United States Patent

Potash

[15] **3,635,217**

[45] **Jan. 18, 1972**

[54] DRINKING AND RESUSCITATION MASK

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[73] Assignee: **The United States of America as represented by the Secretary of the Army**

[22] Filed: **Mar. 4, 1969**

[21] Appl. No.: **804,188**

[52] **U.S. Cl.** **128/145.5,** 128/142.4

[51] **Int. Cl.** **A62b 7/00**

[58] **Field of Search** 128/145.5, 142, 142.4, 142.5, 128/142.6, 142.7, 146, 146.2, 146.3, 146.4, 146.5, 145–145.8

[56] **References Cited**

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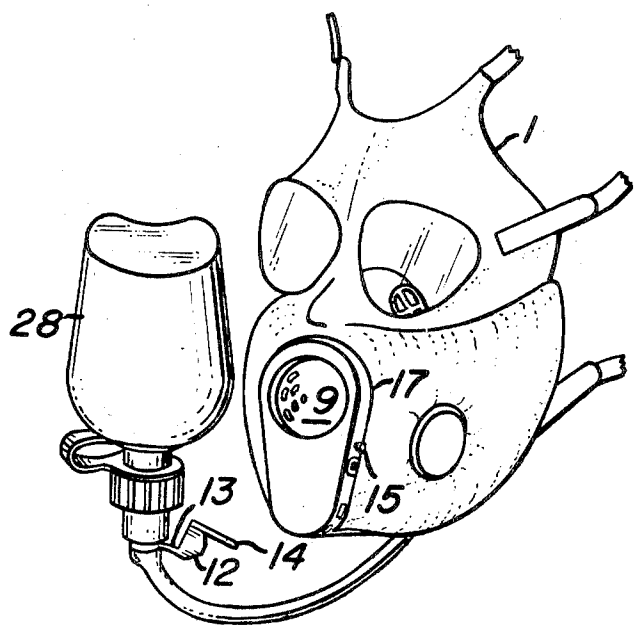
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[57] **ABSTRACT**

An improved protective mask means having a drinking and resuscitation connection means to permit drinking and resuscitation while wearing the mask in a contaminated atmosphere.

11 Claims, 15 Drawing Figures



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SHEET 1 OF 2

Fig. 1

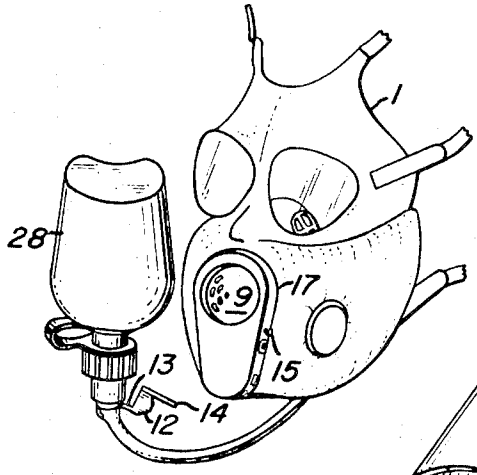


Fig. 2

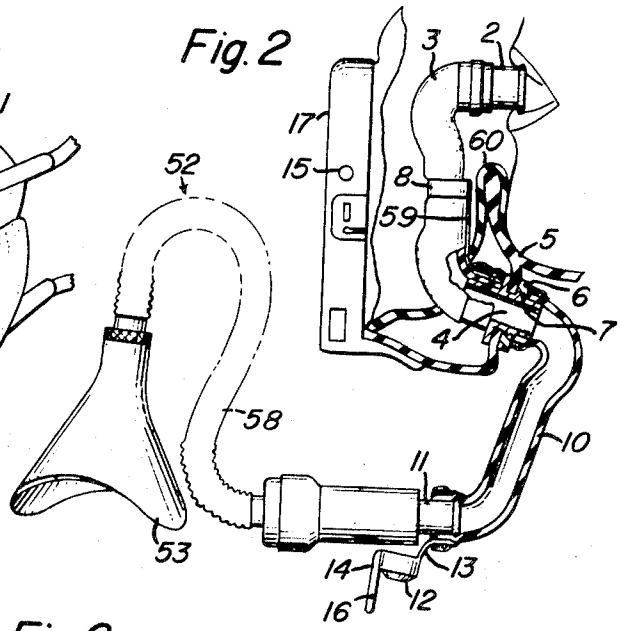


Fig. 3

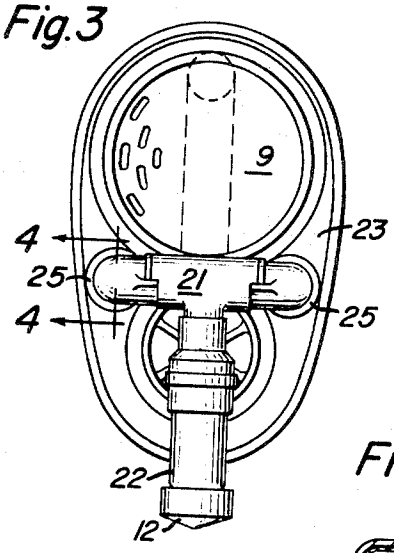


Fig. 6

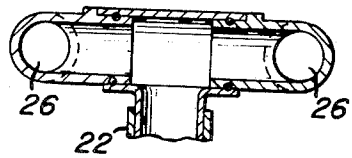
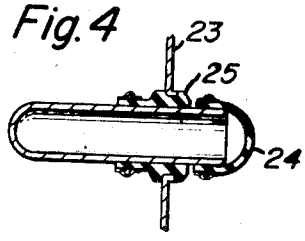


Fig. 4



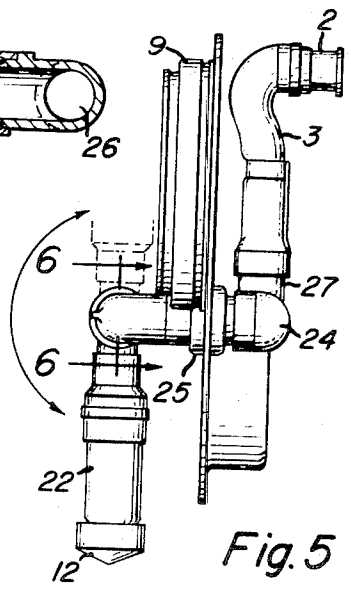


Fig. 5

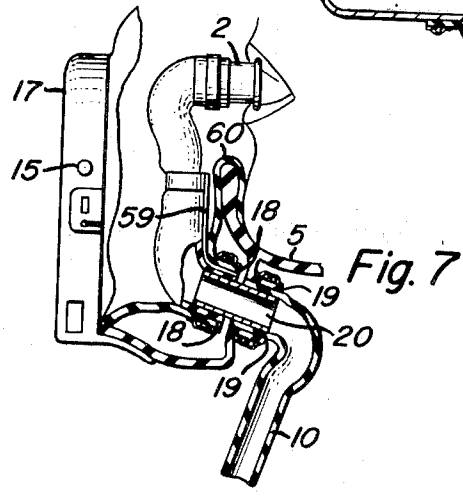


Fig. 7

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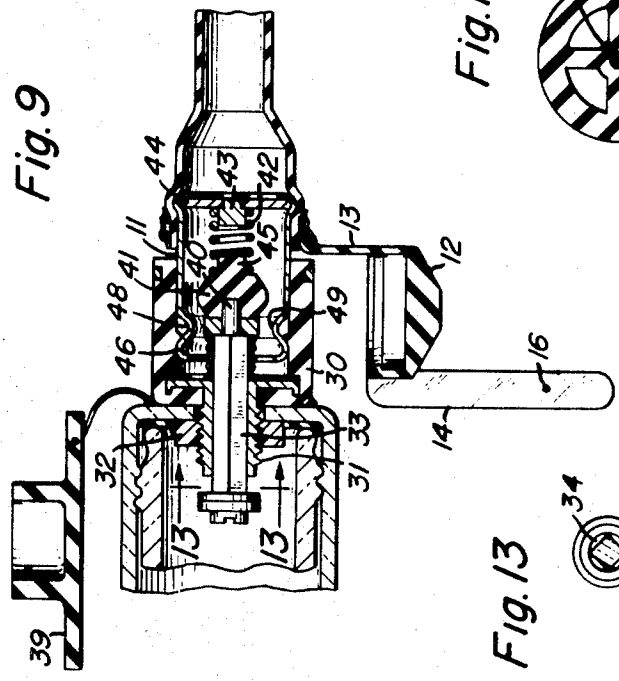


Fig. 9

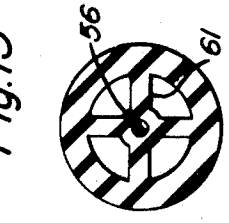


Fig. 15

Fig. 13

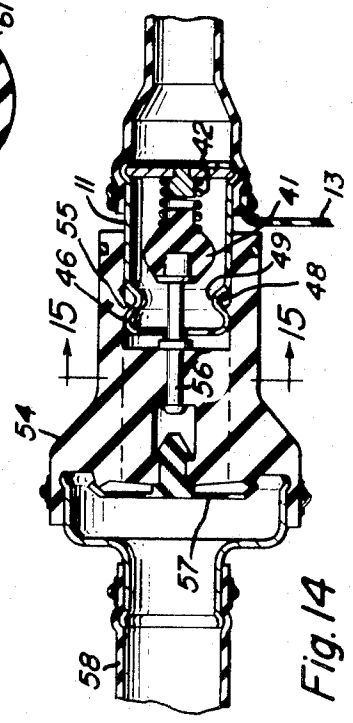


Fig. 14

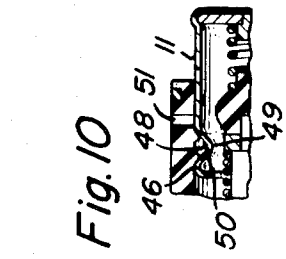


Fig. 10

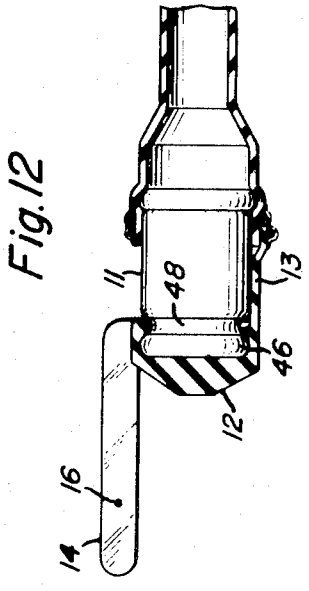


Fig. 12

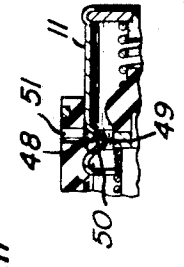


Fig. 11

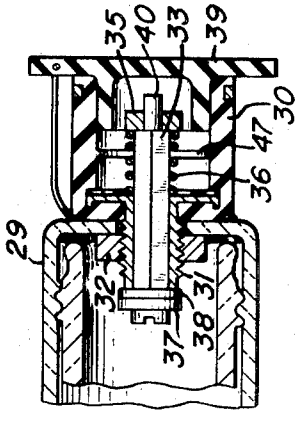


Fig. 8

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DRINKING AND RESUSCITATION MASK

DEDICATORY CLAUSE

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

My invention relates to an improvement in gas masks for combat and industrial use, such as the mask disclosed in U.S. Pat No. 2,910,979. My improvement provides a means for drinking and resuscitation while the mask is being worn and without necessitating removal of the mask.

There has been a long felt need in the protective mask art to develop a satisfactory means for drinking and resuscitation in contaminated atmospheres requiring the use of a gas mask, and my invention was conceived and reduced to practice to solve this problem and satisfy this long felt need.

A principal object of my invention is to provide a means incorporated in a conventional gas mask whereby drinking and resuscitation can be accomplished while wearing the mask.

Another object of my invention is to provide a drinking and resuscitation means for a conventional gas mask which is simple and economical to manufacture, has few parts, is not subject to tinkering and damage, and which can be installed in the mask in the field.

Other objects will be obvious from or will appear in the specification hereinafter set forth.

FIG. 1 is a view showing the drinking utility of my invention with a prior art mask.

FIG. 2 is a view showing the resuscitation utility and the connections for my invention with a prior art mask such as shown in FIG. 1.

FIG. 3 is a view of a tee construction for my drinking improvement installed in the speech transmitter of a prior art mask.

Flg. 4 is a view through section 4—4 of the tee construction shown in FIG. 3.

FIG. 5 is a side view of the tee construction shown in FIG. 3.

FIG. 6 is a view through section 6—6 of the tee construction shown in FIG. 5.

FIG. 7 is a view of an embodiment having a neck molded to the facepiece and nosecup for hose clamp means attaching of the flexible tubing connecting the drinking and resuscitation mouthpiece to a quick disconnect coupling.

FIG. 8 is a view of a canteen means having a quick disconnect coupling means to use with my mask drinking means.

FIG. 9 is a view of the canteen of FIG. 8 connected to the mask male connection member shown in FIGS. 2 and 14.

FIG. 10 is a view showing a flushing embodiment for the drinking and resuscitation means.

FIG. 11 is a view of the flushing embodiment shown in FIG. 10 but in the flushing position.

FIG. 12 is a view of the mask male connection member with the dust cap in place.

FIG. 13 is a view through section 13—13 of the canteen quick disconnect means shown in FIG. 9.

FIG. 14 is a view of the resuscitator means quick disconnect means connected to the mask male connection member.

FIG. 15 is a view through section 15—15 of the resuscitator quick disconnect means shown in FIG. 14.

My invention and FIGS. 1 to 15 will now be described in detail as follows.

Mouthpiece 2 is fixedly connected to one end of rubber tubing means 3 by any conventional means such as adhesive, hose clamp means, etc. The other end of rubber tubing means 3 is connected in the same manner to the flange of male member 7 of a plastic or metal lead-in grommet 4; grommet 4 being mounted within facepiece 5 of mask 1 by screwing a female cap member 6 of the grommet onto the threaded male member 7 of the grommet inserted through a hole in the nosecup 60. Metal band 8 having metal strip 59 welded thereto is fixedly mounted to tubing 3 in any conventional manner, such as taping etc., to provide rigidity to the tubing and to permit the mouthpiece to be adjusted to the comfort and facial configuration of the individual mask wearer. Mouthpiece 2 and tubing 3 are located adjacent to and behind the mask voice transmitter 9. A second rubber tubing means 10 has one end connected to the male grommet member and the other end to the mask male drinking and resuscitation connection member 11. Rubber dust cap 12 is fixedly connected to male connector 11 by any conventional means such as taping etc., of rubber strap 13 to connector 11; the dust cap being provided to cover connector 11 when the mask is not being used for drinking or resuscitation. When the mask is not being used for drinking or resuscitation, connection member 11 and tubing 10 are prevented from dangling free by connecting rubber strap 14 to metal or plastic fastening means 15 by means of hole 16; the fastening means being a double headed pin inserted through a hole in cover 17. An alternate mode of mounting tubing 3 and 10 to mask 1, as shown in FIG. 7, involves connecting tubing 3 to tubing 10 by rigid ferrule 20 and threading the assembled tubing and ferrule through flanges 18 and 19 molded integrally to nosecup 60 and facepiece 5 respectively. Alternative to using rubber tubing 10 for the drinking and resuscitation embodiment, a rigid tee conduit means 21, having a rotatable arm 22 which rotates through 180° in a plane parallel to the plane of the mask vertical axis and conduits 26 integral with arm 22, is mounted in the mask voice transmitter frame 23 below the voice transmitter 9. Tee 21 is mounted in voice transmitter frame 23 and connected to tee 24 by conventional rigid tubing means; conduits 26 passing through rubber grommet means 25 to be connected to tee 24, grommet 25 permitting flexibility to move mouthpiece 2 to the mouth of the mask wearer. Tee 24 is identical to tee 21 except that it does not have a movable arm 22, but tee 24 has a non-movable arm 27 mounted above and integral with conduits 26; arm 27 being in a plane parallel to the plane of arm 22. This embodiment, as shown in FIGS. 3, 4, 5, and 6, is utilized to swing arm 22 above conduits 26, connect canteen means 28 or resuscitation means 52 to male connection member 11, fixedly mounted by any conventional means such as rubber tubing and clamp within arm 22, and permit fluid flow to the mask wearer. To enable drinking without removing the mask from the wearer's face, canteen 28 is provided with a cap 29 having a quick disconnect coupling 30 mounted to the cap by threaded member 31 and nut means 32; threaded member 31 being hollow, cylindrical in configuration, and having a square shaft 33 located within member 31 to form channels 34 to permit fluid flow between member 31 and shaft 33, as shown in FIGS. 8, 9, and 13. Shaft 33 is provided with a head means 35 to retain spring 36 in position and maintain the shaft under spring tension. The opposite end of shaft 33 is provided with a head means 37 to retain washer 38 in position and close off fluid flow through channels 34 when the mask wearer does not wish to drink and has not connected male connector 11 to coupling 30. To drink, dust cap 39 is removed from coupling 30, male connector 11 is inserted within coupling 30, as shown in FIG. 9, so that projection 40 of shaft 33 engages the recess within valve 41; valve 41 being held under spring tension by spring 42, the spring being held in position by projection 43 of spider plate 44 and projection 45 of valve 41. Pressure is applied to male member 11 until lip 46 passes over annular ridge 47 within coupling 30 and ridge 47 rests within annular recess 48 of member 11. When male member 11 reaches the position wherein ridge 47 is within recess 48, valve 41 has been pushed back from seat 49 by depression of spring 42 and washer 38 has been pushed back from closing off channels 34 by depression of spring 36; fluid flow through channels 34 occurring prior to removal of valve 41 from seat 49. Fluid will then flow from canteen 28, into cap 29, into male member 11, through spider plate 44, through tubing 10 or rotatable member 22 on to mouthpiece 2, and to the mouth of the mask wearer. Hole means 50 can be provided in male member 11 between lip 46 and valve seat 49 for alignment with hole means 51 in coupling 30 to provide fluid flushing action to remove any contamination which might accumulate within member 11 or coupling 30 during connection of member 11 within coupling

30. The location of holes 50 and 51 is such that they align, as shown in FIG. 11, after the start of fluid flow through channels 34 but prior to removal of valve 41 from seat 49 to permit fluid to flush through to the outside environment, and the holes are out of alignment, as shown in FIG. 10, after removal of valve 41 from seat 49 to permit fluid flow to the mouth of the mask wearer as described above. The resuscitator 52 embodiment of my invention, as shown in FIGS. 2 and 14, is employed when someone attempts to revive a person in a contaminated atmosphere, such as gas or smoke, requiring the wearing of a protective mask by the person attempting to revive, Mouthpiece 53 is held on the mouth of the person requiring resuscitation and mask male member 11 is inserted within resuscitator coupling 54 until annular ridge 55 of the coupling snaps into annular recess 48 of member 11, in the same fashion as described above regarding the drinking embodiment. When ridge 55 is within recess 48, pin 56 has removed valve 41 from seat 49 through depression of spring 42 to permit the breath of the person attempting to revive to pass through the spider cross section 61, as shown in FIG. 15, of coupling 54, to force open disc-type valve 57, which prevents feedback to the person attempting to revive during inhalation, and to permit the air to pass on through rubber hose means 58 and mouthpiece 53 to the person being revived.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. In a gas mask having components comprising a facepiece, lens means, air outlet valve means, air inlet valve means, filter unit means, nosecup means, voice transmitter frame means, voice transmitter frame cover means, voice transmitter means, a hole means located within the nosecup means below the facepiece means; rigid grommet means is fixedly mounted within said hole means; a first tubing means is fixedly connected one end of said grommet means; a second tubing means is fixedly connected to the opposite end of said grommet means; and a mouthpiece means is fixedly connected to said first tubing means, said first tubing means being located behind and adjacent to the voice transmitter means and between the facepiece means and a mask wearer's face, said second tubing means being located external to the gas mask; and a connector means adapted to be connected to either a drinking means or a resuscitation means.

2. The gas mask of claim 1 wherein the grommet means is made of a material selected from the group consisting of metal and plastic and comprises a threaded male member secured within the hole means and a threaded female cap member adapted to secure said threaded male member.

3. The gas mask of claim 1 wherein the first and second tubing means are flexible rubber tubing; said first tubing means having a metal band fixedly mounted thereto, said metal band being welded to a metal strip adapted to provide rigidity to said first tubing means and permit adjustment of position of the mouthpiece means for the comfort and facial configuration of an individual mask wearer.

4. The gas mask of claim 1 wherein the gas mask connector means is a male member fixedly connected to the end of the second tubing means opposite to the rigid grommet means, said connector means comprising a rigid body means having an open end opposite to the end connected to the second tubing means; a lip means surrounding said open end; a recessed wall portion integral with and adjacent to said lip means adapted to retain an annular ridge means of a coupling means of the drinking and resuscitation means in position, a surface of the recessed wall portion within the connector means being adapted to provide a valve seat means; a spider plate means fixedly mounted in the end of the connector opposite to the open end; a projection means fixedly mounted in the center of said spider plate means adapted to retain a spring means in position; a spring means superimposed on said spider plate means and surrounding said projection means; a ball-shaped valve means having a projection portion superimposed on the projection means and having the projection portion within the spring means, said valve means being adapted to contact the valve seat means in a closed position and prevent fluid flow through the connector means; and a dust cap means adapted to cover the connector means open end when a wearer of the mask is not drinking or resuscitating.

5. The gas mask of claim 4 wherein the connector means is provided with a flushing hole means through the body means between the lip means and the recessed wall portion means, said flushing hole means being adapted to align with a hole means in the coupling means of the drinking and resuscitation means to flush out any contaminated fluid from the connector means prior to the valve means being opened and prevent passage of contaminated fluid to and through the connector means.

6. A method of drinking with the gas mask of claim 1 comprising the steps of removing a dust cap means from a gas mask connector means, said connector means being integral with a first fluid passage means connected to a mouthpiece means located between the facepiece means and a gas mask wearer's face; grasping the mouthpiece means between the wearer's teeth; removing a dust cap means from a canteen coupling means; partially inserting the gas mask connector means within the canteen coupling means to displace a washer means within the canteen coupling means from a second fluid passage means and to align a first hole means through a wall of the canteen coupling means with a second hole means through a wall of the gas mask connector means, said displacing of the washer means permitting fluid flow from a canteen means through said second fluid passage means and through said first and second hole means to the outside environment to flush out an contamination prior to drinking by the mask wearer; fully inserting the gas mask connector means within the canteen coupling means to disalign the first and second hole means and to displace a gas mask connector valve means from a valve seal means to permit fluid flow through the gas mask connector means and through the first fluid passage means to the mouthpiece means; and drinking fluid from the mouthpiece means by the gas mask wearer while wearing the mask.

7. A method of resuscitation with the gas mask of claim 1 while wearing the gas mask comprising the steps of removing a dust cap means from a gas mask connector means, said connector means being integral with a first fluid passage means connected to a gas mask mouthpiece means located between the facepiece means and a gas mask wearer's face; grasping the mouthpiece means between the wearer's teeth; placing a resuscitator mouthpiece means over an asphyxiated individual's mouth, said resuscitator mouthpiece means being integral with a second fluid passage means and the second fluid passage means being integral with a resuscitator coupling means; inserting the gas mask connector means within the resuscitator coupling means to displace a valve means within the gas mask connector means from a valve seat; exhaling into the gas mask mouthpiece by the gas mask wearer to displace a disc valve means from a valve seat means within the resuscitator coupling means and permit fluid flow through the gas mask connector means to the second passage means to the resuscitator mouthpiece means; inhaling by the gas mask wearer to permit the disc valve means to be seated against the valve seat means and to stop fluid flow to the resuscitator mouthpiece means; and repeating the exhaling and inhaling steps until the asphyxiated individual is revived or pronounced dead.

8. A canteen means and a gas mask having components comprising a facepiece, lens means, air outlet valve means, air inlet valve means, filter unit means, nosecup means, voice transmitter frame means, voice transmitter frame cover means, voice transmitter means; the improvement being that said mask has a hole means located within the nosecup means below the facepiece means; a rigid grommet means is fixedly mounted within said hole means; a first tubing means is fixedly

connected to one end of said grommet means; a second tubing means is fixedly connected to the opposite end of said grommet means; and a mouthpiece means is fixedly connected to said first tubing means, said first tubing means being located behind and adjacent to the voice transmitter means and between the facepiece means and a mask wearer's face, said second tubing means being located external to the gas mask; and a connector means connected to said canteen means; said canteen means comprising a container means having an open end, said open end receiving said mask connector means inserted therein; a canteen cap means having an open end and a hole means in the closed end, said cap means being adapted to cover said open end of the container means; a canteen coupling means superimposed on the cap means closed end and fixedly mounted to said cap means, said canteen coupling means having an open end and a closed end having a hole means therein, said canteen coupling closed end hole means being adapted to align with the cap means closed end hole means; a cylindrical, hollow member having threads on a portion of its length surrounded by the cap means closed end hole means and the canteen coupling means closed end hole means and projecting into the cap means and the canteen coupling means, said cylindrical member having a head means integral therewith and adjacent to the threads, said first head means being disposed within the canteen coupling means and adapted to contact the canteen coupling means closed end; a nut means adapted to secure the cylindrical member within the cap means closed end hole means and the canteen coupling means closed end hole means and to provide a hermetic seal of the canteen coupling means to the canteen cap means; a square shaft means surrounded by the cylindrical member to form a plurality of channels for fluid flow between an inner wall surface of the cylindrical member and a wall surface of the square shaft, said shaft projecting into the cap means and the canteen coupling means and extending past the ends of the cylindrical member, said shaft having a head means integral with the shaft within the canteen coupling means and being adapted to retain a spring means under tension between the integral shaft head means and the cylindrical member head means; a removable head means connected to the shaft means at the end thereof opposite to the shaft integral head means and adapted to retain a washer means on the shaft means; a spring means surrounding the shaft means and located between the cylindrical member head means and the shaft integral head means, said spring means being adapted to retain the shaft means under spring tension and to maintain a hermetic seal by a washer means over the plurality of channels to prevent fluid flow from the canteen cap means to the canteen coupling means when a wearer is not using the mask for drinking or resuscitation function; a washer means adjacent to the shaft removable head means, said washer means being adapted to cover the plurality of channels and to prevent fluid flow from the canteen cap means to the canteen coupling means when a wearer is not using the mask for drinking or resuscitation function; a projection means integral with the shaft means and extending past the shaft integral head means, said projection means being adapted to displace a mask connector valve means from a valve seat means when the mask connector is inserted within the canteen coupling means and to displace the shaft washer means as a cover for the plurality of channel means to permit fluid flow from the canteen means into the connector means; an annular ridge means integral with the canteen coupling means inner wall and adjacent to the canteen coupling means open end, said annular ridge means being adapted to be retained within a recessed wall portion of the mask connector means and to maintain a connection between the mask connector means and the canteen coupling means; and a dust cap means adapted to cover the open end of the canteen coupling means when the mask is not being used for drinking.

9. A resuscitator means and a gas mask having components comprising a facepiece, lens means, air outlet valve means, air inlet valve means, filter unit means, nosecup means, voice transmitter frame means, voice transmitter frame cover means, voice transmitter means; the improvement being that said mask has a hole means located within the nosecup means below the facepiece means; a rigid grommet means is fixedly mounted within said hole means; a first tubing means is fixedly connected to one end of said grommet means; a second tubing means is fixedly connected to the opposite end of said grommet means; and a mouthpiece means is fixedly connected to said first tubing means, said first tubing means being located behind and adjacent to the voice transmitter means and between the facepiece means and a mask wearer's face, said second tubing means being located external to the gas mask; and a connector means connected to the resuscitation means; said resuscitator means comprising a second mouthpiece means; a rubber tubing means having one end fixedly connected to said second mouthpiece means and the other end fixedly connected to a resuscitator coupling means; and a resuscitator coupling means connected to said connector means.

10. The resuscitator means of claim 9 wherein said coupling means comprises a hollow body means having one end open and the opposite end closed by a disc valve means, said disc valve means being adapted to be actuated by fluid pressure; a spider cylinder within the body means and integral with the body wall, said spider cylinder being a predetermined length to permit insertion of said mask connector means within said resuscitator coupling means, said spider cylinder having a pin means fixedly connected to the spider cylinder and extending axially within the spider cylinder to a point adjacent to the resuscitator coupling means open end, said pin means displacing a valve means from a valve seat means of the mask connector means when the mask connector means is inserted within the resuscitator coupling means; projection means integral with the disc valve means on the resuscitator coupling means open end side of the disc valve means, said projection means being adapted to removably mount the disc valve means within a recess located in the pin means end opposite to the resuscitator coupling means open end; and an annular ridge means integral with the resuscitator coupling means inner wall and adjacent to the resuscitator coupling means open end, said annular ridge means being adapted to be retained within a recessed wall portion of the mask connector means and to maintain a connection between the mask connector means and the resuscitator coupling means.

11 A gas mask having components comprising a facepiece, lens means, air outlet valve means, air inlet valve means, filter unit means, nosecup means, voice transmitter frame means, voice transmitter frame cover means, voice transmitter means, a hole means located within the nosecup means below the facepiece means; a rigid grommet means is fixedly mounted within said hole means; a first tubing means is fixedly connected to one end of said grommet means; a second tubing means is fixedly connected to the opposite end of said grommet means; and a mouthpiece means is fixedly connected to said first tubing means, said first tubing means being located behind and adjacent to the voice transmitter means and between the facepiece means and a mask wearer's face, said second tubing means being located external to the gas mask; and a connector means adapted to be connected to either a drinking means or a resuscitation means; a pair of hole means located near the voice transmitter frame means on opposite sides thereof and below the voice transmitter means; a rubber grommet means removably mounted within each of said pair of hole means; a first rigid tee structure having a first pair of parallel conduit means integral with a movable arm means having an open end mounted on the front of the voice transmitter frame means, said first pair of conduit means extending through the rubber grommet means, said movable arm means located in a plane parallel to the plane of the gas mask vertical axis, said movable arm means being adapted to rotate through 180°; a second rigid tee structure having a second pair of parallel conduit means integral with a fixed arm means having an open end located behind the voice transmitter frame

means, said second pair of conduit means being fixedly connected to said first pair of conduit means; a gas mask connector means being fixedly connected to the movable arm means open end, said gas mask connector means being adapted to be connected to the drinking means and the resuscitation means; a tubing means being fixedly connected to the fixed arm means, said tubing means being located behind and adjacent to the voice transmitter means and between the facepiece means and a mask wearer's face; and a mouthpiece means fixedly connected to the tubing means.

* * * * *