

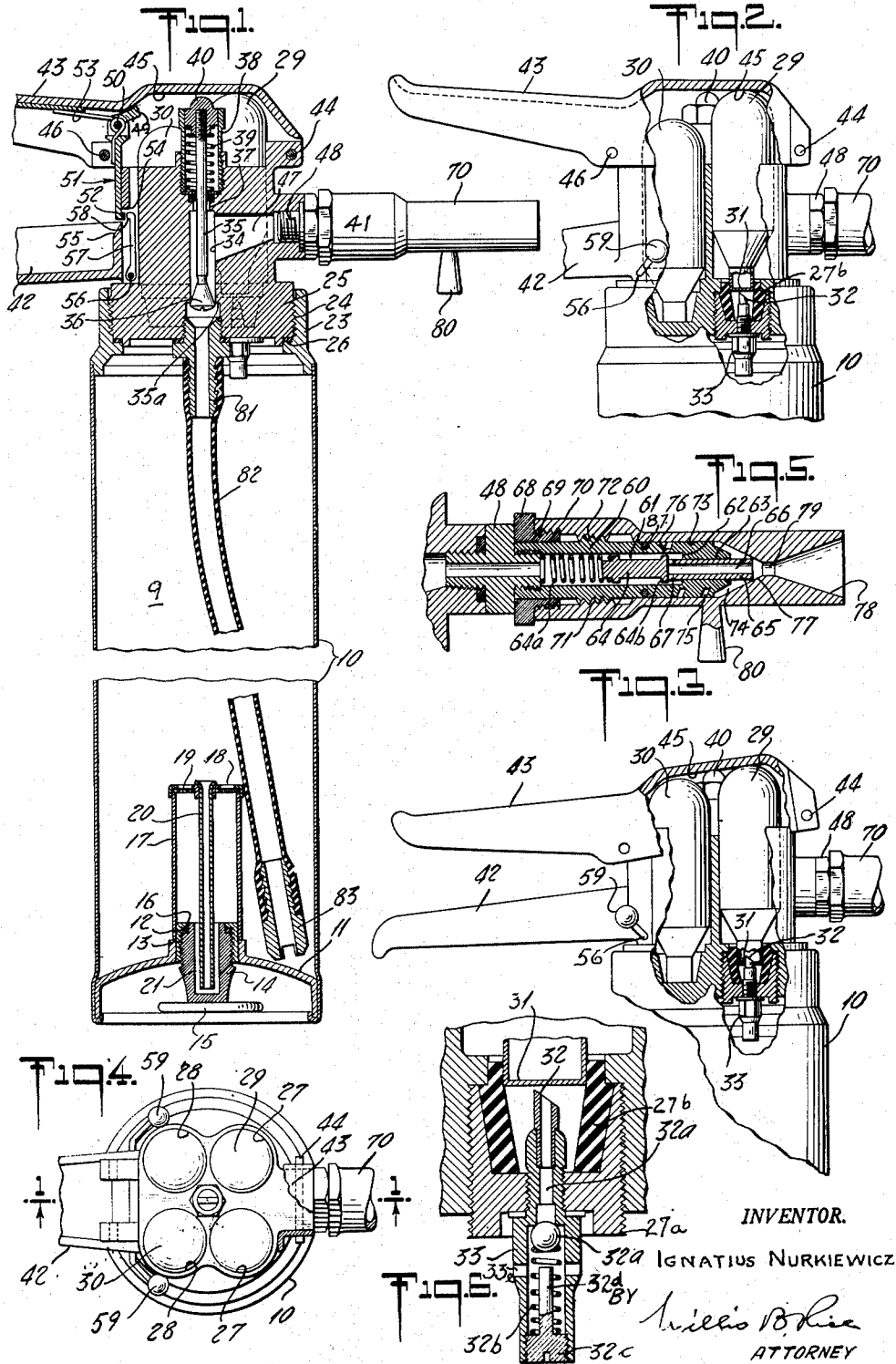
Dec. 12, 1950

I. NURKIEWICZ

2,533,685

FIRE EXTINGUISHER

Filed June 9, 1949



## UNITED STATES PATENT OFFICE

2,533,685

## FIRE EXTINGUISHER

Ignatius Nurkiewicz, Brooklyn, N. Y., assignor to  
Stop-Fire, Inc., Brooklyn, N. Y., a corporation  
of New York

Application June 9, 1949, Serial No. 97,997

8 Claims. (Cl. 169—31)

1

This invention relates to fire extinguishers and more particularly to that type of extinguisher in which an extinguishing medium such as carbon tetrachloride, chlorobromomethane, or a dry powder or a water antifreeze solution may be projected upon a flame by a gas pressure.

It is an object of this invention to provide a new and improved device of the character described in which the gas propellant is derived from a cartridge which may be pierced and admitted into the device at the time of use.

It is a further object of this invention to provide a device of the character described which may be brought into use instantly when required, but which may remain ready for use for long periods without exhaustion.

It is a further object to provide a device in which fresh cartridges of gas may be inserted without delay whenever required, so that used cartridges may be rejected and replaced without loss of time or effort, so that a number of cartridges can be used successively in substantially continuous action.

It is a further object to provide a device which will be locked against accidental operation at the wrong time, and which nevertheless can be simply and readily brought into action.

It is a further object to provide a device adapted to release gas under pressure into the cylinder, from a cartridge which will nevertheless prevent the cartridge from being blown from the device when it is pierced.

It is a further object to provide a device which will release gas under pressure into the cylinder through a check valve which nevertheless will prevent damage to the valve from the heavy pressure.

It is a further object to provide a device having a container for the fire extinguishing compound which can readily be filled without loss of time or liquid, and which will permit the air to pass out as the liquid runs in, without bubbling over.

It is a further object to provide a device of the character described which will operate in any position.

It is a further object to provide an extinguisher of the character described in which the gas content is confined within sealed cartridges; and in which the operation of a single lever will first puncture the cartridge and permit the discharge of the gas into the extinguisher shell and will thereupon open a discharge valve to permit the contents of the container to be discharged upon the fire, all by a single continuous operation.

It is a further object of this invention to pro-

2

vide an extinguisher of the pressure operated type which is capable of projecting either a dispersed spray or a concentrated jet or both at the will of the operator.

The invention accordingly comprises a device possessing the features, properties and the relation of elements which will be exemplified in the device hereinafter described and the scope of the application of which will be indicated in the claims.

This invention comprises primarily a container for the fire extinguishing medium; a cartridge adapted to be pierced by a pin to admit gas to the interior, the container being provided with a discharge orifice from which the contents may be expelled either as a fine spray or as a solid stream. An operating lever serving also as a handle serves as the means for pressing the cartridge on to the pin and also to open a valve controlling the discharge.

It is, of course, unimportant to the broad aspects of the invention how the cartridges lie within the device or what the exact form of the operating lever may be, so long as the cartridges are so held as to be replaced with maximum ease and so long as the lever by its single operation may substantially simultaneously pierce the cartridge and open the valve.

I have found, however, that many advantages come from the specific construction herein described, which affords the maximum of convenience and speed of operation, which are of such importance in its use.

The preferred form of the device, therefore, is shown and described as follows:

Fig. 1 is a cross section of an extinguisher embodying this invention on the center line as shown at 1—1 of Fig. 4.

Figs. 2 and 3 are fragmentary views of the upper portion of the device being broken away along the center line of the gas cartridges on one side of the device, Fig. 2 showing the device in the static condition and Fig. 3 in actual operation.

Fig. 4 is a top plan view with the lever open. Fig. 5 is a section through the spray nozzle. Fig. 6 is a section through the piercing pin and check valve.

In the drawings, the numeral 9 represents a container comprising a shell 10, closed at the bottom by a concave or dished base 11 carrying a central bushing 12, having a threaded filling opening 13 to receive a threaded filling plug 14 having a rotatable handle 15. As will be seen, the plug 14 and the handle 15 are wholly contained within the cavity of the dished head 11, so that the shell may rest upon its end without

interference by the handle 15. This also greatly facilitates filling the device. The plug 14 bears against a gasket 16 within the bushing to effect a tight closure of the device.

An overflow tube 17 attached to the bushing 12 extends inwardly into the shell, carrying at its inner end a frame 18 which retains a screen 19 in place. Attached to the holder 18 and extending downwardly and out through the opening 13 is an air vent tube 20, which extends beyond the opening 13 into a recess 21 in the plug 14.

The upper end of the shell fits tight upon and is brazed to a top bushing 23 having a threaded opening 24 into which is screwed a head 25. A gasket 26 is employed to provide a tight joint. The head 25, as shown, is provided with four vertical cavities 27—27 and 28—28, each of a size and shape to receive a cartridge 29 or 30. Each of these cartridges is of the standard commercial type for containing gases, such as CO<sub>2</sub> or N<sub>2</sub> under heavy pressure, having in one end a closing disc 31 by which the gas is confined in place. This disc is sufficiently thin and soft so that it may readily be punctured by a pin to release the gas.

The cavities 28 are for storage only of extra cartridges. They are, therefore, of sufficient depth so that the cartridges may rest in them without being engaged by the operating lever which will be described.

The cavities 27, however, are open at the bottom to the interior of the container, the opening being threaded to receive a bushing 27a, which in turn has a central opening to receive a bushing 33. The bushing 27a has a tapered recess in its upper end to receive a plastic gasket 27b which surrounds and supports the mouth of the cartridge 29, as shown in Fig. 6. This gasket will, nevertheless, permit the cartridge to be forced down by pressure sufficient to puncture the sealing disc 31.

The bushing 33 is hollow throughout its length. At its upper end it supports a pointed hollow piercing pin 32 just below the normal position of the disc 31.

The lower end of the bushing provides a valve chamber and valve seat against which a ball valve 32a is pressed by a spring 32b. The spring is held in place by a screw 32c having a stem 32d extending up through the center of the spring. This stem prevents the ball 32a from compressing spring 32b too far so as to distort it.

Lateral openings 32e give access to the interior of the container from the cartridge when the latter is pierced.

The head is also provided with a central bore 34 constituting a valve chamber containing a vertically sliding valve 35 carrying a valve head 36 which cooperates with a shoulder 35a in the bore serving as a valve seat. This valve 35 controls egress of the fire fighting medium up into the bore 34, into a communicating lateral passage 47 into which is screwed a nipple 48 which carries the discharge nozzle 41.

The valve stem of valve 35 extends up through an opening or bearing 37 in the head and extends upwardly through a cup bushing 38 in the head. A spring 39 within this bushing is compressed between the bottom of the bushing and a button 40 on top of the valve stem to hold the valve in closed position until the button is depressed.

The device is operated by a pair of handles 42 and 43 extending out from the side opposite the

nozzle 41. The handles 42 and 43 are adapted to be gripped by the hand and pressed toward each other to hold and operate the machine. The handle 43 is designed to retain the extra cartridges in place, and, when operated, simultaneously to open the discharge valve 35 and move the cartridge 29 against the pin 32 to cause it to be pierced; it is, therefore, pivoted at 44 on the far side of the head from the handle 42 and extends over the head at which point it is box like in shape, as shown at 45, to enclose all the cartridges and the button 40 of the discharge valve. The handle 43 is normally held in neutral position by a locking pin 46. In this position the upper face of the interior of box 45 is in light engagement with the cartridges 29 in cavities 27, but spaced considerably from those in cavities 28, while it is spaced only slightly from button 40 so as to start the piercing only just before the outlet valve is opened.

A safety trigger is provided to prevent the premature piercing of the cartridges until the device is to be operated and to prevent the cartridges from blowing the operating handle 43 upwardly, blowing the cartridge from the machine. To this end, there is pivoted to the underside of handle 43 at 50 a downwardly extending latch 51 pressed inwardly by a spring 53 and having its lower end turned in, as shown at 52. This latch is provided with a projection 49 which bears against the handle 43 and limits the inward movement of the latch 51 as the handle 43 is opened to replace the cartridges. This inwardly turned end 52 rests in a groove 54 in the head, in which position the handle 43 cannot be moved upward and similarly it cannot be moved downward unless the end 52 is moved outwardly beyond a stop 55.

For the purpose of releasing the machine for operation or for opening, there is pivoted in the head a shaft 56, carrying a dog 57 having at its upper end an outwardly bent end 58 and having at the end of the shaft an operating handle 59 in position to be engaged by the thumb. This end 58 of the dog 57 is in position to engage the end 52 of the latch 51 when the lever 43 is in neutral position and the latch in locking position. As soon, however, as the handle 59 is manipulated, the dog 57 may be caused to push the latch out of locking position and permit the operation of the machine.

The spray nozzle heretofore designated generally as 41 comprises a cylindrical body 60 screwed upon nipple 48. This body has a coaxial bore 61 terminating in a shoulder 62 beyond which is a smaller concentric bore 63. Within these bores there is slidably mounted a valve pin 64 having a solid portion within the bore 60 and a tubular portion 65 within bore 63 having a bore 66. The solid portion is provided with a flange at each end, one of which is engaged by the spring 64a and the other 64b serving to engage shoulder 62 to stop the movement of the valve pin under the influence of the spring 64a when it is otherwise free to move.

The flanges upon the solid portion are spaced from the walls of bore 61, so that the medium can flow past them, and the bore 66 has at its inner end radial inlets 67 through its side walls. This tubular portion slides tightly enough in the bore 63, so that when the flange 64b contacts the shoulder 62 these inlets 67 are closed.

The operation of the valve is controlled by an adjusting head which has internal bearings slidable and rotatable upon the surface of body 60. This head comprises a nut 68, having a

threaded nipple 69 onto which is screwed a sleeve 70. The bearings for this head are in the nut 68 and at 73 within the sleeve. Between these bearings, there are provided upon the body and upon the interior of the sleeve coarse mating threads 71 and 72, so that as the head is rotated it will also move axially.

The walls of the bore 61 are pierced by outlet openings 76, each of which communicates with a spiral groove 75 cut in the outer face of the body, from the opening to the end of the body, forming with the shell spiral channels, so that any fluid issuing through the openings 76 will be discharged at the end of the body in a tangential direction into a whirling chamber 74.

Beyond the end of the body, the interior surface of the shell 77 is contracted conically to a central orifice 79 and beyond this it is again expanded conically as shown at 78, thus furnishing between the end of the body 60 and the contracting portion 77 a whirling chamber 74, in which any medium delivered to it from channels 75 may whirl around the axis and be discharged through orifice 79 while rapidly rotating. An annular washer 81 is fitted within a groove in the body and bears against the interior of the shell to avoid leakage.

A handle 80 extends radially from shell 70 to facilitate rotation of the head.

With this construction, when the head is screwed up tight against flange 48, the conical surface 77 engages the end of valve pin 64 thereby shutting off communication between the whirling chamber and orifice 79, and at the same time pressing orifices 67 back out into the bore 61, permitting liquid to flow from the bore 61 out of the nozzle as a solid stream through bore 66 and orifice 79, which may be made slightly larger than bore 66.

As, however, the head is screwed outwardly, the valve pin, released by the outward movement of conical surface 77, is pushed out of bore 63 by spring 64a until orifices 67 are closed. Thereupon further movement of the valve pin is stopped by the flange 64b, and a passageway is opened between the end of the valve pin and the conical surface 77, permitting fluid to pass out of the nozzle from the whirling chamber. This fluid, because of its high speed rotation, clings to the conical walls 78 and is discharged as a conical spray.

In order to permit the extinguisher to operate in any position, there is screwed into the bottom of bore 34 a nipple 81 to which is attached a flexible tube 82 having at its lower end a weight 83, adapted to fall to the lowest part of the container as the latter is tilted to different positions.

With the above construction it will be clear that so long as the locking pin 46 is in place, all four of the cartridges will remain unpierced and will retain their gas supply, while the shell itself is free from strain due to gas pressure.

When the device is intended for use, the pin 46 is removed and handle 59 is tripped, whereupon the handles 42 and 43 are squeezed. The first effect of this squeezing is to force the cartridge 29 down on to its piercing pin 32, filling the shell with gas pressure from both cartridges. After, but almost immediately thereafter, the valve 36 is opened to emit the discharge of the contents of the shell through the discharge nozzle. It may be discharged as a solid stream if the source of the fire is not readily accessible, or as a smothering spray if it be near at hand, de-

pendent upon the position of the adjusting head of the nozzle.

The device may now be used until the gas from the two cartridges is completely exhausted, whereupon the handle 43 may be thrown back upon its pivot and the two cartridges 29 discarded and the two refill cartridges 30 placed in the recesses 27, whereupon the operation is ready for repetition. When the supply of medium in the container is exhausted, it may be readily replaced, the dished bottom serving as a funnel.

With this construction it will be clear that if the shell is filled with liquid or powder, the gas pressure derived from the cartridges will force this liquid or powder up through the hose 82 and out through the nozzle, mingled with some of the gas. Furthermore, since the gas is under heavy pressure, the tube contents will be projected on to the fire with great force.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

I claim:

1. A fire extinguisher comprising a cylindrical container, a head for closing one end of said container having a plurality of bores therein parallel to the axis of the container, one of said bores comprising a valve chamber communicating with the interior of the container and with an outlet opening in the side of the head, a spring pressed valve within said valve chamber having an operating button, a pair of operating handles extending laterally from said head on the side opposite the outlet opening, one of said handles being rigid with said head and the other extending over said head and being pivoted to said head on the side having said outlet opening, and being positioned to engage said button to depress said valve when said pivoted lever is moved toward said fixed lever, another of said bores comprising a cartridge bore having at its lower end a piercing pin having a central hole therein communicating by a passage with the interior of the container, said last named bore being of a size and shape to receive a gas cartridge of the type adapted to carry gas under pressure and to release the same when punctured, said cartridge bore being adapted to support such a cartridge in position to be forced against said puncturing pin just before the pivoted handle is moved enough to open said valve whereby the cartridge is punctured just before the valve is opened.

2. A device in accordance with claim 1 in which the point of engagement of said pivoted handle with said cartridge is closer to the handle pivot than the point of engagement of said handle with said button.

3. A device according to claim 1 having two of said cartridge bores positioned to have the container cartridges pierced simultaneously, and having a pair of said bores closed at their lower ends to receive idle cartridges held in place by said pivoted handle but not in position to be punctured.

7

4. A device according to claim 1 having a check valve in the passage from said piercing pin, to pass gas from a cartridge into said container but not out from it.

5. A device according to claim 1, in which the passage from said piercing pin includes a flexible tube extending downward to the bottom of said container.

6. A device according to claim 1 in which the end of said container opposite said head is dished inwardly and is provided with a central screw threaded opening, a cylindrical overflow tube extending inwardly from the periphery of said opening, an air vent tube supported from said overflow tube and extending from the inner end thereof out beyond the screw threaded opening and a filling plug for closing said opening, having a recess to receive the end of said overflow tube.

7. A device according to claim 1, in which the cartridge bore has at its lower end an annular gasket adapted to embrace the cartridge tight enough to make a tight joint, and yet to permit the cartridge to be forced through the gasket to be pierced by the pin.

8. A device of the character described comprising in combination, a shell, a head at one end of said shell for closing the same, having a handle pivoted to one side of it and extending over it, said head having a discharge opening in one side thereof communicating with the interior of the

8

shell by a passage, a valve within said passage having a head engageable by said handle, a bore within said head to support a gas cartridge in position to be engaged by said handle, a pin at the bottom of said bore, the parts being so proportioned that the depression of the handle will puncture the cartridge and open the valve, said pin affording communication for said gas to the interior of said shell, and said passage including a tube extending to the bottom of said shell, and said outlet opening having means for causing the discharge to issue either as a solid jet or as a conical spray.

IGNATIUS NURKIEWICZ.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name     | Date          |
|-----------|----------|---------------|
| 356,372   | Parker   | Jan. 18, 1887 |
| 1,939,336 | Coffield | Dec. 12, 1933 |

#### FOREIGN PATENTS

| Number  | Country       | Date          |
|---------|---------------|---------------|
| 237,405 | Great Britain | July 30, 1925 |
| 605,078 | France        | May 19, 1926  |
| 363,235 | Great Britain | Dec. 17, 1931 |