Sept. 5, 1933. J. E. LE DUC 1,925,764

RESPIRATORY MASK

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Fig. 1

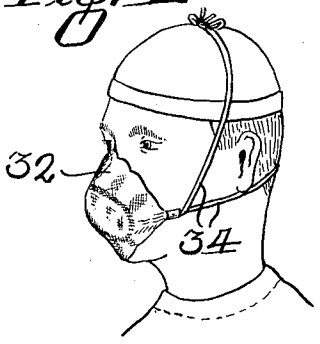



Fig. 2

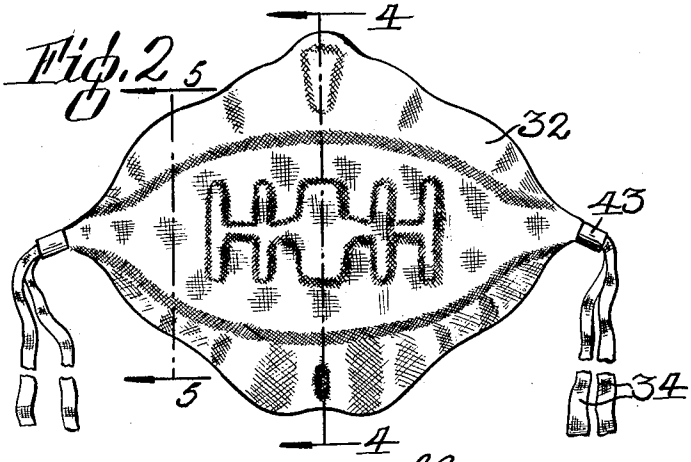



Fig. 4

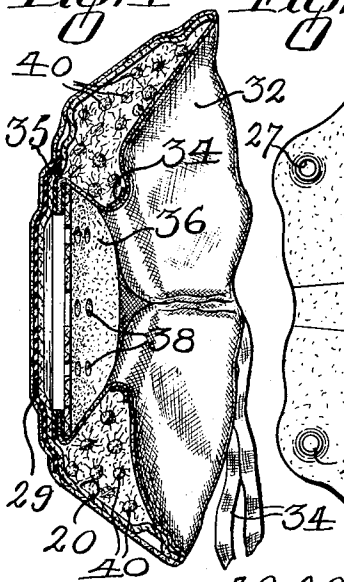



Fig. 6

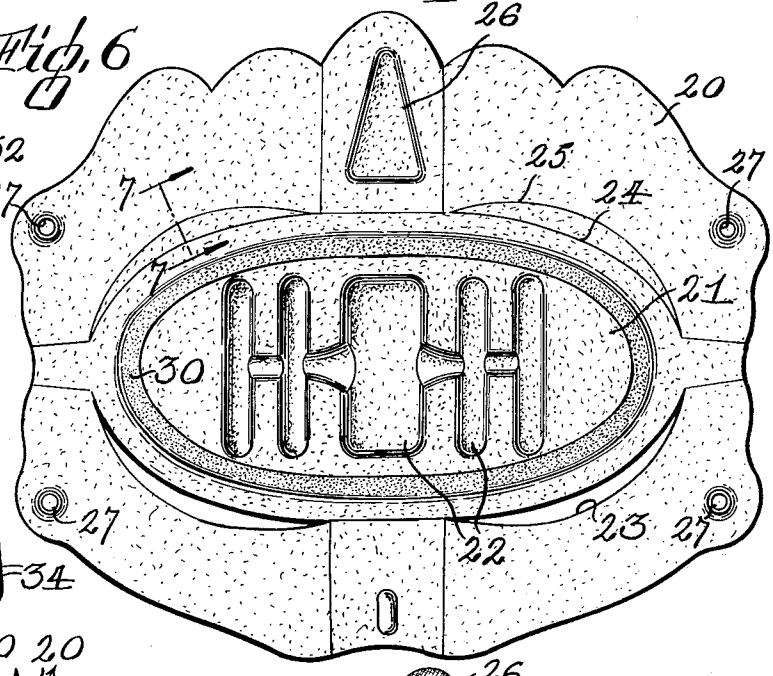



Fig. 5

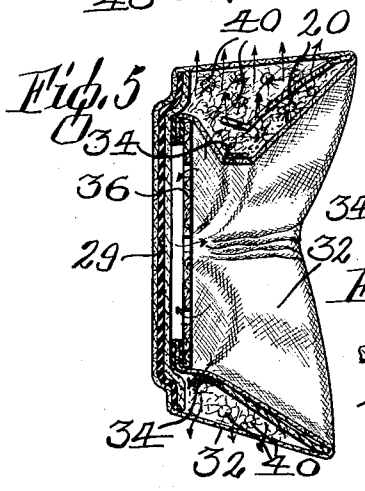



Fig. 3

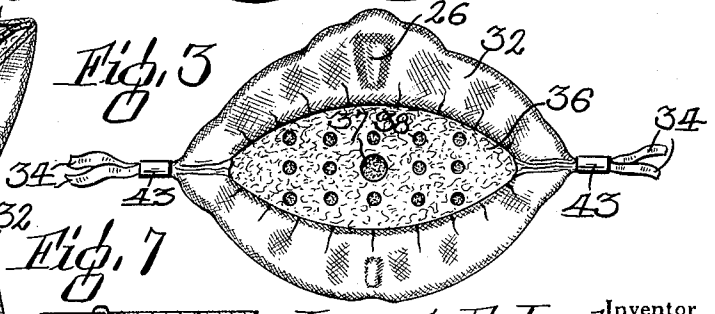
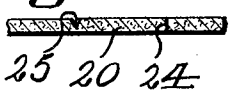



Fig. 7




Inventor

Joseph E. Leduc

By Marion & Marion

Attorneys

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Fig. 8

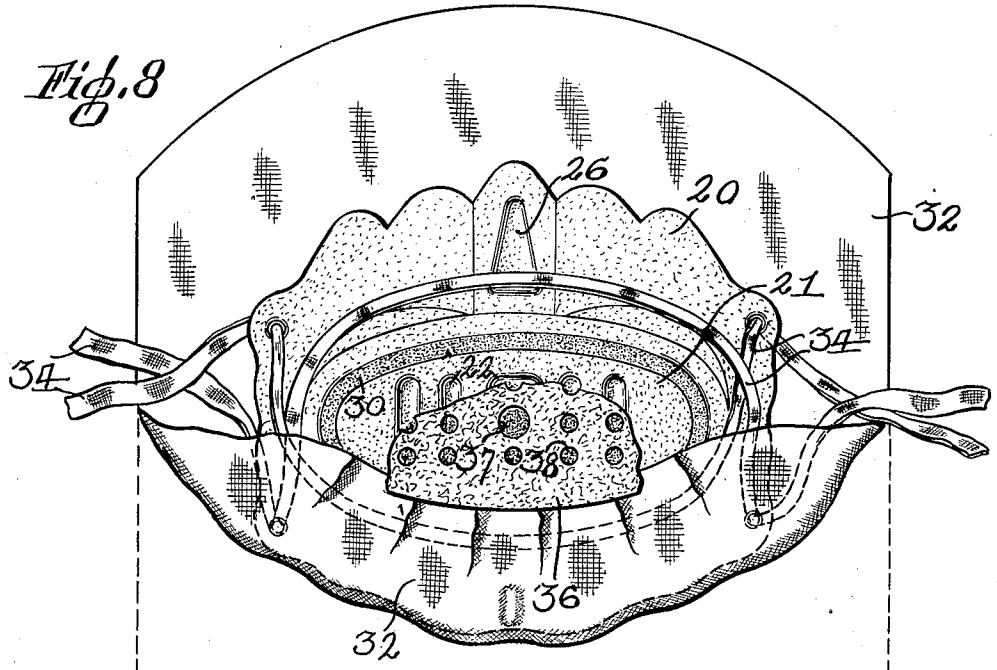



Fig. 12




Fig. 13

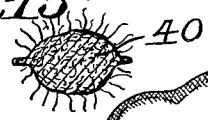



Fig. 9




Fig. 14




Fig. 15




Fig. 10

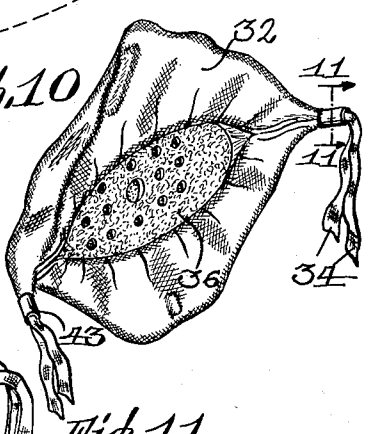



Fig. 11




Joseph E. Leduc Inventor

By Marion & Marion

Attorneys

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# UNITED STATES PATENT OFFICE

1,925,764

## RESPIRATORY MASK

Joseph Edouard Le Duc, Outremont, Quebec, Canada

Application June 27, 1932. Serial No. 619,606

4 Claims. (Cl. 128—146)

The present invention relates to improvements in respiratory masks particularly adaptable for use by surgeons and physicians.

An important object of the invention is the provision of a germ proof mask designed to be comfortably fitted over the mouth and nose of a wearer.

A further object of the invention is the provision of a mask constructed so as to obviate passage of organisms therethrough during prolonged periods of conversation.

Another object of the invention is the provision of a mask of the above type designed so as to practically eliminate fogging of lenses of those using the mask and wearing glasses.

Still another object of the invention is the provision of an orinasal mask which will not be unduly warm and which can be manufactured at a relatively low cost.

Other objects and advantages of the invention will become apparent as the description progresses.

In the accompanying drawings forming a part of this specification and in which like reference characters are employed to designate corresponding parts throughout the same:

Figure 1 is a perspective view of the mask properly fitted over the nose and mouth of a wearer,

Figure 2 is an exterior elevational view of the assembled mask,

Figure 3 is an interior elevational view of the same,

Figure 4 is an enlarged transverse section taken on the line 4—4 of Figure 2,

Figure 5 is a similar section taken on the line 5—5 of Figure 2,

Figure 6 is a plan view of the inner side of the mask frame piece,

Figure 7 is an enlarged fragmentary section taken on the line 7—7 of Figure 6,

Figure 8 is a plan view showing the initial assembly of the mask structure,

Figure 9 is a similar view showing an advanced assembly of the mask,

Figure 10 is a perspective view showing a final assembly operation,

Figure 11 is an enlarged transverse section taken on the line 11—11 of Figure 10,

Figure 12 is a plan view of one of the filling elements,

Figure 13 is a transverse sectional view therethrough,

Figure 14 is a perspective view of a modified form of filling element, and

Figure 15 is a transverse section therethrough.

Referring to the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 20 generally designates the frame piece of the mask which is preferably formed of relatively stiff material such as cardboard, celluloid or the like. The frame piece 20 is provided with a centrally disposed oval shaped section 21 which is stamped or indented in order to form, at the inner side, a series of transversely elongated shallow pockets 22.

At spaced positions, the frame piece 20 is cut at the edge of the center section 21 to provide tapering slots 23 and arcuate cut lines 24, and is scored at the upper side portions as indicated at 25, to facilitate shaping of this piece. In the upper portion, the margin of the frame piece 20 is stamped to provide a nose accommodating indentation 26. At the ends, the piece 20 is provided with four apertures.

Over the exterior surface of the central section of the frame piece, I apply a coating of wax, collodium or other suitable adhesive indicated at 29. Upon the inner edge margin I also apply a marginal coating of similar adhesive, indicated at 30. A sheet of covering material, preferably gauze, indicated at 32 is then properly positioned over the frame piece, the sheet entirely covering the outer surface of the frame and being fastened thereto by the adhesive coating 29. As shown to advantage in Figure 8, the gauze sheet is folded over the margins of the frame so as to assume a doubled position thereon.

The folded covering sheet also encloses a pair of strings or tapes 34 previously laid upon the frame piece about the edges of the center section as shown to advantage in Figure 8 and having the ends extended through the eyelets 27.

The edges of the folded sheet are gathered and firmly pressed unto the marginal coating of adhesive 30, as shown to advantage in Figures 4 and 5. A second marginal coating of adhesive 35 is then applied over the fastening margin of this sheet and a relatively rigid oval-shaped member 36 secured thereon. The member 36, which may be formed of pressed cotton or other suitable material, is adapted to provide a baffle to be disposed directly in front of the mouth of the mask wearer and is formed with a relatively large central opening 37 and a series of smaller openings 38.

After thus assembling the elements of the mask the tapes 34 are grasped at the ends and

drawn outwardly to effect an initial tightening adjustment causing contraction of the inner portion of the covering sheet, as shown in Figure 4, and forming marginal chambers in the covering material. The chambers formed between the folded portions of the covering are loosely filled with filling elements preferably embodying balls of absorbent cotton or other suitable material indicated at 40 and shown at Figures 12 and 13. These balls may be formed by stamping or cutting out portions of a sheet of absorbent cotton and they are preferably inserted into the chambers of the mask by blowing in order that they may be loosely positioned, yet effectively distributed.

A modification of the filling medium, shown at Figures 14 and 15, embodies a cylindrical roll of absorbent cotton indicated at 42, punched or otherwise treated to form therein a series of apertures. These rolls may be positioned in the covering sheet during the folding of the sheet.

As shown to advantage in Figures 2 and 10, the end extensions of the strings 34 are preferably trained through cylindrical rings 43 designed to enable proper contraction of the mask and attachment thereof to the head of a wearer. Thus, when the mask is to be applied, the end portions of the strings are drawn laterally, causing contraction of the covering sheet and bending the frame into a substantially cup-shaped configuration so that the mask will be snugly fitted to enclose the mouth and nose of the wearer. The edges of the frame are preferably of undulatory contour designed so as to be snugly fitted upon the face and provide a tight covering about the nose and mouth.

With the present construction, any germ organisms issuing from the nose or mouth of the wearer will be collected within the mask. Organisms ejected from the mouth will impinge initially upon the baffle member 36 although parts thereof will be discharged through the apertures therein and collected in the indentations 22 in the center plate of the frame. The loosely stuffed marginal portions of the mask will obviate the discharge of organisms about the top, bottom or sides, inasmuch as the absorbent filling will act as a filtering medium. In consequence thereof, the mask provides a highly efficient respiratory device greatly desired for many purposes and particularly for surgeons during operation work in order to reduce to the greatest possible extent the danger of infection.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same, and that various changes as to the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. A mask comprising a frame piece of stiff bendable material scored and cut to enable cupping thereof, a sheet of flexible material covering the outer face and folded over the inner margins of the frame piece, a moisture-absorbent perforated baffle member secured centrally to the inner face of the frame piece and cover, and fibrous filtering material loosely disposed in the marginal folded portion of the covering.

2. A mask comprising a frame piece of stiff bendable material scored and cut to enable cupping thereof, a sheet of flexible material covering the outer face and folded over the inner margins of the frame piece, a moisture-absorbent perforated baffle member secured centrally to the inner face of the frame piece and cover, and balls of fibrous material loosely disposed in the folded marginal portion of the covering.

3. A mask comprising a frame piece of stiff bendable material scored and cut to enable cupping thereof, a sheet of flexible material covering the outer face and folded over the inner margins of the frame piece, a moisture-absorbent perforated baffle member secured centrally to the inner face of the frame piece and cover, balls of fibrous material loosely disposed in the folded marginal portion of the covering, and strings extending through the mask and projecting from the sides thereof for contracting the mask to snugly cover the nose and mouth of a wearer and for securing the mask in proper position on the head.

4. A mask including a frame piece having a straight center section provided with interior recesses, the said piece being cut at intervals to enable cupping thereof, a sheet of gauze covering the exterior surface of the frame piece and folded over the margins of the interior surface, a loose filling of balls of fibrous and absorbent material in the folded marginal portions of the covering and strings disposed to enable contracting of the mask and fastening thereof upon the head of a wearer.

JOSEPH EDOUARD LE DUC.