Dec. 31, 1929. E. TYDEN 1,741,548

VALVE FOR SPRINKLER SYSTEMS

Filed Sept. 26, 1927

Fig. 1.

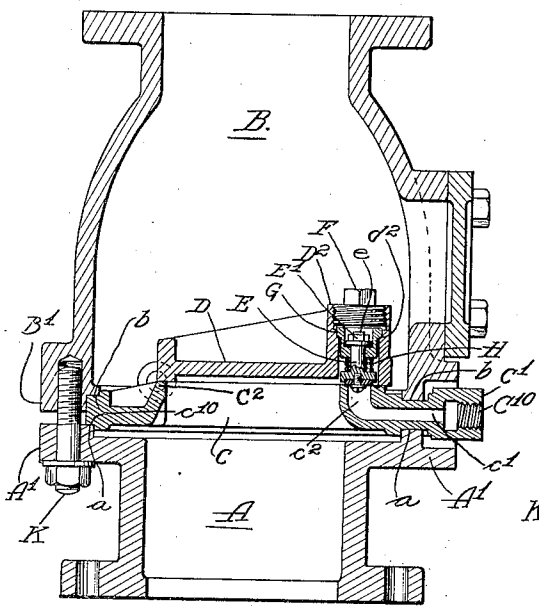


Fig. 2

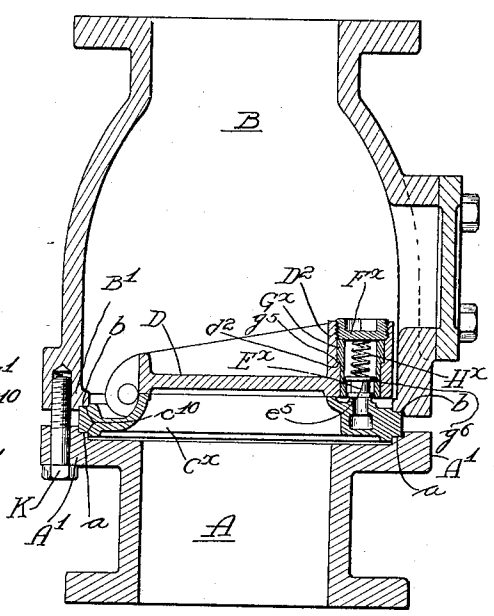


Fig 3.

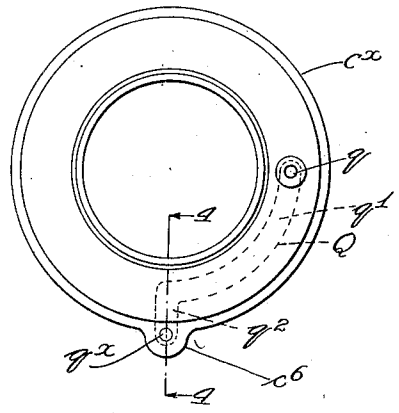
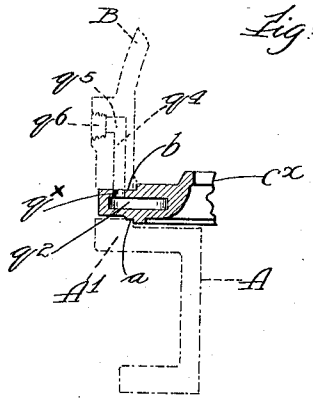


Fig 4.



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UNITED STATES PATENT OFFICE

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VALVE FOR SPRINKLER SYSTEMS

Application filed September 26, 1927. Serial No. 221,892.

This application is a continuation in part of my application #686,554, filed January 16, 1924, and abandoned in view of this continuation in part.

One purpose of the invention is to provide an improved construction in a main valve structure of a sprinkler system in respect to the main valve and the valve controlled alarm duct for ensuring the operation of the alarm when the main valve is opened without cause requiring operation of the sprinkler system, or there is a certain amount of leakage past it which should call for attention, and at the same time to ensure that water will not pass the alarm duct to cause an alarm to be given when there is not occasion for it consisting in escape of water past the main valve.

Another purpose of the invention is to provide a sprinkler system main valve construction of which the main valve and its seat may be readily separated from the structure for re-fitting and repair made necessary by wear or abrasion of the seating surfaces causing such leakage as might operate the alarm; so that it shall not be necessary to do such repair work through the hand hole of the main valve body which affords insufficient access for the necessary tools and manipulation thereof. For this reason in previous constructions when valve or valve seat repairs were required, it has been necessary to completely dismount and dismantle the entire main valve construction, which on account of the great size and weight of these structures, is expensive operation and one which necessitates the shipment of the entire construction to the factory for the necessary repairs, leaving without protection the building protected by the device, or necessitating the temporary installation of a substitute apparatus.

The problem presented is to accomplish these two related purposes in the same construction by means consistent with and contributing to both purposes. The invention consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:

Figure 1 is a vertical axial section of the final element of the main valve water supply pipe and the initial pipe element of the system which is the main valve body member, with the main valve seat member and the main valve thereon suitably interposed between the final element of the water supply pipe and said main valve body member.

Figure 2 is a similar view showing a modification.

Figure 3 is a plan view of the main valve seat member in the form shown in Figure 2.

Figure 4 is a vertical section in the plane indicated by the line 4—4 on Figure 3 through all of the assembled parts in the form shown in Figure 2.

In the structure shown in Figure 1 of the drawings, A is the terminal element of the main water supply pipe, B is the main valve body which may be considered also as an initial pipe element of the sprinkler system served by the main supply pipe, C is a valve seating member interposed between said pipe element, A, and main valve body or initial pipe element, B, of the system. D is the main valve controlling the delivery of water from the main supply pipe to the system. The terminal pipe element, A, and the main valve body or initial pipe element, B, of the system are mated for water tight junction upon being clamped together, having marginal flanges, A^1 and B^1, respectively, provided with registered bolt apertures for clamping bolts, K. The facing surfaces of said elements, A and B, are suitably milled to form clamping areas at *a* and *b*, respectively, and the valve seating member, C, is similarly faced at its opposite sides forming shoulders, c^{10}, for fitting within the opposite ends of said terminal and initial pipe elements, A and B, respectively, and being clamped between the clamping areas, *a* and *b*, respectively, so as to effect substantially non-leaking junction between the three parts, A, B and C. The valve seating member, C, has a peripherally projecting lug, C^1, which projects from between the peripheral flanges of the pipe elements, A and B, at one side thereof, said lug serving for a duct, c^1, which leads from an inlet at c^2 within the port area of said seating member, C, substantially at the plane of the seat, C^2, of the main valve,

D. Said lug, C^1, at its outer end is adapted, as seen at C^{10}, for pipe connection leading to an alarm or signalling device, not shown.

The valve, D, is hinged at the opposite side of the water inlet port through the seating member, C, from the position of the inlet, c^2, of the duct, c^1, for swinging upward from the seat for opening the port. The construction as thus far described is particularly designed for convenience in assembling the valve seating member and the valve thereon between the respective terminal and initial pipe elements, A and B, so that in case of any repairs being necessary, the entire valve and its seating member may be removed and replaced with a minimum disturbance of the remainder of the system and connections. And it will be noted that this facility of removal and replacement of these parts, which are the only parts liable to require attention for repair, is obtained by the mode of junction of the three parts, A, B and C, consisting in providing them with mated clamping areas and clamping them together by direct draw of the clamping bolts, which method is distinguished from more common methods of uniting pipe elements by screw-threaded joints which would require, in constructions of the size and weight of dry pipe valve and connections, very heavy tools and special apparatus for operating, or the only possible alternative of uniting the parts by drive-fitted joints, which again, in such heavy constructions, would require special apparatus, would practically defeat disassembling if the drive-fitted joints were in fact water-tight.

The valve, E, for seating at the inlet, c^2, of the alarm duct, c^1, is desirably formed separately from and mounted upon the main valve, D, and for this purpose, said main valve has a boss, D^2, projecting upwardly opposite the hinged side, said boss being vertically bored to receive a valve-carrying plug, G, in which there is mounted the valve member, E, which seats downwardly upon the seat, around the port, c^2, said seat being formed by the inner end of the boss, C^1, through which the alarm duct, c^1, is formed. The port through the boss, D^2, is counterbored at its upper end to a shoulder, d^2, for stopping the valve carrying plug, G, and is further counterbored and threaded for receiving a closing plug, F, which being screwed down, retains the valve carrying plug on said shoulder, d^2. The valve carrying plug is bored to receive the stem, e, of the valve, E, and counterbored at its upper end to admit a nut, E^1, screwed onto the upper end of the stem, e, for retaining the valve with suitable range of movement of seating and unseating. This construction is designed to permit ready removal of the entire fitting carrying the valve, E, for any necessary attention to ensure its proper action. Desirably, the valve member, E, is mounted for accommodation to its seat both with respect to being seated fully at the seating position of the main valve, and also for coming to its seat throughout its entire seating surface; and for this purpose the stem, e, is loosely fitted in the valve carrying plug, G, and a coil spring, H, is interposed between the upper shoulder of the valve head and the lower end of the valve carrying plug, G. This construction, as will be readily understood, permits the valve to yield upwardly and slightly laterally to accommodate its seat in both respects indicated.

A characteristic feature of this invention consists in that the auxiliary duct, c^1, is devoid of threaded joints between the parts in which it is formed, from the seat of the auxiliary valve, E, to the end of the boss C^1, outside the valve body, at which end pipe connection may be made as indicated by the interior threads at C^{10}.

The particular construction which is shown for avoiding such threaded joints is one in which the valve seating member, C, is machine fitted onto the end of the upper terminal web of the water supply pipe member, A, to complete the passage to the main valve body, B, by the substantial registration of the ports of the two members, A and C. Such absence of threaded joints is important by reason of the liability of any threaded joint to become leaky, and in the case of this auxiliary duct any leakage outside the valve body would be taken as indicating imperfect seating of the auxiliary valve; and such imperfect seating would call for immediate attention to remove or remedy the condition; and if such leakage could occur otherwise than by imperfect seating of the valve, the attendants would be frequently misled into opening the hand hole usually provided in the main body for obtaining access to the valve for the necessary repairs; which as above indicated, would be made very imperfectly and with great difficulty by operating through the hand hole; and, except in case of very minor injury to the seating surfaces, would require the dismantling of the entire structure in order to bring the parts to a machine for re-dressing the seating faces.

By constructing this auxiliary duct so that no leakage thereunto is possible except by imperfect seating or partial opening of the main valve, such unnecessary attention involving draining the system is avoided. Another very important advantage of and motive for the invention consists in that, as above pointed out, whenever attention is required for refitting either the main valve or the main valve seat, or the seat on the main valve seating member of the auxiliary valve, the work cannot be performed effectively upon the parts while they remain in the main valve body; and the separation of the parts for working upon them at the bench, or at the

proper dressing machine, is impracticable in the forms of constructions heretofore common, but is rendered very easy by the construction described, which permits the members, A and B, to be separated without displacement from the position in the system, while the valve seat member, C, and valves thereon are removed for the work to be done on them.

In the construction shown in Figures 2, 3 and 4, the parts, A, B and C, are constructed for being assembled and secured together in the same manner as in the construction of Figure 1. In this construction the alarm valve, E^x, is mounted in the boss, D^2, of the main valve, D, by means of a valve-carrying sleeve, G^x, stopped by its exterior shoulder, g^5, on the shoulder, d^2, formed by counterboring the boss, D^2, from the upper end, the sleeve having an interior shoulder, g^6, for stopping the valve, E^x, which has a flange, e^5, at the upper end cooperating for that purpose with the shoulder, g^5, while the sleeve houses a spring, H^x, for stressing the valve, E^x, on its seat, a plug, F^x, serving to retain the spring.

In this form the alarm duct indicated in totality by reference character Q, comprises a port, q, formed in the valve seat member, C^x, which is formed as in Figure 1, for being clamped between the final water supply pipe element, A, and the main valve body member, B, said duct portion, Q, leading from the upper face of the valve seat member at which its margin constitutes the seat of the valve, E^x, downward a short distance, and then in the course indicated at q^1 horizontally in an arc of about 90° around the main valve seat port to the forward side of the structure; thence outward radially, as seen at q^2, in a slight outwardly protruding boss, c^6, of the valve seat member, C^x, then upwardly to the upper face of the valve seat member at which it started and through which it emerges as seen at q^x for registration with a continuation of said duct, seen at q^4, in the main valve body member, B; said continuation turning outwardly, as seen at q^5, emerging and being counterbored and threaded as seen at q^6 for a pipe connection to lead to the alarm.

In this form, as in that shown in Figure 1, the purpose and advantage served is the avoidance in the course of the duct, q—q^6, from the entrance port, q, at which the alarm valve, E^x, seats, to the exterior of the structure, of any joint at which water might enter and pass to the alarm valve, or be found escaping without passing to the pipe leading to the alarm, that is, not having passed by the valve, E^x, and not having entered the port, q, and therefore not in fact indicating the conditions for sounding the alarm; this avoidance being effected by means which makes it possible to readily remove the main valve seat and valves,—for any work necessary on either the valves or the seats to correct the leakage,—causing wear; so that it is not necessary to do such repair work on the parts while they are accessible only through the usual hand hole. And it will be recognized that the feature which gives these results consists in making all the junctions between the three main elements, viz, (1) the final water pipe supply element, (2) the main valve seat member, and (3) the main valve body member or initial pipe element of the sprinkler system,—by clamping them together at flat surfaced junctions, the clamping pressure for all the junctions between the three parts being in the same direction and preferably effected by one and the same clamping means, namely the clamping bolts, K.

I claim:

1. In a fire extinguishing sprinkler system a main water supplying structure comprising a water inlet pipe member, a main valve body member and a main valve seating member; said three members having substantially registering water ports and annular areas encompassing said ports adapted for water-tight junction of said members successively with each other, and means for clamping said three members together with the valve seating member interposed and clamped between the other two; a main valve in the main valve body member pivoted for seating on said main valve seating member; a duct whose entirety is comprised within said three clamped-together members, having its inlet port at the inner surface of said valve seating member and extending thence into and in outward direction past the zone at which said three members are clamped water-tight, for emerging at the exterior surface of one of said members, and a valve controlling said last mentioned port carried by the main valve for seating at said port.

2. In the construction defined in claim 1, the main valve being pivotally mounted upon said interposed main valve seating member and dimensioned over all, including its pivotal mountings, for entrance through said registered water port of the main valve body in assembling said three clamping members together for clamping.

3. In the construction defined in claim 1, the interposed and clamped valve seating member being dimensioned as to thickness for accommodating said duct and having the duct extending therein transversely of said zone and opening upwardly within the zone at the surface of said valve seating member, the valve body member having a continuation of said duct opening within the clamping surface at a position for registering with said upward opening of the valve seat member, the duct extending in the valve body member upwardly a short distance and then outwardly opening through the exterior sur-

face of said body member for exterior pipe connection thereto.

4. In a construction of the class indicated, a main valve body and an immediately antecedent water pipe element on which said valve body is mounted at the intake of the latter; a main valve seat member peripherally dimensioned for clamping engagement between the facing surfaces of said valve body and pipe element marginal with respect to the registered apertures of said parts; and means for securing the valve body and pipe element together for clamping said valve seat member between said marginal areas; an auxiliary duct leading from the inner side of said valve seat member past the marginal seat of the main valve body member on the valve seat member and emerging for discharge through an exteriorly exposed area of one of the two last mentioned members, said duct having its inlet situated for access of water derived from the main valve port and adapted for pipe connection at the discharge end at the exterior of the member through which it emerges, and a valve operated by the main valve for opening and closing simultaneously therewith for controlling water access to said auxiliary duct.

In testimony whereof I have hereunto set my hand this 21st day of September, 1927.

EMIL TYDEN.