July 12, 1938. S. G. CATT 2,123,353

INHALER

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Fig. 1.

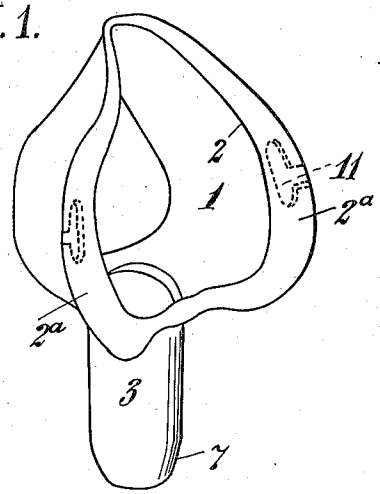

Fig. 2.

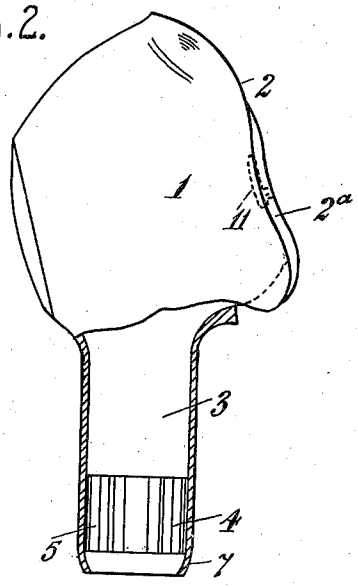

Fig. 3.

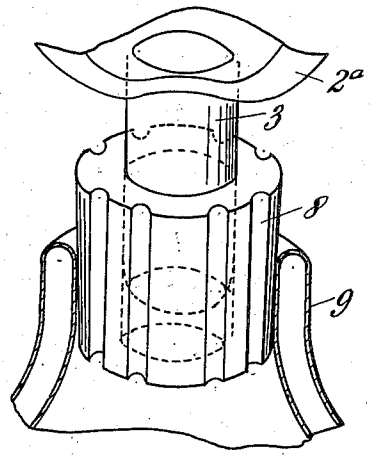

Fig. 5.

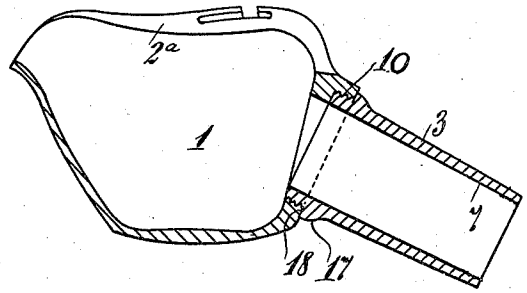

Fig. 4.

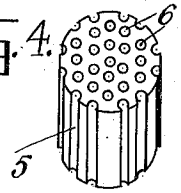

Fig. 8.

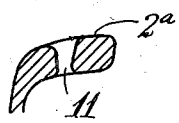

Fig. 9.

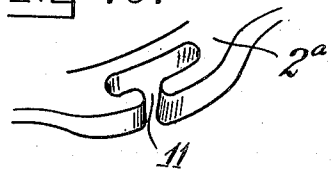

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Fig. 6.

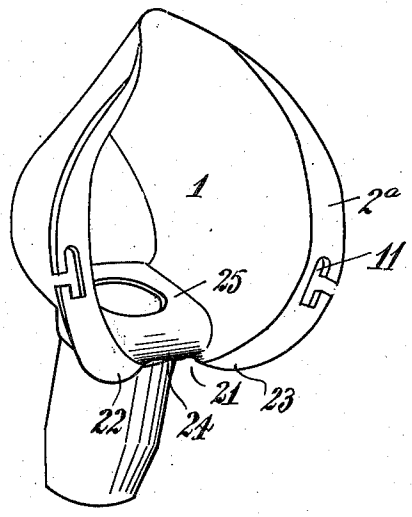


Fig. 7.

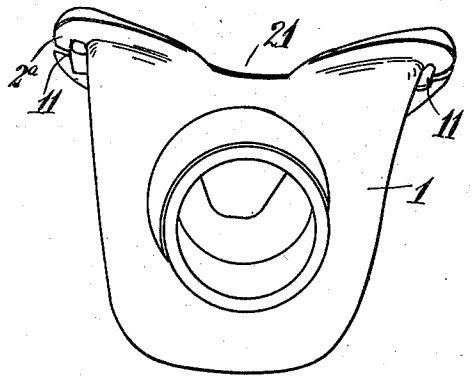


Fig. 10.

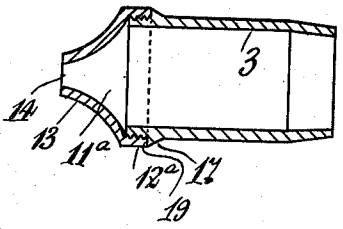


Fig. 12.

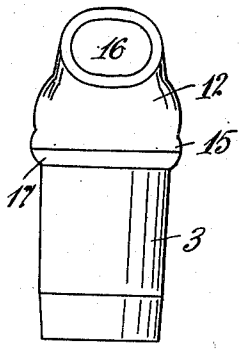
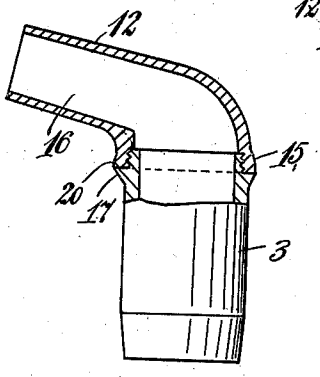


Fig. 11.



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Patented July 12, 1938 2,123,353

UNITED STATES PATENT OFFICE

2,123,353

INHALER

Samuel George Catt, London, England

Application April 2, 1936, Serial No. 72,375
In Great Britain April 6, 1935

3 Claims. (Cl. 128—198)

The present invention relates to inhalers and improvements relating thereto for various uses amongst which may be mentioned the administration of volatile or volatilized substances by inhalation and the filtration of injurious substances from the air breathed through the appliance or apparatus.

One of the objects of the invention is to provide a cheap, simple and easily cleaned self-contained inhaling appliance, i. e., one which can be conveniently held in its entirety by the hand or hands of the user, whilst the inhalations are being self administered. I aim to get the maximum effect from a small inhalant or like cartridge without necessitating the use of resilient sealing rings and the like parts which are generally present in inhaling apparatus.

Another object of the invention is to provide a construction of inhaler which will on the one hand facilitate its manufacture and on the other hand adapt it to a wider usage in conjunction with other parts.

The invention broadly comprises a holder for a porous inhalant cartridge adapted to form therewith a self-contained inhaling appliance, the holder comprising a face mask or cup whose rim has a facial portion of such width as to be capable of being laid substantially flat against the surface of the face to provide a substantial area of contact with the face, and has an upper portion which is sloped forwardly from the general plane of such facial portion to bridge the nose, the holder having a dependent housing for containing the inhalant cartridge.

Such a faced rim can be pressed against the face of the user without giving discomfort, in order to cause the flesh to mould itself to the rim and seal off the cup sufficiently to dispense with resilient sealing rings.

I prefer to use with the holder a porous cartridge of earthenware or the like perforated with multiple passages and charged with a suitable medicament, as the use of such a cartridge, and the absence of restricting valves in the inlet path, as in the hereindescribed holder, is particularly advantageous in realizing the aim of enabling the user to breathe with a natural freedom.

The housing may be formed by a dependent tube having a tapered end which serves as a seating for a cartridge inserted through the upper end of the tube, such a tube serving also when desired to couple the holder to a cork or stopper of a bottle or vessel from which wet inhalations may be taken.

If desired the holder may be made in one piece as in the first form hereinafter described.

In order that the present invention may be the more readily understood, reference is hereinafter made to the accompanying drawings, in which:—

Fig. 1 is a rear perspective and Fig. 2 a side view of the inhaler.

Fig. 3 shows the inhaler fitted to or with a stopper in the mouth of a vacuum flask.

Fig. 4 is an isometric view of a cartridge which is adapted for use for example with the inhaler shown in Figs. 1 and 2.

Fig. 5 is a sectional elevation of a modified form of inhaler; Fig. 6 is a front perspective view of this modified form and Fig. 7 is an under perspective view thereof. Figs. 8 and 9 are detail views of the flange of the rim of the cup. Fig. 10 shows the inhalant-holding stem detached from the face cup and combined with a cap piece to form a variant form of inhaler, and Figs. 11 and 12 are sectional elevational and end views respectively of the stem fitted with a mouthpiece.

The inhaler shown in Figs. 1, 2 and 3 is adapted for nasal breathing only. The nosepiece comprises a cup 1 of metal, vulcanite, glass, synthetic resin, porcelain, rubber or the like easily sterilizable material or papier-mâché, compressed fibre, or pulp or waxed cardboard or the like, whose rim 2 is shaped to a set of facial curves such that it makes a good fit around the nose of practically any person from a small child to a large adult when held in a position suited to the facial angle of the user. The rim is formed with a flange 2a which is of considerable breadth and extends around the sides and below the nose when applied to the face.

It provides a large surface, which is preferably slightly convex, as shown, in the transverse direction, to be brought into contact with the face with little or no pressure, and when pressure is applied the fleshy part of the face can mould itself to the rim and produce an effective seal around the sides and below the nose. It has been found that good results are obtained when the widest part of the flange is about $\frac{5}{16}$", the flange gradually diminishing towards the upper bridge piece, and towards the centre of the lower bridge part in, for example, the proportion shown. The upper portion of the rim is sloped forwardly with respect to the major part of the rim so as to avoid substantial pressure being transmitted across the bridge of the nose, and it can be shaped as illustrated substantially to

follow the bridge of the nose when the cup is in sealed position. A housing for the cartridge is formed at the bottom of the cup, conveniently in the form of a depending tube **3**.

The depending tube **3** will generally be so disposed with respect to the cup **1** that when the appliance is in use the tube will be inclined away from the face and form a very convenient handle with which to hold the inhaler to the nose and/or mouth.

The holder is very well suited for use with a cylindrical cellular cartridge **4**, Fig. 4, of porous earthenware. In one form of such a cartridge, this is provided with external flutes **5** and pierced longitudinally by multiple small passages **6** in which form it serves well for affording in a small compass a large surface area for the purpose of administering volatile substances or for use in inhaling medicated steam. It will absorb volatile liquids and give them off slowly by evaporation and its construction either in cellular or honeycomb form provides considerable area within given small dimensions over or through which air or steam vapor is drawn by natural inhalation and with little or no restriction or effort on the user's part. Thus the entire intake is substantially evenly charged within the area, uncharged air or vapor is substantially excluded, considerable efficacy is obtained from whatever formula is used and little or no medicament is wasted, and the absence of valves in the intake enables the user to breathe through the cartridge with a natural breathing freedom.

A cartridge of the foregoing character very favorably conduces to the economic use of medicament. In one example of such a cartridge which works well a cylindrical piece $\frac{13}{16}$'' long and $\frac{3}{4}$'' diameter is pierced by nineteen passages **6** of $\frac{3}{32}$'' diameter and has twelve external flutes **5** of similar wall curvatures to such passages. Other porous materials, e. g., sponge, paper, cotton, and wool materials, slag wool, woven metal, etc., which enable free inhalation or exhalation therethrough are however available for the purposes of the present invention.

The cartridge may be dropped in position through the cup, its position being determined, for example, by a taper **7** of the tube **3** or by cooperating tapers or shoulders of the tube and cartridge or, otherwise, a detachable sleeve or thimble cartridge holder may be frictionally attachable in or over the bottom of the tube.

If desired an elastic or other head-band may be provided for holding the inhaler in inhaling position on the head. This may for example be secured in slots **11** in the rim of the cup.

In certain cases, e. g., for the inhalation of watery vapors, the depending tube **3** is adapted to be passed into or through a medially perforated cork or other suitable stopper **8** inserted or insertable in the neck of a bottle, flask or the like, the neck of a thermos flask **9** for example when it is desired to keep the liquid warm for some time. Provision for admission of air to the vessel may be made in divers ways, one simple way being by externally fluting the stopper **8**.

The cork or other stopper **8** may be an integral part of the device adapted to fit a standard or common bottle, e. g., a milk bottle or thermos flask **9**, the latter permitting warm inhalations to be taken, e. g., through the night without having to provide fresh hot water on each and every occasion.

If desired the depending tubular housing **3** for the inhalant cartridge may be detachably connected to the face cup or mask **1**, preferably by a screw union **10**, and in such case I may provide for use in combination with the tube a cap **11***a* which can be screwed to the tube and is conveniently shaped to be applied to the nostrils so as to form with the tube and the porous inhalant cartridge, a complete pocket nasal inhaler.

Alternatively, or in addition, a mouthpiece **12** may be provided for use in conjunction with the tube **3**, the tube serving, for example, for attachment to a bottle or vessel as described in the first form above referred to, and the mouthpiece being shaped so that it can be conveniently placed in the mouth for mouth-inhaling of watery vapors or the like. Or a cartridge may be held in the tube for inhaling by the mouth therethrough.

The tube may be tapered at one end, as in the form before described or shouldered or otherwise suitably formed to provide a seating for the porous inhalant cartridge and at its other end may be externally screw-threaded to engage a screw-threaded aperture in that wall of the cup, which is lowermost when the appliance is held to the face.

The cap **11***a* may have an internally screw-threaded wall **12** and a conoidal crown **13** which is preferably made so externally concave that its summit portion, where it is provided with an inhaling opening **14**, can be conveniently inserted in one of the nostrils.

The mouthpiece **12** may comprise an internally threaded base piece **15** for making screw union with the tube and an oval section or flattened pipe piece **16** which extends at or about perpendicularly, or preferably at an angle somewhat greater than a right angle, to the tube.

The tube may be provided with a collar **17** which can be screwed up to an abutment surface **18**, **19** or **20** on the cup, cap or mouthpiece respectively.

The tube is common to the three parts, viz., the face cup, the cap and the mouth pipe, the nasal inhaler forming a very convenient pocket device for use, for example, when travelling.

This method of constructing the inhaler enables the various parts, including the face cup, to be conveniently moulded, e. g., from a synthetic resin or like plastic, but the parts may be made from other materials, e. g., metal, vulcanite, glass, rubber or other easily sterilizable material.

The shape of the cup rim may be somewhat different from that in the first form described in that its continuity is broken at **21** where the rim lies below the nose or mouth in use, and by appropriately fairing off the ends **22**, **23** of the rim portions thus formed and rounding off the corresponding edge **24** of the apertured wall **25** of the cup lying between these ends so that a close and comfortable fit is made by the cup with the face below the nose or mouth.

More particularly when the device is intended to fit only over the nose, the aperture in the base into which the tube **3** screws can be so positioned that the nostrils lie directly over it so as to obtain the full effect of the inhalation.

The present invention provides effective apparatus for conveying steam vapor medicated or plain, and medicated vapor without steam to the entire respiratory tract by natural correct breathing particularly via the nose and naso-pharynx while at the same time substantially excluding extraneous air.

What I claim is:—

1. An inhaling device comprising a porous inhalant cartridge and a holder therefor, said hold-

er comprising a nasal mask, said mask having a rim, said rim including rigid pressure-distributing side facial portions of such width as to provide a surface contact of substantial area with the face at each side of the nose, a lower portion extending between said side portions and arranged to engage against the upper lip, and an upper portion extending beyond said side facial portions which is sloped forwardly from said side portions to bridge the nose and conform closely therewith when said side facial portions are pressed into the flesh, and a housing depending from the lower portion of said mask, said housing containing the said cartridge and being positioned so as to come substantially into alignment with the nostrils when the inhaler is in use, said cartridge being a rigid block of porous material having passages therethrough so that inhalation can take place therethrough with a natural breathing action.

2. An inhaling device comprising a vessel for containing hot liquid, a stopper therefor having a medial passage and an air vent, a porous cartridge and a holder therefor, said holder comprising a nasal mask, said mask having a rim, said rim including rigid pressure-distributing side facial portions of such width as to provide a surface contact of substantial area with the face at each side of the nose, and an upper portion extending beyond said side facial portions which is sloped forwardly from said side portions to bridge the nose and conform closely therewith when said side facial portions are pressed into the flesh, and a tubular housing depending from the lower portion of said mask, said housing for containing the said cartridge being positioned so as to come substantially into alignment with the nostrils when the inhaler is in use, said cartridge being a rigid block of porous material having passages therethrough so that inhalation can take place therethrough with a natural breathing action, said tubular housing being adapted to be fitted into the medial passage in said stopper.

3. An inhaling device comprising an open-ended member adapted to receive a removable porous cartridge, the member being tubular and having a body portion whose inner diameter is substantially uniform and a tapered end portion of reducing diameter, the cartridge being substantially cylindrical in section and having a multiplicity of through passages, the outer diameter of the cartridge being less than the inner diameter of the body portion of the member and greater than the effective inner diameter of the tapered end portion whereby the cartridge may be inserted readily into the member through the other end thereof and frictionally held therein by the tapered end portion, a head member, and means for securing detachably the head member to the other end of the tubular member, the head member being thereupon operative to maintain the cartridge against accidental or unintentional removal from the tubular member.

SAMUEL GEORGE CATT.