G. T. PEARSONS.

FIRE EXTINGUISHER.

APPLICATION FILED SEPT. 22, 1915.

1,188,097.

Patented June 20, 1916.

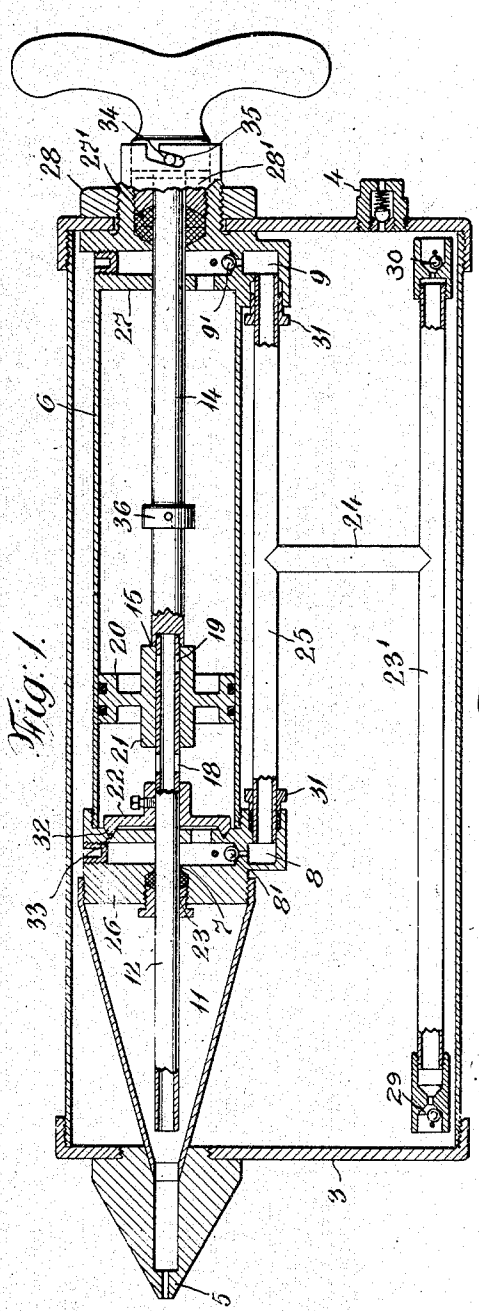


Fig. 1.

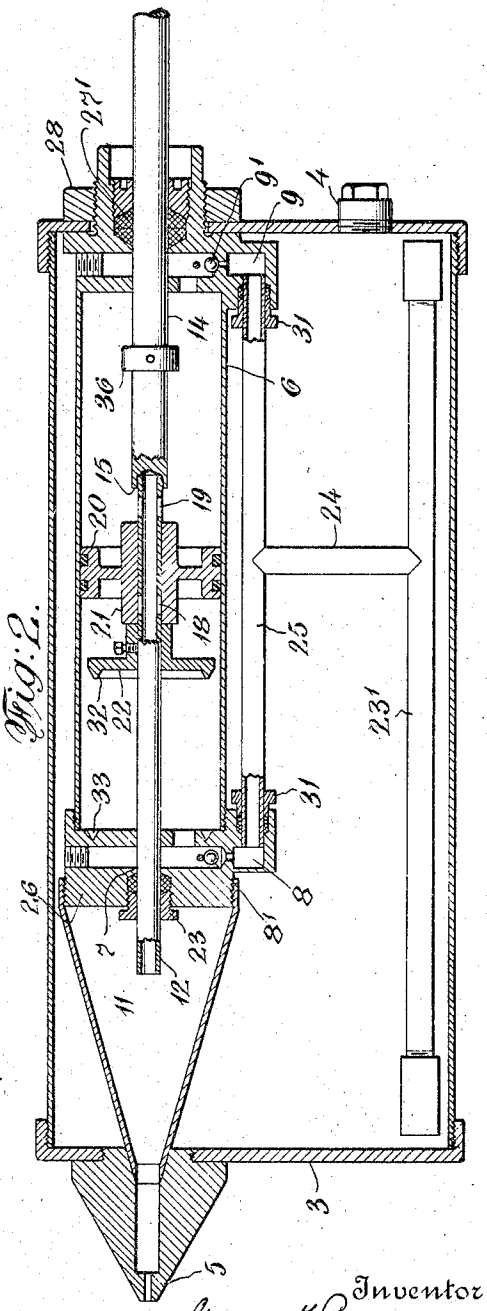


Fig. 2.

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FIRE-EXTINGUISHER.

1,188,097. Specification of Letters Patent. Patented June 20, 1916.

Application filed September 22, 1915. Serial No. 51,928.

To all whom it may concern:

Be it known that I, GEORGE T. PEARSONS, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

This invention relates to fire extinguishers of the syringe type in which a stream or jet of liquid is ejected from a reservoir during each movement of the piston, and it is the object of the invention to provide improved means to obtain this result which are simple and cheap in construction and efficient in operation.

In carrying out the invention I provide a reservoir preferably of cylindrical form having an outlet with a cylinder therein having suction inlets adjacent its ends and an outlet at one end in line with the outlet of the reservoir. A piston is reciprocable in the cylinder by means extending exterior of the cylinder and reservoir opposite to the discharge outlet, a tube reciprocable with the piston extending through the outlet of the cylinder and communicates with the outlet of the reservoir, the inner end being alternately connected with the cylinder at opposite sides of the piston by the piston during the reciprocation thereof.

A further object of the invention is to provide means whereby the liquid is drawn into the cylinder from the lowermost part of the reservoir no matter in what position the discharge outlet of the syringe may be, and to provide means to shut off access of the liquid to the cylinder when not in use thereby preventing leakage through the discharge outlet and evaporation of the contents of the reservoir.

Further objects and advantages will hereinafter appear.

In the drawings accompanying and forming a part of this specification Figure 1 is a sectional side elevation of a syringe showing an embodiment of my invention with the parts in normal position; and Fig. 2 is a similar view but showing the position of the parts as the piston commences its outward stroke.

Similar characters of reference designate like parts throughout the different views of the drawing.

The embodiment of my invention shown in the drawing consists of a tank or reservoir 3 of suitable shape, preferably cylindrical, for a fire extinguishing liquid having a discharge outlet 5 and a filler opening closed by a plug 4, said plug being constructed with an inwardly opening and outwardly closed valve to permit entrance of air to the reservoir to displace the liquid as it is ejected therefrom.

Mounted in the reservoir is a piston chamber or cylinder 6 having a discharge outlet 7 at one end in line with the outlet 5 in the reservoir and inlets 8 and 9 with inwardly opening and outwardly closing check valves 8′, 9′ adjacent opposite ends to connect the cylinder to the reservoir. The cylinder extends from the end of the reservoir opposite the outlet 5 and to a point adjacent such outlet. The outlet 7 communicates with a chamber 11 connected to the end of the cylinder, and the walls of which chamber preferably converge toward the outlet 5 of the reservoir and to which outlet it is connected. This chamber is in the nature of a compression chamber and may constitute an extension of the cylinder 6. A tube 12 slidably engages in the outlet of the cylinder, one end communicating with the chamber 11 and the opposite end extending into the cylinder connected to a rod 14 extending to the exterior of the cylinder and reservoir and has a handgrip fixed thereto. The connection of the rod and tube constitutes a shoulder 15 for a purpose to be hereinafter set forth. The end of the tube has ports 18 and 19 to connect it to the cylinder. A piston head 20 having suitable packing to seal it in the cylinder is mounted on the tube by a sleeve 21 to have a limited to and fro movement on the tube between the shoulder or abutment 15 and an abutment 22 fixed to the tube to thereby control the opening and closing of the ports 18 and 19 to alternately connect the tube with the cylinder at opposite sides of the piston at the commencement of each outward and inward stroke of the piston.

In operation, assuming the parts to be in the normal position shown in Fig. 1, as the piston rod is pulled outward the piston will be moved to the rear due to the engagement of the abutment 22 with the piston sleeve 21, the said sleeve closing the ports 18 and uncovering the ports 19. During this movement of the piston liquid will be drawn from the reservoir into the piston chamber through the inlet 8 in front of the piston,

while the air at the back of the piston will be ejected through the tube ports 19 uncovered by the piston sleeve and through the tube 12 and discharge outlet 5. As soon as the piston rod is moved forward said rod and the tube 12 will move independently of the piston head and until the sleeve engages with the abutment 15 thereby uncovering the tube ports 18 and covering ports 19 and upon further forward movement of the rod the piston will move with it sucking in liquid from the reservoir through inlet 9 to the back of the piston, the liquid previously drawn into the piston chamber in front of the piston now being forced and ejected through the uncovered tube ports 18 into the chamber 11 and out through the discharge outlet 5. As the liquid is drawn from the reservoir it is displaced by air entering through the valved port in the plug for the filler opening. To seal the tube 12 in the outlet of the piston chamber a stuffing box 23 may be provided. The diameter of the tube 12 is relatively large as compared with the area of the discharge outlet 5, and as the liquid enters into the chamber 11 through the tube due to the restriction of the outlet 5 the pressure of the liquid in said member will be greatly increased and thereby the liquid forcibly ejected from the outlet. This operation will be repeated until all of the liquid is exhausted from the reservoir.

The piston chamber is preferably so located that it will be at one side of the center of the reservoir and lie adjacent the side, and which may constitute the top of the cylinder. To permit of the drawing of the liquid from the lowermost part of the reservoir I provide a tube 23′ extending longitudinally of and with its ends adjacent the ends and sides of the reservoir. This tube is connected by a branch tube 24 with a tube 25 connected at its ends to the inlets to the piston chambers to oscillate or swing on an axis longitudinally of the reservoir. The connection of the tube 25 with the inlets 8 and 9 is such that the axis of rotation of the tube will be centrally of the reservoir, and the tube 23 connected thereto so that the ends thereof will lie adjacent the side and opposite ends of the reservoir. The valved inlets 8 and 9 are preferably in the ends 26 and 27 of cylinder as shown. The cylinder end 27 has a screw threaded projection to extend through an opening in the reservoir to which is connected a clamping nut 28 to secure said end of the cylinder in place. The said projecting portion has a threaded recess for the engagement of packing 27′ and held therein by a nut 28′ through which the rod 14 passes to constitute a stuffing box for the piston rod.

To prevent sucking of air through the ends of tube 23′ should the reservoir be partially emptied and should the syringe be held in a position with the discharge outlet 5 inclining upwardly or downwardly from the horizontal, the said ends are provided with gravity seated inwardly closing and outwardly opening check valves 29 and 30. The valve seats are so constructed and the balls are of such size that when the syringe is held in a horizontal position the suction will not draw the balls to their seats, nor will the suction when the syringe is held in a position inclined to the horizontal draw the ball at the lower end of the tube to its seat, but the ball at the upper end will seat itself by gravity. It is contemplated that in use the syringe will be held in position with the piston chamber at the top, but it will be obvious that should the syringe be held in any other position the inlet tube 23′ will assume a position in the liquid in the lowermost part of the reservoir. To connect the tube 25 with the inlets 8 and 9 the tube is made of such length that when one end is inserted into the angular portion of one of the inlets the other end will clear the other inlet and may be inserted thereinto by a longitudinal movement, the tube being held against endwise movement by releasable collars 31 on said tube.

To prevent leakage of the liquid from the tube 12 and the discharge outlet 5, as well as evaporation of the liquid, when the syringe is not in use and suspended in a position with the outlet 5 at the bottom, the abutment 22 is constructed in the form of a disk having a flange 32. This disk is of such size as to close the inlet 8 when the piston is in its lowermost position, the flange 32 engaging in an annular recess 33 in the cylinder end 26 thus precluding any possibility of leakage. Should any liquid enter through the inlet 9 to the back of the piston the liquid will be prevented from entering said tube as the tube ports 19 will be closed by the piston sleeve. To permit of the suspending of the syringe by the handgrip said handgrip has pins 34 projecting laterally and a portion is adapted to engage in the recess of the projecting portion of the cylinder end which is provided with cam slots 35 with which the pins engage. When it is desired to use the syringe and release the piston rod it is only necessary to give the rod a slight rotary movement as will be obvious. To limit the movement of the piston and rod an abutment 36 is fixed to the piston rod to limit the movement in one direction by engaging with the cylinder end 27, and limited in the opposite direction by the abutment 22 engaging with the cylinder end 26.

Having thus described my invention I claim:

1. In a syringe, the combination of a reservoir having an outlet, a cylinder therein

connected at opposite ends to the reservoir; a piston to reciprocate in the cylinder; a tube reciprocable with the piston and slidable in one end of the cylinder to connect the cylinder with the outlet; and a rod to reciprocate the piston and tube from the end of the cylinder opposite to the tube, and said piston during the reciprocation thereof alternately connecting the inner end of the tube to the cylinder at opposite sides of the piston.

2. In a syringe, the combination with a reservoir, of a cylinder therein connected at its ends to the reservoir and having an outlet in one end; a tube slidably engaging in the cylinder outlet and having ports adjacent the end within the cylinder; a piston reciprocable in the cylinder mounted on said tube to control the opening and closing of the tube ports and alternately connect the tube with the cylinder at opposite sides of the piston; and means extending exterior of the cylinder opposite to the discharge outlet to reciprocate the piston and tube.

3. In a syringe, the combination of a reservoir having an outlet; a cylinder connected at its ends to the reservoir and having an opening in one end; a chamber to connect the cylinder to the outlet; a tube slidable in the cylinder end to connect the cylinder and said chamber and having spaced apart ports at the end within the cylinder; a piston reciprocable in the cylinder slidably mounted on said tube to draw liquid from the reservoir into the cylinder and to control the opening and closing of the tube ports to connect the tubes to the cylinder at opposite ends of the piston; and a rod to reciprocate the piston and tube extending exterior of the cylinder and reservoir opposite to the outlet.

4. In a syringe, the combination of a reservoir having an outlet; a cylinder therein connected adjacent its ends with the reservoir; a tube slidable in the cylinder end to connect the cylinder with the outlet; a piston reciprocable in the cylinder to draw liquid from the reservoir into the cylinder and to alternately connect the tube with the cylinder at opposite sides of the piston; and means to reciprocate the piston and tube.

5. In a syringe, the combination of a reservoir having an outlet, a cylinder therein having suction inlets adjacent its ends and an opening in one end; a chamber to connect the cylinder with the reservoir outlet; a tube slidable in the cylinder opening to connect the cylinder with the chamber and having a series of spaced apart lateral ports at the end within the cylinder; abutments at opposite sides of the ports; a sleeve to have movement with the tube between the abutments to control the opening and closing of the ports; a piston carried by the sleeve; and a rod extending from the end of the cylinder opposite to the tube to reciprocate the piston and tube and cause the sleeve to cover and uncover the tube ports to alternately connect the tube with the cylinder at opposite ends of the piston, substantially as and for the purpose specified.

6. In a syringe, the combination of a reservoir having an outlet; a cylinder therein having suction inlets at its ends; a tube reciprocable in the cylinder to connect the cylinder with the outlet; the inner end of said tube having spaced apart lateral ports; a piston reciprocable in the cylinder with the tube and having a limited to and fro movement on the tube to control the opening and closing of the ports to alternately connect said tube with the cylinder on opposite sides of the piston; a rod extending to the exterior of the cylinder and reservoir opposite the outlet to reciprocate the piston and tube, substantially as and for the purpose specified.

7. A syringe comprising a reservoir having a discharge outlet; a cylinder having suction inlets and an outlet at one end; a piston reciprocable in the cylinder; a tube reciprocable with the piston at all times communicating at one end with the discharge outlet and having ports controlled by the piston to alternately connect the tube with the cylinder at opposite ends of the piston during the reciprocation thereof; and a handle exterior of the cylinder opposite to the discharge outlet to reciprocate the piston.

8. In a syringe, the combination of a cylinder having a discharge outlet at one end; a piston chamber connected to the outlet at one end; a piston; a piston rod to extend to the exterior of the piston chamber and cylinder opposite to the outlet; said piston chamber, piston and piston rod being located at one side of the longitudinal center of the cylinder; and a suction inlet to the piston chamber connected thereto to oscillate on an axis centrally of the cylinder and parallel with the piston chamber, substantially as and for the purpose specified.

9. In a syringe, the combination of a cylinder having a discharge outlet at one end; a piston chamber therein connected to the outlet at one end; a piston; a piston rod extending exteriorly of the piston chamber and cylinder opposite to the outlet; said piston chamber, piston and piston rod being located in the cylinder at one side of the longitudinal axis thereof; and suction inlets to the piston chamber, comprising a tube extending longitudinally of the cylinder with its ends lying adjacent the sides and at opposite ends thereof and connected to the piston chamber to oscillate on an axis centrally of the cylinder and parallel with the piston chamber, substantially as and for the purpose specified.

10. In a syringe, the combination of a piston chamber having suction intakes adjacent opposite ends; a piston to reciprocate in the chamber; a tube reciprocable with the piston and slidably engaging in one end of the piston chamber; ports in said tube the opening and closing of which ports is controlled by the piston; and a rod to reciprocate the piston and tube from the end of the piston opposite to the tube, said piston during the reciprocation thereof alternately connecting the inner end of the tube to the piston chamber at opposite sides of the piston.

GEORGE T. PEARSONS.