

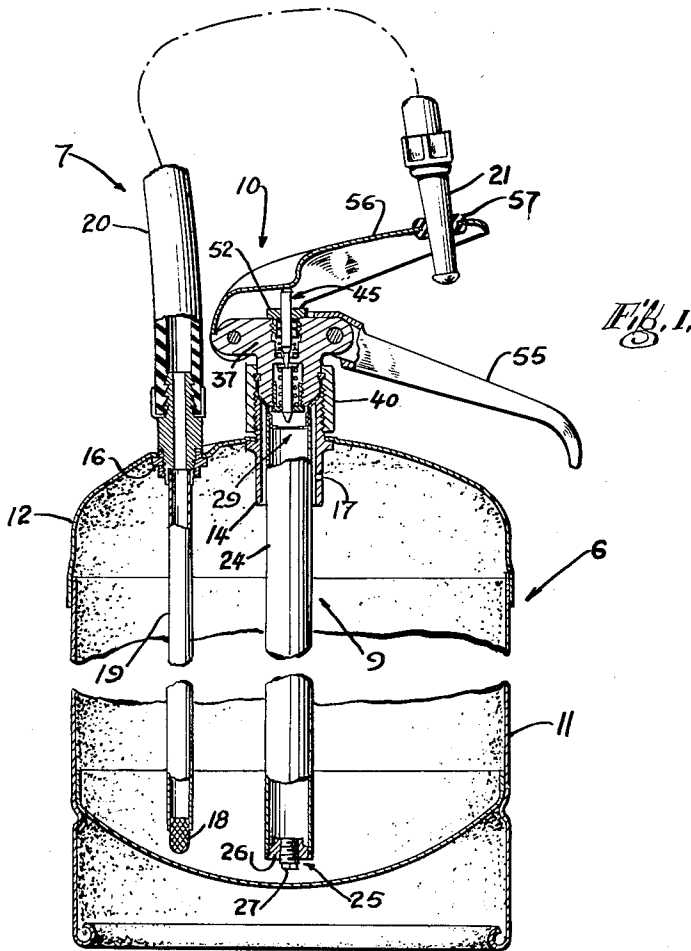
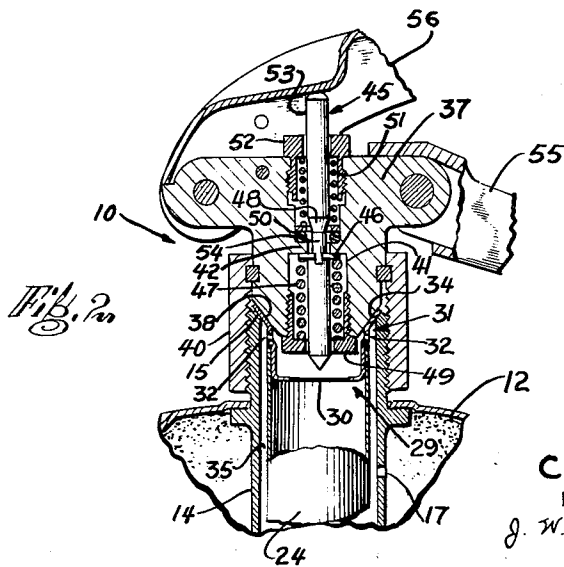
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C. H. BARNES

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FIRE EXTINGUISHER

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INVENTOR
CHARLES H. BARNES
BY
J. William Carson
ATTORNEY

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FIRE EXTINGUISHER

Charles H. Barnes, Wilmington, Del., assignor to Specialties Development Corporation, Belleville, N.J., a corporation of New Jersey

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The present invention relates to fire extinguishing apparatus, and, more particularly, to portable fire extinguishers containing a liquid fire extinguishing agent which is discharged therefrom by a pressurized fluid released from a cartridge.

Fire extinguishers of the foregoing type essentially comprise a receptacle containing the liquid agent with an air space above it, a syphon tube extending to the lower end of the receptacle, a discharge hose connected to the upper end of the syphon tube, a cartridge arranged for discharging pressurized fluid into the air space, and manually operable mechanism for effecting release of the pressurized fluid.

It has been found that the air in the space above the liquid agent expands with an increase in temperature and exerts a pressure on the agent which is effective to expel a portion thereof by way of the syphon tube and the discharge hose. Several cycles of heating and cooling may cause a substantial quantity of the liquid agent to be expelled without positive indication of such loss unless the extinguisher is weighed frequently.

To preclude this danger, it has been common practice to provide an additional control in the form of a valve at some point in the discharge tube. In the hands of the inexperienced, confusion may result in the delay of opening such a valve thus allowing the fire to make headway and thereby be more difficult to extinguish. Also, a relief valve has been provided to equalize small pressure differences while sealing against those pressures associated with deliberate discharge. Owing to its inherent requirement for extreme sensitivity, such a valve is prone to failures of a mechanical nature which may be caused by dirt or damage.

Accordingly, an object of the present invention is to provide a fire extinguisher of the foregoing character having a pressure equalizing passage which is both practical for manufacture and reliable in operation and which will prevent the loss of extinguishing agent due to ambient temperature changes.

Another object is to provide such a fire extinguisher which is both economical to manufacture and convenient to service.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of this invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing wherein:

Fig. 1 is a fragmentary side view of a fire extinguisher in accordance with the invention, partly in section and partly in elevation.

Fig. 2 is a fragmentary enlarged sectional view illustrating the valve of the fire extinguisher in detail.

Referring to the drawing in detail, a fire extinguisher

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is shown which essentially comprises a container or receptacle 6 for a liquid fire extinguishing agent, discharge conduit means 7, a cartridge 9 containing a pressurized fluid and a valve 10 for effecting release of the fluid from the cartridge.

As shown in Fig. 1, the container 6 has a generally cylindrical body 11, a closed lower end, and a top 12 provided with a central spud or tubular element 14 formed with an inwardly inclined seat or shoulder 15 at its upper end and provided with an offset spud 16. The lower end of the central spud 14 extends into the container and is formed with an aperture 17 in the wall thereof.

The discharge conduit means 7 includes a syphon tube 19 attached to the lower end of the spud 16 and extending to the proximity of the bottom of the container and having a conventional wire mesh strainer 18 inserted at its lower end, and a hose 20 having one end attached to the upper end of the spud 16 and having a discharge nozzle 21 attached to its other end.

As shown in Figs. 1 and 2, the cartridge 9 comprises a tubular body 24, a lower end closure 25, including a fixed plug 26 and a removable plug 27, and a generally cup-shaped upper end closure 29 extending partially into the body 24 and having a weakened puncturable central portion 30, a tubular zone 31 disposed outwardly of the body 24 formed with a plurality of apertures 32 and a flared flange 34 adapted for pressure tight sealing upon the seat 15. Ample clearance is provided between the bore of the central spud 14 and the exterior of the tubular cartridge body 24 and the tubular zone 31 for unrestricted fluid flow from the interior of the cup-shaped upper closure 29 through the apertures 32 into the air space above the liquid in the container.

The valve 10, shown in detail in Fig. 2, has a body 37 formed with a frusto-conical lower end 38 adapted for sealing engagement with the flange 34 on the cartridge. A nut 40 is swivelly secured to the valve body by means of a ring and is threadedly secured to the spud 14. A central bore 41 extends through the valve body which has an apertured partition 42 at about its mid-point.

A puncturing pin 45 is disposed within the bore 41 and has a flange 46 intermediate its ends and abutting the lower surface of the partition 42 which is held in position by a compression spring 47 confined within the lower portion of the bore 41 by a retainer 49. The portion of the pin, which is movable within the aperture of the partition 42, is of a reduced diameter and is joined by an upwardly and outwardly extending tapered section 48 to an enlarged diameter section 53 at the upper portion of the pin. A gasket such as an O-ring 54 fits loosely about the reduced diameter of the pin 45, and is held in abutment against the upper surface or shoulder of the partition 42 by a compression spring 51 which is confined within the bore by an upper retainer 52. The pin 45 passes through the upper and lower retainers in very loose fitting relationship, and the flange 46 is appropriately milled to thus provide an unrestricted fluid flow passage from the interior cavity of the upper cartridge closure 29 to the atmosphere.

A carrying handle 55 and an operating lever 56 are attached to the valve body 37. The operating lever is adapted to bear against and depress the puncturing pin 45. A grommet 57 is mounted within the free end of the operating lever and is adapted for retaining the nozzle 21 when not in use.

Thus, it will be seen that an unrestricted path, although devious, is always available to relieve any pressure due to an ambient temperature increase to which the extinguisher may be subjected in normal standby. Commencing with the annular passageway between the cen-

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tral spud 14 and the cartridge body 24, flow is permitted through the apertures 32 and between the puncturing pin 45 and, in sequential order, the lower retainer 49, the aperture of the partition 42 and the upper retainer 52.

In operation, the nozzle is removed from its retainer 57, thus freeing the operating lever 56. Depression of the operating lever drives the puncturing pin 45 downwardly, first to effect a seal between the O-ring 54 and the enlarged diameter section 53 of the pin, and second to rupture the weakened central section 30 of the upper cartridge closure 29. Momentarily, the gas released initially travels upwardly along the puncturing pin through the partition aperture thus forcing the O-ring to further compress the upper spring 51 and to maintain an effective seal as long as pressure remains. The gas flows out of the cartridge through the apertures 32 and downwardly through the annular opening between the cartridge and central spud 35 to develop a driving pressure in the air cavity over the extinguishing agent thus discharging the agent through the discharge conduit means to the atmosphere.

From the foregoing description it will be seen that the present invention provides a simple and practical means for venting fire extinguishers of the class described.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

This application is a continuation-in-part of copending application Serial No. 543,063, filed October 27, 1955, now abandoned.

I claim:

1. A fire extinguisher comprising a receptacle for containing a fire extinguishing liquid, discharge conduit means for said receptacle including a syphon tube, a tubular spud secured to said receptacle terminating in a shoulder externally of said receptacle, and extending downwardly into said receptacle to about the normal filling level thereof and formed with an aperture spaced upwardly from the lower end thereof in fluid flow communication with the interior of said receptacle, a cartridge for containing a fluid under pressure and extending downwardly through said spud, closure means for said cartridge including a flange seated on said shoulder and having aperture means in fluid communication with said aperture in said spud, and a discharge control head secured to said spud to retain said flange on said shoulder, said head including means for puncturing said closure means.

2. A fire extinguisher comprising a receptacle for containing a fire extinguishing liquid, discharge conduit means for said receptacle including a syphon tube, a tubular spud secured to said receptacle terminating in a shoulder externally of said receptacle, a cartridge for containing a fluid under pressure and extending downwardly through said spud, closure means for said cartridge including a flange seated on said shoulder and having aperture means in fluid flow communication with the interior of said receptacle, and a discharge control head secured to said spud, said head including a body retaining said flange on said shoulder and having a bore therein extending from adjacent said spud to the atmosphere, a pin mounted in said bore for puncturing said closure means normally providing a venting passageway from said spud through said

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bore to the atmosphere, and means for sealing said venting passageway coincident with the puncturing of said closure means.

3. A fire extinguisher comprising a receptacle for containing a fire extinguishing liquid, discharge conduit means for said receptacle including a syphon tube, a tubular spud secured to said receptacle terminating in a shoulder externally of said receptacle, a cartridge for containing a fluid under pressure and extending downwardly through said spud, closure means for said cartridge including a flange seated on said shoulder and having aperture means in fluid flow communication with the interior of said receptacle, and a discharge control head secured to said spud, said head including a body retaining said flange on said shoulder and having a bore therein extending from adjacent said spud to the atmosphere, a pin mounted in said bore for puncturing said closure means normally providing a venting passageway from said spud through said bore to the atmosphere, said bore being formed with a shoulder and said pin having a reduced section adjacent said shoulder, and a gasket movably mounted on said shoulder and encircling said reduced section and adapted to move into engagement with said pin above said reduced section in response to fluid pressure and thereby seal said vent.

4. A fire extinguisher according to claim 3, including a spring in said bore for urging said gasket on said shoulder.

5. A fire extinguisher comprising a receptacle for containing a fire extinguishing liquid having means providing an opening at the upper end thereof; discharge conduit means for said receptacle including a syphon tube within said receptacle extending from the upper end to adjacent the lower end thereof; a cartridge for containing a fluid under pressure disposed in said receptacle, said cartridge including a tubular upper end portion secured to said opening means and including sealing means spaced downwardly from its upper end and having an aperture between its upper end and said sealing means in fluid flow communication with the interior of said receptacle; a discharge control head secured to said opening means of said receptacle, said head having a bore extending from within said tubular cartridge portion to the atmosphere; means carried by said head for rendering said cartridge sealing means ineffective including a pin mounted in said bore to normally provide a vent from said tubular cartridge portion to the atmosphere; and means operable to seal said vent coincident with the operation of said means for rendering said sealing means ineffective.

6. A fire extinguisher according to claim 5, wherein said vent and said means operable to seal the same include a shoulder in said bore, a gasket on said shoulder, a reduced pin section encircled by said gasket and a pin section above said reduced section adapted to engage said gasket.

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