United States Patent [19]

Roberts

[11] **3,747,140**

[45] **July 24, 1973**

[54] **INFLATABLE VEST HAVING A QUICK-RELEASE HOSE CONNECTION TO SUPPLY TANK**

[75] Inventor: **Robert E. Roberts**, Torrance, Calif.

[73] Assignee: **Under Sea Industries, Inc.**, Compton, Calif.

[22] Filed: **Oct. 12, 1971**

[21] Appl. No.: **188,082**

[52] **U.S. Cl.** **9/319**, 61/70

[51] **Int. Cl.** **B63c 9/08**, B63c 11/22

[58] **Field of Search** ..... 9/311, 313, 314, 9/316, 319, 340, 341, 342, 329; 61/69 R, 70; 128/1 A

[56] **References Cited**

UNITED STATES PATENTS

3,436,777	4/1969	Greenwood	9/313 X
3,107,373	10/1963	Mellon, Jr. et al.	9/313
3,147,499	9/1964	Nelson et al.	9/313

Primary Examiner—Milton Buchler
Assistant Examiner—Paul E. Sauberer
Attorney—Flam and Flam

[57] **ABSTRACT**

To facilitate inflation of an underwater safety vest, an air supply tank hose is provided with a valved, quick-release connector which mates with and is latched to a coupling on the vest. The coupling includes a check valve and a tubular projection received by a bore in the hose connector housing. A normally closed valve on the hose connector is actuated by depression of a handle to supply air for vest inflation. When the connector is unlatched, a bias spring urges the tubular projection out of the bore to insure quick disconnect of the assembly.

9 Claims, 3 Drawing Figures

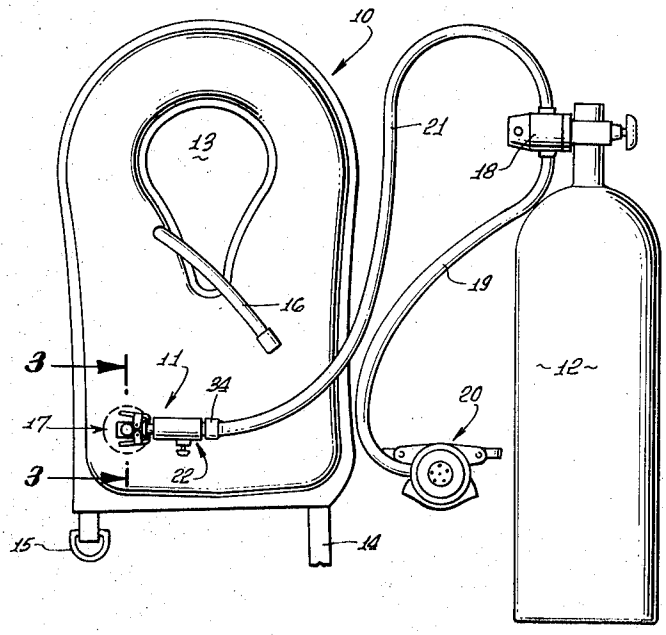


FIG. 1.

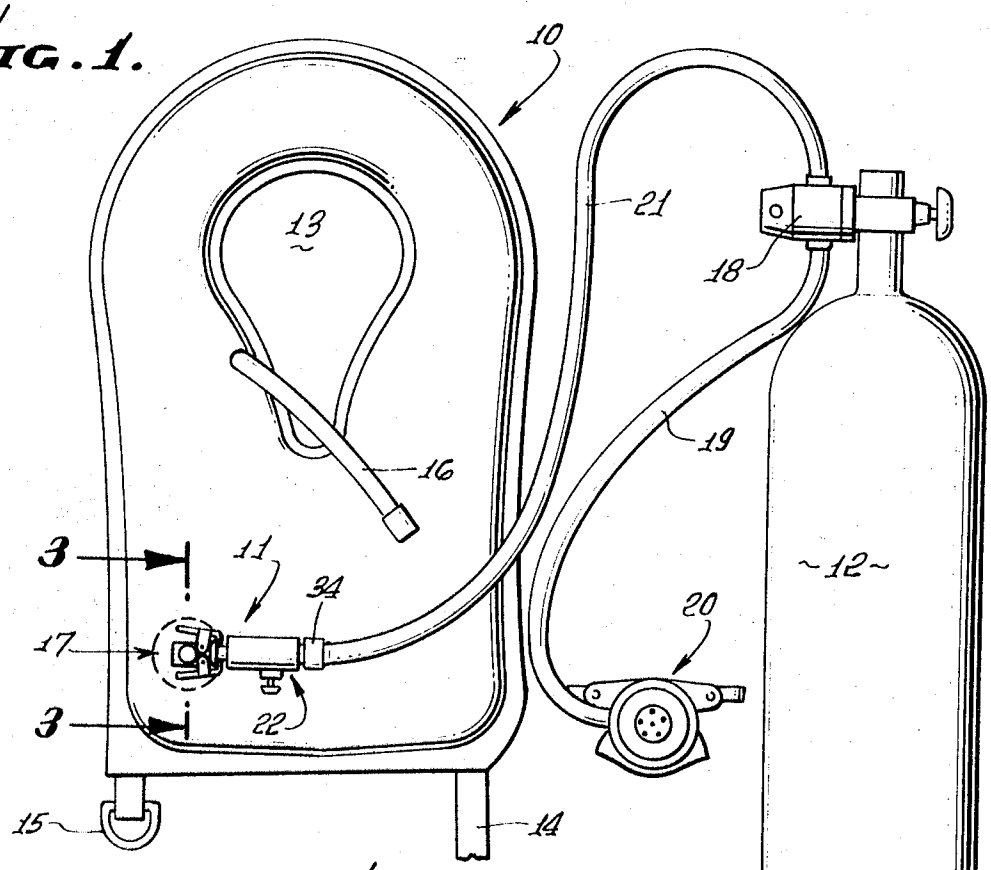


FIG. 2.

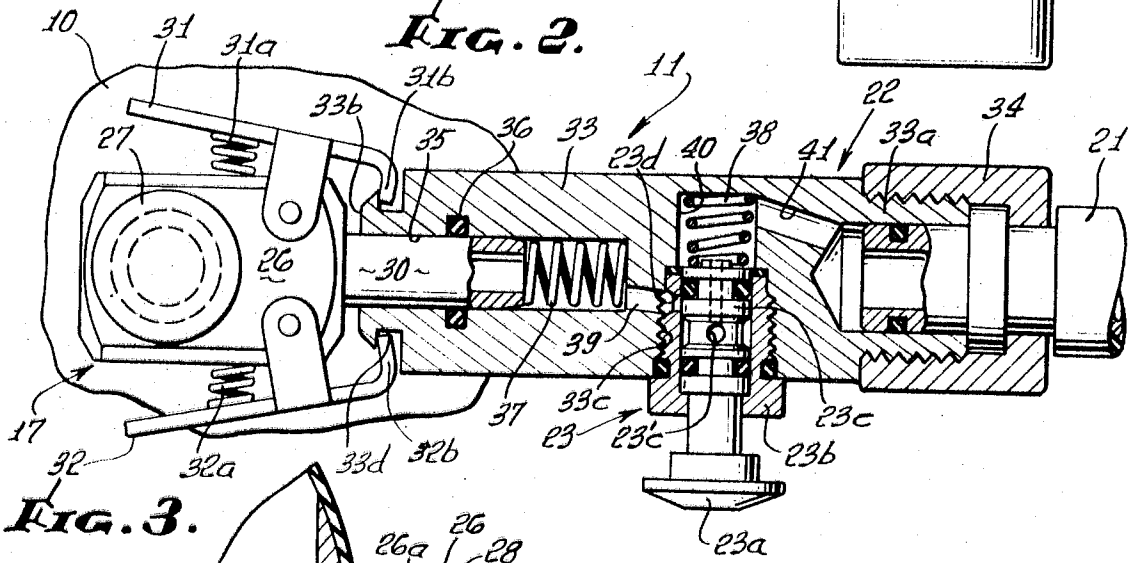
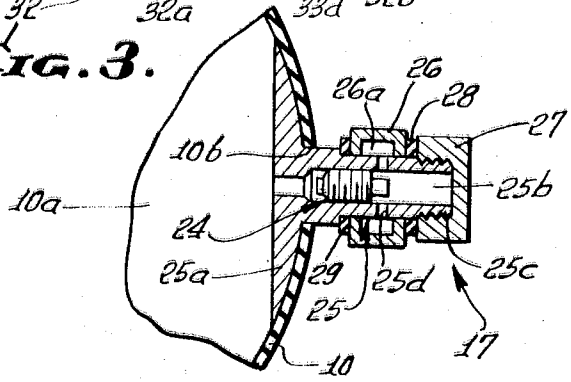


FIG. 3.



INVENTOR.
ROBERT E. ROBERTS
BY
Flam and Flam
ATTORNEYS.

INFLATABLE VEST HAVING A QUICK-RELEASE HOSE CONNECTION TO SUPPLY TANK

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a quick-disconnect and valve assembly facilitating inflation of an underwater safety vest from a scuba supply tank.

2. Description of the Prior Art

Many aquatic divers prefer to wear a safety vest which can be inflated under water to regulate the buoyancy of the diver, or to assist in bringing him safely to the surface. Normally, the vest is empty, provision being made to inflate the vest rapidly under emergency conditions or when added buoyancy is needed.

In the past, most underwater safety vests have used a self-contained inflation source. For example, some vests include a replaceable cartridge of compressed CO_2 gas. A detonator opens the cartridge for instant inflation of the vest. Alternatively, the vest may be inflated from a self-contained compressed air cylinder. Such gear is shown in the U.S. Pat. No. 3,536,071 to Ferrando, the vest also having a breathing tube permitting the inflated vest to serve as an emergency air supply for the diver.

Such self-contained inflation sources represent an additional item for the diver to carry, and must be replaced or refilled after each use. Should the CO_2 cartridge not detonate or the inflation air supply be exhausted, there is no way for a companion diver to use his equipment to inflate the inoperative vest of the other diver.

The supply tank of the diver's self-contained underwater breathing apparatus (scuba tank) represents a potential source of air to inflate a safety vest. The problem is one of implementation. Permanent connection of the supply tank hose to the vest is unsatisfactory, as it would be impossible for the diver to remove or abandon his breathing gear independently of the vest during an emergency situation. A hose connection assembly is desirable which (a) would permit a diver to inflate his own or another vest from the scuba supply tank, (b) could be attached to or released from the vest quickly, without tools, and (c) would include appropriate valves to control inflation and prevent loss of air. An object of the present invention is to provide an underwater safety vest including a quick disconnect and valve assembly having such features.

SUMMARY OF THE INVENTION

To achieve this objective, there is provided a quick disconnect and valve assembly including a coupling affixed to an underwater safety vest and adapted to be latched to a quick release connector attached to a scuba supply tank hose. The hose connector has a valve actuated by depressing a handle to supply air through the connector assembly to inflate the vest.

When the assembly is unlatched, a spring urges quick release of the hose connector by forcing a tubular projection extending from the coupling out of mating engagement with a bore in the hose connector housing. A check valve in the coupling prevents escape of air from the vest.

This arrangement permits the vest to be inflated either from the scuba supply tank carried by the diver wearing the vest, or from the supply tank of a similarly equipped companion diver. A mouth tube permits the air in the vest to be breathed by the diver under emergency ascent conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the invention will be made with reference to the accompanying drawing, which is to scale. Like numerals designate corresponding parts in the several figures.

FIG. 1 is a pictorial view of the inventive quick disconnect and valve assembly connected for inflation of an underwater safety vest from a scuba supply tank.

FIG. 2 is a transverse sectional view of the assembly quick release hose connector, shown operatively attached to the vest mounted coupling.

FIG. 3 is a transverse sectional view, as seen generally along the line 3—3 of FIG. 1, of the vest mounted coupling.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The following detailed description is of the best presently contemplated mode of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention, since the scope of the invention best is defined by the appended claims.

Referring now to the drawings, and particularly to FIG. 1 thereof, there is shown an inflatable underwater safety vest **10** provided with a quick disconnect and valve assembly **11** permitting the vest **10** to be inflated with air from a scuba supply tank **12.** The vest **10** comprises a hollow, inflatable structure of flexible, waterproof material, and has an opening **13** which forms a collar when worn by a diver. The opening **13** has a V-neck design to hold the diver in face-up position when the vest is fully inflated, without constricting the diver's throat. A belt **14** cooperates with a loop to secure the bottom of the vest **10** to the diver's waist. A tube **16** permits oral inflation or manual deflation of the vest **10.** Normally, however, the vest **10** is inflated from the tank **12,** and to this end is provided with a coupling **17** which is the vest-attached component of the assembly **11.**

A conventional first stage regulator **18** delivers air from the tank **12,** but at a reduced pressure, via a hose **19** to a conventional second stage regulator and mouthpiece **20.** To facilitate inflation of the vest **10,** the regulator **18** is equipped with another hose **21** terminating at a quick-release connector **22** forming the other component of the assembly **11.** The connector **22** includes a valve **23,** described below, which controls the flow of air into the vest **10.**

When the quick-release connector **22** is attached to the coupling **17** as shown in FIGS. **1** and **2,** depression of the valve handle **23***a* permits air to flow from the tank **12** through the hose **21** and the assembly **11** into the interior **10***a* of the vest **10.** After the vest **10** has been inflated, the connector **22** can be quickly released from the coupling **17.** A check valve **24** (FIG. 3) prevents subsequent escape of air from the vest **10.**

The coupling **17** includes a tubular stem **25** (FIG. 3) which projects outwardly through an opening **10***b* in the vest **10.** A flange **25***a* forming an integral end of the stem **25** is situated in the vest interior **10***a*, and preferably is adhesively or otherwise bonded to the portion of the vest **10** surrounding the opening **10***b*. The check valve **24,** which may resemble a conventional automo-

bile tire valve, is mounted within the stem **25** and prevents discharge of air when the pressure in the vest interior **10***a* exceeds the pressure at the interior **25***b* of the stem **25**.

The coupling **17** also includes a hollow body **26** which fits over the stem **25** and is secured in place by a cap **27** screwed onto the stem threaded end **25***c*. A pair of gaskets **28, 29** insure a leak-tight assembly. The interior **26***a* of the body **26** communicates with the stem interior **25***b* via lateral holes **25***d* through the stem **25**. Extending from and communicating with the body **26** is a tubular projection **30** which is matingly received by the quick-release connector **22**. A pair of latch levers **31, 32** having respective bias springs **31***a*, **32***a* are pivotally attached to the coupling body **26** and function to retain the connector **22** attached to the coupling **17**.

Referring to FIG. **2**, the connector **22** includes a generally cylindrical housing **33**; the hose **22** is attached to the housing end **33***a* by means of a threaded fitting **34**. Extending inwardly from the housing other end **33**b is a coaxial cylindrical bore **35**. The bore **35** is of appropriate diameter to permit mating reception therein of the tubular projection **30**, as shown in FIG. **2**. A groove mounted O-ring **36** prevents leakage past the inserted projection **30**. A spring **37** situated within the bore **35** is compressed by insertion of the projection **30** and biases disengagement of the connector **22** when the latch levers **31, 32** are released.

The valve **23** includes a cylindrical bonnet **23***b* which is threaded into a lateral opening **33***c* in the housing **33**. A valve spool **23***c* connected to the handle **23***a* reciprocates in the bonnet **23***b* but is biased to the closed position shown in FIG. **2** by means of a spring **38**. In this normally closed position, a section of the spool **23***c* covers the lateral valve outlet **23***d* which communicates via a channel **39** within the housing **33** to the bore **35**.

A lateral opening **23'***c* in the narrow portion of the valve spool **23***c* communicates through a coaxial valve passageway into the chamber **40** containing the spring **38**, and thence via a channel **41** to the hose **21**. When the valve handle **23***a* is depressed, the opening **23'***c* and the narrow portion of the spool **23***c* are aligned with the outlet **23***d*, providing an unrestricted path for air supplied from the tank **12** through to the vest **10**. The flow path includes the hose **21**, the channel **41**, the chamber **40**, the valve opening **23'***c*, the valve outlet **23***d* and the channel **39** to the bore **35**. The supplied air thence flows through the tubular projection **30** and the body **26** to the stem interior **25***b*. Since the source pressure will be greater than that in the vest interior **10***a*, the check valve **24** will open, permitting the supplied air to inflate the vest **10**.

The connector housing end **33***b* (FIG. **2**) is tapered and provided with an annular recess **33***d* which receives the hooked ends **31***b*, **32***b* of the latch levers **31, 32**. To release the connector **22**, the latch levers **31, 32** are depressed to remove the hooked ends **31***b*, **32***b* from the recess **33***d*, and the connector housing **22** is withdrawn from the coupling **17**. Such disconnection is aided by the bias spring **37** which urges the projection **30** out of the bore **35**. Quick release is achieved. To reconnect the assembly **11**, the base connector **22** merely is pushed toward the coupling **17** to insert the projection **30** into the bore **35**. During such insertion, the tapered housing end **33***b* spreads apart the levers **31, 32** and thereafter the springs **31***a*, **32***a* bias the lever hooked ends **31***b*, **32***b* into the recess **33***d*.

Thus there is provided a safety vest having a quick release connection facilitating inflation from a scuba supply tank. Subsequent to supply hose disconnection, the diver can breath air from the inflated vest via the tube **16**.

Intending to claim all novel, useful and unobvious features shown or described, the applicant claims:

1. For use with an underwater safety vest inflatable from a supply tank, a quick disconnect and valve assembly comprising:

a coupling communicating to said vest and including:

a check valve,

a hollow body having a tubular projection extending therefrom, said body providing communication from said projection to the interior of said vest via said check valve,

a connector attached to a hose from said supply tank and adapted for quick-releasable connection to said coupling, including:

a housing having a cylindrical bore extending inwardly from a surface thereof and having an inner diameter slightly larger than the outer diameter of said tubular projection to permit mating reception therein of said projection, said housing also having an interior channel providing communication from said hose to said bore,

a normally closed, manually operable valve mounted in said connector housing for blocking communication through said channel except when said valve is opened manually;

latch means attached to said coupling and engaging said connector for maintaining said coupling and connector together during inflation of said vest, and

biasing means for urging separation of said coupling and connector when said latch means is disengaged.

2. A quick disconnect and valve assembly according to claim **1** wherein said latch means comprises a spring biased, hook ended lever pivotally mounted to said body and engaging an annular recess in said housing, and wherein said biasing means comprises a spring disposed within said bore and compressed by said matingly received projection.

3. A quick disconnect and valve assembly according to claim **1** wherein said valve is spring biased closed and includes a handle extending from said housing and depressed to open said valve.

4. A quick disconnect and valve assembly according to claim **3** in combination with a scuba tank supply air via a first stage regulator to said hose for vest inflation, said vest also including a tube extending therefrom to permit venting or breathing of air from said vest.

5. A quick disconnect and valve assembly according to claim **1** wherein said check valve is situated within a tubular stem extending from said vest, the end of said stem within said vest being flanged to prevent detachment therefrom.

6. A quick disconnect and valve assembly according to claim **5** wherein said stem extends through said body, a lateral hole through said stem providing communication to the interior of said body, a cap at the free end of said stem securing said body in place.

7. An underwater buoyancy device comprising:

a vest having an opening forming a collar when worn by a diver, said vest having a generally annular air chamber surrounding said opening and inflatable from a scuba supply tank

a coupling communicating to said air chamber and including a check valve and a tubular projection,

a connector affixed to a hose from said supply tank and adapted for fluid communicating, releasable attachment to said coupling, said connector including a cylindrical bore matingly receiving said tubular projection,

latch means for detachably latching said connector and said coupling together, and

a spring situated within said cylindrical bore and compressed by insertion of said tubular porjection, said spring urging quick release of said connector and coupling when said latch means is disengaged,

said connector containing a hand actuated valve for controlling the flow of air from said tank to said air chamber.

8. Apparatus according to claim **7** wherein said chamber is provided with a tube for breathing gas from said inflated chamber.

9. An underwater buoyancy device comprising:

a vest to be worn by a diver, said vest having an air chamber inflatable from a scuba supply tank,

a coupling communicating to said air chamber and including a check valve,

a connector affixed to a hose from said supply tank and adapted for fluid communicating, releasable attachment to said coupling,

latch means for detachably latching said connector and said coupling together, and

a hand actuated valve mounted in said connector for manually controlling the flow of air from said tank to said air chamber.

* * * * *