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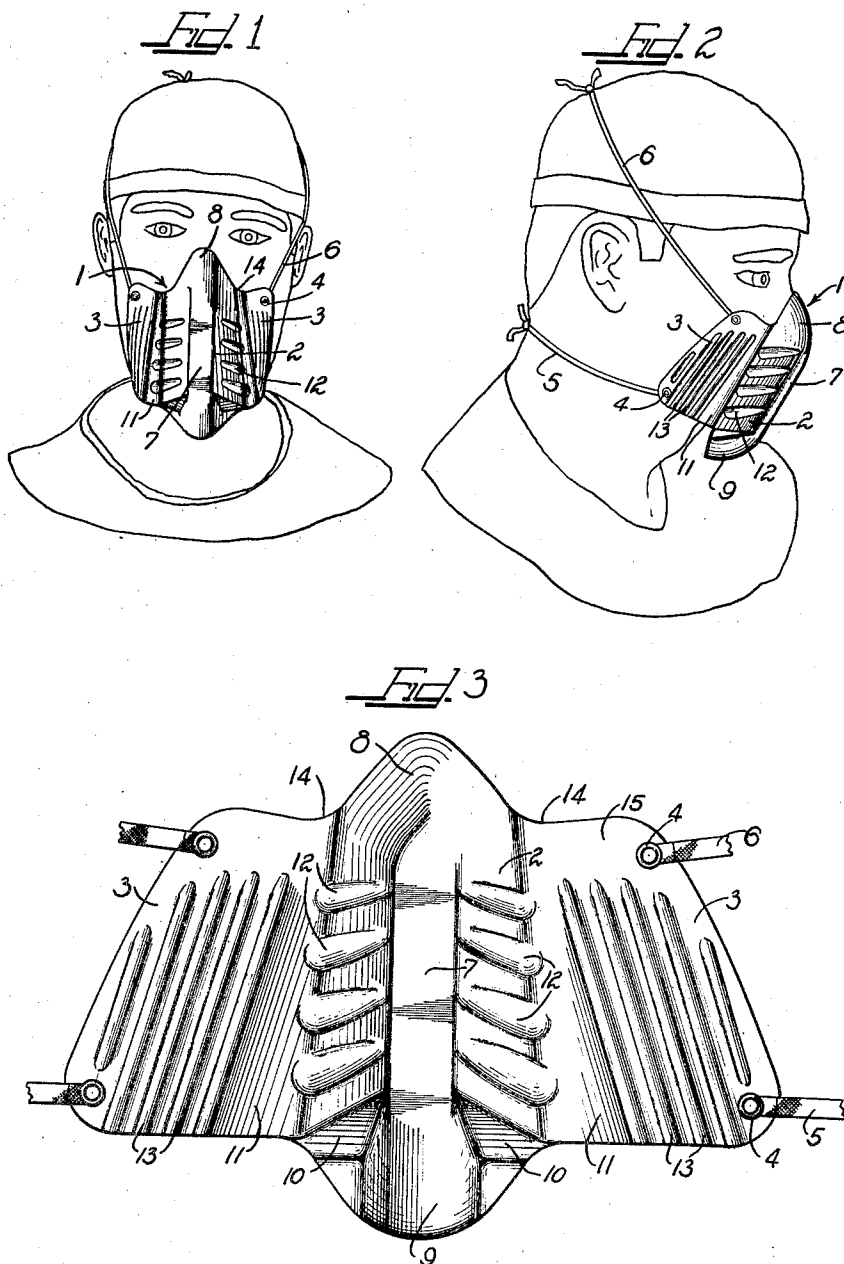
C. PANETTIERE

2,227,667

SURGICAL MASK

Filed Aug. 29, 1938

2 Sheets-Sheet 1



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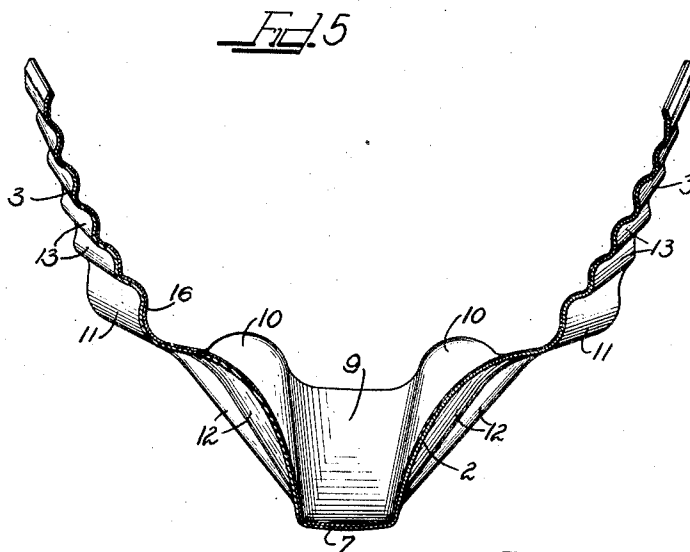
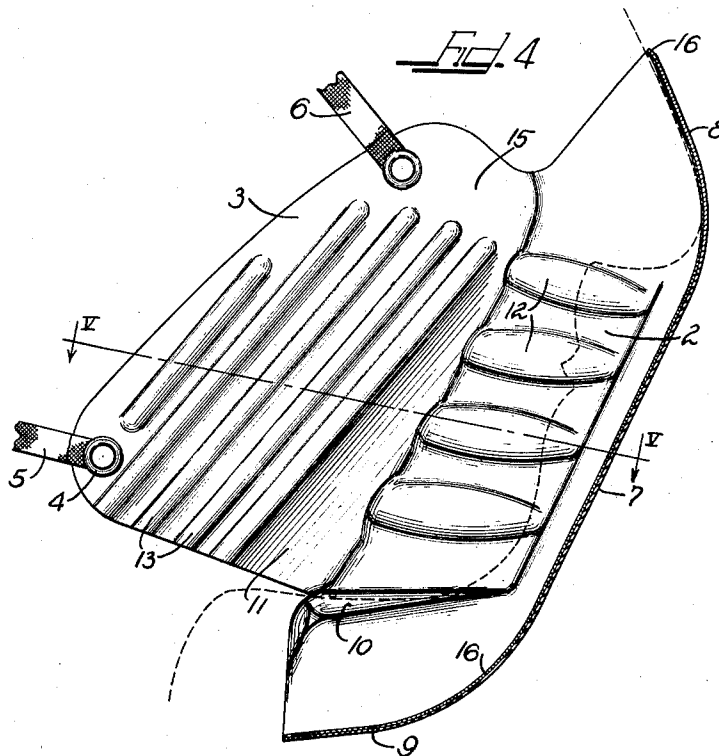
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,227,667

SURGICAL MASK

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Application August 29, 1938, Serial No. 227,231

3 Claims. (Cl. 128—139)

This invention relates to improvements in surgical masks or the like, highly desirable for use by surgeons, physicians, dentists, laboratory workers, etc., where there is likelihood of contamination, the invention effectively preventing contamination both of or by the wearer of the mask, although the invention may have other uses and purposes as will be apparent to one skilled in the art.

While in most operating rooms, a most rigid technique in surgical asepsis is exercised, too frequently the masks or face shields used by the operator and his assistants are not impermeable to bacteria. A single breath exhaled through a permeable mask or shield may result in infection of an open wound, and such danger is increased considerably in the event the wearer of the mask has an incipient respiratory infection. Occasionally, the bacteria breathed through a permeable mask are pathogenic, and while such occurrences may be rather rare, nevertheless it is extremely desirable to eliminate them entirely.

In certain other situations, such as a surgeon working upon the nose or throat of a patient, there is danger of the operator becoming infected from the patient, if he is not provided with an adequate impermeable mask.

I am aware that in the past many and various types of surgical masks or face shields have been developed, but these formerly known devices were subject to such objections as not fitting the face to the proper extent, not preventing fogging of the wearer's glasses, not permitting sufficient circulation of air over the face, interfering with the wearer's breathing, and in many cases they were not impermeable to the passage of bacteria. In some instances, these masks known heretofore fit the face too loosely for satisfactory protection, while in other instances there was too much contact with the face of the wearer and the mask would be exceedingly uncomfortable, especially in operating rooms where the temperature is usually much higher than normal.

With the foregoing in mind, it is an important object of the present invention to provide a form-fitting surgical mask definitely outlining the contour of the face.

Another object of the invention is to provide a surgical mask of stiffened material, with the upper edge portion of the mask turned inwardly to provide a tight contact with the upper portions of the cheeks and bridge of the nose, to prevent upward currents of air from escaping beneath the mask and fogging the glasses of the wearer.

A further object of the invention is the provi-

sion of a surgical mask of stiffened material having relatively large and deep intercommunicating air passages in the nature of corrugations or the equivalent, which corrugations communicate with a central main breathing passage, thus allowing for a diffusion of air in a plurality of directions over the face to render the mask cool and comfortable to the wearer.

Another feature of the invention resides in the provision of a surgical mask of stiffened material provided with a number of corrugations extending in different directions to lessen the surface contact of the mask with the face of the wearer, thus rendering the mask more comfortable without departing in any degree from the protective qualities and impermeability of the mask.

Another object of the invention is the provision of a surgical mask of stiffened material having a centrally defined conduit portion in the nature of a relatively large corrugation or the equivalent, the upper end of which intimately contacts the bridge of the nose and the lower end of which terminates towards the neck beneath the chin of the user, the construction being such that if the mask should become softened by the moisture in the breath of the user or by perspiration, the nose tends to maintain the upper portion of the breathing passage in its original position, and the lower portion of this passage is prevented from collapse or obliteration by means of a chin contacting structure formed in the mask, a portion of which is disposed adjacent each side of the breathing passage.

A further object of the invention is the provision of a surgical mask of stiffened material designed to intimately fit the contour of the lower portion of the face from the bridge of the nose downwardly, the mask being provided on each side of the centrally defined nasal breathing passage with a substantially vertically running large corrugation which not only renders the mask more cool when worn, but also provides a line of bend for the side wing portions of the mask, so that the entire mask will more intimately fit the face.

It is also an object of this invention to provide a surgical mask of stiffened material lined with a moisture and bacteria impervious material, which effectively prevents any escape of bacteria through the mask and at the same time prevents moist breath or perspiration from softening the main body of material forming the mask.

Still another object of the invention is the provision of a surgical mask folded and stiffened to intimately fit the contour of the face, which

mask may either be made sufficiently economical to warrant disposition after a single usage or, if made of material adapted for repeated usage, shaped to facilitate ready and thorough sterilization.

While some of the more salient features, characteristics and advantages of the present invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a composite front view illustrating a surgical mask embodying principles of the present invention in position on the face of a wearer;

Figure 2 is a composite side view in elevation, taken from the left-hand side of Figure 1, illustrating the mask in position on the face of the wearer;

Figure 3 is an enlarged fragmentary elevational view of the inside face of the mask alone;

Figure 4 is an enlarged fragmentary central vertical sectional view of the mask, with the features of the wearer indicated by dotted lines; and

Figure 5 is a plan sectional view of the mask taken substantially as indicated by the line V—V of Figure 4.

As shown on the drawings:

In the illustrated embodiment of the present invention, there is shown a mask, generally indicated by numeral 1, and comprising in the main three structural divisions, namely, a central portion 2 and a pair of similar side wings 3—3, one on each side of the central portion. Each side wing is provided with a pair of spaced tape or strap holding eyelets 4 to which ties 5 and 6 are attached, the tie 5 passing around the neck of the wearer and the tie 6 being secured over the top of the head. With such attachment, the mask is held in firm position over the face of the wearer and covers substantially all of the face of the wearer beneath the eyes, leaving room, of course, for the wearer's glasses outside of the mask.

The mask may be made of any suitable material, such, for example, as a molded pulp, papier-mâché, or it may be built up in a plurality of layers of fabric. In the event pulp or papier-mâché is used, the mask is preferably molded in its desired form, and in the event it is built up of layers of fabric, the fabric is preferably shaped by molding means and starched or otherwise stiffened in its desired form. It is apparent that the mask may readily be made sufficiently economical to warrant disposition after a single usage. It is also apparent that, if desired, the mask may be made for repeated usage and, as will more fully appear later herein, the construction of the mask is designed for simple and thorough sterilization.

The central part of the mask 2 is in the main defined by a relatively large outstanding corrugation 7 which provides the main nasal breathing passage for the mask. The upper portion 8 of this corrugation is inwardly turned to rest on the bridge of the nose of the wearer, as indicated in Figure 4. The lower portion 9 of this corrugation is also inwardly turned to extend well beneath the chin of the wearer, so that a complete air passage is defined from the nostrils, downwardly over the mouth and front part of the chin, and back beneath the chin to a point adjacent the neck of the wearer. Accordingly, the wearer's breath is always inhaled from and exhaled to a point remote from the patient or operating field, as the case may be, and there is no danger of

bacteria infecting the operating field or the wearer of the mask.

With the construction just above described, it will be seen that the wearer's nose tends to maintain the nasal breathing passage open, in the event the mask should become softened during use for any reason. To prevent collapsing or obliteration of the lower portion 9 of the corrugation, the mask is given a formation to provide a pair of opposite shoulders 10—10, one on each side of the main channel of the corrugation in position to seat against the underside of the chin of the user. It will be seen that the deeper part of the corrugation is disposed between the shoulders 10—10, affording a free air passage beneath the chin which is always maintained in open position, even though the mask may become softened, by the contact of the chin on the shoulders 10—10.

The remainder of the central part 2 of the mask extends obliquely rearwardly from the corrugation 7 on each side thereof and merges with one of the side wings 3. The line of merger is defined by a relatively large, substantially vertical and upwardly tapering auxiliary corrugation 11. The widest part of this corrugation is preferably at the lower end of the mask. This corrugation 11 not only provides more air space, but also gives added flexibility to the mask at this point, so that the respective side wings may be easily turned into intimate contact with the cheeks of the wearer.

Between the deeper part of the corrugation 7 and the corrugation 11 on each side thereof is a plurality of relatively wide and deep corrugations 12. These corrugations 12 extend substantially laterally and provide intercommunication between each of the corrugations 11 and the main breathing channel defined by the corrugation 7. Thus, a circulation of air is provided over the face of the wearer, so that the mask is air cooled to some extent, adding materially to the comfort of the wearer. In addition, it will be seen that with the relatively large number of corrugations and their disposition, actual face contact with the mask is lessened to a considerable degree, also enhancing the comfort of the wearer.

Each side wing 3 is preferably of the proper size so that the lower edge extends approximately along the underside of the jawbone of the wearer. Each wing is also provided with a plurality of corrugations 13 to lessen direct contact of the mask with the face and increase the passage of air for the purposes above explained. The upper end of each side wing terminates below the portion 8 of the breathing corrugation 7 and merges with this corrugation along a substantially arcuate line 14, leaving ample room above the mask for the wearer's spectacles.

Another important feature of the mask is best seen with reference to Figures 3 and 4. It will be noted that all of the corrugations, except the central corrugation 7 terminate short of the upper margin of the entire mask. The upper margin of the mask is therefore left smooth and free from corrugations as indicated at 15. The upper edge portion of the mask is definitely turned in, as indicated at 16 in Figure 4, to intimately contact the face and bridge of the nose. This turned margin 16 extends over the bridge of the nose and along each of the side wings 3 to a point adjacent the upper eyelet 4. Such construction causes an intimate line contact of the mask with the upper portion of the face and prevents the escape of air upwardly from beneath the mask,

and thus eliminates the likelihood of the wearer's glasses becoming fogged.

If desired, the entire inside surface of the mask may be lined, as indicated at 16 (Figures 4 and 5), with a moisture-impervius lining, which would likewise be bacteria-impermeable, such, for example, as regenerated cellulose treated to render it moisture-proof. Of course, this is not essential, since the mask without the lining would be impermeable to bacteria, but the regenerated cel-
lulosic lining would prevent moisture from the wearer's breath and perspiration from tending to soften the stiffened mask, and thus aid the mask in retaining its initial rigidity during the course of its usage.

From the foregoing, it is apparent that I have provided a novel surgical mask, which is simple in construction and which, if made for repeated usage, can be very readily sterilized to a most thorough extent, all surfaces of the mask being at once exposed to the sterilizing agent. It is also apparent that the mask is cool and comfortable to wear, impermeable to bacteria, eliminates fogging of the wearer's glasses, and effectively prevents contamination or infection either of the patient or operating field or of the wearer of the mask.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than is necessitated by the prior art.

I claim as my invention:

1. A shield for disposition over the face and chin and including a central portion and side wing portions, means in said shield to define a protector for the nose and mouth and to define a passage for air therewith, said means comprising a portion of the shield formed to define an outstanding central corrugation to extend downwardly over the front of the face and laterally beneath the chin of the user, means intermediate said wings and said central corrugation to define passages for air adjacent the cheek of the user, said means comprising a pair of vertically extending auxiliary corrugations, one on each side of said central corrugation and disposed

spaced transversely of and rearwardly of said central corrugation, and a plurality of vertically spaced and laterally extending corrugations connecting said auxiliary corrugations in fluid communication with said central corrugation, said auxiliary corrugations being vented to atmosphere at their lower ends.

2. A shield for disposition over the face and chin and including a central portion and side wing portions, means in said shield to define a protector for the nose and mouth and to define a passage for air therewith, said means comprising a portion of the shield formed to define an outstanding central corrugation to extend downwardly over the front of the face and chin of the user, means in said shield to define a plurality of spaced lines of contact between the shield and the cheek of the user and to provide a plurality of ventilating ducts adjacent the cheek, said means comprising a wing portion of the shield formed to define a plurality of vertically extending and laterally spaced corrugations and a pair of vertically extending auxiliary corrugations in said central portion, one on each side of said central corrugation and disposed spaced transversely of and rearwardly of said central corrugation, and connected in fluid communication with said wing corrugations, said auxiliary corrugations being vented to atmosphere at their lower ends.

3. A shield for disposition over the face and chin and including a central portion and side wing portions, said shield being formed to define an outstanding central corrugation to extend downwardly over the front of the face and laterally under the chin of the user, a pair of vertically extending auxiliary corrugations disposed one on each side of said central corrugation and spaced transversely of and rearwardly of said central corrugation, a plurality of vertically spaced and laterally extending corrugations connecting said central corrugation with said auxiliary corrugations, and a plurality of corrugations in said side wings to define ventilating passages in fluid communication with said auxiliary corrugations, said auxiliary corrugations being vented to atmosphere at their lower ends.

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