July 6, 1948. C. H. KEARNY 2,444,449

VALVE STEM

Filed March 27, 1943

Fig. 2.

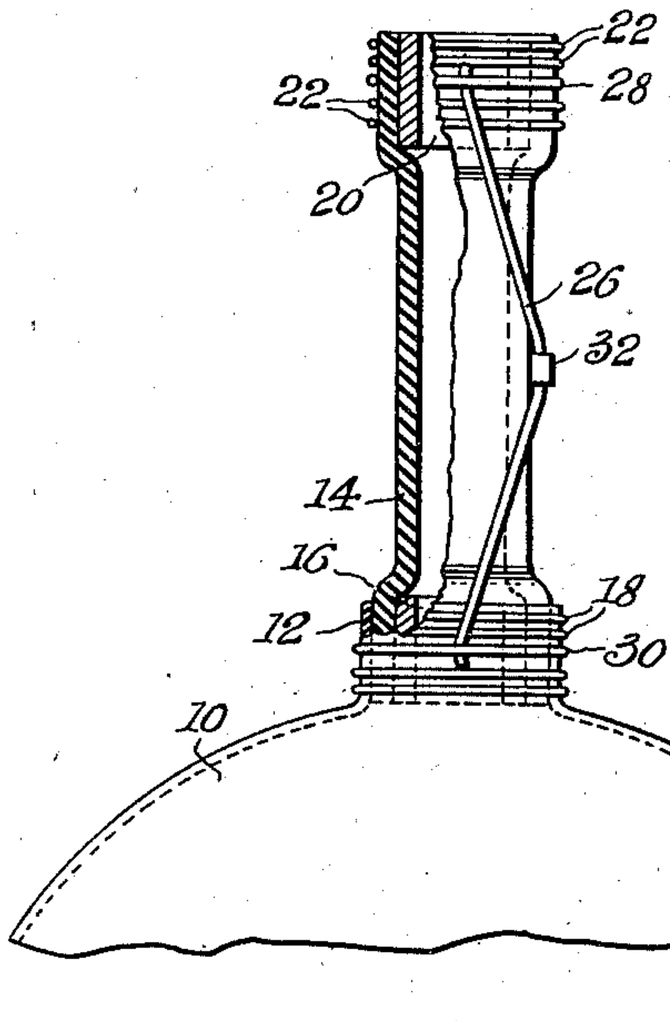


Fig. 1.

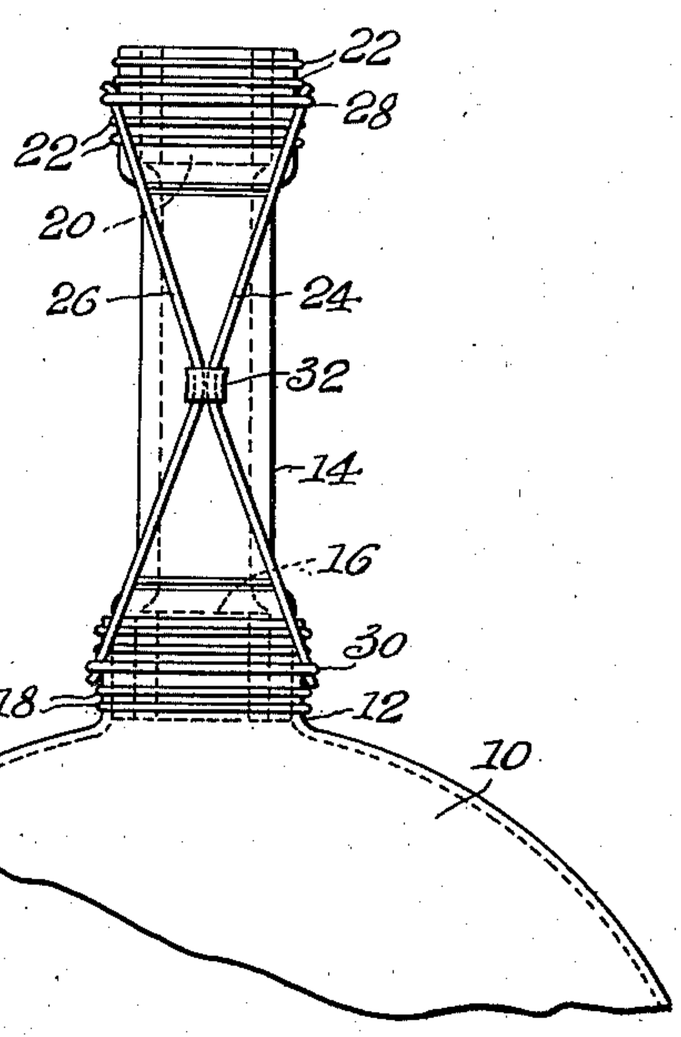
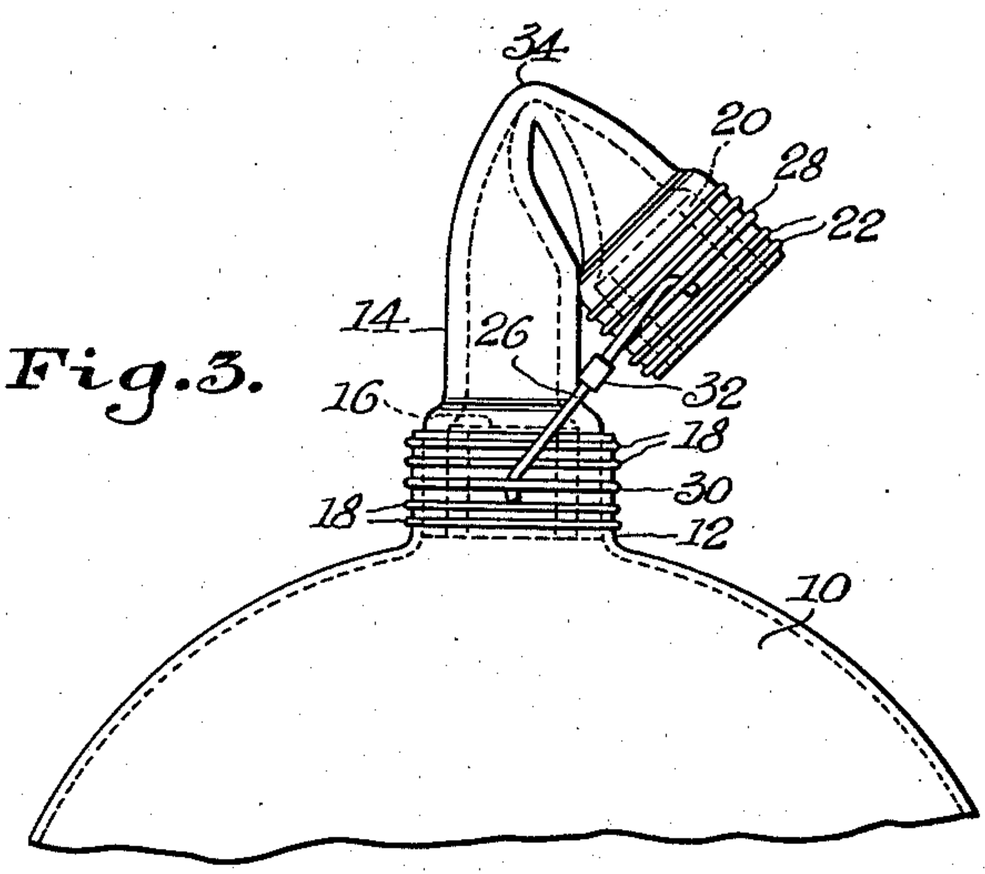


Fig. 3.



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2,444,449

VALVE STEM

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3 Claims. (Cl. 251—5)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of any royalty thereon.

This invention relates to improvements in valve constructions, and more particularly to those of the type used in connection with breath inflatable containers, such as bladders of rubber or the like material, life preservers, air cushions and similar articles having a stem adapted to be folded on itself to prevent escape of air from the container.

It is an object of this invention to provide a valve which is simple and positive in its action and which will be automatically closed after inflation of the container.

It is a further object of my invention to provide a valve of the type described which will present a wide, unobstructed passage and, accordingly, afford minimum resistance to the flow of air, when the valve is in its open position.

The valves in present day use with breath inflated containers, such as those of the type shown in my pending application Serial No. 416,329, filed October 24, 1941, which has matured into Patent 2,391,906, January 1, 1946, are open to the disadvantage that the inflowing air is forced to act against obstructions such as springs or other devices for closing the valve against a valve seat. When such containers must be inflated by an individual, this disadvantage becomes noticeable and results in the rapid tiring of the person using it. In order to overcome this defect and to produce a valve having certain other advantages, I have designed the following apparatus, the operation of which will be clear from a consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which—

Fig. 1 is a front elevation of an embodiment of the invention;

Fig. 2 is a side view of Fig. 1, partially broken away to illustrate the construction and arrangement of the individual parts of the valve;

Fig. 3 is a side view of the valve in its closed position.

Referring particularly to Figs. 1 and 2, the numeral 10 represents an inflatable container of rubber or other flexible material which, in turn, is provided with a throat 12. For the valve stem there is provided a neck 14 consisting of a section of soft rubber tube or other similar substance, the walls of which are thickened to cause the stem to acquire an erect position as shown in Figs. 1 and 2 of the drawings, with an unobstructed

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passage to the exterior of the container. At the upper and lower ends of the neck 14 there are arranged short sections of metal or plastic tubing 20 and 16, respectively, to provide rigidity at the mouthpiece and at the point of attachment to the throat 12. The reinforcing sections 16 and 20 are placed in the ends of the neck 14 and then the assembly is placed inside of the throat 12 of the device to be inflated. The assembly is secured by any suitable means such as the bindings 18 and 22, respectively.

Near the upper and lower ends of the neck 14 there is attached an elastic member 26. On the other side of the neck 14 a corresponding elastic member 24 is secured at points diametrically opposite the points of securing the member 26. The elastic members 24 and 26 may be secured in any suitable fashion such as by the upper and lower bands 28 and 30. The elastic members 24 and 26 are brought together in the front of the valve and are maintained in that position by keeper 32 through which the elastic members are free to move.

When the valve stem is in the erect position, as shown in Figs. 1 and 2, the thickness of the wall of the valve stem is sufficient to maintain the valve stem in an erect position against the action of the elastic members 24 and 26. Upon moving the upper end of the valve stem slightly toward the front where the keeper 32 maintains the elastic members together, the pull of the elastic members is sufficient to overcome the resiliency of the thickened wall of the neck, whereby the upper end of the neck is automatically actuated into a folded position by the elastic members.

Referring to Fig. 3 it will be seen that, in their closed position, the elastic members 24 and 26 have caused the neck 14 to fold over against itself bringing the ends into juxtaposition. This folding over produces a kinking action at the center of the neck 14 resulting in a complete closure of the valve as shown at 34.

When it is desired to use the valve when in its folded condition it is merely necessary to grasp the upper end of the valve and raise it against the action of the elastic members 24 and 26 until the resiliency of the thickened wall of the neck is sufficient to overcome the pull of the elastic members, whereby the neck will automatically assume an erect position. The elastic members 24 and 26 may be designed so that this may be done merely by grasping the neck between the thumb and one or more fingers and compressing the tube. The resiliency of the tube, once the kinked portion is compressed, along with the

straightening action caused by grasping, forces the neck to take a wide-open cylindrical form.

Thus, while the person is inflating the device, breathing in through his nose and blowing out through his mouth into the valve, there will be no resistance other than the compression of the air for the inflowing air to overcome as it enters the bladder.

After the device has reached the desired degree of inflation, to close the valve it is merely necessary to move the upper end of the neck allowing the elastic members 24 and 26 to cause the neck automatically to fold over upon itself to the position shown in Fig. 3. The keeper 32, by drawing the elastic members 24 and 26 to one side of the neck, will cause them to always fold the neck to the same side. This keeper 32 is desirable in order to insure a positive and quick closure and to increase the life of the neck 14 as the degree of bending will be approximately half that which it would receive if the valve were allowed to fold towards either side.

By means of the thickened wall of the neck and with the elastic members connected in the manner disclosed an alternate automatic opening or closing of the passage through the valve stem may be produced.

While I have described my invention with particularity, it is to be understood that I do not wish to be limited to the particular details and assemblies illustrated since various modifications within the spirit of the invention will suggest themselves to those skilled in the art.

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

1. A valve adapted to be attached to an inflatable object and comprising a resilient body member having a passage therethrough and a wall of substantial thickness, an end portion of said body member arranged to be folded upon itself, a pair of diametrically opposed elastic members connected at opposite ends of the flexible body in substantial alignment with the longitudinal axis thereof to actuate said end portion into a folded position against an adjacent side portion of said body member for closing said passage and means for maintaining the centers of said elastic members in juxta-relation, whereby said end portion is caused to be folded always on the same side portion of said body member, with the end portion of said body member adapted to be manipulated to open said passage against the action of said elastic members for closing said passage, said elastic members arranged on the body member and connected to said end portion in a manner that when the end portion is in a certain raised position the resiliency of the thickened wall pulls the body member erect against the action of said members.

2. A valve member adapted to be attached to an inflatable object and comprising a resilient body member having a passage of substantially uniform diameter therethrough, and having a free end portion adapted to be folded upon itself, said body member being formed with a wall of

substantial thickness adapted to maintain said passage at a substantially uniform diameter throughout its length when said free end portion is in an erect position, elastic means secured to opposite ends of the body member at points substantially coincident with the longitudinal axis of the body member for actuating said free end portion to a folded position against an adjacent portion of said body member for closing said passage, with the said end portion of said body member adapted to be manipulated to open said passage against the action of said means for closing said passage, and means mounted on the elastic means for maintaining the centers of the elastic means compressed together for causing the free end portion of the body member to fold to one side of the tube responsively to manipulation of the free end portion away from dead center position of the body member relative to the inflatable object, the elastic means and the said means mounted thereon being relatively slidable responsively to movement of the body member between closed and open positions.

3. A valve adapted to be attached to an inflatable object and comprising a resilient body member having a free end, the said body member also having a passage therethrough and a wall of substantial thickness, an end portion of the body member being arranged to be folded upon itself, a pair of diametrically opposed elastic members connected to actuate the end portion to a folded position against an adjacent portion of the body member for closing the passage, with the end portion of the body member being adapted to be manipulated to open the passage against closing tendency of the elastic members on the body member, the elastic members being operatively disposed relative to the body member and connected to the end portion so that when the end portion is in a raised position approaching dead center, the thickened wall pulls the body member erect against the action of the elastic members, and means mounted on the said elastic members for causing the said end portion of the body member to fold to one side of the body member responsively to manipulation of the said end portion through a predetermined distance away from dead center of the body member relative to the inflatable object.

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