A. L. HANSEN.

FIRE EXTINGUISHER.

APPLICATION FILED MAR. 20, 1916.

1,276,353.

Patented Aug. 20, 1918.

2 SHEETS—SHEET 1.

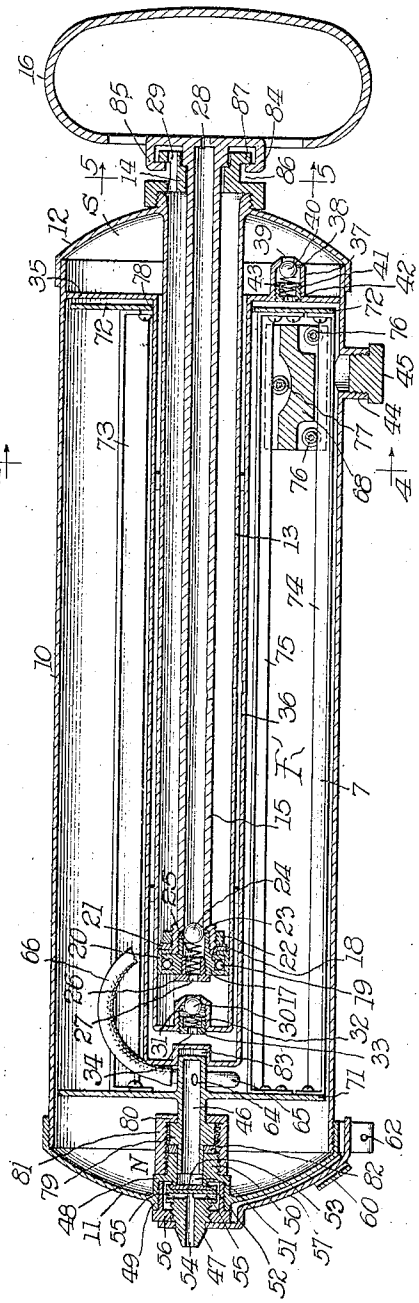


Fig. 1

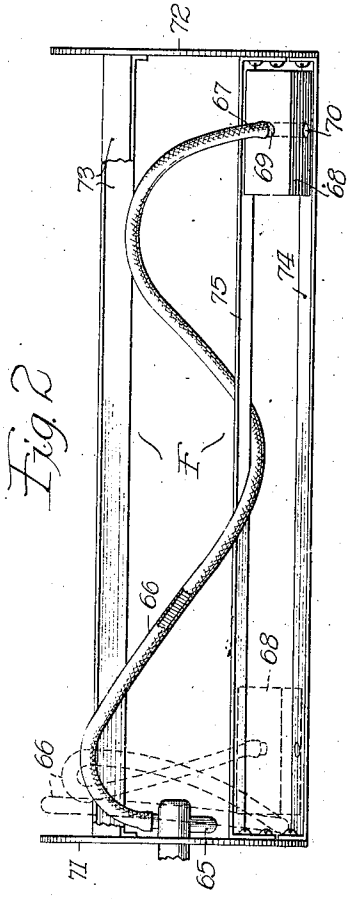


Fig. 2

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2 SHEETS—SHEET 2.

Fig. 3

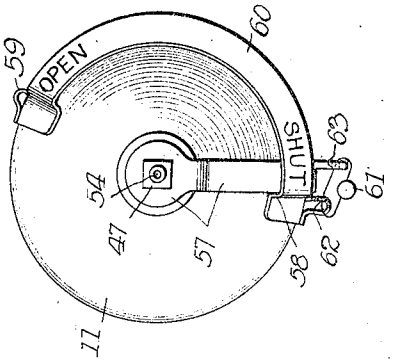


Fig. 5

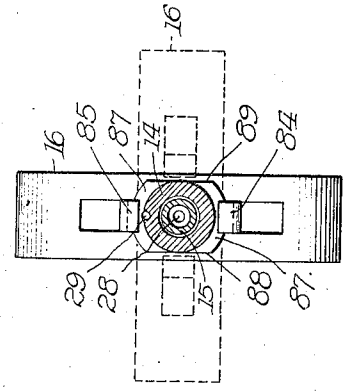
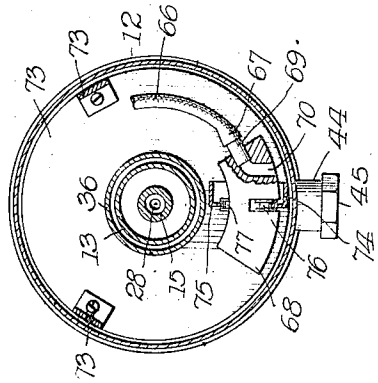


Fig. 4



Witnesses,
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UNITED STATES PATENT OFFICE.

AUGIE L. HANSEN, OF EVANSTON, ILLINOIS, ASSIGNOR TO JUSTRITE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FIRE-EXTINGUISHER.

1,276,353. Specification of Letters Patent. Patented Aug. 20, 1918.

Application filed March 20, 1916. Serial No. 85,284.

To all whom it may concern:

Be it known that I, AUGIE L. HANSEN, a citizen of the United States, and a resident of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

My invention relates to portable fire extinguishers and its general object is to provide construction and arrangement which is more simple and less expensive and which gives greater efficiency.

Fire extinguishers of this class, which are used to considerable extent in buildings and on vehicles, must be capable of operation to eject liquid irrespective of the position in which the extinguisher is held. Furthermore, the capacity of such extinguishers is quite limited, usually to one quart, and provision must therefore be made to enable practically all of the contents to be ejected.

In prior extinguishers of this class a round-about discharge passageway is provided to which separate liquid inlets lead from the respective ends of the liquid container, and complicated valve structures and mechanisms are provided for controlling the inlets and to prevent entrance of air into that inlet which is not immersed in the liquid. The construction and arrangement in such prior extinguishers is therefore complicated and expensive to manufacture and they can readily get out of order.

One of the important objects of my invention is to provide more direct communication between the liquid and the ejection nozzle, and to provide only a single liquid inlet capable of following the liquid to any part of the container, a particular feature of the inlet control being the absence of valves. More in detail, the invention contemplates the use of a flexible conductor connected at one end directly with the ejection nozzle and having its other end free to intimately follow the liquid to all parts of the container as the container is tilted or rotated during use, the conductor being always open to the liquid, there being no valves except a nozzle valve which controls the ejection. Another object of the invention is to provide supporting structure for the flexible conductor which will prevent tangling thereof and which will guide its inlet end to enable it to more readily follow the liquid.

Other features of the invention reside in simplified construction and arrangement which reduce the number of parts to a minimum and which reduce the cost of construction and assembly, no delicate adjustments being necessary.

An extinguisher embodying the various features of my invention is shown on the accompanying drawings, in which—

Figure 1 is a vertical diametral sectional view of the entire extinguisher,

Fig. 2 is a side elevational view, with parts broken away, of the discharge conductor supporting frame,

Fig. 3 is a view of the nozzle end of the extinguisher,

Fig. 4 is a sectional view on plane 4—4, Fig. 1, and

Fig. 5 is a sectional view on plane 5—5, Fig. 1.

The liquid container for the extinguisher comprises a tubular body 10 and the end caps 11 and 12. The cap 12 supports the pump barrel 13 which extends axially through the container body 10 and whose outer end carries the bearing fitting 14 for the hollow piston rod 15 and has secured to its outer end the elliptical grip or handle 16. The inner end of the piston rod carries the piston head 17 having the annular groove 18 in which is seated a circular spiral spring washer 19 which bears outwardly against the leather washer 20 surrounding the piston head and clamped against the rear face thereof by a washer 21 and nut 22. In the piston rod end is formed the seat 23 for the ball valve 24 which is held against the seat by a spring 25 held in place by a plug 26 inserted in the piston head. The opening 27 in the plug 26 connects the interior of the piston rod with the pump barrel 13 and the opening 27 at the other end of the piston rod connects the interior of the rod with the atmosphere. When the piston structure is pulled out the ball valve moves away from its seat and air enters through opening 28 into the piston rod and pump barrel. Air in back of the piston head is forced from the pump barrel through the outlet 29 in the fitting 14. When the piston structure is forced inwardly the ball valve 24 seats and the air in advance of the piston head is com-

pressed. A ball check valve 30 is seated in the pocket 31 at the inner end of the barrel and is normally held to its seat by a spring 32 abutting against the plug 33, this plug having the outlet opening 34. When air is compressed in the pump barrel in advance of the piston head the check valve opens and permits escape of the compressed air, and this compressed air eventually reaches the interior of the container to effect ejecting pressure against the liquid contents. In order to store the air and to retain it from acting on the liquid until it reaches a certain pressure, storage space is provided for the air. As shown, a partition 35 is fitted into the end of the body 10 adjacent the convex end cap 12 and extending from this partition and concentrically surrounding the pump barrel is the tube 36, the interior of this tube together with the chamber S between the partition 35 and the end cap 12 providing the storage space for the compressed air leaving the pump barrel when the piston is forced inwardly. A tubular projection 37 from the partition 35 into chamber S provides a seat 38 around the inlet opening 39 to the projection, a ball check valve 40 being normally held against the seat by a spring 41 held in the plug 42, this plug having the outlet opening 43 into the body 10 of the container which holds the liquid to be ejected. The plug 42 is threaded into the tube 41 in order that the pressure of the spring 41 against the ball valve 40 may be adjusted. With this arrangement the ball valve will not open until the pressure reaches a predetermined value. The body 10 has the fluid charging inlet 44 for which a removable plug 45 is provided.

The end cap 11 supports the nozzle structure N, this nozzle structure comprising the pipe 46 and the nozzle head 47. Provision is made to open or close the passageway through the nozzle structure to the exterior of container. As shown, a valve frame 48 is supported centrally on the end cap 11 and comprises the tubular sections 49 and 50, the inner tubular section 50 being of less diameter than the outer section 49 and the inner end of the passageway 51 through the inner tubular section 50 is surrounded by a bead or ridge 52 forming a valve seat for the base of the nozzle member 47 which is contained within the outer tube section 49. To insure tight seating of the nozzle head a disk 53, preferably of fiber, is inserted in the base of the nozzle head to engage with the valve bead 52. The nozzle head has the central outlet opening 54, from whose inner end extend the radial passageways 55 to the interior of the tubular part 49, the liquid passing from the pipe 46 through the passageways 55 and 54 to the exterior when the valve head is away from its seat. To control shifting of the valve head to and from its seat it has threaded engagement in the outer wall of a hollow plug 56 which threads into the tubular part 49 of the fitting 48 and the outer end of the nozzle head is polygonal as best shown in Fig. 3 and receives the hub and a lever 57 which extends radially over the end cap 11. When this lever is swung the valve head is moved axially to be removed from its valve seat or to be seated thereagainst. To limit the swing of the nozzle lever abutments 58 and 59 are provided on the end cap 11 and these abutments are preferably connected by a bridge 60 which overlies the end of the nozzle lever and protects it against bending. In Fig. 3 the lever is shown against abutment 58, the nozzle valve being closed in this position of the lever. When the lever is swung into position against abutment 59 the nozzle valve will be wide open, and the lever can be swung to any intermediate position to correspondingly control the outflow of liquid from the nozzle. A seal 61 preferably ties the lever in its closed position, the abutment 58 and the lever end being shown provided with openings 62 and 63 respectively for receiving the seal shown in the form of a wire. The seal is of material which can easily be broken when sufficient pull is exerted on the lever, and after breaking of the seal the lever can be operated as desired to correspondingly control the nozzle valve.

The inner end of the nozzle pipe 46 has the inlet opening 64 from which extends a short piece of metal tubing 65 over whose end is slipped one end of a conductor 66, this conductor being flexible and of sufficient length to enable its free end 67 to follow the liquid in the container when the container is tilted or rotated. To enable this free end of the conductor to more readily follow the liquid it is preferably secured to a weight 68 which has the nipple 69 over which the end 67 may be slipped, and which has the inlet opening 70 communicating with the nipple.

As extinguishers of this class are put to strenuous use during fighting of a fire and are rotated and rapidly tilted, the flexible conductor might become tangled up and it is therefore desirable to provide guide means for its free end and for the weight 68. As shown, I have provided a frame F which comprises the end disks 71 and 72 and the longitudinally extending connecting bars 73. The frame carries also the longitudinally extending guide bars 74 and 75 which are secured to the end disks and between which the weight 68 is mounted to slide lengthwise of the frame. To reduce the resistance, rollers 76 and 77 may be provided for engaging with the bars 74 and 75 respectively. The supporting frame for the weight is also free to rotate axially. The

end disk 72 has the central opening 78 for receiving the tube 36, and the nozzle pipe 46 is preferably secured to the end disk 71 axially thereof and swiveled with reference to the fitting 48 which contains the nozzle head 47. As shown, the outer end of the pipe 46 extends into the passageway 51 of the tube part 50 of the fitting 48 and the pipe has the collar 79 which is clamped between the inner end of the tube part 50 and the flange 80 of the cap 81 which screws into the tube part 50, a washer 82 of suitable material being preferably interposed between the collar and the part 50. With this arrangement the weight 71 together with the flexible conductor and the nozzle pipe 46 forms part of the supporting frame which is freely rotatable axially, and such free axial rotation of the frame together with the longitudinal sliding arrangement of the weight on the frame enables the weight to accurately and quickly follow the liquid so that the liquid inlet 70 is always immersed in the liquid no matter how the container is tilted or rotated, and during such movement of the weight the flexible conductor 66 moves bodily with the supporting frame and cannot become kinked or tangled, the conductor being helical and expanding and contracting as the weight shifts along the frame. The conductor may be further held and supported by passing between the guide bars 74 and 75.

The end cap 11 which supports the nozzle has preferably detachable threaded engagement with the end of the container body 10 and therefore when this cap is unscrewed from the container body, it together with the nozzle structure and the intake conductor supporting frame F can be withdrawn from the container body. Inspection and repairs can therefore be very readily and quickly made. There being no valves of any kind associated with the discharge conductor, the arrangement is extremely simple yet most efficient. If desired the discharge conductor mounting frame can be further supported by having the inner end of the pipe 46 extended into the socket 83 at the inner end of the tube 36, this bearing engagement together with the engagement of the frame end disk 72 with the tube causing the frame to be practically pivoted and supported on the tube 36 so that its weight will be removed from the nozzle structure.

I preferably provide interlocking engagement for the piston grip or handle structure 16 with the container. As shown, the handle or grip 16 has hooks 84 and 85 extending from its base and into the peripheral groove 86 formed in the bearing fitting 14 for the piston rod, the hooks engaging with the outer flange 87 on the fitting. The opposite sides of this flange are notched or cut away as indicated at 88 and 89 in order to reduce the width of the flange to less than the distance between the hook ends. With this construction, when the grip is rotated to bring its hooks opposite the notches the handle will be unlocked to allow operation of the pump. When it is desired to again lock the handle to the container it is rotated to bring the tongues opposite the notches whereupon the tongues can be shifted inwardly and then rotated to be in interlocking position behind the flange 87.

When it is desired to operate the extinguisher pull is exerted on the nozzle lever 67 sufficiently to break the seal 61 and the nozzle is opened. Then, after the handle 16 is unlocked the pump mechanism is operated to compress air into the storage space between the tube 36 and chamber S, and when the air is sufficiently compressed to open the valve 40, it enters the body of the container and exerts its pressure against the liquid to force the liquid into and through the flexible discharge conductor and through the pipe 46 and nozzle head, the flexible conductor inlet end being carried by the weight and its supporting frame F to follow the liquid and to be always immersed therein. It is obvious that the pump can be operated before the nozzle is open in order to compress a supply of air in the container for acting on the liquid to effect rapid ejection thereof as soon as the nozzle is opened.

The extinguisher of my invention has very few parts and such parts are of simple and inexpensive construction. The arrangement is also such that assembly of the parts or separation thereof can be readily accomplished. The discharge conductor being entirely free of valves there is no chance for leakage and the conductor inlet always follows the liquid and practically all the liquid can be ejected from the container, the extinguisher being therefore very efficient. I do not of course desire to be limited to the exact construction, arrangement and operation shown and described as modifications are no doubt possible which would still come within the scope of the invention.

I claim as follows:

1. In a fire extinguisher, the combination of a container for liquid, a nozzle pipe at one end of the container and communicating with the exterior, said pipe being rotatable axially, a discharge conductor connected at one end with said pipe, the other end of said conductor being always open to the liquid and free to follow the liquid to any part of the container as the container is tilted or rotated, and pressure producing means within the container for forcing the liquid into the discharge conductor and through the nozzle pipe.

2. In a fire extinguisher, the combination of a container for liquid, a discharge nozzle

structure at one end of the container, a discharge conductor connected at one end with said nozzle structure with its other end open to the liquid, said conductor being flexible and being helically arranged whereby its inlet end may follow the liquid to any part of the container as the container is tilted or rotated, and pressure producing means within the container for forcing the liquid into and through said discharge conductor and through the nozzle structure.

3. In a fire extinguisher, the combination of a container for liquid, a discharge nozzle, a flexible discharge conductor within the container connected at one end with said nozzle, a weight to which the inlet end of said conductor is secured, a shiftable frame for said weight, said weight being shiftable on and with said frame to carry the inlet end of said conductor to follow the liquid to any part of the container as the container is tilted or rotated, and pressure producing means within the container for forcing the liquid through said conductor and nozzle.

4. In a fire extinguisher, the combination of a container for liquid, a nozzle at one end of the container, a supporting frame rotatable axially within said container, a weight shiftable longitudinally on said frame, a flexible discharge conductor supported on said frame, coupling mechanism connecting the outlet end of said conductor with said nozzle, the inlet end of said conductor being secured to said weight, said weight being shiftable on and with said frame to move said conductor inlet end to follow the liquid to any part of the container as the container is tilted and rotated, and pressure producing means within the container for forcing the liquid through said conductor and nozzle.

5. In a fire extinguisher, the combination of a cylindrical container for liquid, a discharge nozzle at one end of said container, a frame within the container, a weight shiftable longitudinally on said frame, said frame being rotatable axially to permit said weight to be always at the lower part of the frame, a flexible discharge conductor supported on said frame, coupling mechanism connecting the outlet end of said conductor with the discharge nozzle, the inlet end of said conductor being secured to said weight, the rotation of said frame by said weight and the longitudinal shift of said weight on said frame as the container is tilted and rotated causing the inlet end of said conductor to be carried by the weight to follow the liquid in the container, and pressure producing means within the container for forcing the liquid through said conductor and nozzle.

6. In a fire extinguisher, the combination of a cylindrical container for liquid, a discharge nozzle axially arranged at one end of the container, a frame rotatable axially in said container, a flexible discharge conductor supported on said frame, coupling mechanism connecting the outlet end of said conductor with the nozzle, a weight to which the inlet end of said conductor is secured, said weight being rotatable with and shiftable on said frame to carry the inlet end of the conductor to follow the liquid to any part of the container as the container is tilted and rotated, and pressure producing means within the container for forcing the liquid through said discharge conductor and nozzle.

7. In a fire extinguisher, the combination of a cylindrical container for liquid, a discharge nozzle structure arranged axially at one end of the container, said structure comprising a head open to the exterior and a pipe extending into the container, a valve between said head and pipe operable from the exterior of the container to control the flow of liquid through the nozzle structure, said pipe being axially rotatable, a frame within the container secured at one end to said pipe and axially pivoted at its other end whereby said frame may axially rotate, a weight shiftable longitudinally on said frame, said frame by being rotatable permitting said weight to remain below the axis of the container, a flexible conductor supported on said frame, the outlet end of said conductor being connected to communicate with said nozzle structure pipe and its inlet end being connected with the weight, said weight by rotating with said frame and shifting thereon causing said inlet end to follow the liquid to any part of the container as the container is tilted or rotated, and pressure producing means within the container for forcing the liquid through said discharge conductor and nozzle structure.

8. In a fire extinguisher, the combination of a cylindrical container, a nozzle at one end of said container, walls forming a chamber at the other end of said container, a tube extending axially through the container and communicating with said chamber to form a continuation thereof, an air pump located within said tube and operable from the exterior of the container, the air compressed by said pump being stored in said chamber and tube, a check valve for controlling the flow of air from said chamber into the container, and a discharge conductor communicating at one end with the nozzle and free at its inlet to follow the liquid.

9. In a fire extinguisher, the combination of a cylindrical container for fluid, a discharge nozzle at one end of the container comprising an outer section and an inner section extending axially of the container, said inner nozzle section being axially rotatable, a frame extending longitudinally

within the container, one end of said frame being suspended from said inner section of the nozzle and there being means at the other end of the container for suspending the corresponding end of the frame for axial rotation, a slider longitudinally shiftable on said frame, the weight of said slider causing said frame always to hang when the container is rotated, a discharge conductor having its intake end secured to said slider and its outlet end connected with said inner section of the nozzle, and means for producing pressure against the liquid in said container.

10. In a fire extinguisher, the combination of a cylindrical fluid container, an axially extending nozzle at one end thereof, an axial support at the other end of said container, a frame suspended from the inner end of said nozzle and said support and extending longitudinally of the container adjacent the cylindrical wall thereof, said frame being weighted whereby it will always hang vertical as the container is axially rotated, a slider on said frame, a discharge conductor having its inlet end secured to the slider and its outlet end connected with the nozzle, and means for producing pressure within said container.

In witness whereof I hereunto subscribe my name this 16th day of March, A. D., 1916.

AUGIE L. HANSEN.