July 10, 1951 S. BOAL 2,560,407

FIRE EXTINGUISHER

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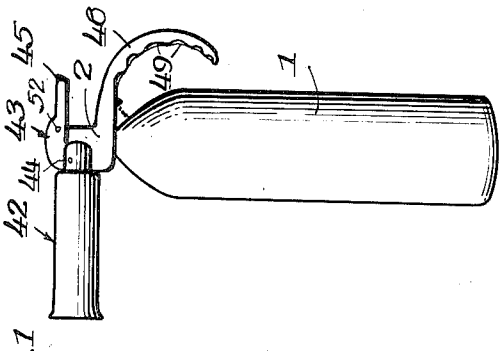


Fig. 1

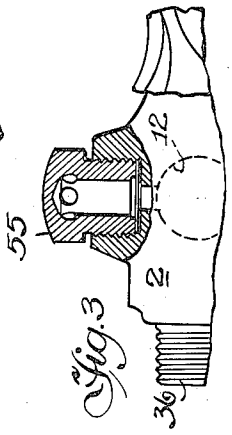


Fig. 3

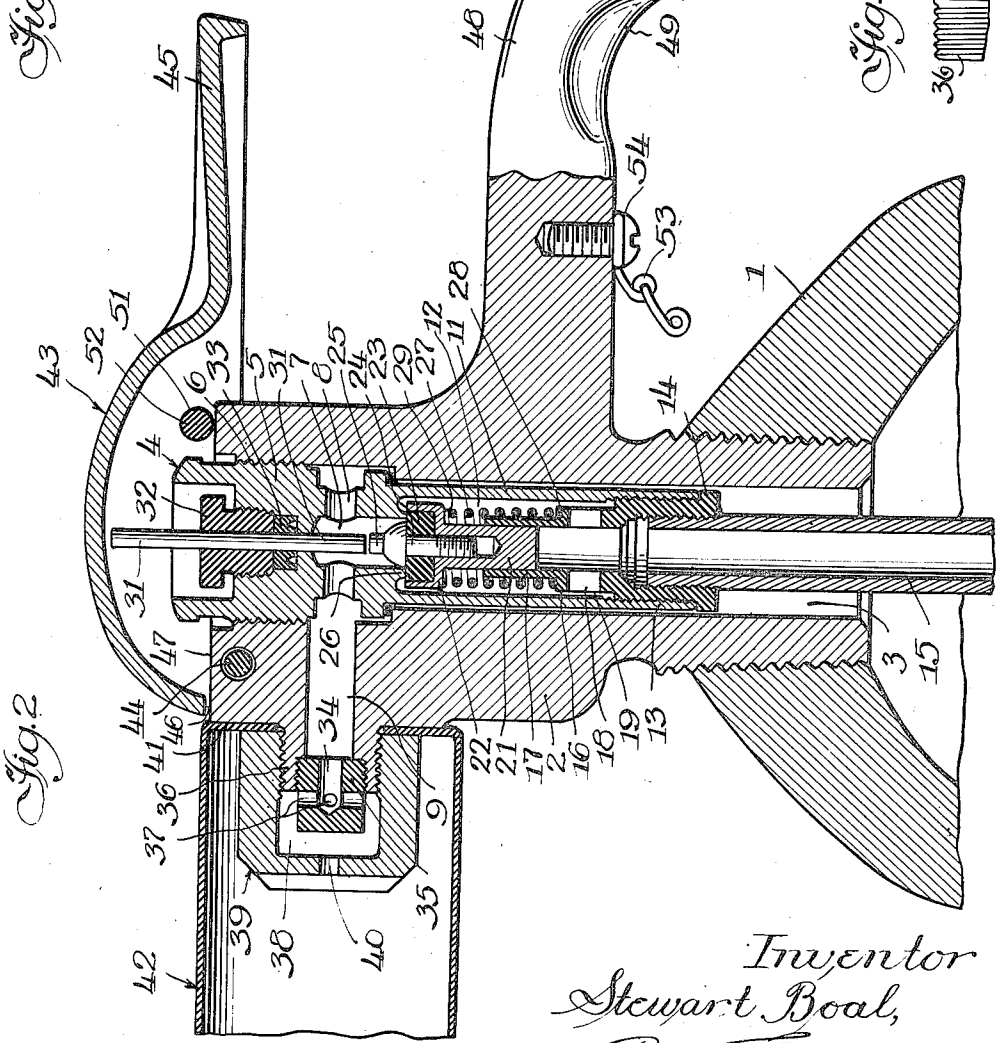


Fig. 2

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FIRE EXTINGUISHER

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4 Claims. (Cl. 169—31)

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The present invention relates to fire extinguishers of the type employing carbon dioxide and particularly to a fire extinguisher in which is embodied a novel valve assembly with siphon tube which can readily and easily be removed from the valve housing. Regulations of the Interstate Commerce Commission now require that fire extinguishers be subjected to a hydrostatic test every five years. As this has required removal of the valve mechanism which necessitates the removal of the entire valve housing from the cylinder to secure access to the valve mechanism, it will be appreciated that considerable difficulty is encountered in removing the valve housing, generally constructed of brass, from the steel cylinder, container or tank of such prior extinguishers after a period of five years.

It is therefor an object of the present invention to provide a novel valve unit that is bodily and easily removable from the valve housing without disturbing the threaded connection between the valve housing and the steel cylinder which rigidly joins these parts and seals against leakage therebetween.

A further object of the present invention is the provision of a novel valve unit assembly that may be quickly removed or lifted bodily from a cored opening in the valve housing along with the siphon tube. This removal of the novel valve unit may be accomplished without disturbing the assembly of its valve housing in the container or tank or the seal therebetween.

The present invention further comprehends a novel combined hood and trigger and its mounting, thus making for simplicity of structure and savings in manufacture, as well as greater strength inherent in the single trigger and hood.

Another object of the present invention is to provide in a removable valve structure a straight line assembly with the outlet nozzle, horn, handle and trigger all lying in substantially the same plane and alignment, whereby to facilitate use of the extinguisher and permit accurate direction of the discharged stream upon a fire.

Another object of the present invention is to provide a novel form of valve housing which carries all of the operative parts, and having a part on the housing extended to form a handle grip for handling or carrying the extinguisher.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

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The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawing, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawing:

Figure 1 is a view in side elevation of the fire extinguisher.

Fig. 2 is a fragmentary enlarged view partly in vertical cross section and partly in side elevation, of the upper portion of the fire extinguisher and more particularly the valve assembly and associated parts.

Fig. 3 is a fragmentary top plan view of the valve housing and trigger and showing the position and arrangement of the relief port.

Referring more particularly to the disclosure in the drawing, there is provided a cylinder or container 1 for holding a fire extinguishing medium under pressure, such as carbon dioxide or the like. The cylinder or container is generally made of steel or other metal of substantial tensile strength and thickness to withstand the pressure involved. Threaded into the upper portion of the cylinder or container 1 is a valve housing 2 preferably made of brass or the like, and cored to provide a vertical aperture 3 which extends completely therethrough but being slightly enlarged at the upper portion thereof to permit ready insertion and assembly of a valve unit or insert 4, as well as its ready removal or replacement when the occasion requires.

The valve insert 4 comprises a threaded body part 5 externally threaded at 6 for detachable mounting in the enlarged upper bore of the valve housing. This threaded body part is provided with a vertical bore 7 and a transverse or lateral bore 8 aligned with a lateral bore or passage 9 for passage of the extinguishing fluid. The part 5 at its longer end is reduced in diameter or cross section to provide a tubular extension 11 having an enlarged vertically arranged bore 12 aligned with and opening into the vertical bore 7. This tubular extension 11 is internally threaded at its lower end 13 to receive a threaded plug 14 which in turn carries a depending siphon tube 15 extending into the contents of the container or tank 1.

The plug 14 is provided with an upwardly projecting part having stepper reductions 16 and 17, the reduction 16 having transverse openings

or ports 18 and 19 therethrough open at all times to the contents of the siphon tube 15, and the reduction 17 providing a sleeve-like bearing or guide for the depending stem 21 of a valve plunger 22. This valve plunger carries a sealing ring or gasket 23 held in a cupped recess in the upper portion thereof by a bolt or other securing means 24 having an upper seat 25 projecting upwardly into the vertical bore 7. To provide a most effective seal against the passage of the fluid in the extinguishing system, the body part 5 is provided with an annular depending valve seat 26 adapted to be engaged by the sealing ring or gasket 23 when the valve is in its upper closed position.

As clearly disclosed in Fig. 2 the valve plunger 22 is spring-biased to closed position by a relatively heavy coil spring 27 seating at its lower end against a shoulder 28 provided at the stepped reduction on the plug 14, and at its upper end this coil spring seats against a shoulder 29 on the underside of the head of the movable valve plunger 22 and tending to force the sealing ring or gasket into closed, sealing position.

To unseat the valve plunger, there is provided a stem or plunger rod 31 longitudinally movable in a threaded plug 32 received in a threaded opening in the upper enlarged end of the body part 5 and provided with a sealing ring or gasket 33 for sealing against leakage about the stem or plunger rod 31. The lower end of this stem or rod is aligned with and bears against the upper end of the seat or projection 25, whereby a force applied to the upper end of the stem or rod 31 is transmitted to the valve plunger, and if sufficient, depresses the latter to unseat the valve seal and permit passage of the fluid under pressure from the interior of the cylinder or container 1, upwardly through the siphon tube 15, through the openings or ports 18 and 19 and into the space provided in the bore 12 between the upstanding bearing or guide 17, then between the valve seat 26 and the sealing ring or gasket 23, into the vertical bore 7, lateral bore 8 and outwardly through the bore 9 into an aligned but reduced passage 34 in a nipple 35 threaded into a threaded extension 36 at the forward part of the valve housing 2.

The nipple 35 is provided with a plurality of laterally opening, reduced ports 37 to provide against recoil upon the liberation of the extinguishing fluid under pressure into an enlarged chamber 38 within the hollow nozzle 39 provided with a discharge port 40. The nozzle is threaded onto the threaded extension 36 and at the rear abuts and rigidly retains the internal annular end flange 41 of a discharge horn 42 in centered, operative position. In larger installations, it may be desirable to attach a hose or tube of any suitable length to the threaded extension 36 and provide the end of this hose or tube with a discharge horn.

To actuate the stem or plunger rod 31, there is provided thereabove a combined hood and thumb-actuating member or lever 43 fulcrumed or pivotally mounted adjacent its forward end upon a cross pin 44 disposed in the valve housing 2, and at the rear end formed to provide a trigger 45. As the forward end 46 of the hood is disposed adjacent the upper surface 47 of the valve housing 2, it will be seen that upward movement of the trigger is limited by contact of the end 46 with the surface 47. A handle 48 for carrying or transporting the fire extinguisher is preferably formed as an integral part of the valve housing 2 and is provided with finger grips 49. This handle is disposed in vertical alignment with the trigger 45 whereby the user can readily depress the trigger while carrying the extinguisher about, causing the hood 43 to depress the stem of plunger rod 31 and unseat the valve plunger 22 against compression of the coil spring 27, whereby to permit the contents of the container to be discharged under pressure through the port 40 in the nozzle 39.

For locking the trigger 45 against accidental discharge, I have provided an aperture 51 through which a locking pin or the like 52 may be inserted, which locking pin bears against the top shoulder of the housing 2 and when in place prevents downward movement of the trigger 45 until the pin 52 is withdrawn prior to operation of the extinguisher. To prevent loss or accidental misplacing of this pin, there is provided a link chain 53 attached at one end to the locking pin, and at its other end securely attached to the grip handle 48 by means of a bolt 54. The customary safety cap or safety relief 55 for permitting the escape of the extinguishing fluid is mounted on one side of the valve housing, just below the valve seat.

It will thus be seen that when the valve insert 4 is unscrewed from the valve housing 2, the entire valve unit and siphon tube may be completely removed for periodical testing or for other purposes, without disturbing the connection or sealing contact between the valve housing and the steel cylinder.

Having thus disclosed the invention, I claim:

1. In a fire extinguisher of the type having a cylinder for holding fluid under pressure, a valve housing attached to said cylinder and provided with a vertical bore of uniform cross section through the greater portion of its length and enlarged at its upper end, and a valve assembly insertable in the bore as a completely assembled unit and having threaded engagement with said valve housing for ready attachment and removal as a unit without removal or disconnection of the valve housing, said assembly comprising a threaded valve body having an enlarged threaded part, a depending tubular extension and a valve seat all integral, lateral openings in said body for the passage of fluid therethrough, a passageway in said assembly adjacent said openings, a second passageway above the valve seat, lateral ports connected to said last mentioned passageway and connected with a transverse bore in the housing, a discharge horn connected to said last mentioned bore, a spring-biased valve in the tubular extension of the valve body, a threaded plug in the lower end of the tubular extension, a siphon tube removably attached to and carried by said threaded plug, a plunger for actuating the valve, and a hood member pivotally attached to said housing and bearing on the top of said plunger and provided with a thumb-actuated trigger for actuating the valve.

2. In a fire extinguisher of the type having a cylinder for holding fluid under pressure, a valve housing attached to said cylinder and provided with a vertical bore, and a valve assembly insertable in the bore and having threaded engagement with said valve housing and assembled therein and removed therefrom as a unit without disturbing the valve housing and its attachment to the cylinder, said assembly comprising a spring-biased valve, a threaded valve plug having an enlarged threaded part, a depending tubular extension and an integral valve seat with the valve

longitudinally movable in the tubular extension into and out of sealing contact with the valve seat, lateral openings in said plug for the passage of fluid therethrough, a passageway in said assembly adjacent said openings, a second passageway above the valve seat, lateral ports connected to said last mentioned passageway and connected with a transverse bore in the housing, discharge means connected to said last mentioned bore, a removable plug mounted in the end of said tubular extension, a siphon tube carried by said last mentioned plug, a plunger for actuating the valve, and a hood member pivotally attached to said housing and bearing on the top of said plunger and provided with a thumb-actuated trigger for actuating the valve.

3. In a fire extinguisher of the type having a container for an extinguishing fluid maintained under pressure, a valve housing rigidly assembled on the container and provided with an integral rigid handle at one end, a vertical bore extending completely therethrough and a horizontal bore for the discharge of the fluid, said vertical bore being enlarged adjacent its upper end, a valve assembly bodily inserted into the vertical bore and bodily removable therefrom for inspection or replacement with the valve housing maintained assembled on the container, said valve assembly including a valve plug having an enlarged part, a depending tubular part and a valve seat all received in the vertical bore with the enlarged part threaded in the enlarged portion of the bore and having a flange in sealing contact with a shoulder in the bore, a spring-biased valve in the valve plug, a removable plug in the depending tubular part and having an annular projection carrying the valve, a siphon tube carried by the removable plug, a plunger for actuating the valve,

and a thumb-actuated trigger pivotally mounted upon the housing in alignment with the handle for actuating the plunger and valve assembly.

4. In a fire extinguisher of the type having a cylinder for holding a fluid under pressure, a valve housing attached to said cylinder, and a unitary valve assembly inserted into or removed from the housing as a self-contained unit with the valve housing maintained attached to the cylinder and said assembly having threaded engagement with said valve housing when in assembled, operative position, said valve assembly comprising a valve body carrying the entire assembly and having an enlarged threaded part, a depending tubular extension and an integral valve seat, a valve disposed in the tubular extension and spring-biased to closed position with the valve seat, a plunger for actuating the valve to open position, a plug mounted in the lower end of the tubular extension and at its upper end carrying the valve for sliding movement, a siphon tube carried by and removable with the plug and valve body, and a hood member pivotally attached to the upper end of said housing and having an extension at one end forming a trigger for actuating the plunger and valve.

STEWART BOAL.

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