March 6, 1962 E. S. HENNIS ET AL 3,023,932

INFLATOR FOR INFLATABLE APPLIANCE

Filed April 13, 1959

FIG. 1

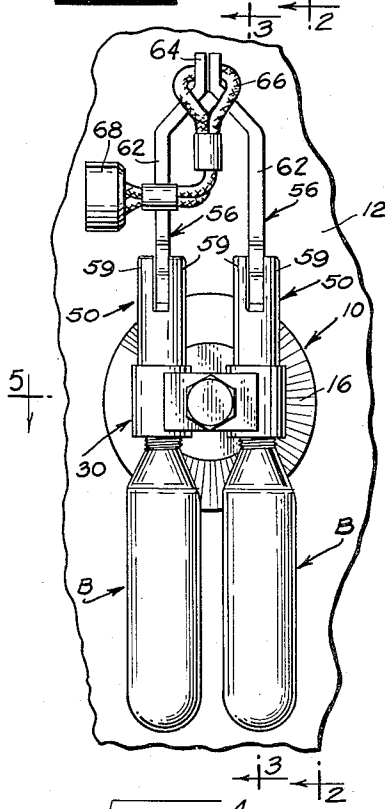


FIG. 2

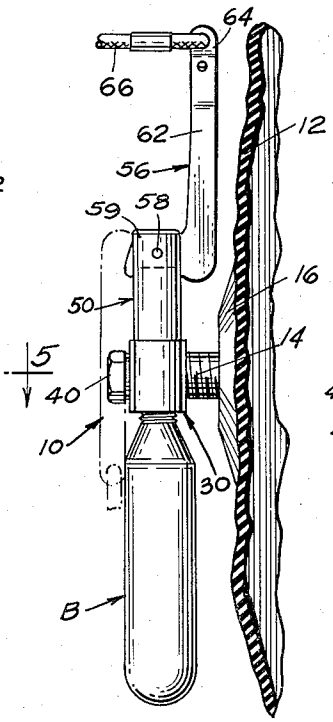


FIG. 3

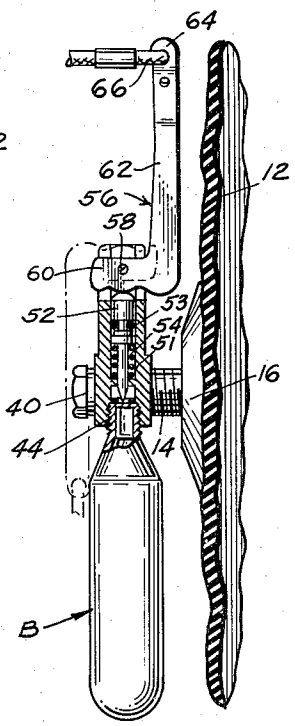


FIG. 4

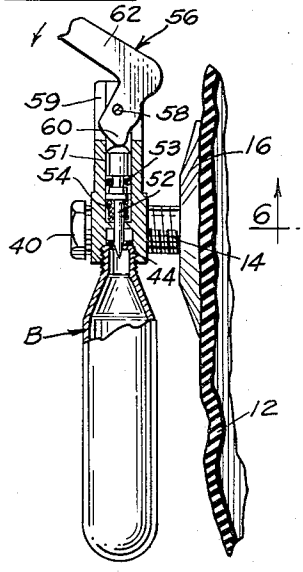


FIG. 5

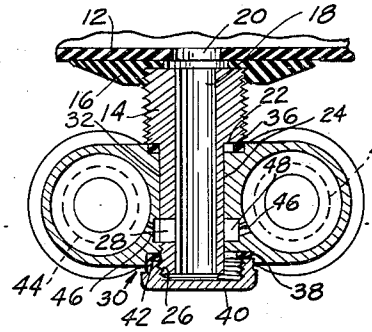
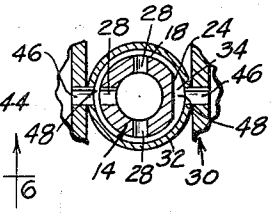


FIG. 6



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INFLATOR FOR INFLATABLE APPLIANCE

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2 Claims. (Cl. 222—5)

This invention relates to an inflator for life-saving equipment or the like, and more particularly relates to an assembly which provides means of increased reliability for injecting gas under pressure into a gas-receiving compartment of an inflatable life-saving appliance.

Inflatable life rafts and jackets and other inflatable equipment which may be inflated by discharge of pressurized CO_2 gas thereinto are of course well known. Present systems provide a bulb-receiving attachment which is connected to the body to be inflated, and said attachment is provided with piercing means for piercing a bulb of compressed gas thereby effecting release of the gas through the attachment into the body to be inflated.

In the inflation of large volume bodies, of course the bulbs are correspondingly larger to provide the requisite amount of inflating gas. Obviously, when the bulb and attachment become large and bulky they are inconvenient from the standpoint of storage, and particularly in the case of inflatable life jackets which may be worn by members of the Armed Forces, a bulky attachment may seriously interfere with the wearer's activities.

It has further been observed that at relatively low temperatures the rate of discharge from a pierced bulb slows down, and, of course, where a life vest wearer has been thrust into icy waters, as may occur with emergency bail-outs from disabled aircraft operating over Arctic Ocean areas, certain factors are of paramount importance, namely, prompt and reliable inflation of the life vest.

The object of this invention is to provide an inflator for inflatable life-saving appliances or the like which is of greater reliability than existing inflators.

Another obect of this invention is to provide an inflator for inflatable appliances which is characterized by its relative compactness and reduction in bulk.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

A preferred embodiment of the invention is shown in the accompanying drawings, in which:

FIGURE 1 is an elevation view showing the inflator of this invention.

FIGURE 2 is a side elevation view taken looking from line 2—2 of FIGURE 1, and FIGURE 2 shows in dot-dash lines the attitude of the inflator actuator prior to piercing of the gas bulbs, while showing in full lines the actuator in bulb-piercing position.

FIGURE 3 is similar to FIGURE 2 but is a partial cross-section view taken substantially on line 3—3 of FIGURE 1.

FIGURE 4 is similar to part of FIGURE 3 but shows the actuator in an intermediate, bulb-piercing position.

FIGURE 5 is a cross-section view taken on line 5—5 of FIGURE 1.

FIGURE 6 is a fragmentary cross-section view taken on line 6—6 of FIGURE 5.

Referring now to the drawings, there is shown in FIGURE 1 an inflator generally indicated at 10 which is attached to a wall 12 of an inflatable appliance, such as a life vest or life raft. The inflator includes an elongated tubular stud 14 connected at one end to appliance-attachment means shown as an annular flange 16 constructed of rubber or rubberized fabric, or the like, and which flange 16 provides means for attachment to the wall 12 of an inflatable appliance in a manner well known in the art. The tubular stud 14 has a central bore 18 which communicates with the interior of the appliance through an opening 20 in the wall 12 of the appliance.

The tubular stud 14 is provided with an annular shoulder 22 intermediate the ends of the stud, and a portion of the stud 14 located between the shoulder means 22 and the extended terminus of the stud is formed with a non-circular portion, such as the flat 24 best seen in FIGURE 6. The extended terminus of stud 14 is threaded at 26 and the wall of stud 14, between shoulder means 22 and threaded end 26, is provided with a transverse bore 28 which communicates with the central bore 18 of the stud. While only a single transverse bore 28 may be used, FIGURE 6 discloses that a plurality of such bores may be provided, if desired, and such bores should preferably be located in a single plane perpendicular to the axis of stud 14.

There is also provided a manifold means, generally indicated at 30 and defining a central stud-receiving bore 32 for slidably receiving therein the stud 14. The manifold is also formed with a non-circular portion 34 in bore 32 which cooperates with the flat 24 on stud 14 for restricting rotation between stud 14 and manifold 30 and for maintaining the manifold at a selected attitude on the stud 14. The manifold 30 provides a portion for abutting against shoulder means 22 on stud 14, and appropriate annular gasket means 36 are provided between the said portion of the manifold and the shoulder means 22, to prevent leakage therebetween. The manifold 30 is provided with an annular recess 38, and threaded cap means 40, connected to the threaded terminus 26 of stud 14, serves both to clamp the manifold 30 against shoulder means 22 and also to close off the longitudinal bore 18 of stud 14. Gasket means 42 are provided in recess 38 against which the cap 40 seals.

The manifold 30 is provided with a plurality of threaded apertures, or sockets, 44 arranged so that their axes are parallel. These threaded sockets 44 are adapted to receive the threaded stud, or neck, of a cartridge or bulb B containing compressed gas. The plurality of sockets 44 permits a plurality of bulbs B to be connected thereto as shown in FIGURE 1. Gas passageways 46 are provided between each socket aperture 44 and an annular recess, or groove, 48 formed in the manifold 30 and opening to bore 32, and being located co-planarly with the transverse bores 28 in the stud 14, when the manifold 30 is properly mounted on the stud 14, as can best be seen in FIGURES 5 and 6. This arrangement communicates apertures 44 to bore 18 in stud 14.

The manifold 30 also carries thereon a plurality of cartridge-piercing mechanisms 50, with one such mechanism provided for, and in alignment with, each bulb-receiving socket 44. Each cartridge-piercing mechanism includes a head piercing pin 52 carried in a bore 51 in the manifold 30 for reciprocal movement therein, and a gasket 53 is provided carried by pin 52 for sealing engagement with the walls of said bore in which the headed piercing pin is adapted to move. There is provided a spring 54 which normally biases the piercing pin to a retracted position, as seen in FIGURE 3, and there is provided a cam lever 56 which is operable to thrust the piercing pin 52 forwardly, against the bias of spring 54, to pierce the head of a gas bulb B, in a manner as seen in FIGURE 4. One piercing mechanism 50 is aligned with, and cooperates with, each cartridge-receiving aperture 44, to permit of simultaneous piercing of the plurality of bulbs B carried by the manifold 30.

Each cam lever **56** is arranged for pivoting about a pivot pin **58** carried by a pair of spaced ears **59** on manifold **30**, and these pivot pins **58** are arranged in spaced, axial alignment with each other. Each cam lever **56** has a pin actuating portion **60** and a lever portion **62**. The lever portions **62** are provided with ears **64** at their extended ends which are pierced so that a member extending transversely through all the pierced ears **64** operates to gang the plurality of cam levers **56** together, such as by means of a cable **66**, or the like, having a manual control **68** connected thereto, so that, upon actuation of the manual control **68**, all cam levers **56** operate simultaneously to effect simultaneous piercing of the plurality of compressed gas cartridges B.

The simultaneous piercing of the gas cartridges B permits of rapid discharge of the compressed gases from the cartridges B through the plurality of passageways **46** and through transverse bores **28** to the interior of the inflatable appliance. The fact that two compressed gas bulbs are pierced simultaneously permits of more rapid gas discharge from said plurality of bulbs compared to what would obtain from the piercing of a single bulb, thereby providing for more rapid inflation of the inflatable appliance.

As another desirable feature, in the event one of the compressed gas cartridges is defective, the other cartridges will serve to discharge their contents into the inflatable appliance, thus making the use of this inflator, with a plurality of gas cartridges, of decided advantage over an inflator which relies upon but a single cartridge, because if the single cartridge is defective, then the entire appliance is useless, while if one of the cartridges of a plural cartridge inflator is defective, there is still some inflation of the appliance, and this may serve to keep the wearer of the appliance afloat for a sufficient period of time to permit the appliance wearer to effect further inflation of the appliance by oral means, as is generally provided for with such appliances.

While there has been shown and described a particular embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and, therefore, it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What we claim as new, and desire to secure by Letters Patent of the United States, is:

1. An inflator for inflatable appliances comprising, in combination: a single hollow, elongated, tubular stud having annular appliance-attachment means connected to one end thereof, shoulder means on said stud intermediate the ends thereof, a portion of said stud between said shoulder means and the other end of said stud being non-circular, said stud being threaded adjacent said other end, and said tubular stud being transversely apertured between said shoulder means and said other end of the stud; manifold means including a stud-receiving bore having a non-circular portion thereof for cooperation with said non-circular portion of said stud to restrict rotation therebetween, said manifold means being positioned on said tubular stud between said shoulder means and said other end of the stud; cap means threaded on said other end on the tubular stud for closing same and for clamping said manifold means between said cap means and said shoulder means; said manifold means including a plurality of threaded apertures for receiving threaded compressed gas cartridges thereinto, gas passageways in said manifold means communicating all said threaded apertures to said single tubular stud; a plurality of cartridge-piercing mechanisms each including a cam lever carried on said manifold means, said cam levers each being mounted for pivoting about an axis perpendicular to the longitudinal axis of said stud, there being one said piercing mechanism aligned with, and cooperating with, each said cartridge-receiving aperture, and means for uniting the cam levers to enable both cam levers to pivot simultaneously for operating said piercing mechanisms responsive to a force applied to either or both levers.

2. An inflator for inflatable appliances comprising, in combination: a hollow, elongated, tubular stud having annular appliance-attachment means connected to one end thereof, shoulder means on said stud intermediate the ends thereof, a portion of said stud between said shoulder means and the other end of said stud being non-circular, said stud being threaded adjacent said other end, and said tubular stud being transversely apertured between said shoulder means and said other end of the stud; manifold means including a stud-receiving bore having a non-circular portion thereof for cooperation with said non-circular portion of said stud to restrict rotation therebetween, said manifold means being positioned on said tubular stud between said shoulder means and said other end of the stud; cap means threaded on said other end of the tubular stud for closing same and for clamping said manifold means between said cap means and said shoulder means; said manifold means including a plurality of threaded apertures for receiving threaded compressed gas cartridges thereinto, gas passageways in said manifold means including an annular groove in said manifold means communicating all said threaded apertures to said stud-receiving bore and to said transverse aperture in said tubular stud, a plurality of cartridge-piercing mechanisms carried by said manifold means with one said piercing mechanism aligned with, and cooperating with, each said cartridge-receiving aperture, and means including a pair of united cam levers each pivotable about an axis perpendicular to the longitudinal axis of said stud to enable both cam levers to pivot simultaneously irrespective of which cam lever is pivoted for operating the respective piercing mechanisms.

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