

Sept. 11, 1923.

1,467,477

W. J. FRISBIE
FIRE EXTINGUISHER

Filed Feb. 8, 1922

2 Sheets-Sheet 1

Fig. 1.

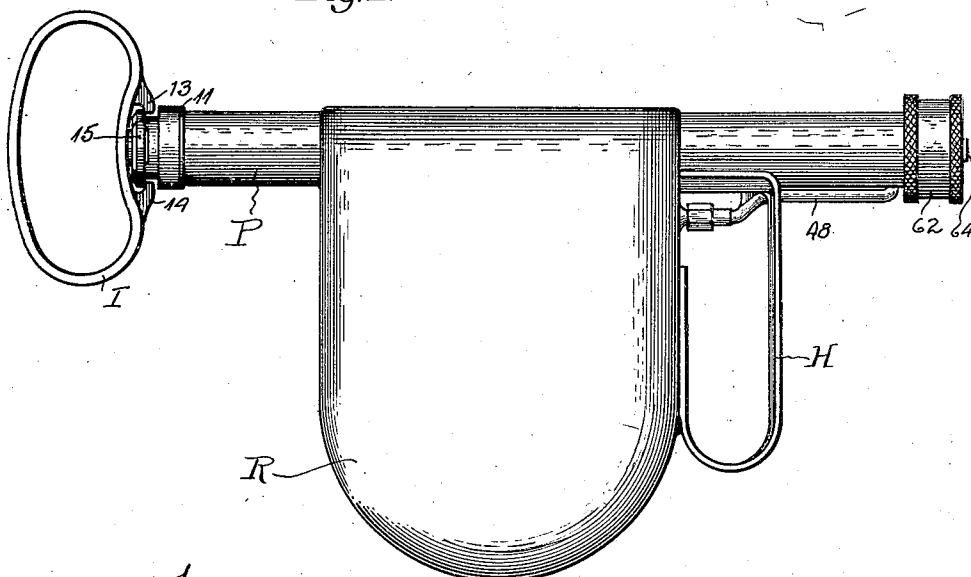


Fig. 2.

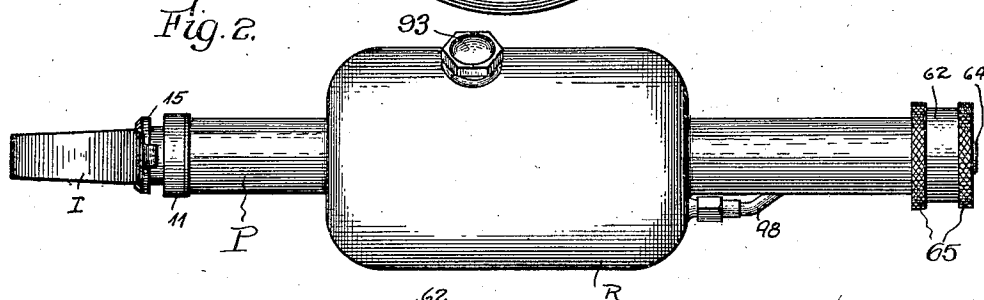
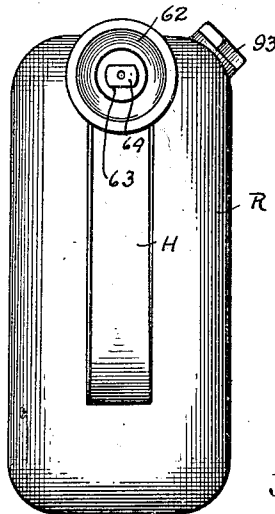


Fig. 3.



Witness:
A. J. Sauer.

Inventor:
William J. Frisbie,
By Charles J. Schmidt,
Att'y

Sept. 11, 1923.

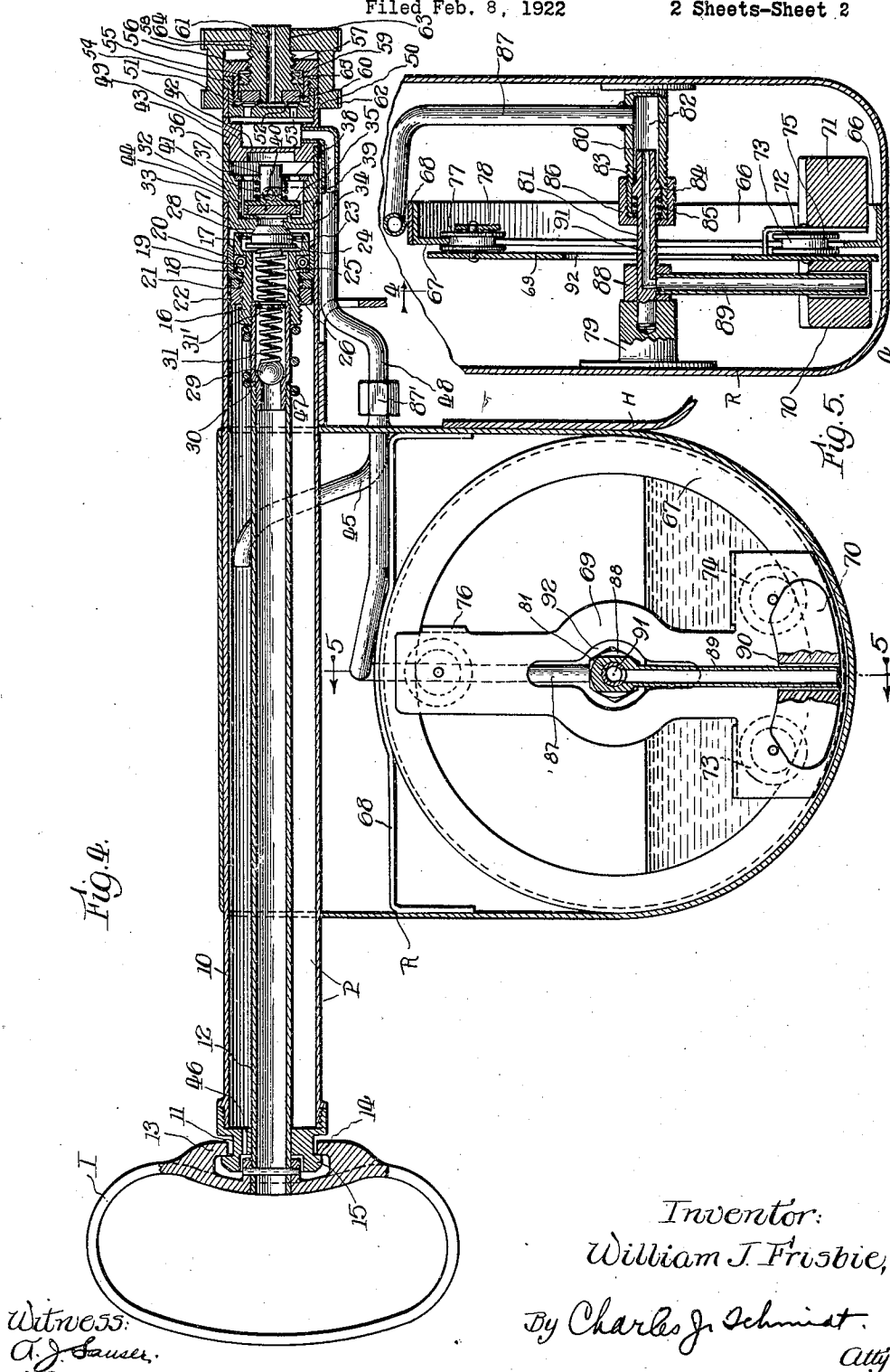
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

WILLIAM J. FRISBIE, OF CHICAGO, ILLINOIS, ASSIGNOR TO JUSTRITE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FIRE EXTINGUISHER.

Application filed February 8, 1922. Serial No. 535,021.

To all whom it may concern:

Be it known that I, WILLIAM J. FRISBIE, a citizen of the United States, and a resident of Chicago, 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 fire extinguishers, particularly to the small portable type which are used in automobiles or distributed around buildings to be readily carried in the hand and quickly operated.

One of the important objects of the invention is to provide novel arrangement of the air pump relative to the fluid reservoir to produce a shape which will enable the extinguisher to be more readily handled and more efficiently manipulated. Another important object of my invention is to so arrange the air pump that none of its operating parts will be within the reservoir but will be at all times away from the fluid which is usually carbon-tetrachloride. Another important object of the invention is to provide for positive shut-off of the air and also the fluid, all valves and joints being made air tight and of material which will not be acted upon by the fluid, thus preventing leakage and evaporation of the fluid. The above and other features of my invention are incorporated in the fire extinguisher illustrated on the accompanying drawing, on which—

Fig. 1 is a side elevational view,

Fig. 2 is a top view,

Fig. 3 is an end view,

Fig. 4 is an enlarged vertical sectional view, the air pump being in diametral section and the reservoir part in section on plane 4—4 Fig. 5, and

Fig. 5 is a sectional view on plane 5—5 Fig. 4.

In accordance with my invention the air pump P is at the top of the extinguisher body or reservoir R, the body receiving the intermediate part of the pump and being of a width and height to provide the necessary capacity for fire extinguishing fluid. At the front of the body and below the pump is the strap or handle H by means of which the extinguisher can be readily and accurately held, the left hand being inserted through the strap and around the front of the body while the handle I of the pump is grasped

by the right hand. Air can then be readily pumped into the reservoir and the extinguisher properly and accurately aimed and directed to put out fires.

Describing first the pump structure, it comprises the cylindrical barrel 10 having the fitting 11 applied at its rear end which forms a bearing for the tubular piston rod 12. The handle I is secured to the piston rod and has the locking tongues 13 and 14 for engaging behind the flange 15 on the fitting 11 to thus lock the handle to the barrel when the device is not in use. The sides of the flange 15 are flattened as indicated in Fig. 2 to be sufficiently narrow so that the tongues can pass the flange whereupon turning of the handle 90 degrees will bring the tongues behind the flange to lock the handle in place.

At its inner end the pump piston rod 12 is secured to the plunger body 16 which behind its head 17 has the annular pocket 18 for receiving the expander ring 19 formed of a length of coiled spring, this ring pressing radially against the leather plunger 20 which is secured in place by the washer 21 and nut 22 which engages on the threaded exterior of the plunger body.

Within the plunger head 17 is the plunger valve 23 which has the flange 24 for controlling the passageway 25 through the plunger body, a compression spring 26 interposed between the valve and the end of the plunger tube 12 tending to hold the valve away from the passageway 25. When the valve is free the spring 26 will hold it with its flange against the wall 27 secured at the outer end of the plunger head 17, this wall having passageway 28 therethrough. Near the inner end of the plunger rod 12 is the check valve 29 in the form of a ball which is normally held against its seat 30 by the spring 31 extending between the ball and the perforated plate 31' secured at the end of the rod.

Secured to the outer end of the pump barrel 10 is the pump valve body 32 whose cylindrical wall forms a continuation of the barrel and whose inner transverse wall 33 has the passageway 34 for the flow of air. The outer edge at the passageway is conical to afford a seat for the outer end of the plunger valve 23 which is also conical, as clearly shown in Fig. 4. When the pump plunger is in its inner position within the

barrel the valve 23 will be held against the conical seat to close the passageway 34 for the purpose to be referred to later.

Within the pump valve body 32 is the pump valve 35 whose guide stem 36 passes through the transverse wall 37 secured in the body 32 and having the passageway 38 therethrough. On the wall 33 and surrounding the passageway is the annular ridge 39 which forms a seat for the pump valve, the valve preferably having a facing 40 of lead or other suitable material for accurately engaging with the seat, the spring 41 tending to hold the valve against its seat.

The outer end of the pump valve body 32 is closed by the transverse inner wall 42 of the nozzle structure body 43 whose cylindrical wall forms a continuation of the cylindrical wall of body 32. The body 32 with its wall 33, and the wall 42, forms the air chamber 44 which is connected by a pipe 45 with the interior of the extinguisher reservoir R, the pipe extending to the top of the reservoir as shown in Fig. 4.

Describing now the operation of the air pump, the handle I is first turned 90 degrees to release it from the fitting 11, and then when it is drawn outwardly with the plunger rod 12 and plunger, the air behind the plunger may escape from the barrel through the passageway 46 in the fitting 11, and air may flow into the barrel in front of the plunger through the tubular plunger rod and past the check valve 29, and then through passageway 25 and past the plunger valve 23 and through the openings 28 in the wall 27. When the plunger is drawn out the plunger valve will be released from the wall 33, but the passageway 34 to the air chamber 44 will still remain closed by the pump valve 35. After the plunger has been drawn out and the pump barrel in advance of the plunger has been filled with air, the handle I is pushed inwardly and the air in advance of the plunger will be compressed, the pressure acting against the plunger valve 23 and forcing it back to close the passageway 25. The check valve 29 will also be closed during inward travel of the plunger and the compressed air is then directed through the passageway 34 against the pump valve 35 which is opened so that the air may travel into the chamber 44 and then by way of pipe 45 into the reservoir R. After several strokes of the pump there will be considerable pressure in the reservoir which will act against the liquid to force it from the reservoir out through the nozzle structure when the nozzle is open. Escape of fluid into the pump barrel is prevented by the pump valve 35 and also the plunger valve 23. When the pump is being operated and the pump valve is open the air pressure will force any liquid out of chamber 44 and the pipe 45, and when the pump is not being

operated, the spring 41 will hold the pump valve firmly against its seat to close the inner end of the passageway 34 between the air chamber and the pump barrel. Also when the pump handle is locked in its inner position the plunger valve 23 will be firmly held by its spring 26 to close the adjacent end of the passageway 34. The spring 26 also acts as a shock absorber during operation of the pump, it absorbing the impact when the plunger is pushed in. A shock absorber spring 47 encircles the plunger tube 12 adjacent the plunger body and this spring is compressed against the fitting 11 when the plunger is pulled out to absorb the shock of impact.

The fluid outlet pipe 48 connects at its inner end with fluid intake mechanism to be later described, and at its outer end is connected with the chamber 49 in the nozzle structure body 43. The transverse wall 50 is secured in the outer end of the body 43 and forms the outer wall of the chamber 49. On its outer side the wall 50 has the concentric annular ridges 51 and 52 forming valve seats, and between these ridges the wall has the passageways 53. The wall also has the outwardly extending interiorly threaded flange 54 which receives the flange 55 on the head 56 which head has the threaded opening 57 for receiving the nozzle 58. The base 59 on the nozzle forms a valve which has the insert 60 of lead or other suitable material for engaging with the valve ridges or seats 51 and 52 to close the passageway 53. The nozzle has the axial passageway 61 through which the extinguishing fluid is discharged. To permit the nozzle to be readily turned to control the discharge of fluid a cap 62 is provided whose cylindrical wall receives the nozzle structure body and whose front wall has the polygonal opening 63 for frictionally receiving the polygonal end 64 of the nozzle. The cap has the knurled ridges 65 which afford a good finger hold for turning the cap. When the cap is turned the nozzle, on account of its threaded engagement in opening 57, will be moved axially to open or close the passageway 53. To prevent leakage past the nozzle a cork washer 65' is applied on the nozzle and which is compressed between the nozzle base 59 and head 56 when the nozzle valve is opened.

Describing now the fluid intake mechanism within the reservoir, provision is made to insure proper intake during the various positions of the extinguisher when in use, it being understood that the extinguisher is used not only to project horizontally, but also upwardly and downwardly. As shown in Fig. 4 the lower end of the reservoir body is of longitudinal circular cross section. Secured in this lower part substantially midway between the sides of the reservoir is the trace frame 66 having the radially ex-

tending rail flange 67, the frame being secured at its upper end to a cross bar 68 secured to the sides of the reservoir as clearly shown in Fig. 4. Extending across the trace frame is the weight carrier frame 69 which at its lower end supports the weights 70 and 71 of lead or other suitable heavy material. The weight 70 is shown secured against one side of the carrier and the weight 71 is shown secured on the opposite side against the wings 72 deflected from the carrier which is of sheet metal, the wings being spaced away a distance to accommodate between them and the carrier body of the wheels 73 and 74 which engage with the inner edge of the rail flange, and have flanges 75 for holding them on the track.

At the upper end of the carrier frame a section 76 is deflected from and spaced away from the carrier body to accommodate the upper wheel 77 which also engages the rail flange and is held thereon by its flanges 78. The carrier frame is thus at all times held in diametral position with reference to the track frame and as the extinguisher is turned the track frame rotates therewith, but the weights will always cause the carrier frame to keep a vertical position.

Secured to and extending from one side of the reservoir wall is the bearing bracket 79 whose axis is coincident with that of the track frame. On the opposite wall of the reservoir is secured a bearing bracket 80, and extending between the brackets is the tubular rod 81 which bears at one end in the bracket 79. The bracket 80 has the passageway 82 which receives the other end of the rod and in the bracket is the conical seat 83 for the conical valve head 84 on the rod, a spring 85 encircling the rod between the head and the cap 86 which threads onto the outside of the bracket. The pipe 87 connects at its lower end with the chamber 82 in bracket 80 and extends to the exterior of the reservoir where it is connected by coupling 87' with the pipe 48 which leads to the nozzle structure chamber 49.

Secured on the rod 81 adjacent the bracket 79 is the enlargement or collar 88 to which is secured the intake pipe 89 which extends downwardly through the passageway 90 formed in the weight 70, the pipe terminating a short distance from the wall of the reservoir. At its upper end the pipe communicates with the passageway 91 extending through the rod 81 to the chamber 82 in bracket 80. In the arrangement described the bracket members 79 and 80 turn when the reservoir is turned during use, but the pipe 89 is held in vertical position by the weight frame. As the rod 81 is secured to the pipe 89 there will be relative rotation between it and the bracket members when the extinguisher is turned, and during such relative movement leakage will

be prevented as the spring 85 will keep the surfaces of the valve 84 and the seat 83 in close contact at all times. Sufficient clearance for the pipe 89 is provided at the passageway 90 through the weight 70 so that there will be no binding or disturbing pressure on the rod 81 which could prevent accurate sealing engagement of the valve against the valve seat during the operation of the extinguisher. The rod 81 is also clear at all times of the weight frame which has the large opening 92 receiving the rod. When the extinguisher is turned to various angles when in use the inlet of the pipe 89 will always be close to the reservoir wall so that practically the entire contents are available in extinguishing a fire. The resistance to movement of the weight carrier 69 is reduced to a minimum by the wheels engaging on the track frame and the carrier will therefore quickly respond, as the extinguisher rotates, to keep the inlet end of the pipe 89 below the fluid surface.

When the extinguisher is not in use the nozzle valve 59 is secured firmly against its seat so that liquid cannot escape. Likewise the escape of liquid into the pump barrel is prevented by the double closure of the passageway 34 by the pump and plunger valves, as has already been explained. When it is desired to use the extinguisher the pump handle is released and the pump can be operated a number of times to compress the air into the reservoir, and then the nozzle can be opened by turning the cap 62. The accumulated pressure will then cause the extinguishing fluid to be projected in a long powerful stream from the nozzle. If desired the nozzle can be immediately opened and then the pump operated while the extinguisher is being directed to project the fluid towards the fire. After use of the extinguisher or when the reservoir becomes empty it can be recharged with fluid through the filler opening which is normally closed by a plug 93 at the top of the reservoir.

The fire extinguisher of my invention is very practical and efficient and on account of its shape and the location of the pump at the top of the reservoir, it can be more readily and accurately manipulated than the cylindrical hand fire extinguishers of the prior art. In such prior fire extinguishers the inner end of the pump structure is inside of the reservoir where it is immersed in the liquid. Such liquid is usually carbon tetrachloride which is very thin and penetrating and would therefore, in such prior structures, eventually work its way between valve surfaces and escape from the outer end of the pump barrel or plunger tube. In my improved arrangement the pump operating parts are outside of the reservoir entirely away from the liquid. There is

therefore no chance for the fluid to escape and leakage and evaporation are eliminated. The extinguisher will therefore always be in good working order and ready for instant use. The extinguisher is also constructed entirely of metal and there are no parts which could be attacked, deteriorated or destroyed by the extinguisher fluid.

I do not desire to be limited to the exact construction, arrangement and operation shown and described as changes and modifications are possible which would still come within the scope of my invention.

I claim as follows:

1. In a fire extinguisher, the combination of a reservoir having a semi-cylindrical lower end, an air pump extending horizontally at the upper end of said reservoir, a connection for conducting the pumped air into said reservoir, a circular track frame seated in said cylindrical bottom concentric therewith, a carrier frame rideable on said track frame, said carrier frame being weighted at one end whereby such end will always be at the bottom part of the reservoir when the extinguisher is rotated during use, an intake pipe carried with said weighted end, a nozzle at the front end of said air pump, and a connection between said nozzle and intake pipe for conducting fluid from said intake pipe to said nozzle.

2. In a fire extinguisher, the combination of a fluid reservoir having a semi-cylindrical lower end with its axis horizontal, an air pump at the upper end of said reservoir extending transversely thereof, a connection for conducting the pumped air into said reservoir, a track frame secured within said reservoir concentric with said semi-cylindrical bottom, a carrier extending diametrically with reference to said track frame, track rollers on said carrier for riding on said track frame whereby said carrier may revolve on the axis of said track frame, a weight at one end of said carrier, the weighted end of said carrier being always down when said reservoir is rotated during use of the extinguisher, a fluid intake at said weighted end adjacent the bottom of said reservoir as it is rotated, a nozzle on the front end of said air pump, and a connection between said nozzle and intake for the transmission of fluid.

3. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated therewith, a connection for conducting the pumped air into said reservoir, a circular track within said reservoir in the plane of said pump, a weighted carrier frame, track wheels mounting said carrier frame on said track, said carrier having an intake passageway, a nozzle on the end of said pump, and a connection between said nozzle and intake passageway, said carrier frame traveling on said track to keep said intake passageway at

the bottom of the liquid when the extinguisher is rotated to direct fluid upwardly or downwardly.

4. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated therewith, a connection for conducting the pumped air into said reservoir, an annular track in said reservoir arranged in the plane of said pump axis, a weighted carrier mounted on said track to ride thereon when the extinguisher is inclined, said carrier having an intake passageway with its outer end adjacent the reservoir walls when the extinguisher is inclined, a nozzle, and a connection for conducting fluid from said intake to said nozzle.

5. In a fire extinguisher, the combination of a fluid reservoir, a pump for pumping air, a connection for conducting the pumped air into said reservoir, an annular track within said reservoir having its axis at right angles with that of the pump, a weighted carrier, track wheels for mounting said carrier on said track, said carrier having a fluid intake passageway, a nozzle on said pump, and a connection for conducting fluid from said intake to said nozzle, said intake being carried with said carrier when said extinguisher is inclined to direct fluid upwardly or downwardly.

6. In a fire extinguisher, the combination of a reservoir, an air pump, means for conducting the pumped air into said reservoir, an annular track secured in said reservoir, a carriage mounted on said track, said carriage being weighted whereby to remain at the bottom of said track when said extinguisher is inclined, said carrier having a fluid intake passageway, a nozzle at the outer end of said pump, and a connection for conducting fluid from said intake to said nozzle.

7. In a fire extinguisher, the combination of a reservoir, an air pump associated with said reservoir, a connection for conducting the pumped air into said reservoir, a curved track in said reservoir concentric with the bottom thereof, a weighted carriage mounted on said track, said carriage having an intake passageway, a nozzle on said pump, and a connection for conducting fluid from said intake to said nozzle.

8. In a fire extinguisher, the combination of a reservoir for extinguishing fluid, an air pump associated with said reservoir, a connection for conducting the pumped air into said reservoir an annular track in said reservoir, whose axis is at right angles to that of the pump, a carriage mounted on said track, a pipe rotatably supported in the track axis, an intake extension on said pipe connected with said carriage, a nozzle at the exterior of said reservoir, and a connection between said pipe and said nozzle, fluid flowing through said intake extension and said pipe

to said nozzle, said weighted carriage keeping said intake extension near the bottom of the reservoir when the extinguisher is inclined.

5 9. In a fire extinguisher, the combination of a reservoir, an air pump associated therewith, a connection for conducting the pumped air into said reservoir, an annular track secured in said reservoir, a weighted carrier mounted on said track, said carrier remaining at the bottom of said track when said extinguisher is inclined, a bearing support in said reservoir having a passageway, a pipe extending through the center of said track and at right angles thereto, a joint connecting said pipe with said bearing support, an intake pipe extending radially from said pipe and connected with said carrier, a nozzle at the exterior of said reservoir, and a connection between said bearing support passageway and said nozzle, fluid flowing through said pipes and said passageway and connection to the nozzle, said intake pipe being swung as the carrier travels during inclination of the extinguisher to be thereby kept below the surface of the fluid in the extinguisher.

10. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated therewith, a connection between said air pump and reservoir for conducting the pumped air thereto, a circular track secured in said reservoir with its axis at right angles to that of the pump, a carrier mounted on said track, said carrier being weighted to thereby remain at the bottom of the track when the extinguisher is inclined, bearing brackets secured in said reservoir in the center line of said track, a pipe rotatably journaled in said brackets and extending through the track center, an intake pipe secured to said rotatable pipe and extending radially therefrom and connected with said carrier, one of said bearing brackets having a passageway communicating with said rotatable pipe, a nozzle on said pump, and a connection between said nozzle and bearing bracket passageway for the flow of fluid.

50 11. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated therewith, a connection for conducting the pumped air into said reservoir, a circular track secured in said reservoir, a carrier mounted on said track to travel thereon as the extinguisher is inclined, said carrier being weighted to remain at the bottom of the track when the extinguisher is inclined, a bearing bracket supported within the reservoir in the center line of said track and having a passageway, a pipe supported in said bracket to be rotatable in the center line of said track, said rotatable pipe communicating with said bracket passageway, said bracket having a coupling

surface, a coupling flange on said rotatable pipe for engaging said surface, means for yieldably pressing said coupling flange against said surface to prevent leakage, and an intake pipe extending radially from the outer end of said rotatable pipe connected with said carrier, said intake pipe being kept in vertical position by said carrier when said extinguisher is inclined, and a nozzle connected with said bracket passageway.

70 12. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated therewith, a connection for conducting the pumped air into said reservoir, a circular track in said reservoir extending along the bottom thereof, a carrier mounted to travel on said track, said carrier being weighted to remain at the bottom of the track when the extinguisher is inclined, bearing brackets extending from the opposite sides of said reservoir in line with the track center, a tubular rod journaled at its ends in said bearing brackets, one of said brackets having a chamber, an intake pipe extending from said rod and connected with said carrier, said rod having a passageway connecting said intake pipe with said bearing bracket chamber, a nozzle at the end of said pump for directing fluid, a connection between said nozzle and said chamber, and means for preventing leakage from said chamber past said rod.

13. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated with said reservoir, an air chamber at the outer end of said pump and a connection for connecting it with the interior of said reservoir whereby pumped air is forced into the reservoir to exert pressure on the fluid therein, a frame supported on the outer end of said pump, a partition dividing said frame into a fluid chamber and a nozzle chamber, a connection for conducting fluid from said reservoir to said fluid chamber, passageways in said partition, a nozzle in said nozzle chamber, said nozzle forming a valve for controlling said partition passageways, and means for adjusting said nozzle to open or close said passageways.

115 14. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated with said reservoir, an air chamber at the outer end of the pump barrel, a connection between said air chamber and the interior of said reservoir for conducting compressed air into said reservoir, a frame mounted on the outer end of said pump barrel and forming the outer closure wall of said air chamber, a partition dividing said frame into a fluid chamber and a nozzle chamber, a connection between said fluid chamber and said reservoir for the flow of fluid, said partition having passageways, a nozzle plug in said nozzle chamber hav-

ing a valve base, and means for adjusting said nozzle plug to cause its base to open or close said fluid passageways.

15. In a fire extinguisher, the combination of a fluid reservoir, an air pump associated therewith having an air chamber at the end of its barrel, a connection between said air chamber and said reservoir for conducting the pumped air into the reservoir, a frame on the end of said pump barrel forming the outer wall of said air chamber, a partition in said frame dividing it into a fluid chamber and a nozzle chamber, the fluid chamber being entirely disconnected from the air chamber, a connection between the fluid chamber and the

reservoir for the outflow of fluid, passageways in said partition, a nozzle plug in said nozzle chamber having threaded engagement therein to be axially shifted, the base of said nozzle plug forming a valve for cooperating with said partition passageways, and a head connected with said nozzle for effecting rotation thereof and thereby axial adjustment to control the flow of fluid through said passageways and said plug.

In witness whereof I hereunto subscribe my name this 3rd day of February, A. D., 1922.

WILLIAM J. FRISBIE.