

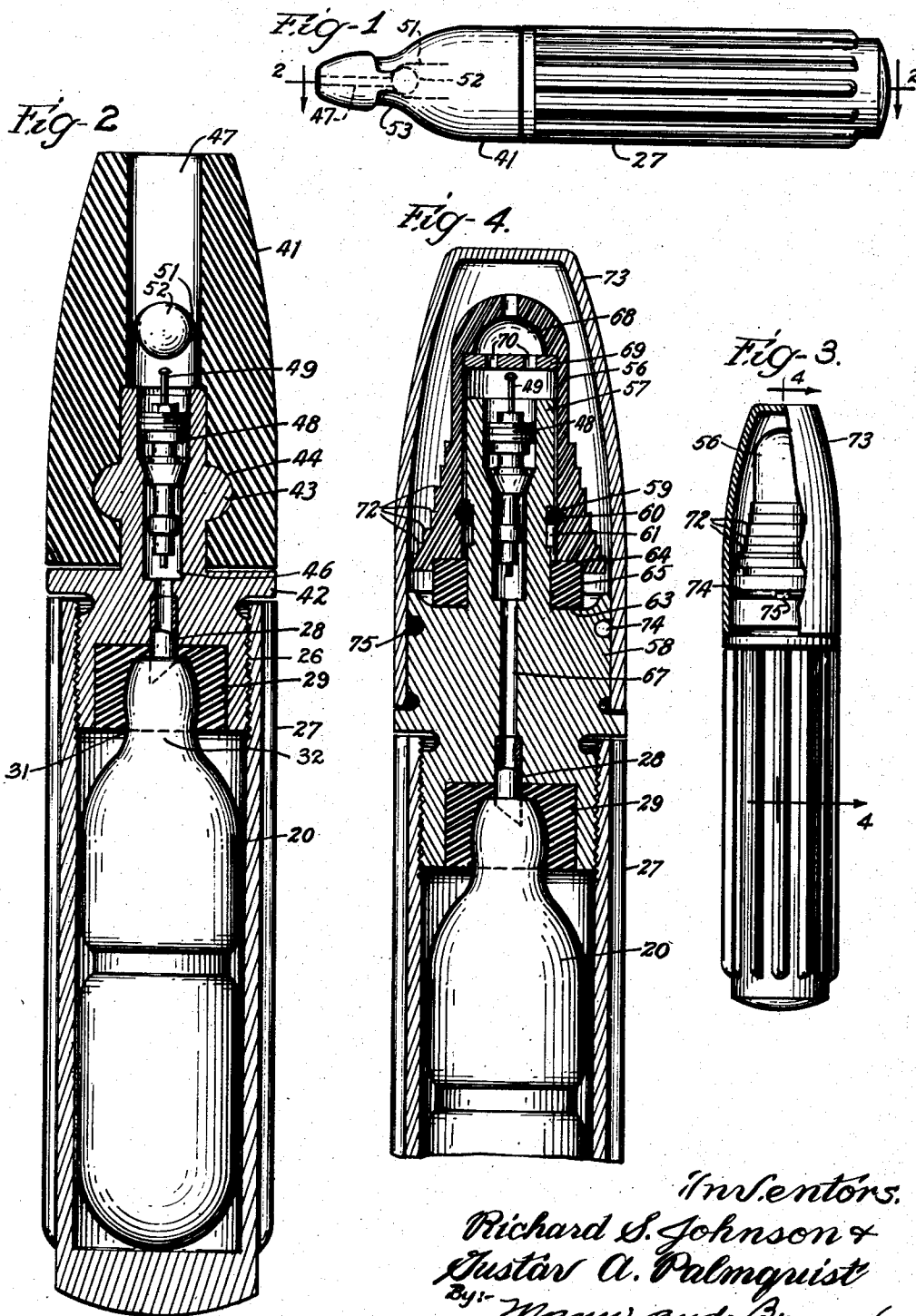
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This invention relates to a small, portable device particularly suited for the dispersion of an inhalant, such as oxygen, from a sealed cartridge filled under pressure. When used for this purpose, the device furnishes a quick and simple way for a person to get a "lift," or be physically and mentally alerted when occasion requires, by supplementing the normal oxygen content of the air.

The device preferably is in the form of a cylinder, approximately 1" in diameter and 3" long, so that it may be conveniently carried in a pocket or purse, and may be inconspicuously used. It may be made of simple screw machine and stock parts, so that its cost of manufacture is small.

Additional objects and advantages will become apparent from the following description taken in conjunction with the drawings, in which

Fig. 1 is a side elevation of a mouth-type embodiment of the invention;

Fig. 2 is a section taken at line 2—2 of Fig. 1, but drawn to an enlarged scale;

Fig. 3 is an elevation of a nasal-type embodiment of the invention with a portion of the cap broken away; and

Fig. 4 is a sectional view taken at line 4—4 of Fig. 3, but drawn to an enlarged scale.

It is contemplated that the containers for storage of the inhalant will be in the form of a cartridge 20 of the type illustrated in Fig. 2. While other forms of containers or cartridges may be used, the type illustrated is presently in general use for the storage of carbon-dioxide under pressure and, thus, is readily available for the storage of other products. In such cartridges the gas is stored under pressure and, therefore, it is possible to store a relatively large volume of gas in a limited space. The cost of each cartridge is quite inexpensive, subject, of course, to the cost of the particular inhalant.

In each embodiment of the invention it will be seen that there are substantially six basic parts: a container or cartridge, a piercing tube used in puncturing the cartridge, means to force the cartridge and the piercing tube together, an applicator, a control valve to regulate the flow of the inhalant from the cartridge to the applicator, and a mounting head for the last-mentioned four parts. While in most embodiments it will be desirable to have each of these parts or its equivalent, it may be apparent that in certain instances a particular part will perform a double duty and/or certain of the parts may be eliminated.

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In Figs. 1 and 2 an embodiment of the invention is illustrated wherein the inhaler is of a type for use in injecting inhalant into the mouth. The applicator is in the form of a molded rubber bit 41 adapted to be received in the mouth and clinched between the teeth. The applicator fits securely about the upper portion of mounting head 42, with projections 43 in the mounting head seating in grooves 44 in the applicator to hold the bit to the mounting head. The lower portion of mounting head 42 is threaded, as illustrated at 26, to receive a hollow, threaded cap 27. The internal opening of cap 27 is of a size just sufficient to receive cartridge 20. A cartridge piercing tube 28 is secured to and projects from mounting head 42. The projecting portion of tube 28 is surrounded by a rubber gasket 29. Opening 31 in gasket 29 is of slightly smaller diameter than that of neck 32 in cartridge 20, and the lower end of gasket 29 projects somewhat below the lower end of piercing tube 28.

An internal passage 46 communicates between the piercing tube 28 and an internal opening 47 in the applicator. Passage 46 is shaped and threaded to receive a valve 48, which valve is of the type commonly used in the valve stems of inner tubes of automobile or other tires. Such a valve is spring-loaded so as to hold it in a normally closed position and is opened by pressure applied to valve stem 49.

A portion of internal opening 47 in the bit is of enlarged dimensions, as illustrated at 51, and within the enlarged portion 51 is received a hard, spherical member, or ball, 52 of slightly smaller dimensions than that of the enlarged portion of opening 47. Ball 52 is used as a pressure member to force projecting valve stem 49 inwardly to open valve 48.

In the operation of the embodiment of Figs. 1 and 2 the cartridge 20 is placed in communication with passage 46 in the manner previously described. Valve 48, being normally closed, prevents the flow of inhalant to opening 47 in the applicator. Bit 41 is placed in the mouth with the teeth gripping neck 53 of the bit. By applying pressure with the teeth to neck 53 the upper and lower faces of the bit at neck 53 are displaced towards each other, with the result that ball 52 is forced against valve stem 49 with sufficient pressure to open valve 48 and allow the inhalant to flow through passage 46 into opening 47. The enlarged portion 51 of passage 47 is of sufficient width that the inhalant may flow around the sides of ball 52 and out through pas-

sage 47, even though the portion of the passage above and below ball 52 is obstructed by the contact of the bit against the ball. From passage 47 the inhalant may be drawn into the lungs through the mouth and trachea.

In the embodiment of Figs. 3 and 4 the applicator is in the form of a nose piece 56 adapted to be brought in contact with, or inserted within, a single nostril. The internal opening of nose piece 56 is adapted to fit somewhat loosely over the upper projecting end 57 of mounting head 58. A retaining ring 59 is seated in groove 60 of nose piece 56 and elongated groove 61 of mounting head 58. The retaining ring allows the nose piece 56 to be moved to a limited extent along upper end 57 of the mounting head, and yet prevents the nose piece from being removed from the mounting head under normal conditions of use.

A shoulder 63 is formed at the juncture of projecting end 57 with the main part of mounting head 58. Between shoulder 63 and the lower face 64 of nose piece 56 is a soft rubber gasket 65. Gasket 65 serves the two-fold purpose of preventing the seepage of inhalant from between nose piece 56 and projecting end 57 of the mounting head and biasing the nose piece upwardly to the limit allowed by retaining ring 59.

Within mounting head 58 is an internal passage 67, a portion of which is shaped and threaded to receive valve 48, with valve stem 49 projecting beyond the upper end of the projecting portion 57 of the mounting head. Within internal opening 68 of nose piece 56 is a disc-like pressure member 69 having openings 70 therethrough. With nose piece 56 held by gasket 65 in the position shown in Fig. 4, pressure member 69 is just out of contact with valve stem 49 to allow the valve to remain in the closed position.

With a charged cartridge 20 brought into communication with passage 67, the inhaler is brought up to the nose with opening 68 in communication with one nostril. A series of steps or ridges 72 on the outer edge of the nose piece permit the nose piece to be grasped and moved toward mounting head 58 of the inhaler. During this movement pressure member 69 forces valve stem 49 downwardly, opening valve 48 and allowing the inhalant to flow through passage 67 and opening 68 into the nostril. With the inhaler grasped in one hand it is a simple matter to hook the nail of the thumb into one of the steps 72 to move the nose piece. When it is desired to interrupt the flow of inhalant, the nose piece is released and the spring action of gasket 65 forces the nose piece outwardly, allowing valve 48 to close.

The user will often desire to carry the inhaler in a pocket or purse, and for this purpose a cap 73 may be used to prevent contamination of the nose piece. The cap slips down over a portion of mounting head 58 and is frictionally held thereon by a spring retainer ring 74 seated in a groove 75 in the body. A similar cap would be used with the embodiment illustrated in Figs. 1 and 2. However, no retainer ring is needed in this case, resilient bit 41 providing sufficient friction to hold the cap in place.

Various modifications, without departing from the scope of the invention, will be apparent. For instance, piercing tube 28, instead of being formed with an axial bore, may be a solid tube having a groove along one side thereof to permit the inhalant to flow from the cartridge into the passage. The choice of particular embodiments

of the invention for specific illustration and description is merely a compliance with section 4888 of the Revised Statutes, and should not be construed as imposing unnecessary limitations on the appended claims.

From the foregoing discussion it will be apparent that the inhalers are an ultimate of simplicity, both from a standpoint of manufacture and use. The mounting head for the four other basic parts, in addition to the cartridge, can be made in an elementary screw machine operation. A simple tire valve, readily obtainable, may be used to control the flow of inhalant if the producer prefers not to construct the valves in his own plant. The remaining parts may be made by employing one or more of a number of fundamental forming operations, the selection depending upon the facilities of a particular manufacturer and the materials employed in the fabrication. The assemblage and use of the inhalers is such that no great amount of thought is required.

The possibilities as to choice of inhalants are numerous and varied. Inhalants in gaseous form are an obvious choice, but liquids or powders with a compressed gas as an ejecting medium may be employed. Through the use of materials in liquid or powder form, the scope of application of our invention may be expanded well beyond the realm of inhalants.

We claim:

1. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into a body orifice communicating with the trachea, including the combination of a mounting head having a passage therethrough, a cartridge-piercing tube attached to the head and communicating with and projecting from one end of said passage, means to force said tube into said cartridge, a normally closed valve within the passage adjacent the other end thereof, said valve having a valve stem movable in a direction longitudinally of the passage to open the valve; an applicator about at least the portion of the head adjacent to said other end of the passage and movable with respect to said head, said applicator being adapted to be inserted in said orifice and having an opening therethrough communicating between said passage and the portion of the applicator inserted in the orifice, and a pressure member within the opening to contact and move the valve stem to open the valve upon movement of the said applicator by a body member.

2. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into a body orifice communicating with the trachea, including the combination of a mounting head having a passage therethrough, a cartridge-piercing tube attached to the head and communicating with and projecting from one end of said passage, means to force said tube into said cartridge, a normally closed valve within the other end of the passage, said valve having a valve stem movable in a direction longitudinally of the passage to open the valve; an applicator, a part of which is resilient, about at least the portion of the head adjacent to said other end of the passage, said applicator being adapted to be inserted in said orifice and having an opening therethrough communicating between said passage and the portion of the applicator inserted in the orifice, a pressure member within the opening and adjacent to said valve stem, said resilient part of the applicator allowing at least

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a portion of the applicator to be moved to press said pressure member against the valve stem to move the latter and open the valve.

3. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into a body orifice communicating with the trachea, including the combination of a mounting head having a passage therethrough, a cartridge-piercing tube attached to the head and communicating with and projecting from one end of said passage, means to force said tube into said cartridge, a normally closed valve within the other end of the passage, said valve having a valve stem movable in a direction longitudinally of the passage to open the valve, an applicator, a part of which is resilient, about at least the portion of the head adjacent to said other end of the passage, said applicator being adapted to be inserted in said orifice and having an opening therethrough communicating between said passage and the portion of the applicator inserted in the orifice, a pressure member within the opening and adjacent to said valve stem, said resilient part of the applicator allowing at least a portion of the applicator to be moved to press said pressure member against the valve stem to move the latter and open the valve, said resilient means also serving as a seal between said applicator and said head.

4. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into the mouth, the combination of a mounting head having a passage therethrough, a cartridge-piercing tube attached to the head adjacent one end of the passage and in communication therewith, means to force the tube into a cartridge, a bit attached to the head adjacent the other end of the passage and having an opening therethrough communicating between said passage and a resilient portion of the bit receivable within the mouth, a normally closed valve within the passage, said valve having an axially movable valve stem to open the valve, and means within the bit to open the valve in response to pressure exerted on portions of the bit, said bit including a pressure member in the said opening to open the valve in response to a displacement of a portion of the bit.

5. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into the mouth, the combination of a mounting head having a passage therethrough, a cartridge piercing tube, means to force said tube into said cartridge, means at one end of the passage for placing the cartridge in communication with the passage, a valve within the passage, said valve being normally closed and having an axially movable valve stem to open the valve, a bit attached to the head adjacent the other end of the passage and having an opening therein between the end of the bit and the other end of the passage, a ball within said opening, said bit being a resilient material whereby by biting on the bit the ball may be forced against the valve stem to move the stem and open the valve.

6. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into the mouth, the combination of a mounting head having a passage therethrough, a cartridge piercing tube, means to force said tube into said cartridge, means at one end of the passage for placing the cartridge in communication with the passage, a valve within the passage, said valve being normally closed and hav-

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ing an axially movable valve stem to open the valve, a bit attached to said head adjacent the other end of said passage, said bit having an opening therein communicating between the end of the bit and the other end of the passage, the portion of said opening adjacent said passage being of greater dimension than the remainder of the opening, and a ball of such dimension as to be received within the larger portion of said opening but too large to be received within the smaller portion of said opening, said bit being a resilient material whereby by biting on the bit the ball may be forced into engagement with the valve stem to move the latter and open the valve.

7. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into the mouth, the combination of a mounting head having a passage substantially axially therethrough, a cartridge-piercing tube attached to the head and communicating with and projecting from one end of said passage, means to force the tube into the cartridge, a normally closed valve within the passage adjacent the other end thereof, said valve having a valve stem movable in a direction parallel to said axis, said stem projecting beyond said other end of the passage, a bit attached to said head adjacent the other end of said passage, said bit having an opening therein communicating between the end of the bit and said other end of the passage, the portion of said opening adjacent said passage being of greater dimension than the remainder of the opening, and a ball of such dimension as to be received within the larger portion of said opening but too large to be received within the smaller portion of said opening, said bit being a resilient material whereby by biting on the bit the ball may be forced into engagement with the valve stem to move the latter and open the valve.

8. In a device for introducing into the nose fluid from a cartridge in which the fluid is sealed under pressure, the combination of a mounting head having a passage therethrough, a cartridge-piercing tube attached to the head adjacent one end of the passage and in communication therewith, means to force the tube into a cartridge, a nose piece movably attached to the head adjacent the other end of the passage and having an opening therethrough communicating between said passage and the end of the nose piece, a normally closed valve within the passage, said valve having an axially movable valve stem to open the valve, and a pressure member adapted to open the valve in response to movement of the nose piece.

9. In a device for introducing into the nose fluid from a cartridge in which the fluid is sealed under pressure, the combination of a mounting head having a passage therethrough, a cartridge piercing tube, means to force said tube into said cartridge, means at one end of the passage for placing a cartridge in communication therewith, the portion of the head adjacent the other end of the passage being of annular configuration of smaller cross-sectional dimension than that of the remainder of the head, a resilient gasket surrounding a part of said annular portion and seating against the remainder of the head, a nose piece surrounding an additional part of said annular portion and having an opening therethrough to provide communication between said passage and the end of the nose piece, said nose piece being free to move at least to a limited extent with respect to said annular portion, a nor-

normally closed valve within the passage, said valve having an axially movable valve stem to open the valve, and means within the nose piece adapted to open the valve as the nose piece is moved toward said remainder of the head, said resilient gasket being adapted to act both as a seal to prevent the leakage of fluid between the annular portion and the nose piece and as a spring to normally position the nose piece away from said remainder of the head thereby rendering the valve-opening means normally ineffective.

10. In a device for introducing into the nose fluid from a cartridge in which the fluid is sealed under pressure, the combination of a mounting head having a passage therethrough, a cartridge piercing tube, means to force said tube into said cartridge, a portion of said head being of reduced annular configuration thereby forming a shoulder, a nose piece received over said reduced annular portion and adapted to move with respect thereto, means for restricting the movement of the nose piece with respect to the head, a normally closed valve within said passage and having a valve stem projecting therefrom, said valve stem being axially movable to open the valve, a pressure plate within the nose piece adapted to contact said valve stem and open the valve as the nose piece is moved towards said shoulder, resilient gasket means between said nose piece and said shoulder, said gasket means being of sufficient thickness to normally position said pressure plate away from the position in which said valve is opened, said nose piece and pressure plate having openings therethrough to provide communication between said passage and the end of the nose piece, and means at the other end of the passage for placing a cartridge in communication with the passage.

11. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into the body orifice communicating with the trachea, the combination of a cartridge-piercing tube, a mounting head having a passage

therein communicating with said tube, means to force the tube into the cartridge, a valve within said passage, said valve having an axially movable valve stem to open the valve, an applicator having an opening therein communicating with said passage and constructed to be placed in communication with said orifice, the applicator including a pressure member constituting a part of the applicator and constructed to contact and move said valve stem to open the valve by pressure from the body member.

12. In a device in which fluid from a cartridge in which the fluid is sealed under pressure is introduced into the body orifice communicating with the trachea, the combination of a cartridge-piercing tube, a mounting head having a passage therein communicating with said tube, means to force the tube into the cartridge, a valve within said passage, said valve having an axially movable valve stem to open the valve, an applicator having an opening therein communicating with said passage and constructed to be placed in communication with said orifice, said applicator including a resilient portion and a pressure member, said resilient portion being adapted to permit a force to be applied to the pressure member by a body member to move the pressure member against the valve stem in a direction longitudinally of said stem to open the valve after the opening has been placed in communication with the orifice.

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