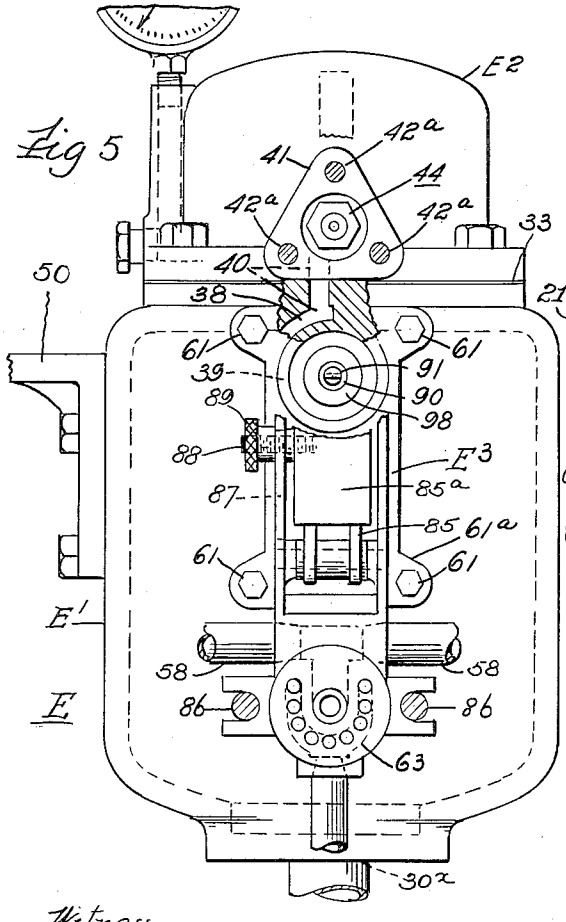
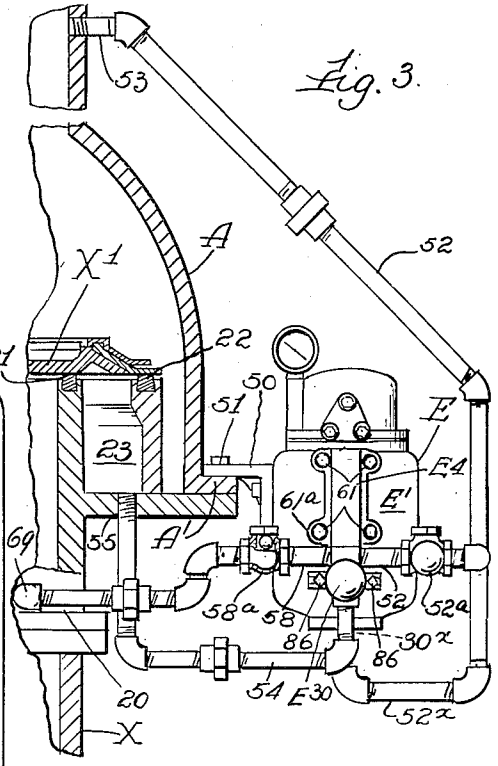


Fig. 3.



Witness.
H. C. McKnight

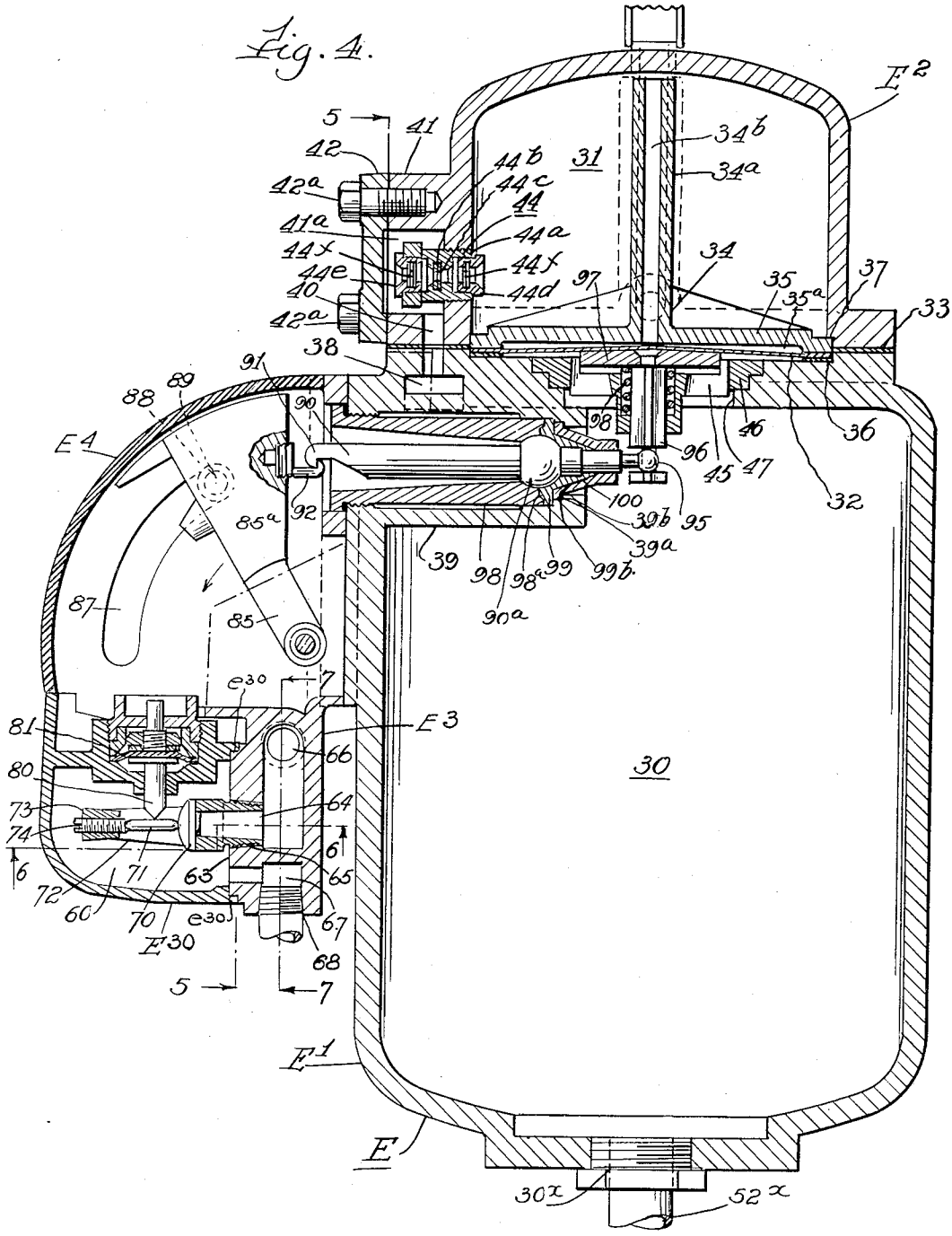
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May 8, 1934. E. TYDEN 1,958,287

ACCELERATOR

Filed Nov. 28, 1932 3 Sheets-Sheet 2

Fig. 4.



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ACCELERATOR

Filed Nov. 28, 1932 3 Sheets-Sheet 3

Fig. 6.

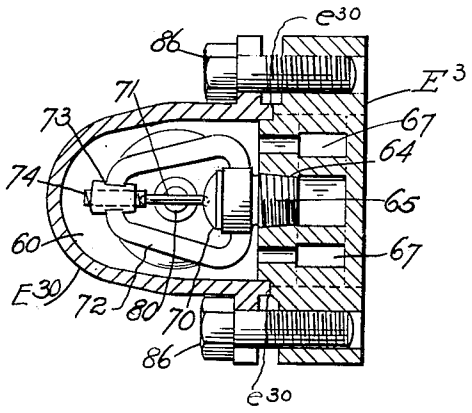


Fig. 7.

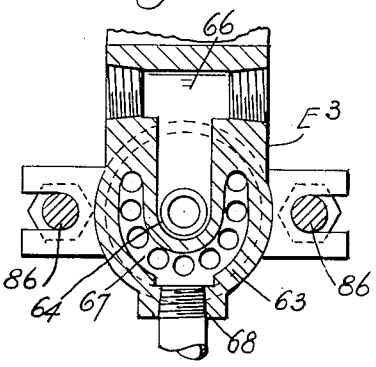
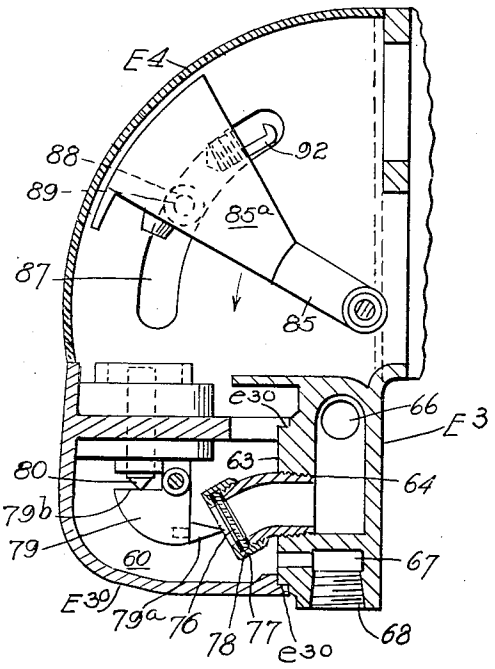


Fig. 8.



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Patented May 8, 1934 1,958,287

UNITED STATES PATENT OFFICE

1,958,287

ACCELERATOR

Emil Tyden, Hastings, Mich.

Application November 28, 1932, Serial No. 644,600

9 Claims. (Cl. 169—17)

The purpose of this invention is to effect an improvement in the construction of the part of the dry pipe fire extinguishing system commonly called the accelerator,—being means for hastening the opening of the main water supply valve when a normally closed head has been opened by fire heat,—and specifically, to effect an improvement over the accelerator construction shown in my Patent No. 1,615,056, January 18, 1927, and Reissue Patent No. 16,678 of July 12, 1927. The present invention consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:

Figure 1 is a side elevation of a dry pipe main valve body equipped with an accelerator device embodying this invention.

Figure 2 is a sectional view showing the accelerator system in top plan section, being taken through the main valve body as at the line 2—2 on Figure 1.

Figure 3 is a section at the line 3—3 on Figure 2.

Figure 4 is a section at the line 4—4 on Figure 2.

Figure 5 is a side elevation of the structure shown in Figure 4, with a removable part of the casing removed, the view looking in the direction of the arrow, 5, on Figure 4.

Figure 6 is a detail section at the line 6—6 on Figure 4.

Figure 7 is a detail section at the line 7—7 on Figure 4.

Figure 8 is a detail section corresponding to the left-hand part of Figure 4, showing a modification of the sealing and seal-breaking means.

The main valve body being indicated in entirety at A is of familiar construction in that it has the water supply connection, 20, leading from a source of water under pressure, indicated by the water main, X, with a main water supply valve, X^1, has the customary concentric main valve seats, 21 and 22, with inter-seat chamber, 23, connected for atmospheric pressure and for draining water therefrom when the system is set up for service and furnished with means for closing the atmosphere access and the drainage connection automatically upon the initial opening movement of the main valve. These means indicated in entirety at M are of familiar construction requiring no further description.

The part referred to as the accelerator it will be understood comprises the apparatus and connections by which, upon the reduction of pressure in the discharge line from the main valve to the discharge head system resulting from the opening of a normally closed discharge head by fire heat, pressure communication is effected either from the air pressure region of the discharge line or from the water pressure region, viz, the water supply line to the inter-seat chamber for counterbalancing, at the under side of the main valve over the annular area of the inter-seat chamber, the pressure on the upper side of the main valve at that area, so that the main valve which has been normally held seated against the water supply pressure operating over the central area of the main valve, by the super-atmospheric pressure in the discharge line, may be opened by the water pressure, which, upon initial opening movement of the main valve, passes the inner seat and operates with full water source pressure on the entire area of the valve.

This accelerator apparatus is of the type having two chambers in communication with the air pressure region of the main valve and water discharge line, and provided with movable wall members, or a movable wall-member-in-common exposed at opposite sides in the chambers respectively to the pressure communicated from the air pressure region, the communication of one of said chambers with the air pressure region being very substantially restricted in comparison with that of the other chamber, so that substantial change of pressure in the air pressure region is experienced on the area of the movable wall member exposed in the second chamber, before it is experienced in the first chamber on the area of the movable wall member exposed in said first chamber, thereby causing movement of the movable wall member or members, said wall member or members being operatively associated with a means controlling communication between the air pressure region and the inter-seat chamber in a manner for opening such communication by movement of said movable wall member or members resulting from the difference in pressure in the two chambers due to the different rate at which change of pressure in the air pressure region is experienced on the exposed areas of the movable wall member of the chambers respectively.

In all accelerators of this type hitherto embodied in fire extinguishing apparatus of which I have any knowledge, the means controlling communication between the air pressure region and the inter-seat chamber and operating for opening such communication by the movement of the movable wall member under the conditions indicated above, have consisted of a valve normally

held seated closing the port of communication and connected for opening and closing under the control of a movable wall member; that is, so as to be seated when the movable wall member is at normal position due to equal pressures in the two chambers to which it pertains, and so as to be opened when the movable wall member is moved from said normal position by difference of pressure in the two chambers.

A serious defect of these hitherto employed constructions arises from the liability of the valve controlling the communication between the air pressure region and the inter-seat chamber, to become imperfectly seated either by damage to the valve or its seat due to the frequently repeated thrusts of the valve against its seat in closing after being opened, or by reason of the accumulation of dirt or rust particles on the valve at its seat or between the valve and its seat. Such imperfect seating of the valve, by opening a path for communication of pressure from the air pressure region to the inter-seat chamber, regardless of fire conditions or any opening of a discharge head, and thus causing the main valve to be opened and the system to be flooded with water, necessitates otherwise unnecessary attention consisting in draining and resetting the system, and sometimes the water pressure thus admitted may force open one or more of the normally closed discharge heads and result in serious water damage in the protected area.

The present invention is intended to obviate this defect of the hitherto employed constructions, by making the means controlling the communication between the inter-seat chamber and the air pressure region of such character that it shall be substantially destroyed or rendered useless for the function stated, by the operation under the control of the movable wall member by which the communication is opened; so that the subsequent resetting of the system shall necessarily involve the substitution of new means for controlling the communication, and not merely the adjustment into closed position of a valve which has been opened under fire conditions.

This method of assuring effective control of the communication between the air or water pressure region and the inter-seat chamber, creates the necessity for arranging the conduit for such pressure so that it shall be accessible at the part at which the destructible controlling means is applied for sealing said communication, and so fully accessible as to facilitate the replacement of the substituted sealing means in sealing position. And the development of the present invention has accordingly included designing the entire accelerator structure for accessibility and replacement of the destructible sealing means between the inter-seat chamber and the air pressure region of the system.

In the construction shown in the drawings, the accelerator comprises a casing indicated in entirety at E having two chambers, 30 and 31, partitioned from each other by a flexible diaphragm, 32, which thus becomes a movable wall member of each chamber.

As shown, the casing comprises two members, E^1 and E^2, mated for seating one upon the other with openings in their mated faces which are spanned by the flexible diaphragm, 32, which is clamped between said mated faces, as seen at 33, where a duct member, 34, hereinafter further described, is shown with its foot flange, 35, engaged at its periphery between the upper face, 36, of the casing, E^1, and a downwardly facing shoulder, 37, with which the casing member, E^2, is provided for thus clamping the diaphragm.

Fluid pressure communication between the two chambers 30 and 31 is provided by a passage, 38, formed in the top wall of the casing member, E^1, opening at one end in the chamber, 30, at one side of a boss, 39, hereinafter described as to its purpose, and at the other end leading up through the upper face of the top wall of the casing member, E^1, registering with an aperture, 40, in an annular boss, 41, which is formed protruding from the side of the casing member, E^2, to form a small chamber, 41^a, which is closed at the upper side by a cap, 42, bolted onto the annular boss, as indicated by bolts, 42^a. Said chamber, 41^a, has fluid pressure communication with the chamber, 31, through a restriction fitting indicated in entirety at 44, and hereinafter more particularly described; and thus the fluid pressure communication between the chamber, 30 and 31 is completed.

The pressure reaching the chamber, 30, by way of the connections hereinafter described reaches the entire area of the under side of the diaphragm within its clamped margin through a circular series of slots, 45, in the bushing, 46, which is mounted in the opening, 47, in the top wall of the casing member, E^1, and the recess in the top surface of the casing member, E^1, the bottom of which recess constitutes the face, 36, above mentioned. And the pressure reaching the chamber, 31, from the chamber, 30, by way of the passage, 40, and the restriction fitting, 44, reaches the entire area within the clamped margin of the upper side of the diaphragm, by way of the axial duct, 34^b, in an upwardly extending stem, 34^a, of the duct member, 34, and the recess, 35^a, in the under face of the foot flange, 35.

The accelerator as an entirety comprising the casing, E, and other parts yet to be described, is mounted in any convenient manner on the main valve body, A, as by a bracket, 50, bolted to the flange, A^1, of the valve body and to the casing, E, as seen at 51; and the accelerator is thus supported in position to have its chambers and passages interposed in the pipe connection of the inter-seat chamber of the main valve with the air pressure region,—and also with the water pressure region, as hereinafter described,—said pipe connection comprising a pipe, 52, connected to the air pressure region in the main valve body, A, as seen at 53, and a pipe, 54, connected to the inter-seat chamber, as seen at 55.

The connection of the accelerator chamber, 30, with the air pressure region is conveniently made by pipe 52^x, connecting the pipe, 52, with the chamber, 30, at the port seen at 30^x, at the lower end of that chamber. As mentioned above, the accelerator construction shown in the drawings is arranged to communicate to the inter-seat chamber for hastening the opening of the main valve after a discharge head has been opened by fire heat, not only the pressure of the air pressure region, but also the pressure of the "water pressure region", as it may be called, that is, the water supply pressure in the supply line antecedent to the main water supply valve; and this is effected by the connections hereinafter described by which the accelerator as an entirety is interposed in the pipe connections.

For adapting the accelerator as an entirety to be thus interposed in the pipe connections in such manner that the accelerator may operate to control fluid pressure communication with the

inter-seat chamber and have the controlling means accessible for substituting new parts after each operation in which the communication is opened, the accelerator includes a third chamber, 60, in a casing member, E^3, which is most conveniently arranged to be detachably mounted on the casing member, E^1, laterally of the latter, as indicated by bolts, 61, through lugs, 61^a.

The casing member, E^3, in the side wall, 63, toward the casing member, E^1, has a cavity, 64, opening at one end, as seen at the nipple, 65, in the chamber, 60, and at the other end connected with an intersecting bore, 66, leading at its opposite ends to the outside of the casing member, E^1, and threaded at one end for connecting the pipe, 52, and at the other end for connecting the pipe, 58, which leads from a connection with the water supply pipe, 20, as seen at 69.

For connection with the inter-seat chamber there is provided in the wall of the casing member, E^3, a duct, 67, leading from the chamber, 60, and to a nipple, connection seen at 68 at which the pipe, 54, is connected for leading to the inter-seat chamber, as seen at 55. Thus the path of communication from either the air pressure region or the water pressure region to the inter-seat chamber is made to include the chamber, 60; and in this chamber the discharge port 65 of the nipple, 68, affords opportunity for supplying means for sealing the nipple discharge opening and blockading the path of communication, which sealing means may be destroyed in the sense of being rendered useless for sealing the opening in the operation for unsealing said opening.

To prevent this connection of the accelerator with both air pressure region and water pressure region operating for admitting the water at all times directly to the discharge line bypassing the main valve, there is provided in the pipe line, 52, a check valve, seen at 52^a, arranged to be seated by flow toward the air pressure region beyond the main valve, and opening only for pressure and flow toward the accelerator connection, and thence to the inter-seat chamber.

And similarly, in the pipe line, 58, there is provided a check valve, 58^a, which opens for flow toward the accelerator connection and is seated by flow or pressure in the opposite direction. It thus results that while pressure connection with the inter-seat chamber is made both from the ar pressure region and from the water pressure region, the inter-seat chamber will experience only whichever of these pressures is the greater at the instant at which the accelerator operates for unsealing the port of communication by way of which either of the two pressures may reach the inter-seat chamber.

As shown in Figure 4 the destructible sealing means consists of a sealing disk, 70, and a strut, 71, for holding it stressed against the seat formed by the open end of the nipple, the nipple having an integral yoke, 72, with its neck, 73, opposite the mouth of the nipple furnished with a set screw 74, between the inner end of which and the sealing disk, 70, the strut, 71, is held, the inner end of the set screw and the outer side of the sealing disk being suitably recessed for seating and centering the strut at its opposite ends. The strut is preferably made of glass or similarly rigid and frangible material so that it may be displaced by being broken; but it may be of any material sufficiently stiff to transmit the stress necessary for holding the sealing disk in sealing position against the fluid pressure which may be presumed to be reaching the disk from the air pressure region, and sufficiently yielding to bending stress to permit it to be unseated at one end or the other, from the sealing disk or from the set screw.

For effecting the unsealing of the communication which is controlled by the sealing disk, 70, by the movement of the diaphragm, 32, which may result from difference of fluid pressure at the opposite sides of the diaphragm due to the reduction of pressure in the air pressure region when a normally closed head is opened by fire heat, there may be provided any means adapted to act automatically for breaking or displacing the strut, such means being normally restrained from automatic action, and releasable means for such restraint, the means for releasing the restraining means being operated by the movement of the diaphragm.

As shown in Figures 4 and 6, the seal-displacing-and-destroying means consists of a thrust pin, 80, carried by a small flexible diaphragm, 81, which is mounted in the wall of the chamber, 60, for thrust against the side of the strut, this thrust pin being extended protruding from the chamber, 60, the diaphragm serving to seal the aperture through which the pin protrudes. A weighted lever, 85, mounted on the inner side of the casing member, E^3, and latched in uplifted position, is arranged when released to drop onto the thrust pin with sufficient force to drive the thrust pin against the strut forcibly enough to break or displace it, whereupon the sealing disk and strut will drop from sealing position to the bottom of the chamber. For latching the weighted lever, 85, in upheld position, there is provided at latch, 90, which is mounted in the boss, 39, above mentioned as extending in the chamber, 30, this latch having at its outer end where it protrudes from the chamber, 30, a catch nose, 91, arranged for engaging a catch, 92, with which the weight, 85, is provided. At the inner end the latch is engaged, as seen at 95, with the stem, 96, of a disk, 97, arranged to bear against the under side of the diaphragm, 32, and provided with a spring, 98, for stressing it upwardly against the under side of the diaphragm, said disk having its stem guided in a central stem of the bushing, 46, said spring, 98, reacting for upholding the disk against the diaphragm, and at the same time upholding the inner end of the lever latch, 90, for holding its outer catch nose in engagement with the catch, 92, of the weight, 85.

Figure 8 shows a modification of the destructible sealing means which as modified consists of a single part instead of the two parts, viz, seal and strut, shown in Figure 4. In this modification the single destructible part is a frangible disk, 76, which may be of glass or other similarly rigid and frangible material mounted for sealing the discharge port of the nipple by any removable device as by the inwardly flanged clamping nut, 77, screwed onto the exteriorly threaded end of the nipple and clamping the disk, 76, upon the open end of the nipple with interposed packing gasket, 78. The nipple in this modification is formed and arranged opening downwardly so that the fragments of the ruptured seal shall not be liable to fall back into the cavity of the nipple, but shall fall outwardly into the bottom part of the chamber, 60. And for breaking the sealing disk, 76, there is interposed between the diaphragm thrust pin, 80, and

the nipple discharge port and sealing disk thereon a lever, 79, having its pivot offset from the axis of the nipple discharge port and seal toward the protruding diaphragm thrust pin, 80, and offset from the axis of that pin toward the plane of the nipple port and sealing disk, said lever having the arm which extends transversely of the axis of the port and sealing disk furnished with a rigid thrust pin, 79^a, adapted for breaking or puncturing the sealing disk, and having the other arm furnished with a shoulder, 79^b, facing the diaphragm thrust pin for encounter by the latter when the diaphragm is struck by the descending weight.

For sealing the mounting of the lever latch, 90, in the casing, E^1, to prevent release of the pressure in the chamber, 30, by leak past the latch lever, in the cylindrical cavity of the boss, 39, which is formed with an interior stop shoulder, 39^a, near the inner end, there is fitted a two-membered bushing, 98, 99, whose two members are formed at their meeting and mated faces, indicated at 98^a, to afford a spheroidal seat for a spherical boss, 90^a, with which the latch lever, 90, is provided, to constitute its pivot. The axial cavity of the bushing member, 98, is tapered widening from the spheroidal seat to the outer end, to afford clearance for the latching and unlatching movement of the lever latch, 90. To ensure perfect sealing of the pivot bearing of the latch lever without unduly tight fitting of the sperical pivot bearing, there is provided a rubber packing sleeve, 100, fitted at its inner end portion sealingly on the inner end part of the lever latch beyond the spherical pivot bearing, and enlarged frusto-conically at the other end portion for suitably fitting about the correspondingly conically tapering terminal of the bushing member, 99, which is seen at 99^b, said rubber packing sleeve being terminally flanged outwardly at the larger end for being engaged between the shoulder, 39^b, of the boss, 39, and the circumferential margin of the bushing, 99.

From the foregoing description it may be understood that when the diaphragm, 32, is caused to move outwardly with respect to the chamber, 31, by reason of the lowering of pressure in the chamber, 30, relatively to that in the chamber, 31, the latch, 90, is operated for releasing the weighted lever, 85, which is pivoted as described, outside the chamber, 30, and necessarily accessible for manual adjustment for re-engagement by the latch, 90, when the system is reset after operating for connecting the inter-seat chamber with the air of water pressure region as described. Preferably, the lever, 85, and weight, 85^a, are enclosed in a hood, E^4, which may be understood as unitary with the casing member, E^3, but which is made as a separate piece attached by the bolts, 61, by which the casing member, E^3, is mounted on the casing member, E^1. At least one of the lateral webs of the hood has an arcuate slot, 87, through which protrudes a rigid stud, 88, carried by the lever, 85, for exterior manual engagement to operate the lever for so returning it to latching position.

For convenience of being able to restore the lever to said latching position before the equalization of the pressures in the two accelerator chambers, 30 and 31, has occurred, the stud, 88, is screw-threaded and provided with a screwed-on knob, 89, with its base flange of greater diameter than the width of the slot, 87, and which can be screwed up tightly against the margin of the slot to hold the lever positioned for engagement by the latch when the conditions permit the latch to operate.

A leading purpose of the present invention, considered as an improvement over the construction of my Reissue Patent No. 16,678, above referred to, is to necessitate the removal and replacement of the means controlling communication of the inter-seat chamber with a fluid pressure region of the system, which means is operated upon for opening that communication automatically when the reduction of pressure in the air pressure region indicates fire danger; and, accordingly, the casing member, E^3, has the part, E^{30}, of the wall of the chamber, 60, which encloses the rupturable sealing means of either of the forms shown, arranged to be detached from the remainder of the fixed structure, as may be understood from the joint seen at e^{30}, and the mounting of the wall member, E^{30}, by means of bolts, 86, on the main body of the casing member, E^3.

The restriction fitting, 44, comprises a bushing, 44^a, screwed into the casing wall of the chamber, 31, said bushing being counterbored from both ends to leave standing midway in its length an annular boss, 44^b, having a relatively small central aperture at which there is mounted a thin disk, 44^c, with its central aperture carefully dimensioned for properly restricting the fluid pressure communication between the chambers, 30 and 31. Into the opposite ends of the bushing member, 44^a, there are screwed bushings, 44^d and 44^e, provided each with a fine meshed screen or strainer, 44^f, the purpose of which is to ensure that the restricted pressure flow port in the disk, 44^c, shall not become obstructed by sedimentary matter such as rust or dust particles which might be carried by the air and become engaged in the small port of the disk, 44^c, so as to unduly restrict the pressure communication before the operation for effecting acceleration is finished in the particular instance, but which being arrested by the screen, will be carried back by the reverse movement of the air in equalizing the pressure in the two chambers when the system is reset after the operation of the accelerator for its function which results from the opening of a discharge head.

It will be understood that the elements and features constituting the present invention are designed for embodiment in a dry pipe fire extinguishing system of the type having a main water controlling valve normally seated against the water supply pressure in the water supply line by air pressure in an air pressure region of the delivery line, whereby the valve is held between two opposing fluid pressures, the valve body having two seats for the main valve element, one of less diameter than the other, the supply line being connected for water pressure on the valve only through the lesser seat, and the valve body having an inter-seat chamber at the inlet side of the main valve wherein the pressure is normally atmospheric. And in the following claims such structure is referred to as "a dry pipe fire extinguishing system of the type indicated".

I claim:

1. In a dry pipe fire extinguishing system having a dry pipe valve with an inter-seat chamber of the type indicated, means for effecting pressure flow communication between one of the fluid pressure regions of the system and the inter-seat chamber consisting of a conduit comprising

a chamber having a port of inlet from the antecedent part of the conduit and an outlet port to the subsequent part of the conduit; sealing means for said inlet port comprising a frangible element whose rupture renders the sealing means ineffective for sealing; rupturing means carried by the wall of said chamber for movement to cause rupture of said frangible element; said rupturing means comprising a part exposed for actuation exteriorly of the chamber; means mounted exteriorly of the chamber for actuation of said exposed part; releasable means for normally restraining said actuating means; means for releasing said restraining means comprising an element normally exposed to the pressure in the air pressure region of the system and adapted to be moved from normal position upon predetermined reduction of said pressure at a predetermined rate.

2. In a dry pipe fire extinguishing system having a dry pipe valve with an inter-seat chamber of the type indicated, conduit means constituting fluid pressure communication between the inter-seat chamber and one of the fluid pressure regions for counterbalancing the air pressure over the area of the valve at the side opposite the inter-seat chamber to permit the valve to be opened by the water pressure, and means normally sealing said communication, means controlling said sealing means comprising a casing with two chambers and a movable wall member of said chambers exposed at different areas to the fluid pressures existing in said chambers respectively adapted to be moved by excess of pressure in one of said chambers resulting from reduction of pressure in the other chamber at more than a predetermined rate; means providing restricted fluid pressure communication between said chambers tending to equalize said pressures; a duct connecting one of said chambers freely with the air pressure region, whereby reduction of pressure in said region is experienced promptly in said duct-connected chamber, said conduit means being wholly outside both said fluid pressure chambers and comprising a third chamber having a port of inlet from the antecedent part of said conduit and an outlet port to the subsequent part of the conduit; said normally sealing means comprising means displaceably mounted in said third chamber normally sealing said inlet port, said means being mechanically destructible as to its fitness for sealing said inlet port and being at sealing position exposed in said chamber to mechanical destroying means; means for so destroying said sealing means comprising a part carried by the wall of said third chamber arranged to be impelled into destructive encounter with some part of said sealing means, said wall-carried part being connected for operation exteriorly of the said third chamber, and means mounted outside said third chamber arranged for actuating said exteriorly operable part, and means operated by the movement of said movable wall member of the fluid pressure chambers for controlling the operation of said exteriorly mounted part.

3. The construction defined in claim 2, the third chamber having its bottom part arranged with respect to the destructible displaceable sealing means for accommodating the latter when destructvely displaced from sealing position, and having a normally closed opening in its outer wall with a removable closure therefor affording access to the chamber for removal and replacement of the destroyed and displaced sealing means.

4. In a dry pipe fire extinguishing system having a dry pipe valve with an inter-seat chamber of the type indicated, conduit means of fluid pressure communication between the air pressure region and the inter-seat chamber frangible sealing means interposed in said conduit normally sealing said communication, a casing having two chambers one of which has pressure-flow communication with the air pressure region with means affording restricted fluid pressure communication between said chambers, and a movable wall member of said chambers exposed at different areas to the fluid pressures existing in said chambers respectively; a device arranged outside said casing chambers for rupturing said frangible sealing means, means for actuating said device said last mentioned means being normally locked against seal-actuating movement, and means operatively associated with said movable wall member for releasing said actuating means by the movement of said wall member due to the reduction of fluid pressure in the chamber in the casing which is in unrestricted communication with the fluid pressure region relatively to the pressure in the other chamber.

5. The construction defined in claim 4, a third chamber independent of the other two chambers interposed in said conduit the sealed communication being within said third chamber, said third chamber having a portion of its exterior wall removable for access to said communication-sealing means.

6. The construction defined in claim 4, a third chamber independent of the other two interposed in said conduit the sealed communication being within said third chamber, said third chamber having a portion of its exterior wall removable for access to said sealing device, the rupturing means comprising a flexible diaphragm mounted at an aperture in the wall of said third chamber, and a thrust pin carried by said diaphragm arranged for thrust against the frangible sealing means by impact on said pin exteriorly of the chamber, the said actuating device consisting of a weighted lever arranged for said exterior impact on the pin by the falling of the weight upon release of the latter by means associated with the movable wall member of the fluid pressure chambers.

7. In a dry pipe fire extinguishing system having a dry pipe valve with an inter-seat chamber of the type indicated, conduit means of fluid pressure communication between the air pressure region and the inter-seat chamber, frangible sealing means interposed in said conduit normally sealing said communication, and means controlling said sealing means comprising a casing having two chambers one of which has pressure flow communication with the air pressure region with means affording restricted fluid pressure communication between said chambers, and a movable wall member of said chambers exposed at different areas to the fluid pressures existing in said chambers respectively adapted to be moved by excess of pressure in one of said chambers resulting from reduction of pressure in the other chamber at more than a predetermined rate, frangible sealing means in said conduit connection of the air pressure region with the inter-seat chamber normally sealing the communication with the inter-seat chamber; a device arranged outside said casing chambers for rupturing said frangible sealing means; means

for actuating said device; a latch member in one of said chambers operatively connected with the movable wall member and extending sealed through and fulcrumed in the outer wall of said chamber and exteriorly arranged for engaging said actuating means to releasably lock it against seal-rupturing movement when the movable wall member is at normal position due to equal pressures in the two fluid pressure chambers.

8. The construction defined in claim 7, the actuating means comprising a weighted lever fulcrumed outside the chambers and latched in uplifted position, said weighted lever being arranged for manual adjustment to restore it to latching position.

9. An apparatus for the purpose indicated comprising a casing having two chambered casing members dimensioned for mounting the second upon the first with the corresponding up-and-down-extending walls of the two chambers substantially continuous in the same planes, said casings having registering apertures in the top wall of the lower chamber and the bottom wall of the upper chamber, and a flexible diaphragm interposed and clamped between said walls spanning said apertures and constituting a movable wall member partitioning the chambers from each other; a device constituting restricted fluid pressure communication between the two chambers, one of said casing members being formed for pipe connections of the chamber with the air pressure region of a dry pipe fire extinguishing apparatus, said device being mounted on the chamber of the second casing member, said casing comprising a third casing member rigidly mounted in connection with the other two casing members and having a third chamber non-communicating with the other two, said third chamber being interposed in and forming part of a fluid pressure conduit for connecting the inter-seat chamber of the water controlling valve device of a dry pipe fire extinguishing system with the air pressure region of such system, said third chamber having an inlet port to which the antecedent part of said fluid pressure conduit leads, and an outlet port from which the subsequent part of said conduit leads; a frangible sealing means displaceably mounted at said inlet port, and a seal-rupturing means mounted in said third chamber comprising a part exposed for actuation outside said third chamber, and means exterior of all said chambers mounted on the casing for actuating said exposed part, and means controlling the operation of said exteriorly mounted operating means operatively connected for such control with the movable wall member of the first and second chambers; said apparatus comprising all said casing members being arranged for mounting in entirety on the main valve body of a dry pipe fire extinguishing system with said antecedent and subsequent parts of the fluid pressure conduit connected respectively with the air pressure region and the inter-seat chamber of the main valve body.

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