Feb. 4, 1969 W. J. LA ROCHE 3,425,414

INHALANT DISPENSER

Filed May 28, 1965

Sheet 1 of 2

FIG. 1

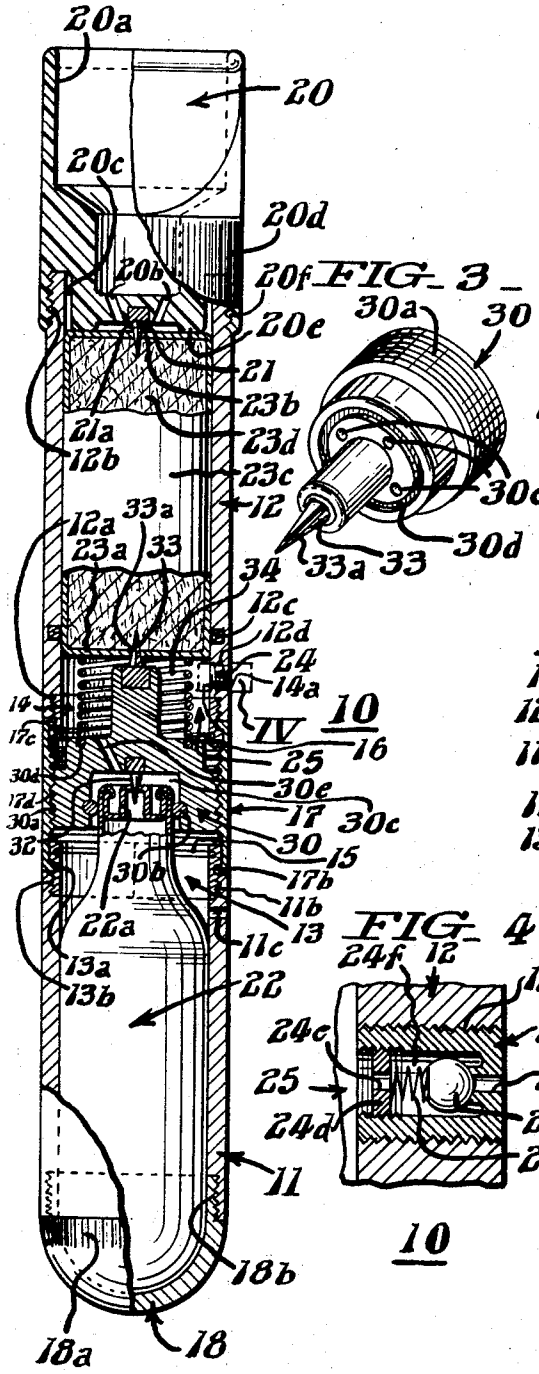


FIG. 3

FIG. 4

FIG. 5

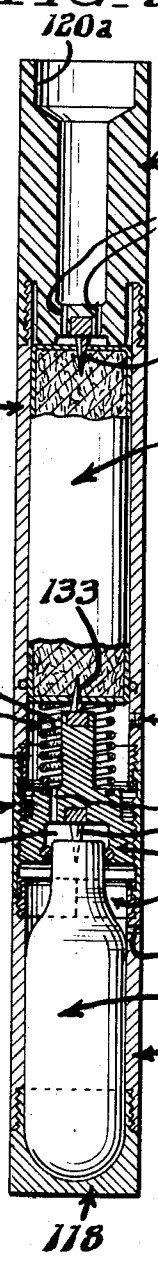
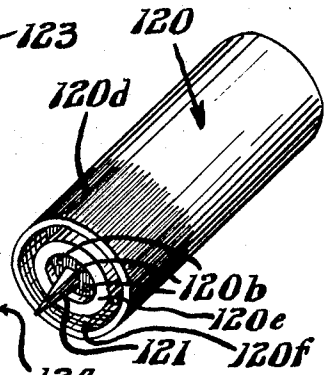


FIG. 6



INVENTOR.
William J. LaRoche,
BY
Paul & Paul
ATTORNEYS.

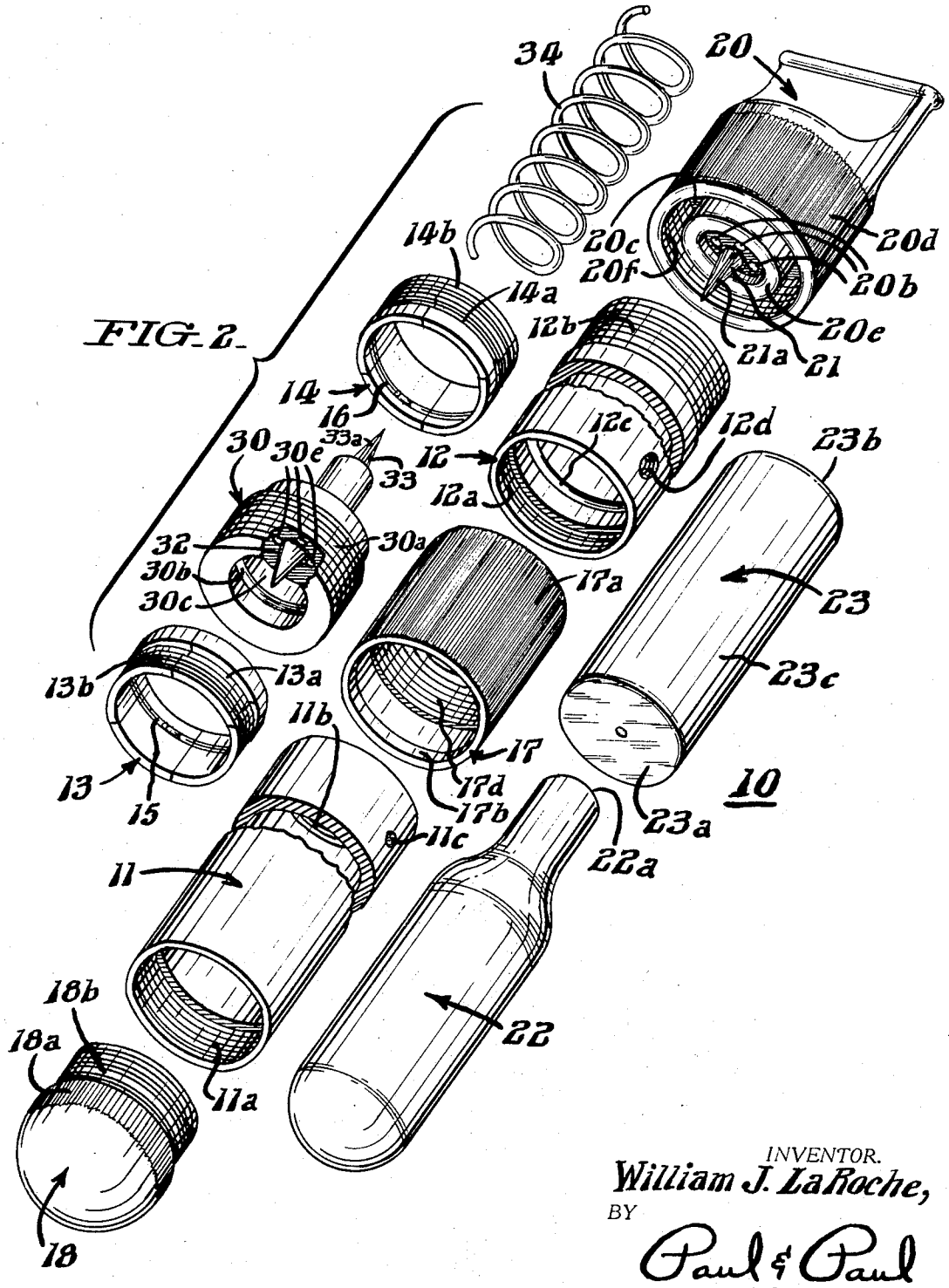
Feb. 4, 1969 W. J. LA ROCHE 3,425,414

INHALANT DISPENSER

Filed May 28, 1965

Sheet 2 of 2

FIG. 2.



INVENTOR.
William J. LaRoche,
BY
Paul & Paul
ATTORNEYS.

United States Patent Office

3,425,414

Patented Feb. 4, 1969

3,425,414

INHALANT DISPENSER

William J. La Roche, 222 Righters Mill Road,
Penn Valley, Montgomery County, Pa.

Filed May 28, 1965, Ser. No. 459,722
U.S. Cl. 128—201 14 Claims
Int. Cl. A61m 15/02, 15/06

ABSTRACT OF THE DISCLOSURE

A positive pressure inhalant device is shown and described having a capsule compartment and a separate inhalant cartridge compartment with an independently movable dividing means separating the compartments with at least one passageway in the dividing means providing communication from one compartment to the other. The dividing means is also provided with piercing means for puncturing a gas-containing capsule positioned in the first compartment and for piercing one end of an inhalant cartridge positioned in the second compartment. A mouthpiece is also provided having piercing means for puncturing the other end of the inhalant cartridge.

This invention relates to a multi-purpose inhalant dispenser and particularly to a dispenser operable under a positive pressure in which a gas under pressure is passed through an impregnated filler or liquid in order to deliver a stream in vapor or mist form to the user for inhaling.

The invention further relates to providing means externally resembling a cigarette or cigar for accomplishing the said positive pressure inhalant function.

Several attempts have been made in the prior art to provide positive pressure dispersion of an inhalant. One example of such a device is shown in the patent to Richard S. Johnson No. 2,651,303 in which a gas sealed in a cartridge under pressure is released through a valve for purposes of inhaling. In such devices the principal resistance to flow is a mechanical valve, and the principal inhalant is the gas itself. The disadvantage of such a system is that it is entirely dependent on the action of the mechanical valve and also it is narrowly limited in the nature and purpose of the inhalant material.

One of the objects of the present invention is to provide an apparatus for positive pressure dispersion of a variety of inhalant materials for a multiplicity of purposes.

Another object of the present invention is to provide an apparatus for positive pressure dispersion of an inhalant in which a preselected gas, such as oxygen, may be inserted into the apparatus by the user in the form of a cartridge and a preselected inhalant may be introduced by the user into the apparatus in a separate cartridge so positioned as to be in the path of a flow of gas from the first cartridge when the cartridges are pierced.

A still further object of the present invention is to provide positive pressure dispersion apparatus which is sufficiently compact to be in the general form of an elongated cigarette or cigar and at the same time be easily and safely operated by the user.

Further objects and advantages of the present invention will become evident from the following description of two examples of apparatus illustrating the present invention, reference being made to the accompanying drawings in which:

FIG. 1 is an enlarged front elevational view partly broken away and partly in section showing the apparatus of the present invention in the form of a cigar;

FIG. 2 is an exploded perspective view of the apparatus shown in FIG. 1 depicting the various individual elements of the apparatus;

FIG. 3 is a perspective view of one of the elements of the apparatus taken from a different angle than in FIG. 2;

FIG. 4 is an enlarged view of the portion of FIG. 1 bounded by the dot and dash lines indicated generally at IV in FIG. 1;

FIG. 5 is an enlarged front elevational view similar to FIG. 1 showing a modification of the apparatus in the form of a cigarette; and

FIG. 6 is a perspective view of one of the elements shown in FIG. 5.

Turning now to the embodiment of the invention shown in FIGS. 1 and 2, a tubular device generally designated **10** is shown having a lower outer casing member **11** and an upper outer casing member **12**. Lower casing **11** is provided with lower internal threads **11***a* and upper internal threads **11***b*. Vent opening **11***c* is also provided in the wall of lower casing **11**. Upper casing **12** is likewise provided with lower internal threads **12***a* and upper external threads **12***b*. An O-ring **12***c* is internally positioned within upper casing **12** as shown in FIG. 2. Threaded opening **12***d* is provided for reception of check valve assembly **24** to be described later.

For ease of assembly two split rings are provided, namely, a lower split retaining ring **13** and an upper split retaining ring **14**. These split rings are each provided with an external groove **13***a* and **14***a* respectively and with external threads **13***b* and **14***b* respectively. Positioned within each of the split rings **13** and **14** are snap retainer rings **15** and **16** respectively.

As shown in FIG. 2, there is also provided a rotatable sleeve **17** having ridges **17***a* formed in its external surface and having a lower rim **17***b* and upper rim **17***c* as shown in FIG. 1. Also provided in sleeve **17** are internal threads **17***d* which are functionally operative in a way to be described later. At the lower end of the casing **10** there is provided a closure element **18** having external ridging **18***a* and external threads **18***b*. In the upper end of the structure shown in FIGS. 1 and 2, there is provided a mouthpiece **20** having an opening **20***a* and provided with a plurality of openings **20***b* in its lower end. There is also provided recess **20***c* within mouthpiece **20** and external ridges **20***d* which facilitate rotation of the mouthpiece **20**. Also formed internally of mouthpiece **20** is a contact surface centrally positioned in the form of a ring **20***e* and internal threads **20***f* formed in the lower portion of the inside wall of mouthpiece **20**. A piercing pin **21** having a slit **21***a* is centrally mounted within a depression outlined by the pressure surface **20***e*.

Turning now to the apparatus to be mounted within the assembled tube shown generally at **10**, there is shown in FIGS. 1 and 2 a cartridge **22** having a cap **22***a*. Cartridge **22** contains a gas, such as oxygen, under pressure and is adapted to be inserted into the lower end of the opening of lower outer casing **11**. There is also shown a cylindrical cartridge **23** having a lower closure member **23***a* and upper closure member **23***b* as well as an outer wall **23***c*. Cartridge **23** contains an impregnated filler **23***d* and is adapted to be inserted into the lower end of the opening of lower outer casing **11**. Cartridge **23** has a lower closure member **23***a* and an upper closure member **23***b* as well

as an outer wall **23***c*. Cartridge **23** is adapted to be inserted into the upper open end of upper outer casing **12** prior to affixing threaded mouthpiece **20**.

Mounted within threaded opening **12***d* is a check valve assembly **24** shown in greater detail in FIG. 4 in which there is shown outer opening **24***a*, a ball **24***b* as well as a spring **24***c* and an adjusting nut **24***d* having a delivery opening **24***e* which communicates with a delivery chamber **24***f* in one direction and with internal chamber **25** in the other direction.

Returning now to FIGS. 1, 2 and 3, there is shown a piercing sleeve **30** provided with external threads **30***a* and with an internally positioned O-ring **30***b* which serves to form an internal chamber **30***c*. As shown in FIG. 3, there is also provided a circular depression **30***d* in sleeve **30** which serves as a seat for the spring **34**. Openings **30***e* are provided for passage of gas under pressure delivered from cartridge **22**. Also formed integrally with threaded sleeve **30** is a lower piercing pin **32** and an upper piercing pin **33**, the latter pin being provided with a slit **33***a*.

An alternate form of the present invention is shown in FIGS. 5 and 6 of the drawings in which corresponding numbers starting with **110** have been used to designate the various parts. It should be noted that the overall external appearance of the device shown in FIG. 5 is in the general form of an elongated cigarette, whereas the external appearance of the device shown in FIG. 1 is in the general form of a cigar.

In FIG. 5 the device shown generally as **110** has a lower outer casing **111**, provided with a vent **111***c*, and an upper outer casing **112**. Within the casing there is shown a lower split retaining ring **113** and and an upper split retaining ring **114**. An adjusting sleeve **117** is provided to carrying out a general function similar to the adjusting ring **17** of FIGS. 1 and 2. At the lower end of the body **110** there is provided a threaded closure member **118** and at the upper end there is shown a mouthpiece **120** having an opening **120***a* communicating with holes **120***b* and having external ridging as shown in FIG. 6. Also affixed to mouthpiece **120** is a piercing pin **121** which is mounted within the depression defined by the pressure surface **120***e*. Internal threads **120***f* are provided as shown in FIG. 6. A gas pressure cartridge **122** is shown in position for use and an inhalant cartridge **123** is shown mounted in position for use in the upper portion of the body **110**. A check valve **124** is shown having a structure and function comparable to check valve **24** of FIG. 1. Check valve **124** communicates with chamber **125** as shown in FIG. 5. Sleeve **130** terminates at its lower end in a chamber **130***c* and has a lower piercing pin **132** as well as an upper piercing pin **133**. Spring **134** is mounted within the chamber **125** and has a function comparable to that of spring **34** of FIG. 1.

Having described the component parts of two preferred forms of my invention, I will now describe the assembly of these component parts into the final devices and the method of using these devices in their intended manner.

Taking first the form of the invention shown in FIGS. 1 to 4 inclusive, the component parts are assembled by first inserting threaded sleeve **30** within adjusting sleeve **17** with the piercing pins **32** and **33** positioned as shown in FIG. 2. The external threads **30***a* of sleeve **30** thus engage the internal threads **17***d* of sleeve **17**, and this threaded engagement is continued so that sleeve **30** comes to a position approximately central along the longitudinal axis of sleeve **17**. With snap ring **15** removed from split retaining ring **13**, there are four segments made available. These four segments are assembled inside sleeve **17** and snap ring **15** is forced into position, thus expanding split ring **13** to a tight fit against the inner wall of sleeve **17**. In a similar fashion, split ring **14** is inserted into the other open end of sleeve **17** and expanded to a tight fit against the inner wall of sleeve **17** by snap ring **16**. With split rings **13** and **14** firmly in place within sleeve **17**, a cementing compound is applied to threads **13***b* and **14***b* after which lower casing member **11** is threaded to threads **13***b* sufficiently far to provide a working fit against sleeve **17**, and upper casing member **12** is threaded to threads **14***b* likewise to a working fit against the other end of sleeve **17**. The cementing compound is then allowed to harden, thus preventing further rotation of casing members **11** and **12** relative to retaining rings **13** and **14** respectively. Spring **34** is then inserted through the open end of upper casing member **12** and is seated in spring recess **30***d*.

Pressure capsule **22** is now inserted in the open lower end of casing element **11** and is forced into engagement with O-ring **30***b* by tightening closure element **18** which engages the lower rounded portion of capsule **22** and thus forces the neck portion of capsule **22** into a tight fit against O-ring **30***b*. Cartridge **23** is then inserted into the open end of upper casing element **12** in which position it rests against the upper end of spring **34**. The threads **20***f* of mouthpiece **20** are then engaged with the threads **12***b* of casing member **12** and the mouthpiece **20** is rotated, thus forcing cartridge **23** downward against the spring **34** which is thereby compressed. Piercing pins **33** and **21** penetrate closing means **23***a* and **23***b* respectively. With cartridge **23** thus firmly fixed in position and pierced at both ends, sleeve **17** is rotated. During such rotation piercing sleeve **30** is prevented from rotating by the frictional fit between the O-ring **30***b* and neck of pressure cartridge **32**. However, this fit permits longitudinal sliding movement of sleeve **30**. Consequently piercing sleeve **30** is caused to move toward or away from pressure cartridge **22** depending upon the direction of rotation of sleeve **17**. In placing the device in condition for operative use, sleeve **17** is rotated to the full extent of the downward travel of piercing sleeve **30**. In this position very little gas under pressure will be released since the pin **32** and the surface around it will be blocking the exit from cartridge **22**. At this point a slight rotation of sleeve **17** in the opposite direction will permit the flow of gas under pressure into the chamber **30***c* and through the openings **30***e* to the chamber **25**. With positive pressure thus present in chamber **25**, the check valve **24** will close and the gas under pressure will make its way through the opening in the closure member **23***a*. Backward flow of such gas is prevented by O-ring **30***b* and flow of such gas around the outside of cartridge **23** is prevented by O-ring **12***c*. The gas under pressure is now forced through the impregnated filler material **23***d* with a sweeping action which carries along vaporized material being released from the impregnated filler. The gas emerges from the opening formed in the upper closure member **23***b* of cartridge **23** and, therefore, consists of a mixture of the gas under pressure and the vapors released from the filler material. This gaseous mixture makes its way through the openings **20***b* in the mouthpiece **20** into the opening **20***a* at which point the mixture is readily available for inhaling by the user. Since there will normally be a slight negative pressure at the mouthpiece, the extent of pressure required can be minimized by proper manipulation of sleeve **17**, and this will extend the time during which the mixed vapors will be presented under pressure for inhaling. When there is no longer gas under pressure flowing from cartridge **22**, it is possible to continue use of the device in order to make use of the final vapors present in cartridge **23**. This is accomplished by creating sufficient negative pressure to open the check valve **24**, thereby admitting outside air into the casing **11** and drawing it through cartridge **23** to the mouthpiece. Vent hole **11***c* is provided as a safey vent to relieve the pressure which might build up in the event all other openings become clogged. In such event, the pressure would be sufficient to force the gas under pressure to pass O-ring **30***b* into the chamber **13** from whence it would escape from vent hole **11***c*. However, under normal operation, there will be no flow of air in either direction through vent hole **11***c*.

In using the cigarette apparatus shown in FIGS. 5 and

6, the same procedure would be followed as in the case of the cigar embodiment of FIGS. 1 to 4. It will be noted that in both embodiments cartridges **23** and **123** are forced down against springs **34** and **134** respectively. Consequently when it is desired to replace the cartridge, the mouthpiece **20** or **120** is removed by rotating in the proper direction whereupon the spring ejects the cartridge by forcing it away from piercing pin **33** or **133**, as the case may be.

In using the present invention, it is contemplated that the gas under pressure may contribute beneficial effects as well as pressure effects. For example, oxygen or mixtures of oxygen and other gases may be employed for this purpose. Likewise, it is contemplated that the cartridge **23** or **123** may contain a wide variety of substances as, for instance, medicinal materials, such as menthol and the like, flavor materials or materials known to be helpful in the breaking of the cigarette habit. In this latter category, it is contemplated that the cartridge **23** or **123** could contain filler material impregnated with a substance containing "Bantron" which is the trade name for a product marketed by Purex Corporation, Ltd. of Wilmington, Calif.

The invention further allows for the inhalation of oxygen by persons afflicted with a variety of cardiac and ventilatory or pulmonary disorders in which administration of an enriched oxygen supply is ordinarily helpful. The portability of the device permits a greater facility of utilization by the ambulant patient. Athletes or other individuals under conditions of physical strain in which oxygen requirements are increased may apply the principles of the device of the present invention to advantage in the correction or reduction of oxygen deficits. The potential for use of combinations of inhaled gases and flavors or medicines generally effective in inhaled form is provided by the tandem arrangement of the gas-filled cylinder and the impregnated filler, particularly where the filler is made of a cylinder of cellulose or similar porous, absorbent material treated by various degrees of saturation with flavors, medicines or other useful substances. Oxygen, thus delivered to the user along a controlled course through a variety of flavored, interchangeable and replaceable fillers, allows for the inhalation of potentially therapeutic gas under more pleasant conditions than would normally be the case. Obversely, the pleasant experience of tasting, smalling and inhaling the various individually selected materials or flavors will have the added advantage of the concurrent potentially beneficial effects of the inhalation of pure oxygen.

An alternate use of this invention involves the delivery of a medicated or flavored mist from the body of the device by the nebulizing action of the gas under pressure through a liquid-filled cylinder placed in the position otherwise occupied by the impregnated (cellulose) filler. Certain medications, such as bronchodilators, are ordinarily effective in the treatment of asthma only in the form of inhaled mists. A suitable mist would be provided by the combined effect of puncturing the upper capsule and introducing gas under pressure.

In addition to the medicinal use of the device of the present invention, there is provided a further advantage for users who desire to continue in the usual motions of cigar or cigarette smoking without actually inhaling cigarette smoke. The device may, therefore, be used in place of cigar or cigarette smoking while at the same time providing the desired mixed vapors for inhaling.

While certain preferred forms of the present invention have been described and illustrated, it will be understood that no attempt has been made to illustrate or describe all possible equivalent forms or variations of the invention. Various modifications and changes, such as changes in shape, arrangement of parts and relative size, may be made without departing from the spirit or scope of the invention herein disclosed. For example, the gas under pressure in the capsule may be pure oxygen or mixtures of suitable gases, or in certain cases air under pressure may be used. Likewise, in the cartridge element there may be contained an impregnated filler material, such as cellulose or methyl cellulose, or in some cases the cartridge may contain a liquid inhalant material.

Having thus described my invention, I claim as follows:

1. A positive pressure inhalant device comprising a casing, dividing means positioned within said casing forming therein a lower compartment and an upper compartment and independently movable axially within said casing, a capsule containing a gas under pressure positioned within said lower compartment, a cartridge containing an inhalant material positioned within said upper compartment, a mouthpiece open at one end and operatively attached to and in communication with said casing, at least one passageway in said dividing means for passage of gas under pressure from said lower compartment to said upper compartment, piercing means at each end of said dividing means for puncturing said capsule and one end of said cartridge on axial movement of said dividing means, means connected to said dividing means to provide said axial movement and additional piercing means adapted to pierce the other end of said cartridge, whereby an intermixture of gas and inhalant material is presented under positive pressure to the user at the open end of said mouthpiece when said capsule and said cartridge are pierced.

2. The inhalant device of claim **1** including spring means positioned within said upper compartment between said dividing means and the lower surface of said cartridge.

3. The inhalant device of claim **1** including a check valve positioned in the casing wall in the lower portion of the upper compartment whereby air may be drawn into said upper compartment and through said cartridge on application of negative pressure by the user in excess of the positive pressure exerted by the gas contained in said capsule at the locus of the check valve.

4. The inhalant device of claim **1** said additional piercing means is affixed to the lower portion of said mouthpiece and projects into the upper compartment for piercing engagement with said capsule.

5. A positive pressure inhalant device comprising a casing, independently movable dividing means positioned within said casing and in operative engagement therewith thereby forming therein a lower compartment and an upper compartment, outlet means communicating with said upper compartment, a capsule containing a gas under pressure positioned within said lower compartment, a cartridge containing an inhalant material positioned within said upper compartment, piercing means projecting into said lower compartment and movable into piercing engagement with said capsule on motion of said dividing means in a downward direction parallel to the longitudinal axis of said casing, and means operative by the user and connected to said dividing means for causing said dividing means to move relative to the casing in directions parallel to the longitudinal axis of the casing, means for piercing the upper and lower parts of said cartridge, and at least one passageway in said dividing means for passage of gas under pressure from said lower compartment to said upper compartment, whereby an intermixture of gas under pressure and inhalant material is delivered to the upper compartment on axial piercing movement of said dividing means.

6. The inhalant device of claim **5** in which a part of the casing is a manually rotatable sleeve, threads formed in at least a portion of the internal surface of said sleeve, threads formed in the surface of the dividing means, said sleeve threads being in operative engagement with said dividing means threads, and means restraining rotary motion of said dividing means whereby rotation of said sleeve causes motion of the dividing means in directions parallel to the longitudinal axis of the casing.

7. The inhalant device of claim **6** in which the means for restraining rotary motion of said dividing means in-

cludes a ring member positioned within the dividing means for frictional engagement with the capsule positioned in the lower compartment.

8. The inhalant device of claim 5 in which the dividing means is provided with said piercing means at its lower and upper surfaces respectively for piercing the capsule and lower cartridge surfaces respectively.

9. The inhalant device of claim 1 in which the gas under pressure in the capsule is oxygen.

10. The inhalant device of claim 1 in which the gas under pressure consists of a mixture of gases.

11. The inhalant device of claim 1 in which the gas under pressure is air.

12. The inhalant device of claim 1 in which the cartridge contains a filler material impregnated with an inhalant material.

13. The inhalant device of claim 1 in which the cartridge contains a liquid inhalant material.

14. The inhalant device of claim 1 in which piercing of the cartridge at both ends thereof is accomplished by pressure exerted through the mechanical attachment of the mouthpiece to the casing.

References Cited

UNITED STATES PATENTS

809,662	1/1906	Barnes	128—200
2,225,201	12/1940	Anderson	128—203 X
2,705,007	3/1955	Gerber	128—200
2,860,638	11/1958	Bartolomeo	128—201
2,920,623	1/1960	Holt	128—208
3,012,694	12/1961	Johnston	128—203 X

WILLIAM E. KAMM, *Primary Examiner.*