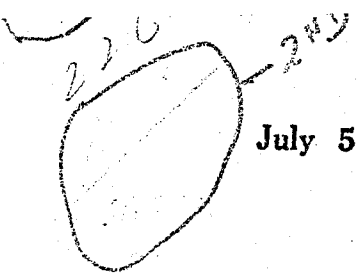


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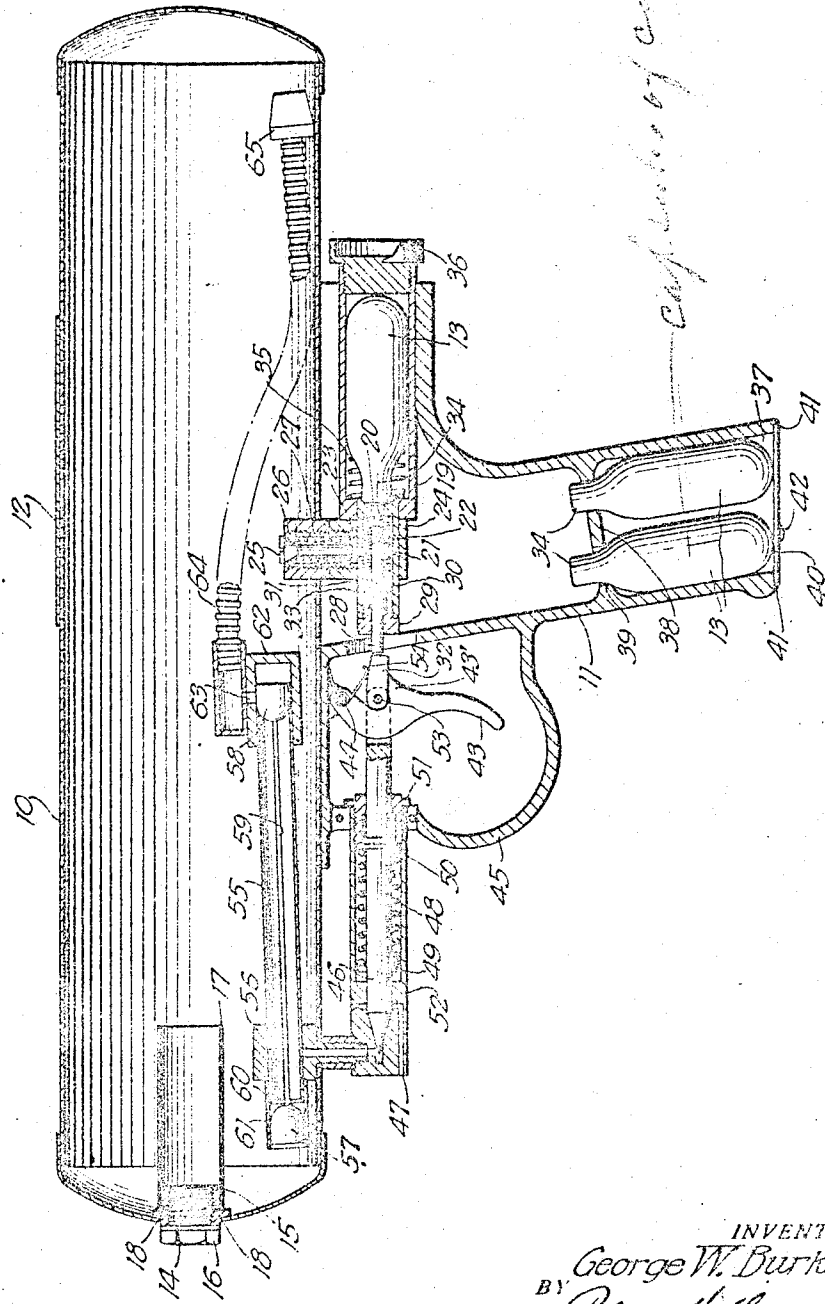


July 5, 1927.

G. W. BURKE, JR
FIRE EXTINGUISHER
Filed Jan. 25, 1924

1,634,976

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UNITED STATES PATENT OFFICE.

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BATTLE-FYRE COMPANY.

FIRE EXTINGUISHER.

Application filed January 25, 1924. Serial No. 688,480.

This invention relates to fire extinguishers of the pistol type, designed and intended particularly for use on aircraft, but of course capable of use generally, wherever it is desirable or necessary that the user be able to operate the same with one hand as in the case of the aviator who must control the plane while fighting a fire.

The present invention has reference to improvements in details in the type of extinguisher shown in Burke application, Ser. #593,034, filed October 7, 1922, whereby a fool-proof, positive and quick-acting device of the character mentioned is provided.

Among other things, the invention provides a fire extinguisher operating with pressure provided by compressed gas cartridges, special means being provided to facilitate the insertion and removal of the cartridges, the storage of reserve cartridges on the device where they will be available at once, improved means for facilitating proper filling of extinguishing fluid in the container, and improved means for feeding the fluid to the discharge opening under pressure to give a steady stream to play upon the fire.

The above and other objects of the invention will be made to appear more clearly as the following detailed description advances, in which reference is made to the accompanying drawing illustrating in longitudinal section the invention.

The extinguisher comprises a container, preferably, although not necessarily, cylindrical in form, and of dimensions to contain a sufficient quantity of extinguishing fluid to comply with underwriter's requirements in the particular field in which the device is to be used. In the present instance where the device is to be operated on airplanes, the container is large enough to hold one quart. A pistol grip 11 extends from the container between the ends thereof and has a band 12 passing about the container. The location of the grip is such that the device is evenly balanced, and can be aimed steadily and without appreciable effort when held with one hand. The container is filled with a suitable extinguishing fluid as for example, carbon tetrachloride, although I contemplate the use of the device operating with water. Where water is used, a very effective extinguishing fluid is provided when the water is carbonated by CO₂ gas from the cartridge 13. The car-

tridge 13 is of metal and filled with compressed gas and has a rupturable cap in the tip thereof to allow the gas to escape when it is to be used. The cartridge in this case provides the pressure fluid for the dual purpose of expelling the extinguishing fluid, in this case water, and going into solution in the water to give the same combustion-retarding or smothering properties.

The container is filled through an opening 14 in one end, the opening being provided in a bushing 15 internally screw-threaded to receive a plug 16. The bushing supports a tube 17 extending inwardly a predetermined distance from the opening 14 so that when the container is filled up to the level of the lower end of the tube 17, it being understood that in filling, the device is held with the container vertical and the refill opening on top, there is afforded an expansion chamber of proper dimensions in the container to insure the proper operation of the device when the compressed gas from the cartridge is admitted. The tube 17 therefore serves as a well or sight tube.

It is contemplated, and in accordance with underwriter's requirements, to refill the gun after each use thereof and to equip the same with a new cartridge. It has been found that a cartridge affords so much pressure ordinarily that even after all of the extinguishing fluid has been expelled, there is a certain amount of residual pressure. To avoid the likelihood of injury by a fine spray of extinguishing fluid being thrown into the eyes of the operator or an observer, when relieving this pressure in the container preparatory to refilling it, a pair of bleeder holes 18 are provided communicating between the refill opening 14 and the expansion chamber above the bottom of the tube 17. When the plug 16 is given a few turns toward removing it, the pressure leaks by the threads gradually and by the time the plug is removed entirely, there is practically no pressure remaining in the container. This provision is important not so much where the container is empty as where there remains a certain amount of extinguishing fluid, since in the latter case, if the plug were removed without dissipating the pressure, there would be a discharge of extinguishing fluid which would almost certainly result in injury. It is of course necessary to remove the plug to refill the container and this may be safely

done after the pressure in the container has been relieved in the manner described.

The compressed gas cartridge 13 is contained within a breech socket 19 in back of the pistol grip 11 directly beneath the container 10. This socket communicates through an opening 20 in a hollow guide 21 and through a second opening 22 in the guide 21 with a chamber 23 in a fitting 24 having a part connected thereto and sealed in the container wall. A valve 25 controls communication between the socket 19 and the inside of the container 10. The valve 25 seats outwardly in the end of a hollow plug 26 under the tension of a spring 27 acting against a spider fixed to the inner end of the stem of the valve 25, the spider being guided in the tubular bore of the plug 26, as shown. The guide 21 is open at the front to admit a firing pin 28 and has a plug 29 threading therein, in which the pin 28 is arranged to move. A disk 30 rigid on the pin 28 has a compression spring 31 bearing against it and the inner end of the guide 21 about the opening 20 normally to hold the pin 28 out so that the outer end thereof projects a substantial distance through the plug 29 for engagement by a small dog 32. The plug 29 is hollow to receive packing material, as shown, the packing being held by a gland 33 against which the disc 30 abuts normally. In this way, it is insured there will be no leakage of the compressed gas when the rupturable cap in the tip of the cartridge 13 is punctured by the pointed end of the pin 28.

The cartridges 13, it will be noted, have reduced necks 34 which are embraced by a coiled compression spring 35 inside the socket 19 when the cartridge is inserted in the socket and the plug 36 threaded to back up the cartridge and seal the socket against leakage of pressure. The spring 35 is compressed upon the inward movement of the cartridge so that when the plug 36 is removed, when it becomes necessary to replace the used cartridge with a new cartridge, the old cartridge is expelled and there is no difficulty as would otherwise be the case, to extract the cartridge. Reserve cartridges are conveniently carried in the hollow pistol grip 11 in a socket 37 opening from the bottom of the grip. A web 38 inside the grip has openings 39 to receive the necks 34 of two or more cartridges. A slide 40 held in under-cut grooves 41 in the bottom of the grip 11 is provided to retain the cartridges. A raised portion 42 on the slide 40 provides a thumb grip to move the slide into and out of place.

The cartridge 13 in the breech socket 19 is punctured at the time the extinguisher is to be used in putting out a fire by the pulling of a trigger 43 pivoted at 44 in the grip 11. For safety a guard 45 is provided

extending around the trigger so that nothing can engage the same and accidentally cause the actuation thereof. The trigger operates in the forked end of a metering pin or valve 46 which controls the discharge of extinguishing fluid from the nozzle 47 under the forward end of the container 10. The pin 46 is normally held closed by a spring 48 acting between a cross pin 49 on the pin 46 and a gland 50 in front of the plug 51 threaded into the open rear end of the nozzle casing 52. The pin 46 is packed at the gland 50 by packing material held in a hollow portion of the plug 51. In pulling the trigger, the dog 32 which is pivoted at 53, in the end of the pin 46 is forced against the protruding end of the firing pin 28, thereby puncturing the cap in the tip of the cartridge 13 in the socket 19. The dog 32 is normally held in the position shown by a spring 54 and is arranged at the limit of depression of the trigger to be moved off the end of the pin 28 by a projection 43' on the trigger to allow the pin 28 to be expelled to its protruding position shown, where it permits the free egress of the compressed gas from the cartridge to the container.

The nozzle 47 communicates through a series of ducts and passages shown with a feed pipe 55 inside the container 10, supported at its forward end in a fitting 56 in the wall of the container connected with the nozzle casing 52. The tube 55 is open at both ends and has spherically faced valves 57 and 58 for controlling the ends thereof. These valves are connected by a rod 59 extending lengthwise of the tube to close one valve when opening the other, and vice versa. The valve 57 slides in a tube 60 held on the projecting end of the pipe 55 and having ports 61 in the wall thereof to admit extinguishing fluid to by-pass the valve when the valve is open to flow into the pipe 55 and from thence to the nozzle 47. The valve 58 slides in a cylindrical bore in a coupling 62 on the rear end of pipe 55. It controls the admission of fluid to the pipe 55 through a port 63 communicating with a flexible metallic hose 64 on the coupling 62. The free end of the hose 64 is open and arranged to have universal movement about the coupling inside the container, and has a weight 65 thereon to insure the movement of the free end of the tube to the lowest elevation, no matter in what position the container may be held in operation. The feed pipe 55, it has been found, functions best mounted inclined to the lower wall of the container 10 with the rear end thereof at a higher elevation than the forward end. This is due to the fact that the interconnected valves 57 and 58 slide from open to closed position and the device is ordinarily held horizontal or nearly so in sighting along the barrel container so that the valves would otherwise

flutter if not tending to assume a normal position with the valve 57 open. Fluttering of the valves seriously affects the efficient operation as it permits leakage of pressure and the extinguishing fluid is forced out in slugs and not in a continuous stream.

The operation of the device is necessarily apparent from the foregoing description since all of the details have been described more or less in relation to the use of the device. It is understood that the device is carried on the wall of the fuselage ordinarily on the outside in a suitable holder where it is within convenient reach of the aviator to be removed and used in the event the plane takes fire in flight. The device is so constructed and proportioned that the aviator may readily operate the same with one hand while controlling the plane with the other. Since the device is capable of sending a stream with ease to the farthest portions of the plane, a fire starting anywhere may be readily taken care of by the pilot while in flight, and it is not necessary that more than one extinguisher be provided on a ship on account of a likelihood that the amount of fluid in one would not be sufficient to cope with a fire. It is contemplated to refill the extinguisher with extinguishing fluid after it has been used and to replace the used cartridge. For this purpose, it is convenient to carry a reserve supply of cartridges on the device as in the pistol grip where they will be readily available. In the event other extinguishing fluid is not available, the device may very readily be filled with water and will function quite satisfactorily particularly if the cartridges used contain compressed CO₂.

I claim:

1. In a pistol type fire extinguisher, a barrel-like container for extinguishing fluid under pressure, a controlled outlet at the forward end of said container, a feed pipe extending longitudinally within said container and communicating with said outlet at its front end and having its rear end spaced farther from the wall of the container than the front end, said pipe having a front intake and a rear intake port, interconnected valves controlling said intake ports, and a universally movable intake tube for the rear intake port of said feed pipe.

2. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip supporting said container, a trigger mechanism in front of said pistol grip, a breech socket having a removable plug, and a cartridge to be received in said socket containing compressed gas for expelling the extinguishing fluid from said container upon the operation of said trigger mechanism.

3. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip supporting said container, a trig-

ger mechanism in front of said pistol grip, a breech socket having a removable plug, a cartridge to be received in said socket containing compressed gas for expelling the extinguishing fluid from said container upon the operation of said trigger mechanism, and a socket in said pistol grip for receiving a reserve cartridge of compressed gas.

4. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip supporting said container having a trigger mechanism in front thereof, a nozzle communicating with said container in front of said trigger mechanism, a valve controlling said nozzle connected with said trigger mechanism to be opened upon the depression of the latter, a breech socket behind said trigger mechanism communicating with said container, and a rupturable compressed gas cartridge in said socket to be punctured upon the depression of said trigger mechanism to admit the compressed gas to said container to expel the extinguishing fluid therefrom through said nozzle.

5. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip supporting said container having a trigger mechanism in front thereof, a nozzle communicating with said container in front of said trigger mechanism, a valve controlling said nozzle connected with said trigger mechanism to be opened upon depression of the latter, a breech socket behind said trigger mechanism communicating with said container, a rupturable compressed gas cartridge in said socket to be punctured upon depression of said trigger mechanism to admit the compressed gas to said container to expel the extinguishing fluid therefrom through said nozzle, and a socket in the bottom of said pistol grip having a removal closure for receiving a reserve supply of cartridges.

6. In a fire extinguisher, a container for extinguishing fluid, a pistol grip on the underside of said container, a trigger in front of said grip, a nozzle at the front end of said container having a valve connected to said trigger to be opened upon the depression of the latter, a cartridge socket behind said trigger having a firing pin to be fired upon the depression of said trigger to release the pressure contained within a cartridge in said socket to expel the fluid from said container, and a member operated by said trigger to engage said firing pin in the course of the depression of said trigger to fire the cartridge but movable off the pin after the firing of the cartridge while the trigger remains depressed.

7. In a pistol type fire extinguisher having a barrel containing extinguishing fluid, a pistol grip holder therefor extending laterally from the side of the container, means including a replaceable compressed gas

cartridge for discharging the fluid from said container under pressure, and means controlled by the hand which holds the grip while holding said grip and directing the extinguisher for firing the cartridge and controlling the discharge from said barrel.

8. In a piston type fire extinguisher, a barrel containing extinguishing fluid, means including a replaceable compressed gas cartridge for discharging the fluid from said container under pressure, and a pistol grip holder for said container, said pistol grip having a storage chamber therein for the reception of reserve cartridges.

9. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip therefor, a discharge nozzle toward the forward end of said barrel in front of said pistol grip, a cartridge arranged to discharge into said container to supply the pressure for expelling the fluid therefrom, a trigger in front of said pistol grip, a valve extending forwardly from the trigger for controlling the discharge from said nozzle, spring means normally holding said valve closed and said trigger cocked, and a firing pin operated by the pulling of said trigger to discharge said cartridge into said container.

10. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip therefor, a discharge nozzle for the forward end of said barrel in front of said pistol grip, a trigger in front of said pistol grip, a valve extending forwardly from said trigger for controlling the discharge from said nozzle, spring means normally holding said valve closed with the trigger cocked, a cartridge arranged to discharge into said container and supply the pressure for expelling the extinguishing fluid therefrom through said nozzle, a firing pin for said cartridge, spring means normally holding the same away from said cartridge toward the back of said trigger, and means on the trigger for engaging said pin to fire said cartridge, while at the same time opening said valve to permit the dis-

charge of extinguishing fluid from said nozzle.

11. In a pistol type fire extinguisher, a barrel container for extinguishing fluid, a pistol grip therefor, a discharge nozzle toward the forward end of said container in front of said pistol grip, a trigger in front of said pistol grip, a valve connected therewith and extending forwardly to said discharge nozzle to control the discharge of extinguishing fluid therefrom, spring means normally holding said valve closed with the trigger in cocked position, a cartridge mounted behind the trigger and arranged to discharge into said container to supply the pressure for expelling the extinguishing fluid therefrom through said nozzle, a firing pin for said cartridge, spring means normally holding the same away from said cartridge toward the back of said trigger, and a member on said trigger normally engaging the end of said firing pin arranged to depress the same when the trigger is pulled but to ride off at one point of the stroke of the trigger to permit the pin to recede from said cartridge under the action of its spring means.

12. In a fire extinguisher, a portable barrel like container for extinguishing fluid under pressure, a fitting in the wall of the container having a controlled outlet therefor, a feed pipe connected to said fitting and extending from a point at one end of the container close to the wall thereof to a point at substantially the center of the container and farther away from the wall than said first named point, an intake port at each end of the feed pipe, interconnected valves to close one of the intake ports while the other port remains open, and a flexible tube connected at one end to the intake port which is at substantially the center of the container, and having a weighted free end capable of moving universally about to always assume the lowest level in the container.

In testimony whereof I affix my signature.

GEORGE W. BURKE, JR.