

Jan. 5, 1960

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2,919,833

MEANS FOR INFLATING LIFE SAVING DEVICES

Filed Dec. 23, 1957

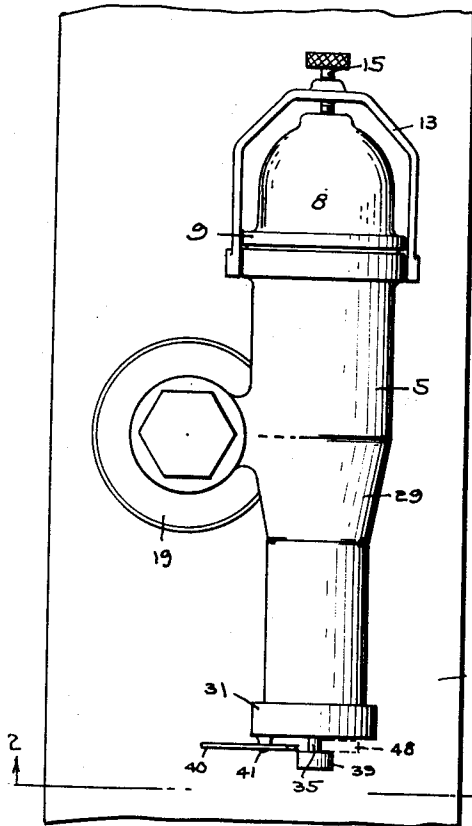


FIG. 1.

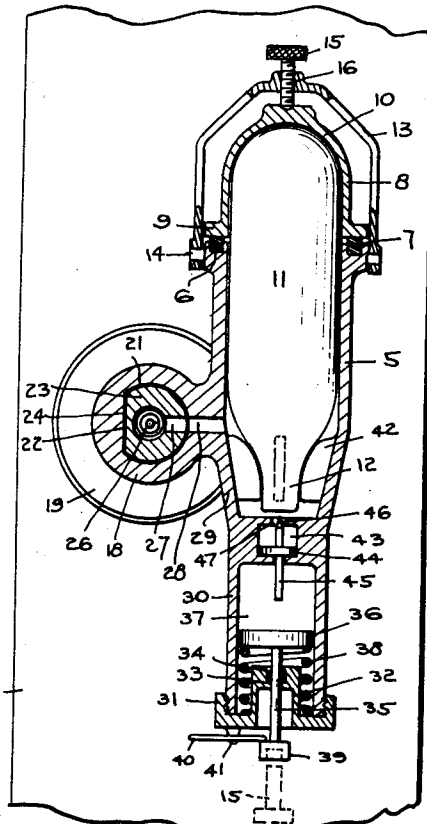


FIG. 3.

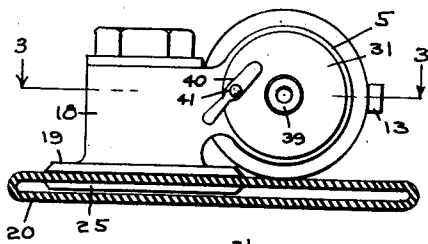


FIG. 2.

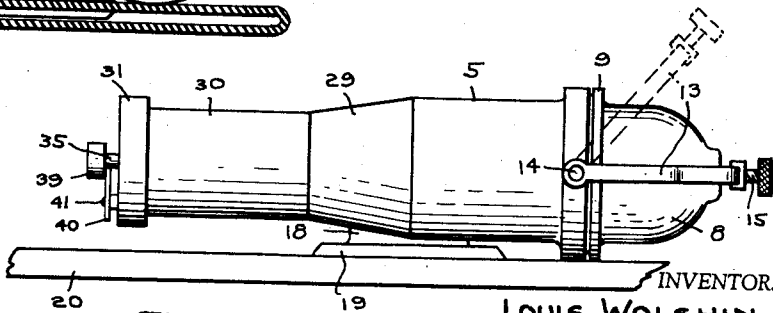


FIG. 4.

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MEANS FOR INFLATING LIFE SAVING DEVICES

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Application December 23, 1957, Serial No. 704,711

2 Claims. (Cl. 222-5)

This invention relates to inflatable means for life belts, life jackets, life rafts or other inflatable objects commonly employed as life saving means and for other purposes.

The device contemplates a novel mechanism that has a permanent attachment to an inflatable life belt or similar device, for use by lifeguards, swimmers or possibly for others who may find themselves in distress or while attempting to rescue others in distress and also for use by others who may faint, become unconscious or for any cause be unable to actuate a manually controlled release associated with the device and the device contemplating the dual purpose of either a manually actuatable air supply or an automatically actuatable air supply that functions when immersed in water.

The invention primarily concerns a novel source of highly compressed gas and a supporting medium therefor that is connected with a life belt, life jacket or other inflatable object and with the device having means that may be manually actuated to release the compressed gas to the life saving device for inflation purposes or the device may be automatically actuated to release the compressed gas by the use of a readily dissolvable tablet that serves to trigger control means to an operative position and that permits the actuation automatically of the mechanism when the structure is immersed in the water and whereby to automatically inflate the life belt or the like to support the individual to whom the belt is attached and especially should he accidentally fall into the water and be rendered unconscious or possibly panicky to the extent that he would be incapable of actuating mechanical release means for the gas supply, thus creating an extremely useful product having a dual purpose.

The device contemplates a tubular housing for the replaceable support of a conventional CO₂ cartridge and with the housing being coupled to the inflatable life belt, jacket or the like and with the housing having communication with the interior of the device to be inflated in a conventional manner and with the housing being provided in one end with puncturable means and driving means for the puncturing means that is actuatable either manually or by the use of a dissolvable tablet and under the influence of a compression spring, to drive the puncturing member into the CO₂ cartridge for releasing the highly compressed gas to the interior of the belt, jacket or the like and with the puncturing means automatically sealed against the escape of the pressurized gas after the puncturing operation and whereby all of the gas is directed to the interior of the belt.

The invention further contemplates a holder for a CO₂ cartridge that automatically centers the cartridge to maintain its puncturable end in alignment with a puncturing pin and with the neck portion of the cartridge being held in suitable spaced relation to the holder to permit of a free flow of the gas to the belt and with the puncturing pin operable under the influence of a spring biased hammer and with the hammer having a

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rod that extends outwardly axially of the holder in a manner whereby the spring and the hammer are sealed against the entry of water and with the rod being provided with a head that is engageable with a latch member to hold the hammer in a triggered position or for the reception of a dissolvable tablet between the head and a closure cap of the holder whereby the hammer will be released automatically when the tablet becomes immersed in water.

The invention further contemplates novel means for permitting the insertion of a CO₂ cartridge whereby it may be quickly and easily replaced without the use of tools and with the hammer being resettable to a triggered position in a novel manner.

Various novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings, wherein has been illustrated a preferred form of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

Figure 1 is a plan view of a device constructed in accordance with the invention and shown in operative attached relation to a life belt or the like,

Figure 2 is a section through the life belt, taken substantially on line 2-2 of Figure 1,

Figure 3 is a horizontal section taken substantially on line 3-3 of Figure 2 and,

Figure 4 is a side elevation of the device.

The device of this invention embodies a cylindrical housing 5 that is open at one end. The open end is circumferentially grooved at 6 for the reception of a compressible gasket 7. The open end of the housing is covered and uncovered by a cap 8, having a lower flange 9 that has normal seating engagement upon the gasket 7. The cap 8 is rounded as illustrated at 10 to conform to the rounded end of a conventional CO₂ cartridge 11, having a reduced neck portion 12 that is puncturable in a manner well understood in articles of this type. The cap 8 is held in closure position by a yoke 13 that is pivotally connected at 14 to the housing 5 and with the yoke being provided with a set screw 15 that is operable through a threaded opening 16 formed in the end portion of the yoke 13 and whereby the cap is forced downwardly to a sealed engagement with the gasket 7.

Intermediate its length, the housing is provided with a preferably integral hub portion 18 and with the hub portion being provided with an integral clamping plate 19, that has a sealed engagement with the outer surface of the life belt 20. The hub 18 is apertured axially at 21 and with the aperture having one flat side wall 22. Engageable within the aperture 21 is a correspondingly shaped stud 23, having one flat wall 24 that has mating engagement with the flat wall 22 of the hub. The stud 23 is provided with an enlarged flat clamping plate 25 that engages upon the inner side of the belt 20 and whereby to clamp the belt between the plates 25 and 19, it being understood of course that the belt has been previously apertured for the passage of the stud 23. The stud 23 is axially apertured for the reception of a conventional valve device 26. The stud is laterally ported at 27 while the housing and the hub are jointly ported at 28 and whereby to establish communication between the interior of the housing and the valve 26 and whereby to direct pressurized air from the housing to the interior of the belt, where it is held against escape by the valve 26.

The housing 5 intermediate its length is preferably tapered as shown at 29, to terminate in a reduced cylin-

drical extension 30. The extension 30 is open at its end and is closed by a detachable closure cap 31. The cap 31 has an axially arranged and inwardly extending cylindrical cup 32, having an axial bore 33.

Axially shiftable with respect to the cup 32 and slidable through the bore 33 in overriding contact with a sealing gasket 34, is a piston rod 35, having connection with a piston head 36 that is slidable within a cylindrical chamber 37, formed in the extension 30. The piston 36 functions as a hammer and is biased inwardly by a compression spring 38, that bears beneath the piston 36 and upon the inner surface of the cap 31. The rod 35 is provided with an enlarged head 39 and the head 39 is preferably axially apertured and threaded for the reception of the screw 15, when the device is to be reset. A latch finger 40, is pivoted at 41 to the face of the cap 31 and its end is shiftable to a position behind the head 39 as a means to retain the hammer in a compressed position and for manual release thereof. The housing 5 is provided with radial ribs 42, forming seats for the neck portion 12 of the cartridge 11. The housing is further molded to form a cylindrical chamber 43 in which is operable a piston 44, carrying a relatively slender piercing rod or pin 45, having a sharpened end 46 that is directed toward the puncturable end of the neck 12 of the cartridge. The sharpened end of the pin operates through an aperture 47 formed in the casting and with the lower end of the pin 45 being in direct axial alignment with respect to the piston 36.

Operation

In the use of the device, the screw 15 is loosened and the yoke 13 swung to one side so that the cap 8 may be removed. A cartridge 11 is then inserted into the housing 5, to rest upon the ribs 42, thus limiting the position of the cartridge. The cap 8 is replaced and the yoke swung upwardly, at which time the screw 15 is turned downwardly, forcing the cap into a sealed engagement with the gasket 7. The screw 15 may first be employed to be threaded into the aperture of the head 39 formed on the rod 35, such being necessary to retract the hammer 36 forwardly to compress the spring 38 and, when fully compressed, the latch 40 is swung downwardly so that its end engages behind the head 39 to hold the hammer 36 in a triggered position. The screw 15 is then replaced into the yoke 13 and firmly seated so that the flange 9 compresses the gasket 7 and whereby to effectively seal the housing against the escape of compressed gas when the device is actuated. When the tube 20 is to be inflated, such as may be necessary in various times of emergency, the operator merely swings the latch 40 to a release position, illustrated in Figure 2, releasing the hammer 36, permitting it to quickly shift upwardly, striking upon the pin 45 and driving the point of the pin into the neck portion of the cartridge. When this happens, the hammer will be somewhat retracted, since the spring is not capable of holding the hammer in engagement with the pin and, upon puncturing the cartridge, the gas will flow outwardly, past the ribs 42 and through the ports 27 and 28 to pass downwardly by the valve 26 to inflate the tube. Simultaneously, the force of the gas escaping from the cartridge 11, impinges upon the disk 44, forcing the disk to the bottom of the chamber 43 and the pressure exerted thereon will effectively prevent the escape of any air past the pin 45 to the chamber 37. The gas continues to flow into the tube until the cartridge has been fully discharged. The escaping gas not only forces the disk 44 to a sealed contacting engagement with the bottom of the chamber 43, but the disk likewise functions as a piston whereby the escaping gas forces the puncturing end of the pin outwardly of the cartridge. The pin 45 and its disk 44 are floatingly mounted in the chamber 43. When the device is to be set for automatic actuation, the hammer 36 is triggered as before by the use of the screw 15 and, a dissolvable tablet, such as an aspirin or salt tablet, indicated in dotted lines at 48 in Figure 1 is disposed behind the

head 39 where it will be fixedly held by the pressure of the spring 38 and the tendency to bind the tablet against the lower face of the cap 31. Thus, when an individual may be working on a bridge or possibly fishing, and accidentally falls into the water, the tablet will dissolve and permit the spring 38 to automatically project the hammer 36 inwardly to cause the pin 45 to puncture the cartridge 11. The use of the dissolvable tablet is normally employed when a condition exists such as that just described and it may be, that the operator may employ both the tablet and the latch 40 and with the latch 40 to be subsequently released after a person reaches the point of operations and whereby to set the mechanism for automatic use, should he be accidentally precipitated into the water and possibly, due to accidental injury or other causes be incapable of actuating the latch 40 and in such case, the device will be automatically released. It should be understood of course that the belt, jacket or the like to which the device is attached will be secured to the body of the person in a position that will maintain his head above water, even though he be unconscious. After the device has been actuated to inflate a life belt or the like, it of course becomes necessary to reset the hammer 36 and to replace the cartridge 11 for subsequent operation. Usually, the operator will employ the screw 15 to retrigger the hammer 36 and to permit the movement of the latch to a holding relation with respect to the head 39, the screw 15 then being returned to its normal position with respect to the yoke 13.

It will be apparent from the foregoing that a very novel construction has been provided for either manually or automatically inflating a life belt, life jackets, life rafts or the like. The structure is simple and the piercing means for the cartridge is believed to be novel. The hammer and its compression spring are housed against the entry of water to the chamber 37 and it will be apparent, that if the chamber 37 were permitted to fill with water, the action of the hammer 36 would be impeded and of insufficient force to drive the piercing pin into the cartridge 11. The gasket 34 permits of the free sliding movement of the rod 35, yet prevents any seepage of water into the chamber. The parts are few and simple, are strong, durable and highly effective as a means for the quick piercing of the conventional CO₂ cartridge. It is contemplated of course that the parts shall be formed of materials having a high degree of resistance to corroding or rusting and further, the device is of such size as to be conveniently supported upon the article to be inflated, without interfering in any manner with the floatation ability of the article.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An inflation device for attachment to an inflatable type life belt, the inflating device comprising a cylindrical housing open at one end for the replaceable reception of a pressurized gas holding cartridge, the open end of the housing adapted to receive a closure cap, means for clamping the closure cap in sealing arrangement to the open end of the housing, a coupling carried by the housing and whereby the housing is connected to and communicates with the belt or the like to be inflated, valve means in the coupling to maintain the life belt in the inflated position, the said coupling being ported to communicate with the interior of the housing and whereby pressurized gas may pass from the housing to the coupling for inflating the life belt, the said cartridge being puncturable at one end, the housing being reduced intermediate its ends to form a coaxial tubular extension open at its lower end, a closure wall between the housing and the extension, the closure wall being apertured

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and chambered for the reception of a cartridge puncturing pin and with the pin carrying a collar movable in the chamber and whereby to limit the movement of the pin to and from a puncturing engagement with the cartridge, a closure cap for the open end of the tubular extension, the closure cap being provided with an inwardly extending inverted cup that is concentric to the extension and with the cup being apertured axially with respect to the pin, packing means disposed adjacent the last named aperture, a hammer device that is slidable in the tubular extension, a rod carried by the hammer device and that extends through the aperture of the cup to project outwardly of the last named cup, a head formed upon the outer end of the rod, latch means pivotally supported upon the cap and that is shiftable to and from an engagement with the head and whereby to maintain the hammer in a predetermined inoperative position, a spring device disposed within the tubular extension and that jointly bears against the cap and the hammer and whereby to bias the hammer into engagement with the piercing pin when the latch device is released, the said head constituting a means for manually pulling the hammer to a

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compressive engagement with the spring and whereby to permit the engagement of the latch therewith.

2. The structure according to claim 1 wherein the clamping means for the first named closure cap comprises a yoke that is pivotally supported upon the housing and that is shiftable to and from an overlying relation with respect to the first named cap, a set screw carried by the yoke and that has a clamping engagement with an end of the cap, the said housing adjacent its inner end being provided with radial ribs that constitute a seat for the reception of a neck portion of the cartridge and whereby to limit the movement of the cartridge into the housing.

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