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MEANS FOR LOCKING VALVES AND THE LIKE

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Fig. 1

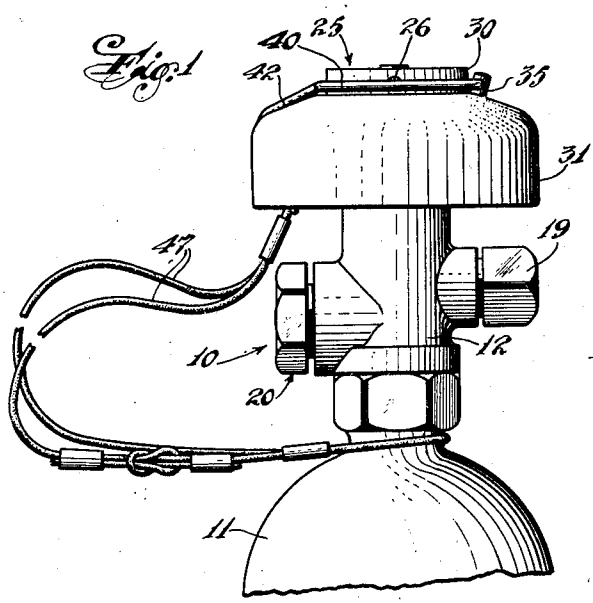


Fig. 2

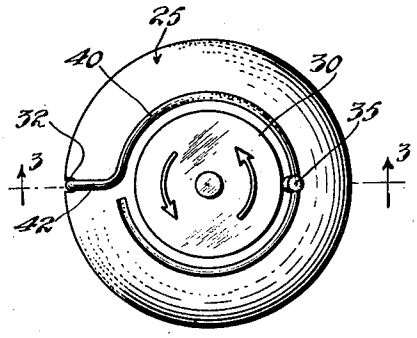
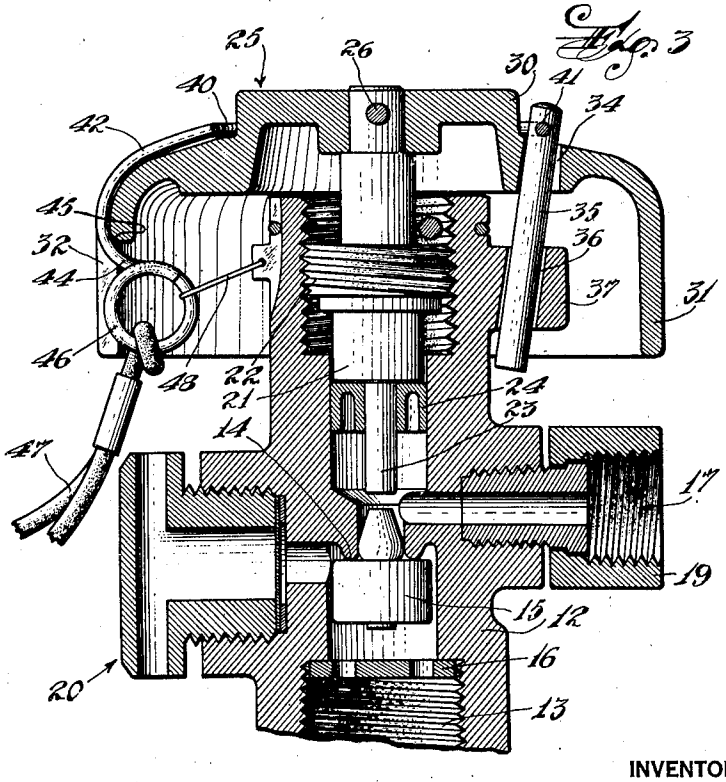


Fig. 3



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MEANS FOR LOCKING VALVES AND THE LIKE

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16 Claims. (Cl. 251—163)

This invention relates to valves and the like, and more particularly to means for locking the valve operating member against movement.

In connection with aircraft, particularly military aircraft, it has been customary to provide each airman with safety equipment, such as illustrated in United States Patent No. 2,114,301, which comprises a parachute for making a safe descent after abandoning the craft in mid-air, and a life raft or life boat folded and stored in a pack. The raft or boat is adapted to be inflated by a fluid pressure medium, in the event the airman anticipates that he will land on a body of water. The fluid pressure medium may be compressed air or liquified carbon dioxide gas, which usually is stored in a pressure container or cylinder having a valve for releasing the medium to inflate the boat or raft.

The present invention aims to provide an improved valve adapted to be used in connection with equipment of the foregoing character, although its use is by no means limited thereto.

An object of the present invention is to provide an improved valve which is locked against unauthorized or accidental operation, but can be readily unlocked when operation of the valve is required.

Another object is to provide a valve of the foregoing character which is simple in construction, can be economically manufactured, and can be easily assembled.

Another object is to provide means for effectively locking the valve operating member which are quickly and positively released in a simple manner.

A further object consists in the construction and arrangement of the parts of the valve, whereby the foregoing objects and advantages may be attained.

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 the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing, forming a part of the specification, wherein:

Figure 1 is a side elevational view of a valve illustrating an embodiment of the invention.

Figure 2 is a top view of the valve shown in Figure 1.

Figure 3 is an enlarged sectional view taken substantially along the line 3—3 on Figure 2.

Referring more particularly to the drawing, there is shown a valve 10 attached to the neck of a cylinder 11 for containing a fluid pressure medium (Figure 1). As shown in Figure 3, the valve comprises a valve body 12 having a chamber therein provided with an inlet 13 for the pressure medium, an annular downwardly facing valve seat 14, a valve member 15 adapted to be forced upwardly against its seat 14 by the pressure medium, a perforated disc 16 for preventing the valve member from dropping into the cylinder, and a discharge outlet 17 in communication with the valve chamber above the seat 14.

The discharge outlet 17 is adapted to receive a suitable hose or the like (not shown) which may be secured to the outlet by a suitable coupling 19. The valve body may, further, be provided with a safety discharge and recoil preventing plug assembly 20 for releasing the pressure medium to the atmosphere in the event the pressure within the cylinder exceeds the safe working pressure.

A spindle 21 is threaded for rotation into the upper portion of the valve body at 22, and has a depending shank 23, which extends through a U-sectioned sealing washer 24 located in the upper portion of the valve chamber and is adapted to unseat the valve member 15. The thread illustrated at 22 is "left-handed," whereupon counter-clockwise rotation of the spindle, the shank 23 is moved downwardly to urge the valve member 15 off its seat and pressure medium is released from the cylinder 11 through the discharge outlet 17. The upper end of the spindle 21 extends outwardly from the valve body, and is provided with a manually operable member, such as a hand wheel 25, or the like, secured to the spindle by a pin 26. The hand wheel may be provided with suitable legend or indicia for indicating that counter-clockwise rotation thereof will open the valve (Figure 2).

The valve illustrated, and so far described, has been chosen by way of example, and the present invention in no way is intended to be limited to valves of this type. It will thus be understood that other types of valves, having valve operating means, may be provided with the locking means in accordance with the invention about to be described.

In order to lend itself suitable for such locking means, the hand wheel 25, for example, may be provided with a centrally located boss or upwardly projecting portion 30, and a depending skirt or flange 31 for facilitating manual gripping of the hand wheel. The flange is provided with a recess or cut-away portion 32, and the upper surface of the hand wheel is provided with an aperture 34 adjacent the boss 30 and extending downwardly through the hand wheel. The aperture 34 and the recess 32 are located diametrically opposite each other and facilitate reception of the locking means, about to be described, for

preventing accidental rotation of the hand wheel.

The locking means are illustrated more particularly in Figure 3, and may comprise a member such as a cylindrical pin 35, or a cotter pin, adapted to extend through the aperture 34 in the hand wheel and adapted to extend into or through an aperture 36 in a lug or ear 37 provided on the valve body adjacent its upper end. The aperture 34 of the hand wheel is adapted to be placed substantially in alignment with the aperture 36 of the valve body when the hand wheel is turned to a position so that the shank 23 is out of engagement with the valve member 15. The apertures 34 and 36 may extend vertically through the hand wheel 25 and the lug 37, respectively, but, preferably, are diagonally or slantingly disposed, as shown herein, so that the pin 35 extends therethrough in a downward and inward direction and is less likely to fall out of the apertures when the cylinder is inverted.

Suitable snap fastening means are provided for maintaining the pin 35 in the apertures 34 and 36 to thereby prevent accidental rotation of the hand wheel. Such means may comprise a substantially ring-shaped member 40 (Figure 2) extending about the boss 30, and extending through an aperture 41 at the upper end of the pin 35, whereby the pin is pivotally attached to the member 40. If desired, the pin may be attached to the member 40 in any other suitable manner. The ring-shaped member 40 is further provided with a substantially radially outwardly and downwardly extending portion 42 terminating in an inwardly curved portion or projection 44, adapted to engage the flange 31 of the hand wheel. As illustrated herein, the portion 44 fits into the recess 32 of the flange 31 and resiliently grips the downwardly facing edge of the flange at 45, so that the ring-shaped member is snapped into position on the hand wheel. Preferably, the member 40 is formed of resilient stock, such as spring wire of suitable diameter.

In order to facilitate unlatching or release of the snap fastening means, an eyelet 46, or the like, is provided adjacent the portion 44, and a pull cord 47 has one end thereof attached to the eyelet 46, and has its other end attached to the container 11 or to the valve body 12, in any suitable manner. The eyelet 46 extends inwardly of the flange and substantially beneath the hand wheel, to prevent accidental engagement thereof.

If desired, a seal wire 48 may be provided for securing the eyelet to the valve body to prevent accidental or unauthorized unlocking of the valve.

In operation, the valve and locking means are assembled as illustrated in Figure 3. In the event it is desired to release the pressure medium from the cylinder, the middle portions of the pull cord 47 are yanked upwardly to break the seal wire 48. This pulls the projection or portion 44 out of engagement with the flange 31 of the hand wheel, and unlatches the ring-shaped member 40. Further upward pulling of the cord causes the member 40 to withdraw the pin 35 from the aperture 34 and 36, whereby the hand wheel is unlocked. The hand wheel then may be rotated to cause the shank 23 to unseat the valve member 15, whereby the pressure medium is released.

From the foregoing description it will be seen that the present invention provides an improved locking device for valves, which prevents accidental or unauthorized operation thereof, but which can be rapidly manipulated to unlock the valves when operation thereof is desired. The locking device is constructed of a minimum number of parts which can be economically manufactured and assembled. The device is rugged in construction and can withstand the rough usage to which it may be subjected.

The locking device illustrated herein is particularly adapted to be used in connection with valves on pressure medium cylinders for inflating a raft contained in a pack. The valve and locking device are constructed so that accidental operation and release of the pressure medium are prevented while the raft is in the pack. The valve can be readily unlocked and operated in an emergency.

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.

It is also to be understood that the following claims are intended to cover all 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.

We claim:

1. In a valve, the combination of a valve body having an aperture therein, a manual valve operating member having an aperture therein, a member extending through the aperture in said valve operating member and into the aperture of said valve body for locking said valve operating member against movement, fastening means connected to said last member for maintaining said last member in said apertures, and a pull cord connected to said fastening means for releasing said fastening means and withdrawing said last member from said apertures to permit movement of said valve operating member.

2. In a valve, the combination of a valve body having an aperture therein, a manual valve operating member having an aperture therein and provided with a ledge portion, a member extending through the aperture in said valve operating member and into the aperture of said valve body for locking said valve operating member against movement, and snap fastening means connected to said last member and engaging said ledge portion for maintaining said last member in said apertures.

3. In a valve, the combination of a valve body having an aperture therein, a manual valve operating member having an aperture therein and provided with a ledge portion, a member extending through the aperture in said valve operating member and into the aperture of said valve body for locking said valve operating member against movement, snap fastening means connected to said last member and engaging said ledge portion for maintaining said last member in said apertures, and manually engageable means connected to said snap fastening means for releasing said snap fastening means and withdrawing said last member from said apertures to permit movement of said valve operating member.

4. In a valve, the combination of a valve body having an aperture therein, a rotatable valve operating hand wheel having an aperture therein adapted to be placed substantially in alignment with the aperture of said valve body, a pin extending through the aperture in said hand wheel and into the aperture of said valve body for locking said hand wheel against rotation, and snap

fastening means pivotally connected to said pin for maintaining said pin in said apertures.

5. In a valve, the combination of a valve body having an aperture therein, a rotatable valve operating hand wheel having an aperture therein adapted to be placed substantially in alignment with the aperture of said valve body, a pin extending through the aperture in said hand wheel and into the aperture of said valve body for locking said hand wheel against rotation, snap fastening means pivotally connected to said pin for maintaining said pin in said apertures, and manually engageable means connected to said snap fastening means for releasing said snap fastening means and withdrawing said pin from said apertures to permit rotation of said hand wheel.

6. In a valve, the combination of a valve body having an aperture therein, a rotatable valve operating hand wheel having an aperture therein adapted to be placed substantially in alignment with the aperture of said valve body, a pin extending through the aperture in said hand wheel and into the aperture of said valve body for locking said hand wheel against rotation, snap fastening means pivotally connected to said pin for maintaining said pin in said apertures, and a pull cord attached to said snap fastening means for releasing said snap fastening means and for withdrawing said pin from said apertures to permit rotation of said hand wheel.

7. In a valve, the combination of a valve body having an aperture therein; a rotatable valve operating hand wheel having an upper surface provided with a substantially circular formation and an aperture extending through the hand wheel adapted to be placed substantially in alignment with the aperture of said valve body; a pin extending through the aperture of said hand wheel and into the aperture of said valve body; and snap fastening means comprising a ring-shaped portion pivotally connected to said pin and adapted to extend about said circular formation, and a projection on said ring-shaped portion adapted to resiliently engage said hand wheel beneath the outer peripheral edge thereof.

8. In a valve, the combination of a valve body having an aperture therein, a rotatable valve operating hand wheel having a depending flange provided with a recess, and having an upper surface provided with a substantially circular formation and an aperture extending through the hand wheel adapted to be placed substantially in alignment with the aperture of said valve body; a pin extending through the aperture of said hand wheel and into the aperture of said valve body; and snap fastening means comprising a ring-shaped portion pivotally connected to said pin and adapted to extend about said circular formation, and a projection on said ring-shaped portion adapted to extend into said recess and resiliently engage said hand wheel.

9. In a valve, the combination of a valve body having an aperture therein; a rotatable valve operating hand wheel having a depending flange provided with a recess, and having an upper surface provided with a substantially circular central upwardly projecting portion, said hand wheel having an aperture extending therethrough located substantially diametrically opposite the recess in said flange and located to be placed substantially in alignment with the aperture of said valve body; a pin extending through the aperture of said hand wheel and into the aperture of said valve body; snap fastening means comprising a ring-shaped portion pivotally connected to said pin and adapted to extend about said circular portion, and an eyelet on said ring-shaped portion adapted to extend into said recess and resiliently engage said hand wheel to lock said snap fastening means thereon; and a pull cord attached to the eyelet of said snap fastening means for moving said eyelet out of said recess to release said snap fastening means.

10. In a valve, the combination of a valve body having an aperture therein, a manual valve operating member having an aperture therein, a member extending through the aperture in said valve operating member and into the aperture of said valve body for locking said valve operating member against movement, fastening means connected to said last member for maintaining said last member in said apertures, a pull cord attached to said fastening means for releasing said fastening means and withdrawing said last member from said apertures to permit movement of said valve operating member, and a seal wire for securing said fastening means to said valve body.

11. A valve handle locking device of the class described, comprising a pin member, snap fastening means pivotally connected to one end of said pin member, said snap fastening means having a locking projection, and manually engageable means attached to said snap fastening means.

12. A valve handle locking device of the class described, comprising a pin member, snap fastening means pivotally connected to one end of said pin member, said snap fastening means having a locking projection, and a pull cord attached to said snap fastening means.

13. A valve handle locking device of the class described, comprising a pin; snap fastening means pivotally connected to said pin, said snap fastening means having an eyelet for locking said snap fastening means on a valve handle; and a pull cord attached to said eyelet.

14. A valve handle locking device of the class described, comprising a pin; and snap fastening means having a ring-shaped portion pivotally connected to one end of said pin, said snap fastening means having a locking projection at one end of and offset from said ring-shaped portion.

15. A valve handle locking device of the class described comprising a pin having an aperture adjacent one end thereof; wire-like snap fastening member inserted through said aperture to pivotally connect said snap fastening member to said pin, said snap fastening member having a ring-shaped portion and an eyelet on said ring-shaped portion; and a pull cord attached to said eyelet.

16. A valve handle locking device of the class described, comprising a pin; snap fastening means having a ring-shaped portion pivotally connected to one end of said pin, said snap fastening means having a locking projection at one end of and offset from said ring-shaped portion; and manually engageable means attached to said snap fastening means adjacent to said locking projection.

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