

1,258,296.

Fig. 1.

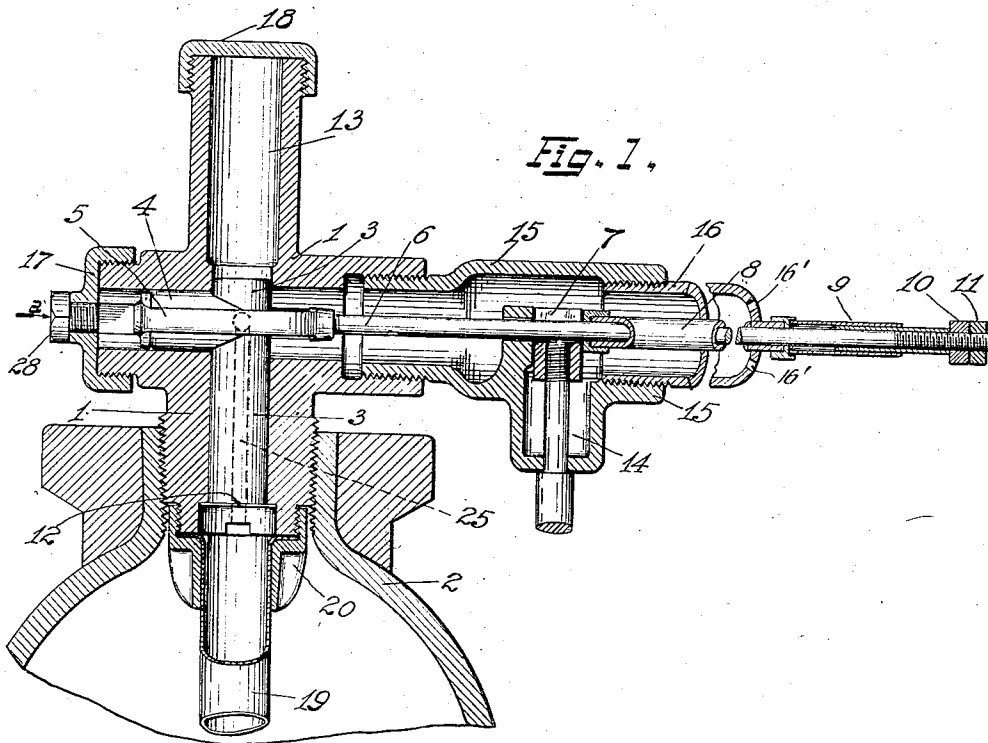
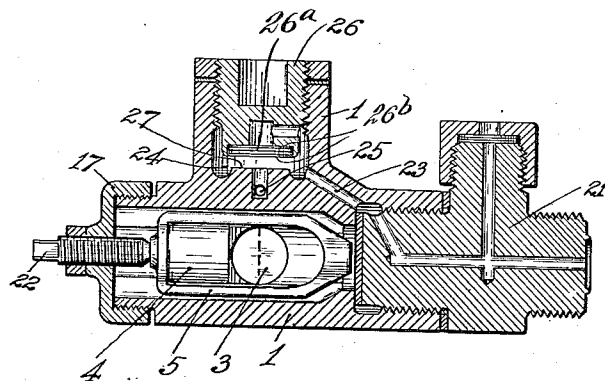


Fig. 2.



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VALVE FOR FIRE-EXTINGUISHERS.

1,258,296.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed January 16, 1915. Serial No. 3,658.

To all whom it may concern:

Be it known that I, HERMAN J. ZOTTEL, citizen of the United States, residing at Milwaukee, county of Milwaukee, State of Wisconsin, have invented certain new and useful Improvements in Valves for Fire-Extinguishers, of which the annexed is a complete, concise, and clear specification.

The above entitled invention pertains to improvements in valves for charging, storing and discharging of highly compressed liquids and gases. More particularly the invention belongs to that class of valves where it is desirable or essential to give instantaneously and automatically a large opening for the discharge of a gas or liquid. A further object of the invention is to produce a valve with the number of joints exposed to the high pressure, reduced to a minimum; this is very important when it is considered that every joint is subject to a chance of leakage which under very high pressure is very frequent and where a valve with a great many joints is used it becomes almost a certainty. The smallest imaginable leak would in course of say a few months permit a great portion of the liquid or gas to escape, which would in certain cases be detrimental.

Perhaps one of the widest uses for the practical application of this valve may be embodied in apparatus for storing, controlling and discharging of fire extinguishing medium, and for convenience the present patent describes such an installation. It will at once be apparent that a container for fire extinguishing medium must be able to retain its contents for a very long period without permitting even a small fraction thereof to escape, and further if the apparatus after a long period is called into action, the various parts of the valve must respond instantly.

One of the oldest and best known fire extinguishing agents are those containing or producing carbon dioxide gas. One of the characteristics of most gases when highly compressed is to freeze the moment they are liberated and allowed to expand sufficiently; this freezing always occurs at or near the point where the gas is permitted to expand or where it diffuses into the atmosphere.

It is for this reason that a valve having a screw stem could not be used in this connection, because it is impossible to open such a

valve very rapidly; the gas will escape and expand the moment the valve is starting to open with the result that all available space in the valve would immediately fill with ice making further discharge of the gas very slow if not stopping it completely.

In fire extinguishing apparatus using gases, or liquids which later produce gases, it is essential to discharge and bring the extinguishing medium to the vicinity of the fire quickly and in abundant quantity so as to completely and instantly replace the oxygen of the surrounding air with a gas in which combustion cannot exist.

To further describe a valve meeting the above requirements reference will be taken to the accompanying drawing in which

Figure 1 is a vertical section through the valve, part of the container and the valve controlling devices; this view shows the arrangement of parts when the apparatus is charged and ready to be called into action.

Fig. 2 is a horizontal section through Fig. 1 at the line —a— and shows the arrangement of parts when the container is being charged.

Like characters will identify like parts throughout this specification.

Again referring to Fig. 1 character 1 shows the main body of the valve which may be screwed tightly into a threaded opening at the neck of the container 2; character 3 is a plunger or stay bolt held in place by a suitable V-shaped cut, into which a secondary stay bolt 4 engages; surrounding stay bolts 3 and 4 is a yoke 5 to the closed end of which a rod 6 may be secured, such as by means of a screw thread; this rod in turn is sustained by a spacer 7, a tubing 8, a fusible link 9 an adjustment nut 10 and a lock nut 11. A thin disk 12 is fused to the main body 1 and hermetically seals the opening occupied by the plunger 3. The operation of this part of the valve is as follows:—Suppose that all parts are arranged as shown by Fig. 1 and the adjustment nut 10 is screwed tightly against the fusible bushing 9 thereby securely holding the yoke 5 and the stay bolt 4 against the V-shaped cut in the stay bolt 3 and preventing the same from movement in any direction; in this condition the pressure from the container 2 against the thin disk 12 is transferred to the stay bolt 3 and no strain is exerted upon the disk. If, however, the

stay bolt 3 was suddenly allowed to move freely the pressure against the disk 12 would at once force the stay bolt 3 into the chamber 13, the disk would no longer be able to sustain the pressure and would consequently burst or tear and make a large, full and clear opening instantaneously. To make the freeing of the stay bolt 3 possible two methods may be employed one whereby this is accomplished automatically and one where it is accomplished manually. In the former case the fusible bushing 9 may be caused to collapse lengthwise by transmission of heat thereto which would permit a slack in the rod 6, the yoke 5 and the staybolt 4; in the latter case the spacer 7 may be withdrawn and pulled within the chamber 14 thereby giving slack to the tubing 8, the fusible bushing 9, the adjustment nut 10, the rod 6, the yoke 5 and the staybolt 4. In both cases the tooth on the staybolt 4 disengages from the recess in the staybolt 3, enabling the same to move freely.

The gas or liquid after being so liberated may be conducted through the fitting 15 and the pipe 16 to wherever the discharge of the same into the atmosphere or upon an object may be desired, through the openings 16' in the termination of the pipe 16. The cross-sectional area of all conductors for the extinguishing medium should of course be kept equal to that of the staybolt 3 so that no expansion or freezing of the medium can take place until the same has left the apparatus.

Caps 17 and 18 are of constructional detail and are merely for the purpose of closing the openings which are necessary for assembling of the movable parts. A tube 19 may be secured to the main body 1, by means of a threaded bushing 20, and reach within proximity of the bottom of the container; this is for the purpose of tapping the extinguishing medium where it is densest and allowing expansion only at the top or above the extinguishing medium.

In Fig. 2 I show the arrangement of parts for charging the container. In this connection it is obvious that the time required for filling the container is of little importance and may therefore be performed through a comparatively small opening. For this operation the fitting 15 is replaced by a suitable charging fitting 21 which may be part of an apparatus especially designed for charging the containers; the yoke 5 is held against the staybolt 4 by a set screw 22 in the cap 17. The rod 6 and all other sustaining parts are removed for this operation; a vent 23 forms a communicating channel between an opening through the charging fitting 21 and a chamber 24 in the main body 1; the extinguishing medium is then conducted through another vent 25 to the inside of the tube 19 and the container 2. After

the charging is complete the threaded plug 26 is screwed home very tightly against the facing 27 and forms a seal therewith; the communication between the vent 25 leading into the container and the vent 23 is thereby cut off and the charging fitting 21 may be disconnected from the valve. As a precautionary measure against a sudden heating of the container and a consequent increase in pressure of the medium therein the plug 26 is provided with a safety; this is merely a disk of suitable metal of known breaking strength and so calculated as to break before serious damage could result to the container or the valve; on both sides of this disk packing material may be placed to produce a hermetical joint and prevent leakage around the disk.

The container with the valve is now ready to be transported to the place of installation where it is fitted up as displayed by Fig. 1. After the apparatus is completely set up the set screw 22 is removed and the threaded opening closed by a shorter cap screw 28; this allows the yoke 5 and the staybolt 4 to move as far as the inner face of the cap 17 when either of the releasing means is operated.

The fusible bushing consists of two pieces of tubing cut approximately equal in length and of such diameters as to permit telescoping of the same; the two lengths are then offset lengthwise so that one tubing projects beyond the other and soldered in this position by fusible metal of known melting point.

If the apparatus is installed and the temperature of the air surrounding the bushing rises as high as the melting point of the fusible metal the joint formed therewith between the two lengths of tubing will of course be broken, the bushing will collapse and readjust its members until the end margins of the two tubings are even; this then permits a practically instantaneous discharge of the extinguishing medium.

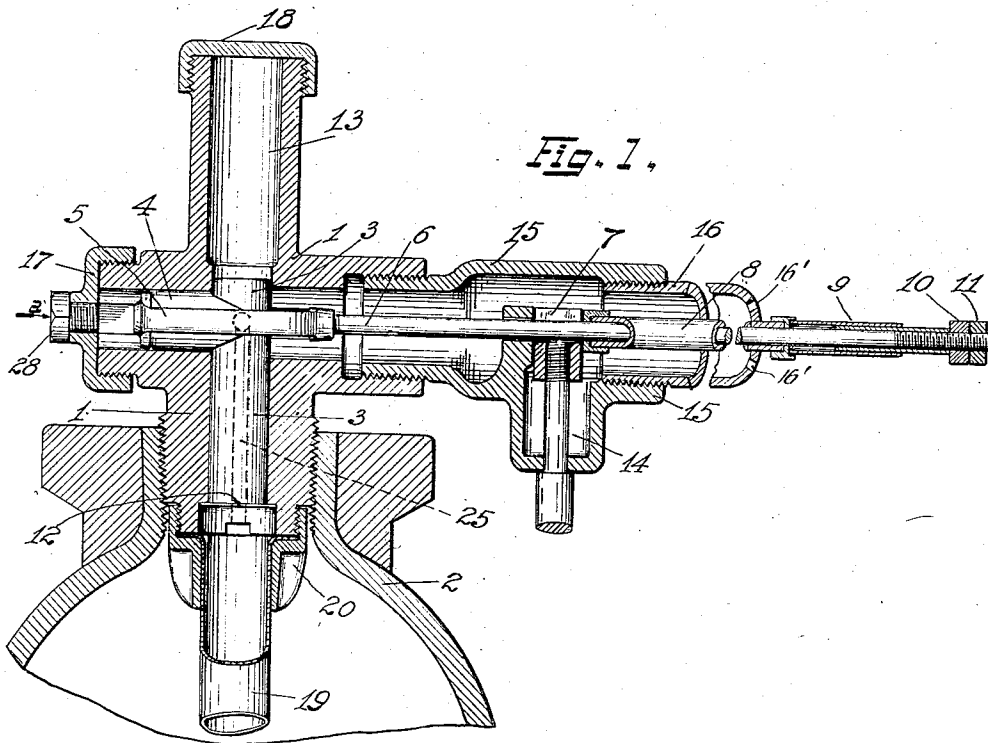
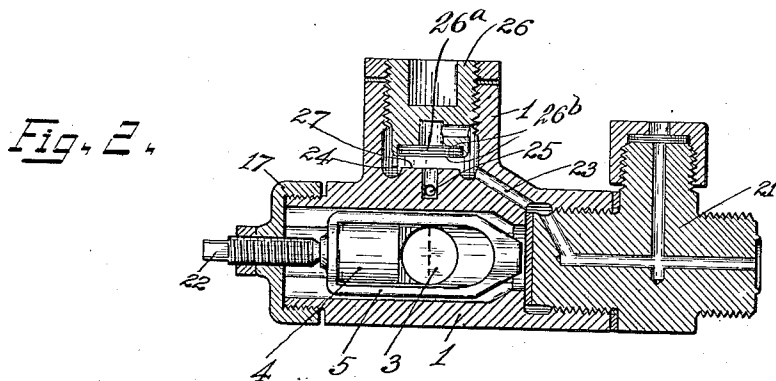
Having now fully described my invention and set forth its purposes and uses, what I claim as new and wish to secure by Letters Patent of the United States is as follows:—

1. In an apparatus of the class described a container and a valve connected therewith, said valve being provided with a passage adapted for discharging the contents of said container, said passage sealed by a breakable disk in said passage, a plunger supporting said breakable disk to prevent breakage thereof by pressure from the interior of said container, a stay bolt having the end thereof cam-shaped, said cam-shaped portion engaging a suitable cam-shaped recess in the side of said plunger, a yoke member straddling said stay bolt lengthwise and said plunger circumferentially, a rod attached to one end of said yoke, a fitting at-

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