

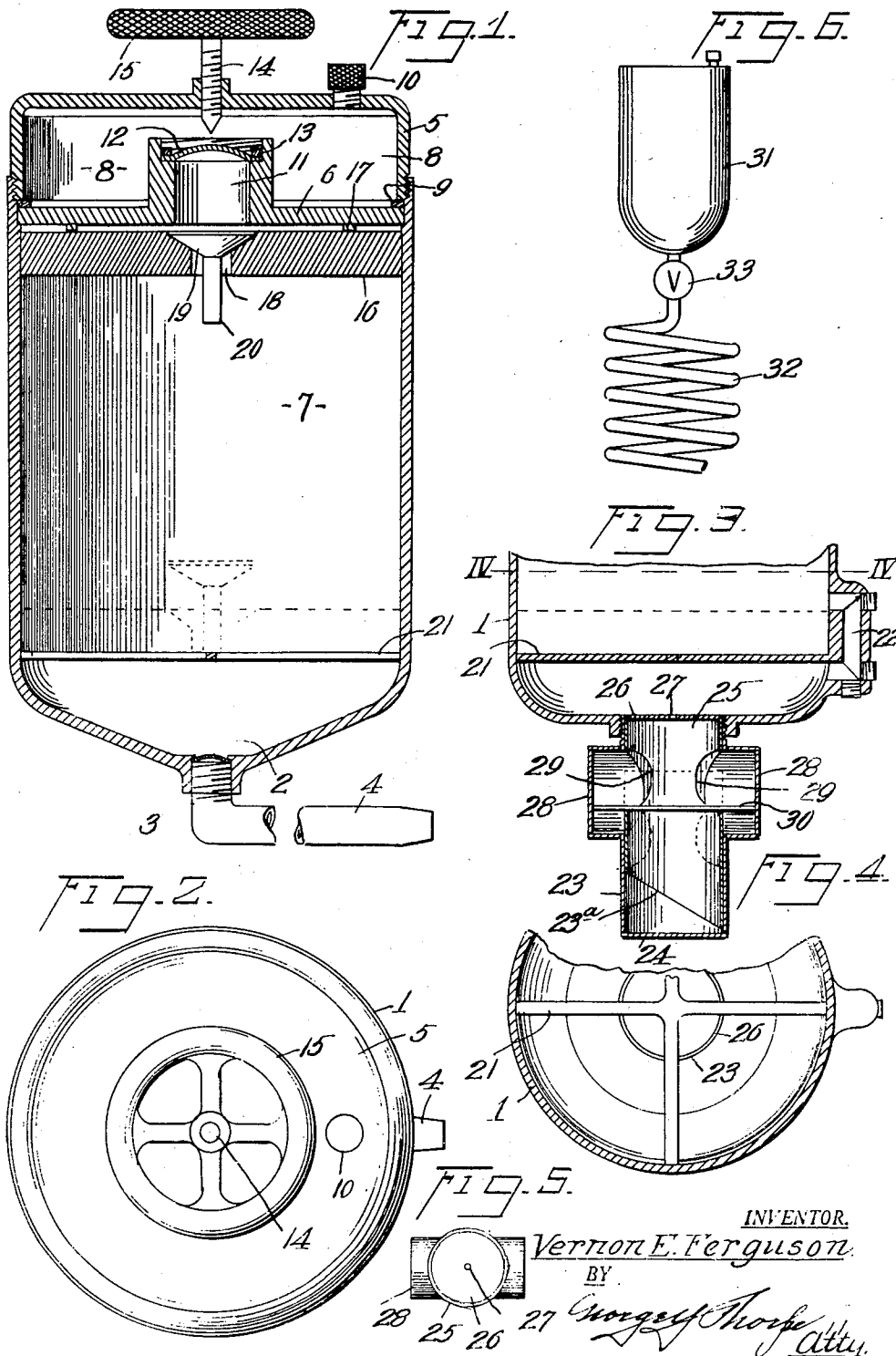
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V. E. FERGUSON

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FIRE EXTINGUISHER

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FIRE EXTINGUISHER

Vernon E. Ferguson, Kansas City, Mo.

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This invention relates to fire extinguishers operated by fluid pressure adapted to discharge a fluid fire extinguishing agent through a relatively extended discharge tube of the general class installed in aeroplanes and the like for the extinguishment of fires, particularly those which may occur in flight, although the device lends itself to other situations as well.

One of the general objects of the invention is to provide a propulsive fluid container in which there is no mixture of such fluid with the fire extinguishing agent and thereby insures that the latter will be discharged in a homogeneous full-strength mass.

Another object of the invention is to provide a construction in which mechanical means is provided to prevent possible mixing of the two fluids or blow-by of the propelling fluid during the discharge of the fire extinguishing fluid.

A further object of the invention is to provide a construction in which the propulsive fluid is permitted to enter the discharge line to follow through and exhaust all of the extinguishing agent.

A still further object of the invention is to provide a fire extinguisher which is operative at any angle in relation to the ground.

Another object is to produce a sealing means for fire extinguishers of the general type described which involves a closure, such as a diaphragm, and a knife-edge operated by pressure on the fluid to sever or rupture the sealing diaphragm.

With the general objects named in view and others as will hereinafter appear, the invention consists in certain novel and useful features of construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawing, in which:

Figure 1 illustrates a central vertical section through a fire extinguisher involving the invention.

Figure 2 is a top plan view of the same.

Figure 3 is a fragmentary vertical section through the discharge end of a slightly modified construction in which a by-pass is illustrated in the wall of the extinguisher.

Figure 4 is a horizontal section on the line IV—IV of Figure 3 to illustrate the piston stop or spider, also shown in Figure 1.

Figure 5 is a top plan view on a reduced scale of the diaphragm rupturing device shown at the lower end of Figure 3.

Figure 6 is a side elevation of a modified struc-

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ture in which the fire extinguishing fluid discharge line also constitutes the container for the fire extinguishing fluid, its end being sealed as by such a device as shown at the lower end of Figure 3.

In the said drawing, where like reference characters identify corresponding parts in all of the figures, 1 is a container for fire extinguishing fluid, the discharge end of said container, as shown in Figure 1, being formed with a seat receiving a rupturable sealing diaphragm 2 held in position by a threaded fitting 3 on a fire extinguishing discharge line 4. The other end of the container 1 is internally threaded to receive a cap 5, said container below the cap being shouldered to receive a permanent partition 6 which is sweated or otherwise seated in leak-proof relation and provides a pair of chambers 7 and 8, respectively, adapted to hold a fire extinguishing fluid and a propulsive fluid under pressure, the cap 5 being threaded down against a suitable gasket 9 abutting the partition 6 so that there shall be no leak to the atmosphere of the propulsive fluid. The chamber 8 is charged through any conventional charging opening 10.

The partition 6 is formed with a through opening or passageway 11, which is normally sealed by a closure 12, here shown as in the form of a diaphragm, held down on its seat in the partition by a locking ring 13. In order to open the closure 12 in the construction shown in Figure 1, any suitable mechanically operable device may be employed, the construction shown involving a piercing point 14 threaded through the cap 5 and externally formed with an operating handle 15.

To prevent mixing of the propulsive fluid with the fire extinguishing fluid upon the opening of the closure 12, the chamber 7 is fitted with a piston 16 normally resting in contact with a concentric spacing bead 17 projecting from the face of the partition 6. With this arrangement it will be apparent that when the closure 12 is ruptured, the propulsive fluid will exert pressure on the piston to compress the fire extinguishing fluid which causes rupture of sealing diaphragm 2 and the discharge out through the line 4.

In some installations the discharge line 4 may be very extensive and embody a number of branch lines leading to various points where fires may occur. Therefore, in order to insure complete discharge of all fire extinguishing fluid, the preferred arrangement involves providing sufficient propulsive fluid at such pressure, that it still has considerable energy after the fire extin-

guishing fluid has been ejected from chamber 7. To use this energy means must be provided to permit the propulsive force to pass around the discharge piston 16 when the latter has reached its limit of travel. An arrangement of parts to accomplish this end is shown in Figure 1, in which the piston is provided with a through pas-
 5 sageway 18 terminating in a valve seat on which a valve 19 normally rests. The valve has a stem 20 projecting some distance beyond the piston. At the lower end of the chamber 7, a spider 21 is provided. When the piston 16 reaches its limit of travel as shown in dotted lines, the stem 20
 10 contacts the spider 21 and lifts the valve 19 off the seat and permits the propulsive gas to flow out through the discharge line and completely scavenges all fire extinguishing fluid which may be in said line.

In Figure 3 the propulsive fluid is permitted to follow the fire extinguishing fluid after the piston 16 has reached its limit of travel by provid-
 15 ing the container with a by-pass 22. This by-pass leads from above the piston to a point below the same as indicated.

In some fire extinguishing installations, increase of pressure on the fire extinguishing fluid alone may not be depended upon to rupture the closing diaphragm 2 as shown in Figure 1, but positive mechanical cutting or piercing means may be essential. One arrangement is shown
 20 in Figure 3, in which 23 is a tube forming part of the discharge line either at a point remote from the body of the extinguisher, at any intermediate point in the discharge line, or attached to the body of the extinguisher as illustrated for purposes of convenience. In the construction as shown the tube 23 is externally threaded into the discharge opening in the body
 25 1 of the device, the end of said tube being sealed by a diaphragm or closure 24.

Mounted within the discharge tube 23 is a reciprocating tube or piston 25 having one end closed by a plate or disc 26 forming a piston head so that predetermined increase in pressure
 30 on the fire extinguishing fluid will reciprocate the piston to cause the other end of the tube 25 cut on a bevel as at 23a to sever the closure 24. In order to equalize pressure on opposite sides of the piston head and prevent corrosion, the piston head is preferably formed with a pin-hole opening 27 so that normally fire extinguishing
 35 fluid stands above and below the piston head. This is done to prevent possibility of the piston sticking on its seat since slight leakage past the piston would be more likely, to freeze the same, than complete immersion of all of the parts. The discharge tube 23 is provided with a pair of oppositely projecting branch tubes or enlargements 28, and the reciprocating piston
 40 tube 25 in the plane of said enlargements is cut away on opposite sides as at 29. Travel of the piston in both directions is limited by a stop wire or rod 30 projecting through the openings 29 and carried by the enlargements 28. Normally the piston stands in its full line position, but when
 45 it has been moved by pressure of the fire-extinguishing fluid as increased by the propulsive gas to its dotted line position, it will be evident that its knife edge 23a will have cut diaphragm 24, the fire extinguishing fluid passing over the top of the piston in its dotted position, into

the enlargements 28, and then through the openings 29 into the discharge tube. With this arrangement the stop wire 30 holds the piston against travel beyond the dotted line position and thus guards against blockage of the system by a
 5 too extended travel of said piston.

In Figure 6 a construction is illustrated in which the chamber 31 only contains the propulsive fluid, the fire extinguishing fluid being contained
 10 in an extensive discharge line 32, having its ends sealed as by the piercing diaphragm arrangement shown in Figure 3, or the sealing diaphragm arrangement of Figure 1. Any suitable closure, as a hand valve 33, is interposed between the propulsive chamber and the discharge line. In this construction the cross-sectional area and the extent or length of the discharge line is such that the propulsive fluid cannot blow-by the fire
 15 extinguishing fluid, consequently a mechanical separator is not necessary.

From the above description it will be apparent that while I have described and illustrated the preferred embodiment, it is to be understood that I reserve the right to make all changes
 20 within the spirit and scope of the appended claims.

I claim:

1. A fire extinguishing device comprising a pair of chambers, one of said chambers being adapted to contain a propulsive fluid and the other
 25 chamber a fire extinguishing fluid and having a discharge opening, a diaphragm sealing the discharge opening and broken by increase in pressure in the extinguishing chamber, a closure between said chambers, means to open the closure,
 30 a piston in the fire extinguishing chamber adapted to be driven by the propulsive fluid to expel the fire extinguishing fluid, a valve in the piston normally held closed by the pressure of the propulsive force, and means in the fire extinguishing
 35 fluid chamber to effect opening of the valve against the pressure of the propulsive force upon predetermined travel of the piston.

2. A fire extinguishing device comprising a pair of chambers, one of said chambers being adapted to contain a propulsive fluid and the other chamber a fire extinguishing fluid and having
 40 a discharge opening, a diaphragm sealing the discharge opening and broken by increase in pressure in the extinguishing chamber, a closure between said chambers, means to open the closure, a piston in the fire extinguishing chamber adapted to be driven by the propulsive fluid to expel the
 45 fire extinguishing fluid, a valve in the piston normally held closed by the pressure of the propulsive fluid and having a stem projecting through the piston, and a spider in the extinguishing chamber to contact the valve stem and unseat the valve on predetermined travel of the piston.

VERNON E. FERGUSON.

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