

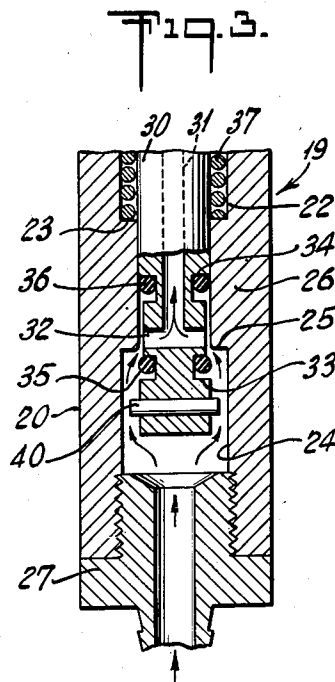
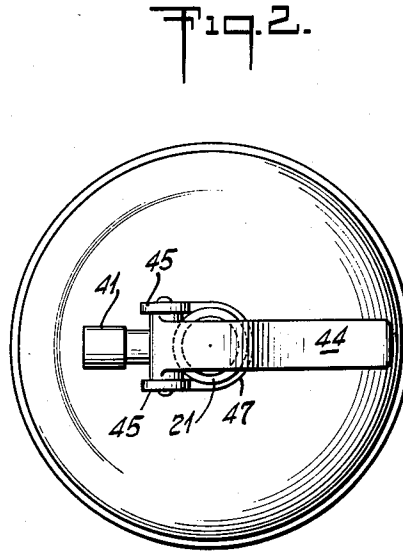
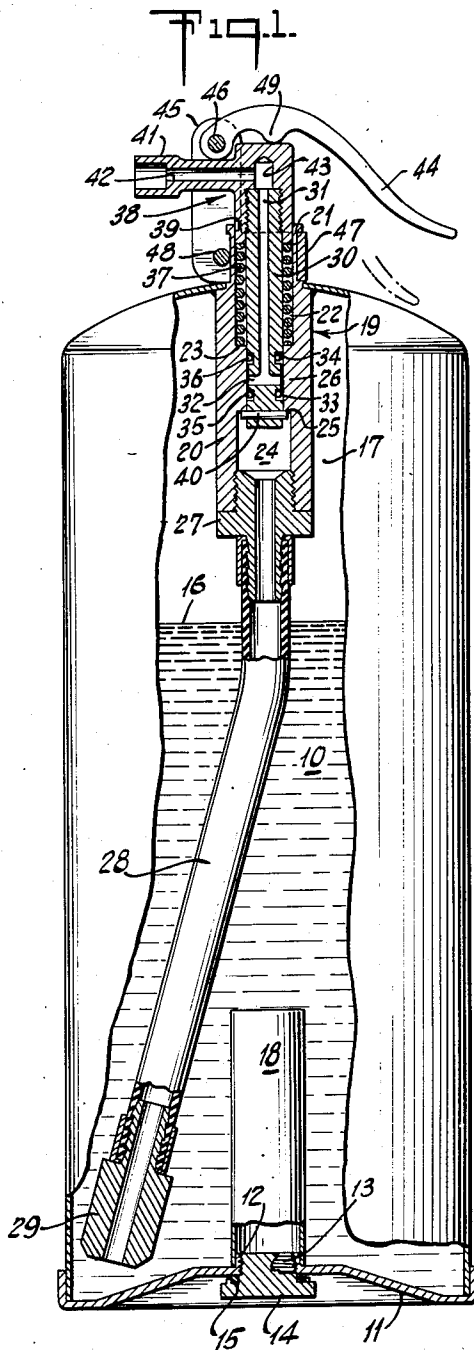
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T. BEAUREGARD

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FIRE EXTINGUISHER

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INVENTOR
THEODORE BEAUREGARD
BY
William C. Miles
ATTORNEY

UNITED STATES PATENT OFFICE

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FIRE EXTINGUISHER

Theodore Beauregard, Stamford, Conn.

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This invention relates to fire extinguishers and is herein illustrated as embodied in that type of extinguisher wherein the extinguishing liquid, such as carbon tetrachloride, is forcibly expelled from the liquid container under the influence of an expansible pressure medium, such as compressed air, stored within said container and acting directly on the liquid content thereof at all times.

An important object of the invention is to provide a generally improved fire extinguisher which is simple, efficient, inexpensive and otherwise highly satisfactory.

To the above and other ends the invention contemplates a liquid storage container in association with a novel control unit by way of which air under pressure may be readily introduced into that container and by which such air as well as the liquid content of the container may be effectively held against undue escape and by which the extinguisher may be readily set into operation as occasion may require.

Other objects and advantages of the invention will become apparent from the following description when taken in connection with the accompanying drawings, in which—

Fig. 1 is a view showing, partly in section and partly in elevation an extinguisher embodying the present invention,

Fig. 2 is a top view of the extinguisher, and

Fig. 3 is an enlarged fragmental view showing in vertical section the lower end of the control unit appearing in Figure 1.

The extinguisher herein illustrated as one embodiment of the present invention includes a liquid container 10, the bottom end wall 11 of which is provided with an inwardly extending internally threaded flange 12, defining a filling opening 13, adapted for the reception of a removable screw threaded closure plug 14, equipped with a suitable gasket 15, by which a liquid-tight seal is insured between the filling opening and the closure plug. The extinguishing liquid, herein indicated by the numeral 16, is poured or otherwise gently introduced into the container 10 by way of the filling opening 13 while the extinguisher is held in an inverted position; and in order to insure the existence of a satisfactorily proportioned air space 17 above the liquid at the conclusion of the liquid-filling operation, there is provided an appropriately dimensioned trap-tube 18, which is suitably secured at one of its ends to the inwardly extending flange 12 and through which the liquid is directed into the container during the filling operation. It will be well

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understood by those skilled in the art that at such time as the liquid rises, in the inverted extinguisher during the liquid-filling operation, to the level of the innermost end of the trap-tube 18, an air pocket is effected above that level and thus further introduction of liquid into the container becomes impossible. After the liquid-filling operation has been carried out and the closure plug 14 has been run down into sealing position, the extinguisher may be turned to an upright position preparatory to introducing a charge of compressed air into the air space 17 which results, of course, from displacement of the above mentioned air pocket from the bottom end of the container 10 to the top end thereof as the extinguisher is turned from liquid-filling position to its upright or normal operating position.

Suitably connected to the upper end of the container 10 and forming an air and liquid tight union therewith, is a control unit 19, by way of which air under pressure may be introduced into the container in the manner hereinafter described and by which such air as well as the liquid content of the container may be held against undue escape as will hereinafter more clearly appear and by which the extinguisher may be set into operation at will and in the manner hereinafter explained.

The above mentioned control unit 19 includes a tubular body-like housing 20, which, except for its neck-like end 21, is located wholly within the container 10. The housing is counterbored at its opposite ends to a considerable depth so as to provide, on the one hand, a spring chamber 22 having a ledge-like bottom wall 23, and on the other hand, a liquid chamber 24 having a ledge-like bottom wall 25. These chambers 22—24 are disposed in axial alignment with each other and are likewise disposed with reference to the intervening central bore of that intermediate portion of the housing 20 which serves as a valve cylinder 26, it being noted in this connection that such cylinder may be regarded as extending from the bottom wall 23 of the chamber 22 to the bottom wall 25 of the chamber 24.

Within the lower end of the liquid chamber 24, there is carried a screw threaded nipple 27, to which is securely connected a flexible pick-up tube 28, constructed from an appropriate material, such as a suitable thermo-plastic, and carrying at its lower end a relatively heavy inlet nipple 29, which, due to its inherent weight, is adapted to so flex the pick-up tube as to maintain its pick-up end satisfactorily submerged in the

liquid 16 at all times while the extinguisher is in operation.

Within the housing 20 there is arranged a vertically displaceable rod-like valve 30, provided with a central longitudinal passage 31, which, at its lower end, opens directly into a transverse duct 32, normally located, with reference to the valve cylinder 26, on substantially the mid-point-diameter of that cylinder. The valve 30 is provided with a pair of circumferential grooves 33 and 34, the former being located slightly below the transverse duct 32 and the latter at a somewhat greater distance above that duct. Each of the grooves 33—34 are of a substantial width, and within them are respectively carried a pair of suitable seals 35—36, such as those commonly known as thermoplastic O-rings. Here it should be noted that the seals 35—36 are inherently of an elastic or resilient character and are adapted to impinge against the cylindrical wall surface of the valve cylinder 26 and also against the inner wall of the respective grooves 33—34 so as to afford an effective air and liquid tight seal between the rod-like valve 30 and said valve cylinder.

Normally, the valve 30 is held in its upper-most or closed position by a compression spring 37, which is carried within the spring chamber 22 where it abuts against the ledge-like bottom wall 23 of that chamber and is arranged to operatively cooperate with a vertically displaceable nozzle-head 38 which includes a skirt-like flange 39 screw threadedly connected to the upper end of the rod-like valve 30 and having a sliding fit within the neck-like end 21 of the housing 20. The upper end of the spring 37 engages the lower end of the flange 39 at all times and constantly exerts an outwardly directed thrust on the valve 30, which is held against undue outward displacement by a transversely disposed stop-pin 40 passing through the lower end of said valve and adapted to engage the ledge-like bottom wall 25 of the liquid chamber 24 as the valve assumes a definite closed position.

The nozzle-head 38 further includes a tube-like nozzle 41, having a central passage 42 communicating with the valve-passage 31 by way of a connecting chamber 43 formed in said head and presenting a relatively large diameter with respect to that of each of said passages. The outer end of the nozzle 41 is so formed as to accommodate the usual nozzle end of a suitable air line, such as that ordinarily used in inflating automobile tires, so that the extinguisher may be conveniently charged with air for use as a stored pressure medium by which the fire extinguishing liquid 16 may be forcibly expelled from the extinguisher in accordance with standard trajectory requirements.

In order that the valve 30 may be readily moved downwardly from its closed-position to its open position against the action of its associated spring 37, there is provided an actuating lever 44, the fulcrumed end of which is disposed intermediate the upper ends of a pair of supporting arms 45 and pivotally connected thereto by a pin 46. The arms 45 are so spaced from each other as to readily accommodate the nozzle 41 for vertical displacement therebetween and are formed integral with a collar-like yoke 47, which embraces the neck-like end 21 of the housing 20 and is securely anchored thereto by a clamp screw 48. The lever 44 is provided at a suitable point intermediate its ends with a contact lobe 49 which engages the upper end of the nozzle-head 38 and

by way of which a downward thrust is exerted on that head as the lever is moved downwardly to shift the valve 30 from its closed position to its open position.

From the foregoing description of the extinguisher embodying this invention, it becomes apparent that the necessary charge of air may be conveniently delivered to the air space 17 by connecting the nozzle 41 to a suitable source of air under pressure and thereupon so depressing the valve 30 under the action of the lever 44 as to establish a direct communication between the liquid chamber 24 and the transverse duct 32. In this connection, it will be noted that the instant such communication is established air under pressure from its source is forcibly delivered to the air space 17 by way of the passage 42, chamber 43, passage 31, duct 32, chamber 24, pick-up tube 28 and finally the liquid 16 through which it rises into said air space where it is trapped for use as a liquid expelling medium. At such time as the desired air pressure is attained in the air space 17, the lever 44 is released, whereupon the spring 37 operates to move the valve 30 to its closed position, thus shutting off the air supply and sealing the extinguisher against undue escape of any portion of its content.

Here it is to be noted that during the air charging operation pressure is prevented from escaping upwardly along the inner wall of the valve cylinder 26 due to the presence of the seal 36, which, when subjected to pressure from below, impinges firmly against the cylinder wall and the upper wall of the groove 34 while undergoing sufficient radial distortion to occupy or fill the corner space normally afforded at the juncture of said walls. It will be understood, of course, that after the air charging operation is completed and the valve 30 is closed, the seal 35, which functions as described in connection with the seal 36, becomes effective to prevent any portion of the extinguisher-content from unduly escaping upwardly along the inner wall of the cylinder 26 and thence into the duct 32 which at all times communicates with the nozzle passage 42 by way of the passage 31 and the chamber 43.

When it becomes necessary to set the extinguisher into operation, the valve 30 is so depressed as to establish a direct communication between the liquid chamber 24 and the duct 32, whereupon the normally static air pressure within the air-chamber 17 becomes effective on the liquid 16 to forcibly expel it from the extinguisher by way of the pick-up tube 28, chamber 24, duct 32, passage 31, chamber 43 and the passage 42. Here it is to be noted that during such time as the extinguisher is operating to expel its liquid content by way of the nozzle 41, the seal 36 so functions as to prevent the escape of any portion of such content upwardly along the inner wall of the valve cylinder 26 as will be readily understood from the previously described manner in which such seal is adapted to operate during the air charging operation.

What is claimed is:

1. For use in a fire extinguisher of the type including a container wherein a fire extinguishing liquid is carried and wherein an expansible medium is stored in gaseous form for use in expelling the liquid content, a control unit comprising a housing, a valve mounted for longitudinal displacement within said housing, said valve being provided with a liquid-discharge passage having an inlet end confined at all times within said housing, a nozzle-head connected to

said valve and mounted for longitudinal telescopic displacement with reference to said housing, spring-pressure means acting on said valve to normally maintain such valve in closed position, and manually operable actuating means mounted in a cooperative relation to said head for displacing such head longitudinally of said housing whereby said valve is correspondingly moved to open position against the action of said spring-pressure means.

2. For use in a fire extinguisher of the type including a container wherein a fire extinguishing liquid is carried and wherein an expansible medium is stored in gaseous form for use in expelling the liquid content, a control unit comprising a housing presenting a valve cylinder intermediate its ends, a rod-like valve mounted for longitudinal displacement within said housing, said valve having a longitudinal passage and a transverse duct formed therein and communicating with each other at all times, a nozzle-head connected to said valve for longitudinal displacement with reference to said housing and having a passage communicating with the first mentioned passage at all times, a spring acting on said valve to normally maintain such valve so positioned within said housing that said duct is normally maintained closed by the inner wall of said cylinder, and manually operable actuating means mounted in a cooperative relation to said head for so displacing such head longitudinally of said housing that said valve is correspondingly moved to open position against the action of said spring.

3. For use in a fire extinguisher of the type including a container wherein a fire extinguishing liquid is carried and wherein an expansible medium is stored in gaseous form for use in expelling the liquid content, a control unit comprising a housing formed at one end with a liquid chamber and presenting a valve cylinder intermediate its opposite ends, a rod-like valve mounted for longitudinal displacement within said housing, said valve having a longitudinal passage and a transverse duct formed therein and communicating with each other at all times, a pair of seals carried by said valve and located respectively at opposite sides of said duct, a nozzle-head connected to said valve for longitudinal displacement with reference to said housing and having a passage communicating with the first mentioned passage at all times, a spring acting on said valve to normally maintain said valve so positioned within said housing that said duct is normally maintained at a point intermediate the opposite ends of said cylinder, and manually operable actuating means mounted in a cooperative relation to said head for so displacing said head longitudinally of said housing that said valve is correspondingly moved against the action of said spring to such extent that said duct is directly opened to said chamber.

4. For use in a fire extinguisher of the type including a container wherein a fire extinguishing liquid is carried and wherein an expansible medium is stored in gaseous form for use in expelling the liquid content, a control unit adapted to be located above the liquid content of the extinguisher and comprising a housing formed at one end with a liquid chamber and presenting a valve cylinder intermediate its opposite ends,

a pick-up tube communicating with said liquid chamber and adapted to extend downwardly into the liquid content of said container, a rod-like valve mounted for longitudinal displacement within said housing and having at its lower end a slide fit with reference to the inner wall of said cylinder and there provided with a transverse duct, said valve being provided with a longitudinal passage communicating with said duct at all times and extending upwardly therefrom to the extreme upper end of said valve, a pair of elastic seals carried within a pair of annular grooves formed in said valve at opposite sides of said duct, the upper-most seals being maintained in impinging engagement with the inner wall of said cylinder at all times and the lowermost seal being maintained in such engagement with that wall only during such time as said valve occupies its closed position, a nozzle-head connected to the upper end of said valve for longitudinal displacement with reference to said housing and having a passage communicating with the first mentioned passage at all times, a spring acting on said valve to normally maintain such valve so positioned within said housing that said duct is normally maintained at a point intermediate the opposite ends of said cylinder, and manually operable actuating means mounted in a cooperative relation to said head for so displacing such head longitudinally of said housing that said valve is correspondingly moved against the action of said spring to such extent that said lowermost seal is moved from said cylinder into said liquid chamber and said duct is directly opened to that chamber, thus affording a passage of escape for the liquid content of said container by way of said pick-up tube, chamber, duct and passages.

5. For use in a fire extinguisher of the type including a container wherein a fire extinguishing liquid is carried and wherein an expansible medium is stored in gaseous form for use in expelling the liquid content, a control unit comprising a housing provided at one end with a spring chamber, a valve mounted for longitudinal displacement within said housing, said valve being provided with a liquid-discharge passage and having an inlet duct confined at all times within said housing and at all times communicating with said passage, a nozzle-head connected to one end of said valve and accommodated in part within said chamber for longitudinal displacement with reference to said housing, a spring carried within said chamber and acting on said valve by way of said head to normally maintain said valve in closed position, and an actuating lever pivotally supported adjacent said head in a cooperative relation thereto for displacing said head whereby said valve is correspondingly moved to open position against the action of said spring.

THEODORE BEAUREGARD.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
646,527	Linton	Apr. 3, 1900
1,194,450	Wesel	Aug. 15, 1916
2,513,272	Bowen	July 4, 1950