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2,877,764

SELECTIVE CONTOUR RETAINING MASK

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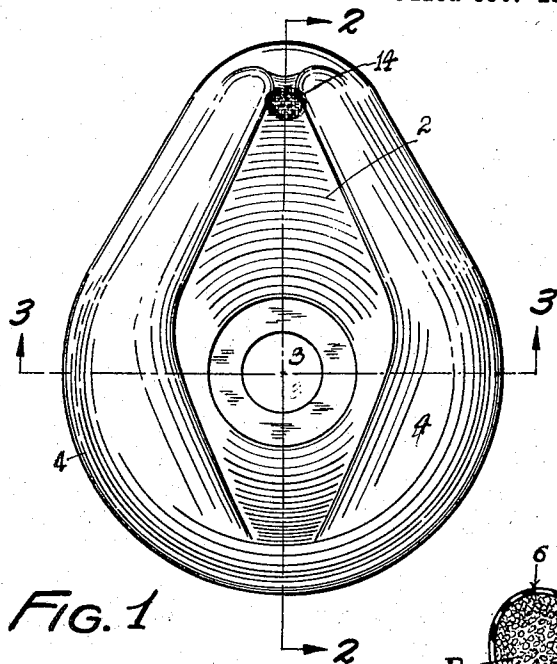


FIG. 1

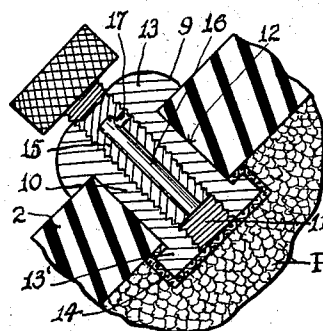


FIG. 4

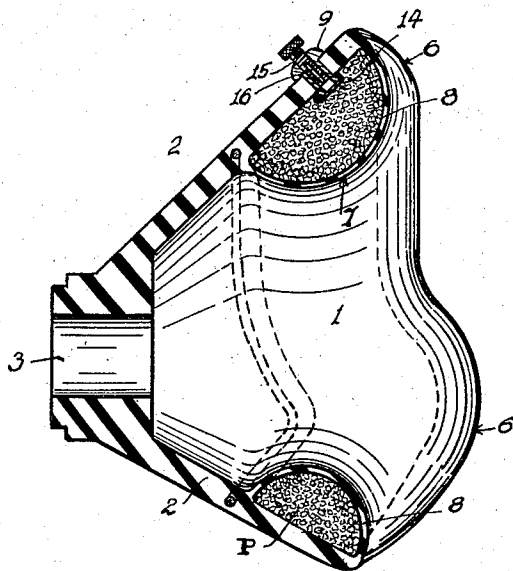


FIG. 2

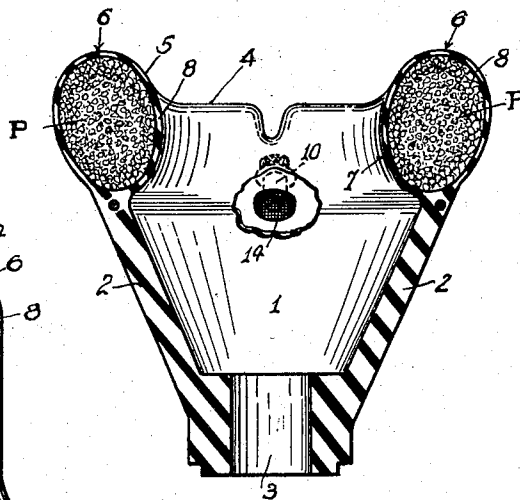


FIG. 3

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SELECTIVE CONTOUR RETAINING MASK

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Application October 15, 1956, Serial No. 615,970

9 Claims. (Cl. 128—146)

My invention is an improvement in anatomical masks and relates more particularly to facial masks of the inhaler type through which oxygen and other gases may be supplied to be inhaled by the patient, and which is provided with a soft peripheral portion having comfortable contact with the face of the wearer and which portion is easily and selectively contoured to match the facial contours of the wearer along the areas of contact and in sealing relation thereto. My invention also is an improved selective method of obtaining and retaining in a mask or the like a contour matching an anatomical contour to which the mask is applied.

An object of this invention is to construct a mask of the inhaler type or the like for the administration of oxygen and other gases or for therapeutic purposes, on which there is provided a peripheral cell or cuff easily contoured to the area to which the device is applied, by the application of a light pressure while valved to the outside atmosphere thereby exhausting air from within the cuff.

Another object of the invention is to provide a device of the type described which, having been placed under light pressure to evacuate some of the air and to effectively match the contour of the area with which it is in contact, may be caused to retain such contour by closing the valve while the mask is under light pressure to retain the partial vacuum within the peripheral cell while the device is in sealed contour contact with the area to which it is applied.

Another object of the invention is to provide a mask or similar device having a peripheral cell of relatively thin, flexible body engaging walls, and to provide a filler therein composed of finely divided porous, sponge like particles substantially filling the cell and which particles are independently movable one over another, and have the independent ability to be inflated or deflated depending upon the pressures imposed upon them.

Another object of the invention is the provision of a suitable filler for the valved peripheral cell of an inhaler mask in which the filler is composed of finely divided porous particles of compressible, resilient foamed rubber, latex or similar materials characterized by their ability individually to hold air at atmospheric pressures but to readily give up and release such air under a force of compression applied to the particle mass.

A further object of the invention is to construct a device of the type described which in use imparts a high degree of comfort to the wearer, not only in use in supplying oxygen or other gases to the patient, but also during the contouring of the mask to the anatomical contour of the patient to which it is applied.

A still further object of the invention is a device of the kind described which is capable of being easily and comfortably contoured to an anatomical area to be treated and which will retain such contour or shape at the will of the operator.

A still further object is to provide in a device of the

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kind described simplicity of construction and an effective sealing contact with the anatomical surfaces to which the device is applied.

Other objects and advantages of this invention will become more apparent as the following description of an embodiment thereof progresses, reference being made to the accompanying drawing in which like reference characters are employed to designate like parts throughout the same.

In the drawings:

Figure 1 is a rear end view of an inhaler mask embodying my invention looking toward the contour cell and thence toward the intake opening;

Figure 2 is a view taken on line 2—2 of Figure 1 and illustrates the peripheral cell of the mask having valved connection with the outside atmosphere;

Figure 3 is a section taken on line 3—3 of Figure 1; and

Figure 4 is an enlarged section of a valve device communicating the interior of the peripheral cell with the outside atmosphere.

While the invention is illustrated in the drawing as being applied to an inhaler mask, it will be understood that the same may equally well be applied to other devices for pressure or vacuum treatment of other anatomical areas.

Referring still more particularly to the drawing which illustrates an embodiment of the invention, the inhaler mask comprises a face piece 1 formed of walls 2 converging to terminate at one end in a fluid intake orifice 3 fitted with a coupling (not shown) by which the mask is connected by any suitable means to a hose supplying oxygen or other gases to the device. The walls 2 diverge in the opposite direction toward a cuff portion 4.

A peripheral cuff or cell 5 is formed within the diverging walls 2 and extends outwardly and forwardly of the face piece, as at 6, as well as internally thereof, as at 7, to project beyond the face piece walls for soft, comfortable sealing contact with the face or other anatomical area to which the device is applied.

The cell 5 includes a wall 8 which is relatively thin as compared to the face piece walls 2 forming with the walls 2 along the extended portions thereof an enclosure or cell which may be filled with suitable finely divided particles in accordance with my invention. The relatively thin wall 8 preferably may have a thickness of the order of .0010" to .0030" which renders this wall extremely flexible, soft and resilient and which presents to the surface to be treated a smooth, continuous, sealing contact area. The walls 2 at their outer portions form with the thin wall 8 a peripheral chamber referred to as the cell 5. The cell 5 is valved to the outside atmosphere by means of a valve device 9. The valve device includes a headed sleeve 10 having a threaded axial bore 11 and which is inserted in an opening 12 in a wall 2. The sleeve is held in place in the wall 2 by means of the headed ends 13 and 13', as shown in Fig. 4, there being a screen 14 over the inner end of the threaded bore to prevent loss of the particles in the cell when the valve is open. A valve stem 15 is threaded into and operates along the bore and is itself provided with an axial opening 16 communicating at one end with the interior of the cell 5 and with an opening 17 at its other end opening to the outside atmosphere. The valve may be opened and closed by manipulating the threaded stem 15 which operates in the threaded sleeve 10.

In further carrying out my invention, I provide a filler within the cell 5 for the purpose of cushioning the mask comfortably in place on the face of the wearer both during the fitting or contouring of the mask to the facial con-

tours and subsequently during the use of the mask while supplying air or a gas to the patient.

I have found that by employing a filler mass composed of individual finely ground or divided foamed or sponge latex particles P, many advantages are obtained which heretofore have not been possible. In the first place, such particles possess the ability individually to take up, to hold and to release air depending upon the varying pressures imposed upon them. These same particles are porous and resilient, as distinguished from solid, hard particles whether smooth or sharp, and they are individually movable one over another in the filler mass. The fact that these foamed or porous particles depress easily and readily under light pressure insures a soft cushioning effect and greatly enhances the comfort to the patient during the contouring or fitting of the mask to the face.

In order to remove any tack which the sponge or foam particles might have, it is desirable to apply a lubricant such as soapstone or similar lubricant to the particles, thus removing any hindrance, due to tackiness, to freedom of movement of the particles over one another in the filler mass.

Thus it will be understood that a mask employing a peripheral cell containing a filler of the type disclosed in accordance with my invention, and in which the cell is valved to the outside atmosphere, possesses many distinct and new advantages over prior practices and constructions.

In use, the mask, having a peripheral face engaging cell valved to the outside atmosphere and containing a filler mass of foamed latex particles as described hereinbefore, is vented to the atmosphere by opening the valve 10. A light but firm pressure is applied to press the mask to the face of the wearer while the valve is open, thus compressing the porous particles against the contour of the area engaged by the cell and causing them individually to release some of the air held in them, depending, of course, upon the varying pressures imposed on them. As the mask is thus fitted to the facial contour, some of the air released from the particles is exhausted through the valve 10 and into the outside atmosphere. Should the contouring pressure be released while the valve is still open, the air will be sucked in through the valve 10 to the interior of the cell and into the voids or spaces in the particles, due to the resiliency of the particles and their natural tendency to return to their original form or shape upon the release of pressure.

Thus, in order to retain the face fitting contour imparted to the mask, the valve 10 should be closed tightly before releasing the contour forming pressure on the mask.

The contoured mask may now be removed from the face of the wearer while still retaining the matching contour imposed upon it. When it is desired to release the imposed contour and to restore the cell to its normal contour, this may be done merely by opening the valve 10 to permit air at atmospheric pressure to be sucked into the cell and into and around the particles forming the filler mass. The resiliency of the particles and their ability individually to take up and hold air will quickly return the cell to its original and normal shape ready for another and different contour fitting.

From the above, it will be seen that by my invention I have provided a selective contour retaining mask which is simple of construction, extremely comfortable and effective in use, and which employs a face contacting cell having a filler which is effective to carry out the objects hereinbefore set forth. The improved method of obtaining and retaining a selected contour in a device of this kind at the will of the operator and with the highest degree of comfort to the patient in accordance with my invention is also readily apparent from the foregoing description.

Various changes may be made in the details of construction and arrangement of parts of the invention without departing from the spirit thereof or the scope of the appended claims.

I claim:

1. In an inhaler mask, a peripheral selective contour retaining cushion exposed for contact with the facial contour of the wearer, said cushion comprising a relatively thin walled cell, a filler for the cell comprising particles of foamed latex, the particles being characterized by their ability to receive, hold and release a fluid in said cell, and valved means communicating said cell with the outside atmosphere.

2. In a mask, a peripherally arranged selective contour retaining cushion exposed to engage the facial contour of the wearer, a valved conduit for communicating said cell with the outside atmosphere, and a filler material disposed in and substantially filling the cell, said filler material comprising foamed resilient particles individually movable over one another and having the ability under a compressive force to give up air when said valved conduit is open to the atmosphere, and to remain deflected when said valved conduit is subsequently closed and the compressive force released.

3. In a mask, a peripherally arranged selective contour retaining cushion exposed to engage the facial contour of the wearer, a valved conduit for communicating said cell with the outside atmosphere, and a filler material disposed in and substantially filling the cell, said filler material comprising porous resilient particles individually movable over one another and having the ability under a compressive force to give up air when said valved conduit is open to the atmosphere, and to remain deflated when said valved conduit is subsequently closed and the compressive force released.

4. The method of fitting a device of the character described having a peripheral valved to atmosphere cuff containing a mass of foamed resilient particles to the contour of an anatomical surface in fluid sealing relation thereto which comprises placing the mask over the surface to engage the cuff with said surface, communicating the interior of the cell with the outside atmosphere, applying a force of compression to the mask in the direction of the surface engaged to expel air from said cell and, during the application of said compressive force, closing said cell to the outside atmosphere thereby to retain the contour of the anatomical surface impressed in said cell, and then releasing said compressive force.

5. An inhaler mask including a mask body and a peripherally arranged selective contour retaining and sealing cushion for mating contact with the facial contour of the wearer, said cushion comprising a thin walled cell, a valved conduit for communicating the interior of the cell with the outside atmosphere, and a filler for the cell comprising a mass of resilient particles individually movable over one another and characterized by the ability to be compressed under a compressive force when said valved conduit is opened to exhaust a fluid medium from the cell to the outside atmosphere, and to remain compressed when said valved conduit is subsequently closed while said particles are under compression and after the compressive force is released.

6. An inhaler mask including a mask body and a peripherally arranged selective contour retaining and sealing cushion for mating contact with the facial contour of the wearer, said cushion comprising a thin walled cell, a valved conduit for communicating the interior of the cell with a source of fluid, and a filler in the cell comprising a mass of compressible, finely divided porous particles individually movable over one another and characterized by their ability to be compressed under a compressive force when said valved conduit is open to exhaust a fluid medium from the cell, and to remain compressed when said valved conduit is subsequently closed while said particles are under compression and after compressive force is released.

7. An inhaler mask including a mask body and a peripherally arranged selective contour retaining and sealing cushion for mating contact with the facial contour of

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the wearer, said cushion comprising a thin walled cell, a valved conduit for communicating the interior of the cell with the outside atmosphere, and a filler in the cell comprising a mass of finely divided resilient inflatable particles individually movable over one another and characterized by their ability to be compressed under a compressive force when said valved conduit is open to deflate said particles and to exhaust the fluid medium from the cell to the outside atmosphere, and to remain deflated when said valved conduit is subsequently closed while said particles are under compression and after said compressive force is released.

8. An inhaler mask including a mask body and a peripherally arranged selective contour retaining and sealing cushion for mating contact with the facial contour of the wearer, said cushion comprising a thin walled cell, a valved conduit for communicating the interior of the cell with the outside atmosphere, and a filler for the cell comprising a mass of resilient particles individually movable over one another and characterized by the ability to hold air at atmospheric pressure as when said valved conduit is open to the outside atmosphere and further characterized by their ability to give up air contained therein when a force of compression is applied to the particles and when said valved conduit is open to the out-

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side atmosphere when contouring the said cell to mate with the facial contour with which the cell is in contact, said particles being further characterized by their ability to retain their deflated condition after said valved conduit is closed and said compressive force is subsequently released to retain the formed contour in the cell so long as said valved conduit remains closed.

9. A selective contour forming and retaining means comprising a thin walled flexible cell, a valved conduit for communicating the interior of the cell with the outside atmosphere, and a filler in the cell comprising a mass of finely divided resilient particles individually movable over one another and characterized by their ability to be compressed under a compressive force when said valved conduit is open to the outside atmosphere to exhaust a fluid medium from the cell to the outside atmosphere, and to remain compressed when said valved conduit is subsequently closed while said particles are under compression and after the compressive force is released from the cell.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,877,764

March 17, 1959

Ellis A. Galleher, Jr.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 18, for "deflected" read — deflated —.

Signed and sealed this 4th day of August 1959.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents