E. R. GILL.

FIRE EXTINGUISHER.

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1,183,185.

Patented May 16, 1916.

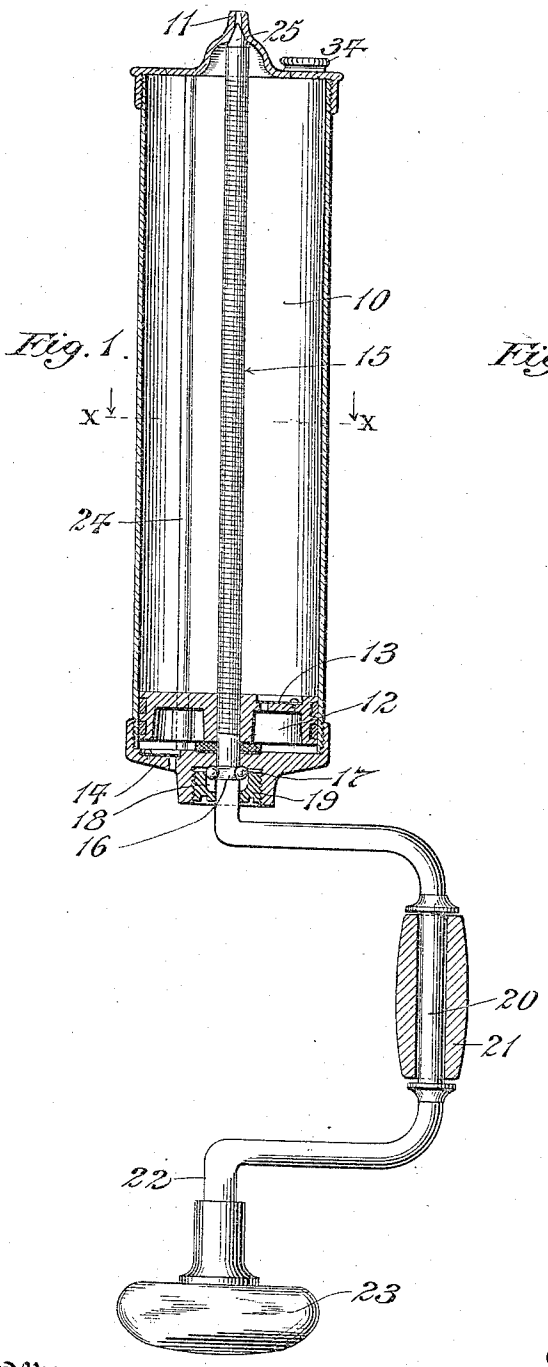


Fig. 1.

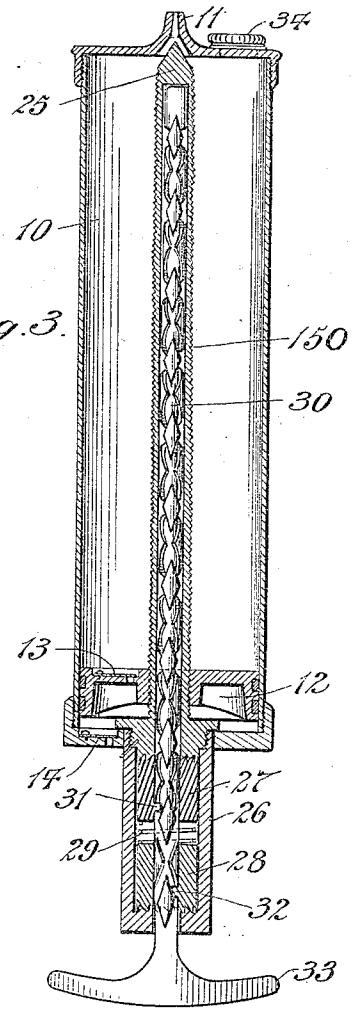


Fig. 3.

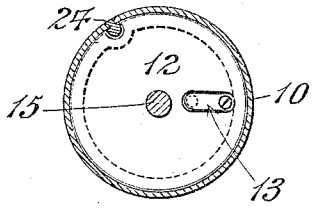


Fig. 2.

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FIRE-EXTINGUISHER.

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To all whom it may concern:

Be it known that I, EDWIN R. GILL, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Fire-Extinguishers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improved form of device for projecting liquids particularly useful as light portable fire extinguishing means of the type adapted to be placed conveniently at hand for instant use in checking incipient conflagrations. Such instruments are expected to lie dormant for long periods of time without any use, and their structure should be such as to guarantee perfect operation at any moment, in spite of such long periods of idleness. Furthermore these instruments, while light enough to be easily handled by women and children, if necessary, should be powerful enough to project a stream a considerable distance with accuracy, and it is desirable that such streams should be continuous.

The object of my present invention is to provide means of a simple and relatively inexpensive character wherein the above qualifications and advantages are united.

Certain embodiments of my invention are illustrated in the accompanying drawings, wherein—

Figure 1 is a longitudinal section of my device comprising a rotary operating means, Fig. 2 is a cross section of the same on the line x—x of Fig. 1, and Fig. 3 is a longitudinal section of a modification comprising a reciprocating operating means.

Devices of the general type to which my invention belongs comprise a container, designed to be filled with carbon tetrachlorid or other effective fluid, and means for ejecting such fluid from the container in a stream. These latter means have hitherto been expensive, complicated and subject to uncertainty of action.

In my improved device, a container, 10, is employed, preferably of substantially cylindrical shape and having at one end a discharge opening 11. Within the container there is placed a tight plunger or piston 12, extending completely across the container. With these elements, I combine a hand-operated means for producing continuous movement of the piston toward the front end of the container, whereby the fluid is forcibly ejected in a continuous stream of great velocity, owing to the small area of the opening 11 as compared with the cross section of the container.

To facilitate movements back and forth of the plunger, I supply it with an automatic valve 13, opening only forward; and at the rear or bottom of the container I place a similar valve 14, opening only inward, whereby vacuum behind the plunger is prevented. The latter valve may be omitted and clear openings substituted, if desired; but the construction shown is preferred, as it prevents spilling of any fluid which might leak around the plunger.

In Figs. 1 and 2 is shown an example of means for forcing the plunger forward. In this form a revoluble screw shaft 15 extends longitudinally of the container and within it, the same being threaded into the plunger 12, as shown, and having a suitably supported shoulder to take the thrust incidental to use. I prefer to supply an annular groove 16, receiving the surfaces of ball bearings 17, held within a suitable bearing cavity 18. This cavity is preferably extended somewhat in a longitudinal direction for a purpose explained hereinafter. For better assembling of the parts, the rear of this cavity is closed by a threaded plug 19.

The rear end of the shaft 15 is extended outward and formed into a bail-shaped crank 20, provided with a loose handle 21, and returning to a longitudinal portion 22 lying in the prolongation of the shaft axis and provided with a revoluble steadying handle 23. Where a cylindrical container is used, revolution of the plunger 12 may be prevented in a variety of ways, as for instance by an inset rib 24, fixed to the container, and entering a slot in the plunger, as shown in Fig. 2.

In using this device, the steadying handle 23 is placed against the breast, the container being held in the left hand, which directs the instrument, while with the right hand the crank 20 is turned, and the screw 15 is made to press the plunger forward, ejecting a continuous stream, as above described.

It is one very desirable feature of my preferred forms that they provide auto-

matically operated means for securely closing the discharge orifice 11 when the instrument is out of use, and for opening it when the same is to be used. For this purpose the screw shaft 15 is provided at its outer end with a plug 25 which may or may not form a part of the shaft and is adapted to tightly close the discharge opening 11 when the screw shaft is pressed forward. The abutment for the screw shaft is so arranged in any convenient manner as to permit longitudinal movement back and forth of the screw shaft and the closing plug, and in the form shown in Fig. 1, this is accomplished as heretofore stated by so forming the cavity 18 as to permit the ball bearings 17 to move backward. It will now be evident that upon turning the handle or crank 20 in such a direction as tends to thrust the plunger 12 forward, the first effect of this movement will be to cause the screw shaft 15 to move backward, since the friction of the plunger on the walls will make it act as a stationary abutment and the revolution of the screw will turn it backward or inward. This will continue until the bearings find a seat at the bottom of the cavity 18, when the immovable abutment thus afforded will prevent further movement of the screw and will force the plunger 12 to move forward in spite of friction.

It is thus evident that, on turning the crank in the proper direction, the opening 11 is automatically opened before movement of the plunger takes place and this is accomplished by movement of the plunger for ejecting the liquid.

In Fig. 3 is shown a modified form of means for causing forward movement of the plunger. In this modification, the screw shaft 150 is hollow and its external prolongation takes the form of an enlarged chamber 26 provided both at top and bottom with clutch teeth. Within the chamber 26 are two movable clutch members 27 and 28 forced apart by a suitable spring 29 between them, and adapted to engage respectively with the clutch teeth at top and bottom of the chamber 26. These teeth are of a well known character, so shaped as to allow of transmission of motion in one direction of revolution while permitting the opposed clutch teeth to ride over each other, in the opposite direction. Within the screw 150 there extends a reciprocating operating rod 30 provided with oppositely cut spiral grooves of suitable pitch as clearly shown in Fig. 3. With one of these grooves there engages a suitable pin or projection 31 at one side of the movable clutch member 27, and a similar pin 32 on the other side of the clutch member 28 engages the other spiral groove in the rod 30. A handle 33 is provided on the outer end of the rod 30 whereby said rod can be pushed in and pulled out alternately. It will be seen by inspection of Fig. 3 that the operation of this device is as follows—Assuming the position of parts shown in Fig. 3, the handle 33 being pulled out, the sides of the grooves on the rod 30 will simultaneously disengage clutch member 27 and insure firm engagement of the clutch member 28 with their respective teeth. At the same time the inclined edge of the spiral groove which engages the pin 32 will cause clockwise rotary movement of the clutch member 28. This is transmitted through the teeth of the clutch member to the chamber 26 and screw 150, causing this latter to revolve for the purpose of pushing the plunger 12 forward as already described. When the end of the outward stroke is reached the rod 30 is pushed in. The clutch member 27 instantly engages its opposed teeth while the clutch member 28 is withdrawn, and the groove on the rod 30, which engages the pin 31, causes clockwise revolution in the clutch member 27, which movement is transmitted to the screw 150 as before. It will thus be seen that a virtually continuous movement of the screw 150 and plunger 12 is produced by the inward and outward reciprocation of the rod 30.

When it is desired to fill either form of container, after the same has been discharged, it is only necessary to remove the lid 34 at the forward end after having drawn back the plunger to the position shown in the drawings, after which the liquid can be poured in through the opening which is closed by the lid 34. This being accomplished, the screw is turned sufficiently to close the aperture 11 and the device can then be laid away or stored in any desired position without danger of leakage of the contents.

It is not essential to my invention that a cylindrical container should be employed. Nor, where such a container is used, is it essential that any particular device should be added to prevent rotation of the plunger. By placing the operating screw slightly off center this tendency to turning the piston or plunger will not arise, and any slight inequality of pressure distribution which may arise will be counteracted by making the plunger sufficiently deep lengthwise of the device. For this purpose eccentricity of the driving screw may be made so slight as not to be perceptible, and therefore either Fig. 1 or Fig. 3 may be taken as illustrating a device made as last described.

Various changes may be made in this device without departing from the spirit of the invention and scope of my invention, and I do not limit myself to the details herein shown and described.

What I claim is—

1. A fire extinguisher comprising in combination an extended cylindrical container

having a restricted discharge opening on its forward end, an expelling plunger adapted to slide back and forth within said container, a revoluble screw shaft threaded onto said plunger, steadying means adapted to steady the device against the chest, and manual revolving means for the screw shaft inserted between said shaft and said steadying means, substantially as described.

2. A fire extinguisher comprising in combination a container having a discharge opening at its forward end, an expelling plunger adapted to slide back and forth within said container, a revoluble screw shaft threaded into said plunger, and a crank handle having a return bend on said shaft and adapted to revolve around the prolongation of the shaft axis and provided with a steadying knob at its extremity, substantially as described.

3. A fire extinguisher comprising in combination a container having a discharge opening at its forward end, an expelling plunger adapted to slide back and forth within said container, a longitudinally disposed screw shaft threaded into said plunger and having a groove for ball bearings, a bearing having a longitudinally elongated cavity, balls within said cavity fitting said slot in the shaft, means outside of the container for revolving said shaft, and a plug on said shaft for closing said discharge opening, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

EDWIN R. GILL.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."