Jan. 12, 1960 J. J. HOLT 2,920,623

POCKET OXYGEN DISPENSER

Filed Aug. 26, 1957

Fig. 1.

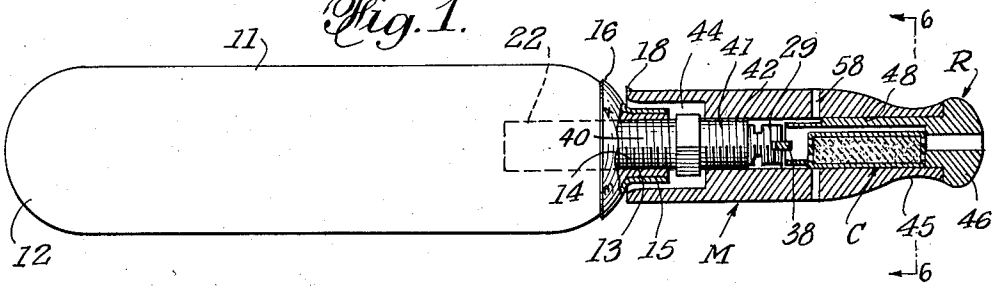


Fig. 2.

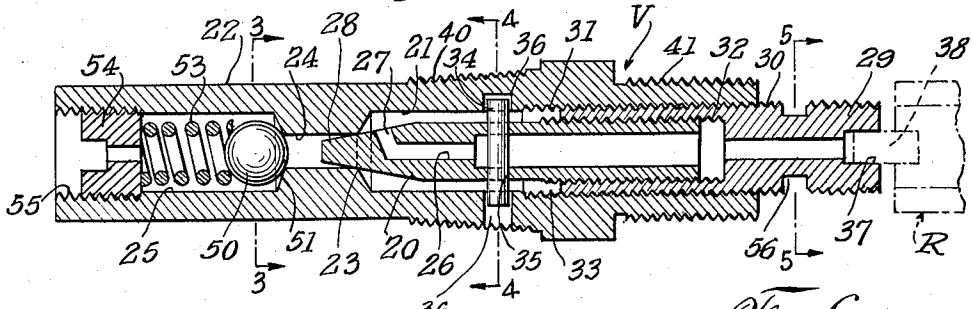


Fig. 3.

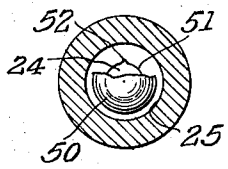


Fig. 4.

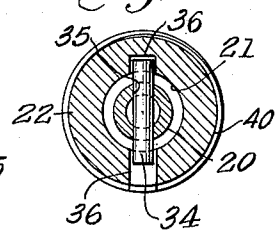


Fig. 5.

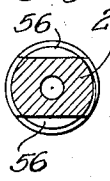


Fig. 6.

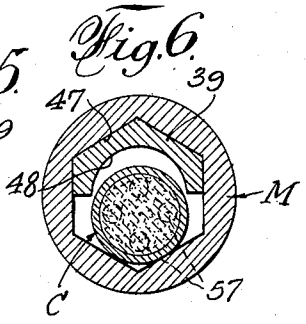


Fig. 7.

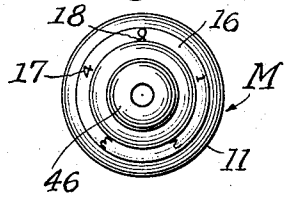


Fig. 8.

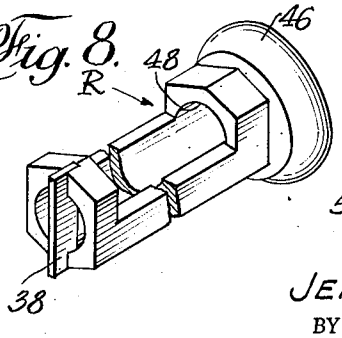
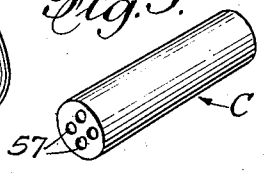


Fig. 9.



INVENTOR.

JEROME J. HOLT

BY

C. G. Stratton

ATTORNEY

United States Patent Office 2,920,623 Patented Jan. 12, 1960

2,920,623

POCKET OXYGEN DISPENSER

Jerome James Holt, Los Angeles, Calif.

Application August 26, 1957, Serial No. 680,211

12 Claims. (Cl. 128—208)

This invention relates to a portable oxygen dispenser and in particular to one which may be carried in the pocket of a garment or in a purse.

One object of the invention is to provide a small, portable oxygen dispenser that is ready and convenient for immediate use, as needed.

Another object is to provide a portable oxygen dispenser from which oxygen may be dispensed to be safely inhaled.

A further object is to provide a safe, portable dispenser for oxygen and gas-carried medicament for administration of oxygen by inhalation.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawing merely shows and the following description merely describes, one embodiment of the present invention, which is given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

Fig. 1 is an elevational view of the assembled dispenser, portions being broken away and parts shown in longitudinal section to reveal the interior structure.

Fig. 2 is an enlarged fragmentary longitudinal sectional view of a valve assembly used in the present dispenser.

Figs. 3, 4, 5 and 6 are cross-sectional views taken on the respective lines 3—3, 4—4 and 5—5 of Fig. 2.

Fig. 6 is a cross-sectional view taken on the line 6—6 of Fig. 1.

Fig. 7 is an end elevational view of the device taken from the mouthpiece or inhaling end.

Fig. 8 is a broken perspective view of a mouthpiece and capsule cartridge used in the dispenser.

Fig. 9 is a perspective view of a medicament capsule for use in my device.

In the form of my invention that is shown in the drawing, a container **11** for compressed oxygen, usually called a bottle or cylinder, is provided with a metering valve assembly V and a mouthpiece assembly M, including a medicinal capsule retainer R, as more fully described below.

The container **11** is of conventionally hollow cylindrical cross-section, having one of its ends **12** closed in the form of a hemisphere, its other end being reduced in diameter to form a neck **13**. The inside **14** of the neck is shown as internally threaded to engage the valve assembly V and the outside surface **15** of the neck is preferably smooth and forms a bearing or contact surface for an overlying indicator dial **16**. The latter is held, preferably frictionally, on said outside surface **15**. The indicator dial **16** is provided with suitable indicia **17**

(Fig. 7) denoting the degree of valve opening in terms of different rates of discharge of the oxygen (preferably in the accepted units of liters per minute). An overlying pointer or index **18** is attached to the mouthpiece assembly M, the same being provided so that the user may set the rate of discharge, as desired.

In order to accurately meter the desired amount of oxygen to be discharged from container **11**, and for safety in avoiding dangerous rates of discharge due to a too-wide opening of the valve mechanism V, said mechanism is provided with a ball check and with a micro-adjustment means of a needle valve. The valve V is arranged to provide for minute axial movement of its needle **20** with the bodily turning of the mouthpiece assembly M, the needle being arranged to move longitudinally in a bore **21** in a valve housing **22**. A needle valve seat **23** is provided in the housing or body **22** and the same is disposed in operative relation to the needle **20** which, thereby, controls the opening **24** between the valve bore **21** and the ball check bore **25**. The needle **20** is provided with a longitudinal hole **26** terminating in a laterally directed opening **27** adjacent but rearward of the needle valve point **28** and of the valve seat **23**. Thus, said opening **27** opens into bore **21**. The needle **20** is moved axially by a metering screw **29**, the outside threads **30** of which are adapted to engage with the threaded wall of the bore **21** in the valve housing or body **22**. The metering screw **29** is provided at its end nearer the needle **20** with a threaded hole **32** which is engaged with the exterior threads **33** of the needle **20**. The needle **20** is held non-rotationally by means of a cross pin **34** which is inserted through a transverse hole **35** in the needle **20**. Said pin engages the walls of transverse holes **36** disposed on opposite sides of the bore **21**, said holes being preferably made somewhat larger than the pin **34** in order to provide for subsequent limited adjustment, as will be later described. It will be seen that the needle **20** is moved axially through very small distances for each full rotation of the metering screw **29** because the threads **30** and **32** on the inside and outside of said metering screw each have a different number of threads per inch, both threads being of the same hand. Thus, rotation of the metering screw **29** in one direction will move said screw in one longitudinal direction relative to the valve housing **22**, while at the same time it will move the needle **20** in the opposite axial direction. If both threads **30** and **32** were of the same number of threads per inch, there would be no actual movement of the needle with respect to the valve body. However, by making the number of threads per inch on the outside greater than on the inside of the metering screw, a differential linear movement is obtained. In practice, the outside thread **30** of the metering screw may be provided with fifty-one threads per inch, while the inside thread **32** of the metering screw may be made with fifty threads per inch. Therefore, one revolution of the metering screw will advance said screw axially $\frac{1}{51}$ (.0196) inch in one direction and will draw the needle axially $\frac{1}{50}$ (.0200) inch. The net axial movement of the needle relative to the housing **22** and the needle valve seat **23** is the difference of .0004 inch in a direction that is opposite to the axial movement of the metering screw **29**. If both threads are left-handed, turning the metering screw counter-clockwise (when viewed from the mouthpiece) will open the valve, and when both threads are right-handed, turning the mouthpiece clockwise will open the valve.

The outer end of the metering screw **29** is provided with a radial slot **37** which is engaged with a corresponding key-like projection **38** extending from the inside end of the capsule cartridge R. The valve housing **22** is provided on its outside surface with a taper-threaded portion **40** which is adapted to engage the inside threads **14**

of the neck portion 13 of the oxygen cylinder 11. The valve housing is also provided at its end opposite to the threads 40 with a threaded portion 41 arranged to engage the inside thread 42 of the mouthpiece assembly M. The mouthpiece assembly M is of generally cylindrical shape, the same having a cylindrical counterbore 44 at its inner end into which the neck portion 13 of the cylinder 11 extends. The index pointer 18 is provided on said mouthpiece end so as to indicate the opening of the micro-valve above described by pointing to the indicia 17 on the indicator dial 16 which has previously been described. The opposite end of the mouthpiece assembly M is preferably tapered to a smaller diameter neck 45 which is adapted to be held between the lips of the user and constitutes the mouthpiece of the present device. The outer end of the mouthpiece assembly M is provided with a longitudinal, non-circular cavity 47 which is adapted to receive the capsule cartridge or retainer R. The capsule cartridge R is also generally non-circular in its outer shape to non-rotationally fit the cavity 47 and the same is provided with a terminal portion which constitutes the terminal end 46 of the mouthpiece. The cartridge retainer R is cut away laterally so that a capsule C (Fig. 9) may be inserted in the longitudinal hole or seat 48. The capsule C is provided with openings 57 at its opposite ends so that the oxygen gas flowing toward the mouthpiece may pass through the capsule. The capsule is adapted to contain suitable medicinal or perfuming materials which are volatilized or dispersed and carried out of the mouthpiece with the oxygen gas. The capsule cartridge R is frictionally engaged in the cavity of the neck 45 of the mouthpiece assembly and the key-like projection 38 on the inside end of the cartridge R engages the radial slot 37 in the end of the metering screw 29. By this means the valve mechanism V is opened and closed upon the turning of the mouthpiece assembly M.

A check ball 50 is provided in the ball check bore 25, the ball being biased against a seat 51 provided with a bleeder notch 52 of a selected cross-sectional opening so that only a safe rate of flow of oxygen can be discharged through the notch opening 52 past the ball. The ball is pressed against the seat 51 by a spring 53 which is held by a retainer plug 54 engaged in the threads 55 of the ball check bore 25. The use of a ball check valve with a small leakage notch is preferred over a simple restricted orifice because it facilitates refilling of the oxygen container.

The metering screw 29 is provided with a pair of diagonally opposite grooves 56, the bottoms of which form a key for registration in a bifurcated member of a filling machine (not shown) used in connection with recharging oxygen container 11 with compressed oxygen.

When assembling the metering screw 29 into the valve housing 22, the needle 20 is first threaded into the metering screw a distance necessary to bring the cross-pin hole 35 substantially in alignment with a hole 36 in the side wall of the valve body 22. The holes 36 of the valve housing 22 are somewhat larger than the cross-pin 34 and a trial setting of the needle in the metering screw 29 need not be too accurate. The metering screw, with the needle thus inserted, is threaded into the valve body until the needle seats. The metering screw 29 is then backed away slightly, just sufficient to bring the cross-pin hole 35 in the needle in radial registration with the opposed holes 36 in the valve body. The cross-pin 34 is then pressed through the needle so that its protruding ends are in registration with the cross-pin holes 36 in the valve body. The mouthpiece assembly M is then threaded onto the valve housing 22 and the capsule cartridge R with its capsule C is inserted in the mouthpiece assembly. The mouthpiece assembly is backed away slightly to permit radial registration of the key 38 at the end of the cartridge R and the slot 37 in the end of the metering screw 29. The cartridge R is then pressed into the hexagonal hole 47 of the mouthpiece assembly M, frictional engagement being provided so that accidental withdrawal is not probable. With the valve adjusted to closed position, the indicator dial 16 is turned so that the zero mark thereon registers with the pointer 18. The valve is then opened to the desired indicated rate of discharge of oxygen, which can never exceed that passing through the notch 52 in the check valve seat 51. The holes 58 in the body of the mouthpiece assembly M permit inspiration of air, if desired.

The cartridge may contain a volatile or dispersible medicament or perfume material which is adapted to be administered by inhalation with the oxygen gas stream through the mouthpiece.

It will be especially noted that the present device embodies a valve assembly that is operatively attached or connected to the mouthpiece and that said combination of elements or components provides for a novel, facile and efficient device for the purpose intended.

While the foregoing has illustrated and described what I now contemplate to be the best mode of carrying out my invention, the construction is, of course, subject to modification without departing from the spirit and scope of my invention. Therefore, I do not desire to restrict the invention to the particular form of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

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

1. A portable gas dispenser comprising a container adapted to hold compressed gas, said container being provided with connecting means for attachment thereto of a valve assembly; a valve assembly including a needle valve having differential screws for fine adjustment and separably attached to the connecting means of said container; a rigid mouthpiece assembly comprising a mouthpiece having an inhaling orifice, said mouthpiece assembly being attached to said valve assembly and interconnected with the needle valve to control the same, the mouthpiece being rotatively carried by the valve assembly.

2. A portable gas dispenser comprising a container adapted to hold compressed gas, said container being provided with connecting means for attachment thereto of a valve assembly; a valve assembly including a needle valve having differential screws for fine adjustment and having a restricting orifice means adapted to release gas at a predetermined rate of flow, said valve assembly being separably attached to said container; a rigid mouthpiece assembly comprising a mouthpiece having an inhaling orifice; means rotatively connecting said mouthpiece assembly to said valve assembly, whereby said needle valve is moved to open or closed position by turning said mouthpiece assembly relative to said container.

3. The portable gas dispenser according to claim 1 in which said mouthpiece assembly is provided with a cavity for holding a replaceable medicament capsule.

4. The portable gas dispenser according to claim 2 in which said mouthpiece assembly is provided with a cavity for holding a replaceable medicament capsule.

5. A portable oxygen dispenser comprising a container adapted to hold compressed oxygen gas, said container being provided with connecting means for attachment thereto of a valve assembly; a valve assembly including a micro-adjustable needle valve and having a restricting orifice means adapted to release oxygen gas at a predetermined rate, said valve assembly being attached to said container; a mouthpiece assembly rotatably attached to said valve assembly and rotatable relative to said container to control said needle valve, and said mouthpiece assembly having a cavity in its outer end, a cartridge in said cavity and having an inhalation piece attached at one end thereof and adapted to receive a replaceable capsule containing a dispersible medicament, said cartridge being removably held in said cavity of said mouthpiece assembly.

6. The portable oxygen gas dispenser according to claim 5, in which indexing means are provided between the container and the mouthpiece assembly to show the movement of said mouthpiece assembly relative to said container.

7. A portable oxygen dispenser comprising a container adapted to hold compressed oxygen gas, said container being provided with a neck portion with inside screw-thread connecting means for attachment thereof of a valve assembly; a valve assembly threadedly attached to said neck portion, said valve assembly comprising a needle, a valve housing having a seat and in which the needle is disposed in operative relation to said valve seat, and a differential screw means interconnecting said needle and housing for moving said needle relative to the housing; a mouthpiece assembly rotatably attached to said valve assembly, said mouthpiece assembly having a pointer indicator; an indicator dial on said container in operative association with the pointer indicator, and said mouthpiece assembly having a cavity in the outer end thereof, a cartridge in said cavity and having an inhalation piece attached at one end thereof and being adapted to receive a replaceable capsule containing a dispersible medicament, said cartridge being frictionally held in said cavity in said mouthpiece assembly.

8. In combination, a container for gas under pressure and having an outlet, a valve assembly connected to said container outlet and including a needle valve and rigid means rotatively mounted thereon to control said needle valve, and a mounthpiece separably connected to said rotative means and having a gas-passing orifice, said mouthpiece and rotative means being non-rotatively connected whereby manual rotation of the former imparts

rotation to the latter to effect control of the needle valve.

9. In the combination according to claim 8, the assembly being provided with a housing, and differential screw means between the rotative means and the needle valve and the rotative means and the housing to effect micromatic linear movement of the needle valve upon rotative movement of the rotative means by the mouthpiece.

10. In the combination according to claim 8 in which the mouth piece is provided with a cavity for medicament inward of the orifice and in the path of gas flowing toward the orifice past the valve assembly.

11. In the combination according to claim 9 in which the mouthpiece is provided with a capsule-holding cavity inward of the orifice and in the path of gas flowing toward the orifice past the valve assembly.

12. In a portable gas dispenser, a connector for attachment to a portable gas container, a valve assembly in said connector comprising a needle valve and a differential screw rotatably mounted coaxially therewith for fine adjustment of the needle valve, and a mouthpiece assembly rotatably mounted on said connector having means engaging said differential screw for rotation thereof to adjust the valve.

References Cited in the file of this patent

UNITED STATES PATENTS

2,418,036 Lane ---------- Mar. 25, 1947

FOREIGN PATENTS

358,673 France ---------- Dec. 27, 1905
257,817 Germany ---------- Mar. 20, 1913