

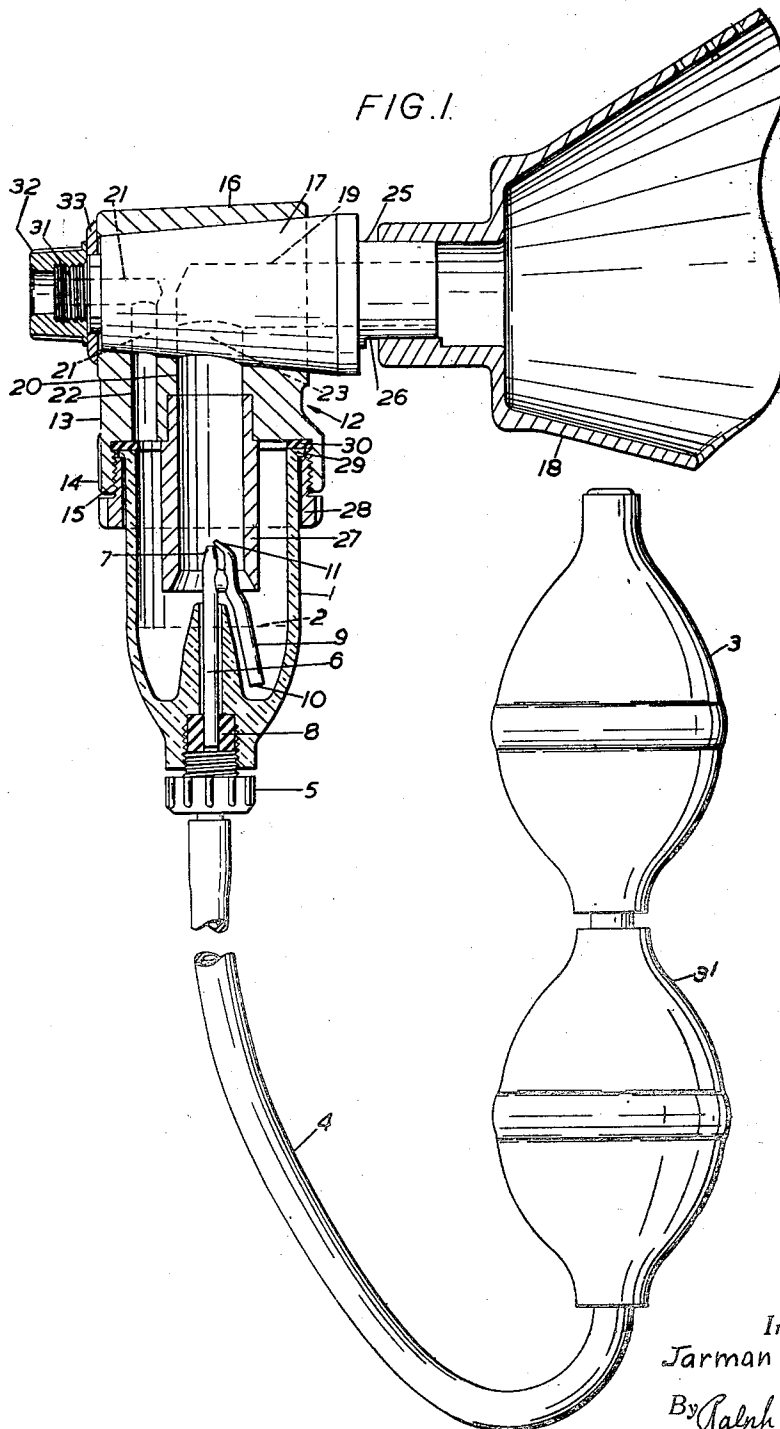
Oct. 20, 1953

J. M. L. JONES
INHALATION APPARATUS

2,655,918

Filed June 18, 1951

2 Sheets-Sheet 1



Inventor
Jarman M. L. Jones
By *Ralph B. Stewart*
Attorney

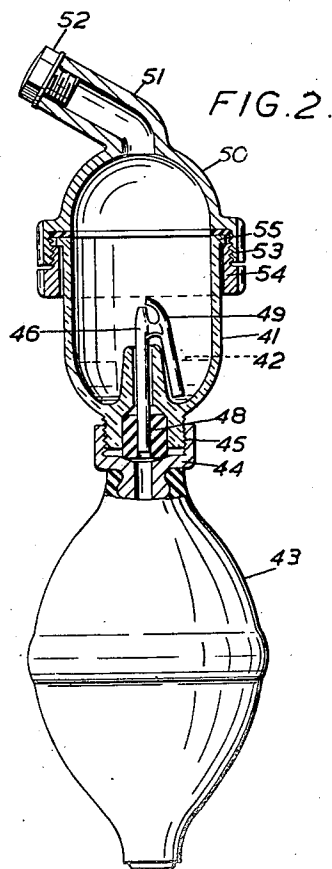
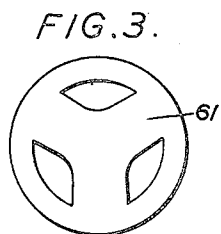
Oct. 20, 1953

J. M. L. JONES
INHALATION APPARATUS

2,655,918

Filed June 18, 1951

2 Sheets-Sheet 2



Inventor
Jarman M. L. Jones
By *Ralph B. Stewart*
Attorney

UNITED STATES PATENT OFFICE

2,655,918

INHALATION APPARATUS

Jarman Maldwyn Lloyd Jones, London, England,
 assignor to Riddell Products Limited, London,
 England, a British company

Application June 18, 1951, Serial No. 232,105
 In Great Britain June 27, 1950

1 Claim. (Cl. 128—173)

1

This invention has for its object to provide an improved insulation apparatus of the kind employed for inhaling atomized medicaments and comprising a container for the inhalant, atomizing means in said container and external air compressing means coupled to said atomizing means, and a detachable head portion forming a closure for said container and having a delivery nozzle, mouthpiece or mask for location over or close to the user's mouth and/or nose.

It is usual for the aforesaid container to be screwed direct to the head portion and it has been found that the screw threads bind, so making dismantling of the device difficult or impossible, or else become loose so leading to leakage of the medicament owing to variations in the expansion of the said container and heat portions. This difficulty is accentuated by the use of different materials for the container head portions respectively, and it will be appreciated that it is necessary to use transparent material for the container so that a user can ascertain whether there is any inhalant therein, whilst the head portion in the interests of economy and ease of manufacture is made from another material.

A more specific object of the present invention is to provide a screwed coupling between the said head and container portions which will not bind or become loosened even under the varying temperature conditions to which the inhaler may be subjected.

Another object is to provide a coupling where the formation of a screw thread on the container is entirely avoided by the provision of a coupling collar which makes a compression joint with the container and a screw-threaded joint with the head portion of the inhaler.

In order that the invention may be well understood, two embodiments thereof will now be described, by way of example only, in conjunction with the accompanying drawings in which:

Figure 1 is a part-sectional elevation of one embodiment of inhalation apparatus according to the invention adapted for use with a mask and shown in operative position,

Figure 2 is a sectional elevation of a second embodiment of inhalation apparatus according to the invention, and

Figure 3 is a plan view of a baffle.

In the embodiment shown in Fig. 1, the inhalation apparatus is provided with a container 1, preferably of transparent material such as cellulose acetate, in which inhalation liquid is stored, the level of which being indicated at 2. A hand bulb 3 serves as a source of compressed air and is connected to the container 1 by a tube 4. A single bulb may be used, or a double bulb, 3, 3' may be employed as shown. The second bulb 3'

2

then serves as an air container and ensures an even flow of compressed air into the container 1. The said tube 4 is connected through a screw-threaded nipple 5 in the bottom end of the container to an air jet 6 mounted in a rubber washer 8 and extending inside the container. The air jet is of glass and is provided with a fine outlet 7. Mounted adjacent the air jet 6 and inclined at an angle thereto is a further jet 9 through which liquid is entrained when air issues from the air jet, the said further jet 9 also being made of glass and having its inlet end 10 located near the base of the container so as to be immersed in the inhaling medicament with which the container is charged. The upper end of the last mentioned jet is provided with a fine outlet 11 positioned close to and directed over, the outlet 7 of the air jet 6.

The head portion 12 of the apparatus is preferably moulded from an opaque material such as Bakelite (a registered trade-mark) and consists of a circular base portion 13 having a downwardly extending peripheral flange 14, said flange being internally threaded as at 15. Mounted on said base portion and integral therewith is a fixed outer sleeve 16, disposed with its axis at right angles to the axis of the said base 13.

A rotatable inner tube 17 fits within the sleeve with a liquid-tight joint and is adapted to turn within it. This inner tube is of such length as to extend from each end of the sleeve, one end of the tube being adapted to receive an inhalation mask 18, so formed and shaped as to fit over a user's mouth and nose. The other end of the tube is formed with a threaded boss 31. A screw cap 32 engages the boss 31 to bear against the sleeve 16 through a washer 33, thereby holding the inner tube 17 in liquid-tight engagement within the sleeve 16, but not so as to prevent rotation of the tube 17 within the sleeve 16. The said inner tube is provided with a central passage 19 connecting the mask to a passage 20 extending upwardly and centrally through the base portion 13. The other end of the inner tube is also drilled with a passage 21 connectable to a further passage 22 extending upwardly through the base portion 13 and disposed adjacent the said central passage 20 through the base, such further passage forming a "breather" opening. In each case the respective pairs of passages are connectable to the container by means of radially drilled holes 23, 24, in the wall of the tube 17.

The mask 18 is located on and engages the reduced end 25 of the inner tube 17 by a flat 26, and by rotating the mask and thereby the inner tube the two passages 20 and 22 through the base portion 13 may be sealed off from their respective connecting passages 19 and 21 in the tube by the wall of the said tube.

A cylindrical downwardly depending sleeve 27 extends from the base portion 13 in alignment with the central passage 20 therethrough, and is such that when the head portion is connected to the container it surrounds the outlets 7 and 11 of the aforementioned jets 6 and 9 respectively.

A coupling collar 28 is provided, being preferably of the same material as that from which the head portion 12 is moulded. The collar makes a sliding fit around the container 1, the upper end of which is provided with an outwardly extending flange portion 29 against which the collar 28 is adapted to abut. The external diameter of the collar 28 is slightly greater than that of the said flange 29 on the container, and the upper part of said collar is externally threaded for engagement with the internally threaded flange 14 of the above mentioned base portion 13.

By screwing the collar 28 firmly into the base portion 13 the top of the container 1 is held tightly in and against said base thereby providing an effectively sealed connection. A rubber ring or like sealing element 30 may be placed between the engaging surfaces of the container and base portion.

As shown in the drawing, the annular flange 29 is relatively thin in the direction of its axis, thereby reducing to a minimum the amount of differential expansion and contraction which must be accommodated in the joint.

Thus an effective fluid-tight connection is provided between two components of the inhalation apparatus, each being of different material, which connection does not entail any direct threaded engagement between those two different materials.

In use the mask is turned to operative position, the position shown in Fig. 1, thereby bringing the various passages in the head portion into coincidence, and then by squeezing the hand-bulb compressed air is forced into the container. This induces a fine atomisation of liquid to issue from the liquid jet 9, such atomisation being vaporized at the air-jet outlet 7 and the vapour then passing up the depending sleeve 27 into the head portion 12 and thence to the mask 18. The apparatus may be filled through the passage 21 in the inner tube remote from the end carrying the mask.

When not in use, the mask, and thereby the inner tube 17 is turned to inoperative position whereby the passages extending through the base portion are completely sealed off by the inner tube.

In another embodiment of the present invention, suitable for carrying in the pocket and shown in Fig. 2, the inhalation apparatus again comprises a transparent container 41 for the inhalant liquid, the level of which is indicated at 42, such container having atomisation producing means 46, 49 similar for instance to those already described, held in a rubber washer 48 and connected to a hand bulb or other air compressing means 43, a connecting member 44 held in the bulb making threaded engagement as at 45 with the container 41. The said container instead, however of being detachably connected to a head portion having a plurality of passages and a mask, is connected to a cap portion 50 having a delivery nozzle 51 suitable for being directed into a user's mouth or nostril. The said cap portion may be of dome like shape with the delivery nozzle extending therefrom at an angle, and the outlet end of the said nozzle may be provided with a

removable closure 52 so as to prevent leakage or evaporation when the apparatus is not in use.

The above mentioned cap portion is provided with a base flange 53 which is internally threaded for engagement by a collar 54 similar to the collar already described, and the container is provided with an outwardly directed peripheral flange 55 against which the inner face of the collar abuts. The container can therefore be connected to the cap portion by means of a fluid-tight compression joint and the latter is not adversely affected by differences in the coefficients of expansion of the material from which the cap portion and container are made.

As in the case of the earlier example, the container is preferably made from cellulose acetate or other transparent material and the cap portion is preferably moulded from opaque plastic material.

Preferably, a rubber ring or like sealing element 60 is placed between the engaging surfaces of the container and cap portion as in the first embodiment. If desired a baffle may be interposed between the said sealing ring 60 and the cap portion for the purpose of improving atomisation such baffle for instance being in the form of a disc 61, as shown in Figure 3.

It will be understood that various changes and modifications may be made without departing from the scope of the invention. As has been said, single or double compression bulbs may be used, while the embodiment shown in Fig. 2 may also be adapted to be used with a face-mask if desired, similar to that shown in Fig. 1.

Furthermore, the collar could be channel-shaped in cross-section, the outer wall of the channel being internally threaded to engage an externally threaded portion of the head portion, the inner wall of the channel abutting against the flange on the container.

I claim:

Inhalation apparatus comprising a container for the inhalant, said container being formed of transparent material and having a cylindrical portion providing a circular opening at its outer end, said cylindrical portion having a thin annular flange extending outwardly therefrom at its open end, means in said container for atomizing said inhalant, means for supplying compressed air to said atomizing means, a head portion formed of material having a different coefficient of expansion from the material of said container, said head portion having a flat annular surface forming a seat for said thin annular flange on said container and being formed with an internally threaded cylindrical flange surrounding said seating surface and said annular flange, and a clamping collar formed of the same material as said head portion and having a portion extending into said annular flange and externally screw threaded to engage the internal threads of said cylindrical flange, said clamping collar having a further portion thereof positioned to engage the rear face of said annular flange and to press the front face thereof into sealing engagement with the annular seating surface of said head portion.

JARMAN MALDWYN LLOYD JONES.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
447,064	Shurtleff	Feb. 24, 1891
2,202,701	Lehmann	May 28, 1940
2,421,359	Sutherland	May 27, 1947