April 15, 1969 J. C. KRANTZ, JR 3,438,370

FACE MASK

Filed Oct. 3, 1966

Fig. 1

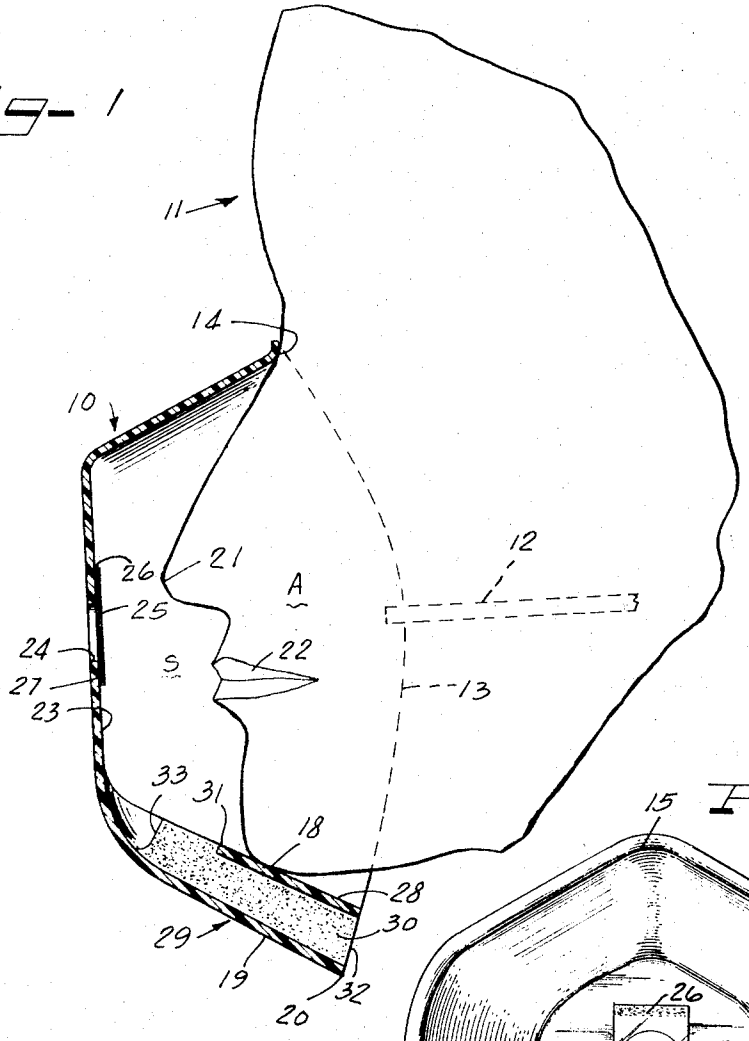


Fig. 2

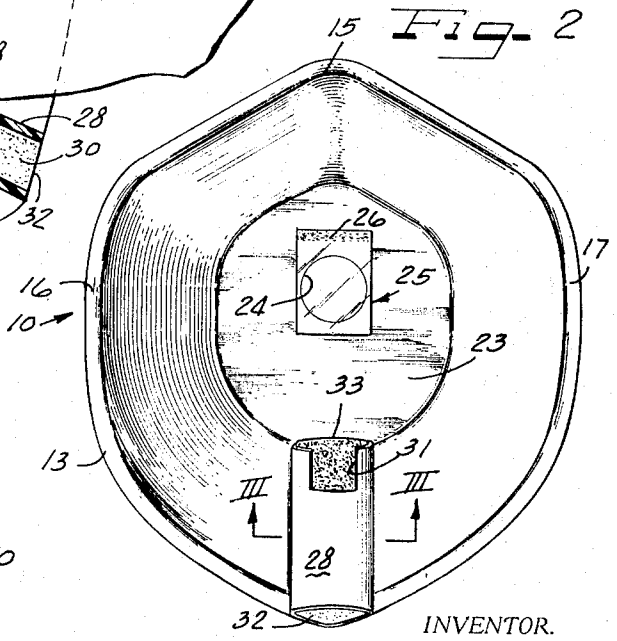
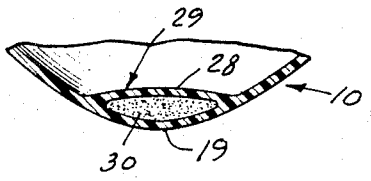


Fig. 3



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FACE MASK

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This invention relates to a face mask and more particularly to face masks for hospital, office and general sanitary uses to prevent the wearer of the mask from breathing upon or toward a nearby patient or other person, yet providing for easy inhalation by the wearer of the mask.

In the case of prior face masks of the inexpensive and therefore disposable type to which this invention relates, the construction has been such that the air exhaled from the mouth of the wearer may be directed into the other person's face, or, if vented by being diffused through the material of the mask, may give rise to a heated and humid condition within the mask that causes discomfiture to the wearer. Additionally, if the mask is pervious to air, it may also be pervious to viruses and bacteria with a resultant buildup of the bacteria population close to the mouth of the user. Such a condition entails re-breathing through the bacteria-laden material of the mask.

It is, therefore, an important object of this invention to provide a mask so constructed and arranged as to direct the exhaled mouth air rearwardly and downwardly under the wearer's chin and not into the other person's face; that provides a discharge conduit or passageway that optionally contains active material that will absorb bacteria and most viruses, without building up excessive back pressure; that will provide a continuous flow of air into the mask upon inhalation through a valved inlet opening for that purpose; that is transparent and translucent and therefore does not partially disguise the identity of the wearer, as do conventional opaque masks; and that can be inexpensively manufactured as a disposable item.

Other and further important objects of this invention will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

On the drawings:

FIG. 1 is a profile view of the face of a wearer with the mask shown in place thereon and in section;

FIG. 2 is a plan or elevational view looking into the inside of the mask; and

FIG. 3 is an enlarged sectional view taken substantially on the line III—III of FIG. 2.

In the specification:

The reference numeral **10** indicates generally a face mask embodying the principles of my invention. As shown in FIG. 1, the mask **10** is positioned in place on the head **11** of a user, with means, such as a tie band or string **12** for holding the mask in place. As so mounted, the mask's rear edge portion, indicated generally by the reference numeral **13**, lies in contact, as at **14**, with the bridge portion of the nose by virtue of a conforming arcuate shaped portion **15** in the edge **13**, and contact is generally established between the more or less conforming lateral portions **16** and **17** of the edge **13** with the sides of the face of the wearer. The contour of the mask **10** is such as to provide contact with the chin of the wearer, as at **18**, with the lower, rearwardly sloping wall portion **19** of the mask extending rearwardly and downwardly beyond the chin engaging area **18** to terminate at **20**.

The mask **10** is of an outwardly convex contour, and is preferably formed of the thin wall of relatively air-impervious material, such as a synthetic organic plastic, that is sufficiently rigid to hold its shape when not put under stress but is sufficiently deformable to be shaped by pressure to conform to the contour of the wearer's face, and particularly the bridge of his nose. The wall **10** is preferably transparent or translucent, but may be opaque. If of plastic or other suitable moldable material, the body portion of the mask **10** can be formed integrally, as by molding, or stamping, to the desired size, form and contour, as illustrated. Suitable plastic materials include such organic synthetic resins as the polyacrylates, or methacrylates, the polyvinyls and the polyolefinics. Polyethylene or polypropylene resins are most suitable. Due to the outwardly convex form of the mask **10**, a space, indicated by the reference letter S, is included between the mask **10** and the face area that is bounded by the face-engaging portion of the edge **13** of the mask. The area A includes the nose **21** and mouth **22** of the wearer.

The front portion of the mask **10** is preferably constituted by a relatively flat or planar segment **23**. Said segment **23** is provided with an opening **24** that is generally positioned so as to be in alignment with the nose **21** of the wearer but spaced thereform. A flutter valve **25**, also termed a flap valve, is associated with the opening **24** in such manner as to normally close said opening but be adapted to uncover the opening under the reduced pressure set up in the space S during inhalation of air by the wearer. For this purpose, the valve **25** is adhesively or otherwise secured along its upper border, as at **26**, so as to be, in effect, hinged therealong and free to swing rearwardly to uncover the opening **24**. The valve **25** may suitably be formed of a rectangular, or other shape, of flat sheet material, such as a thin sheet of regenerated cellulose, polyethylene, or the like, that is itself relatively impervious to air and to bacteria and viruses. If the wall portion **23** is not substantially flat as initially formed, a portion of the inner surface should be rendered flat and smooth to provide a seat, as at **27**, for the flap valve **25**.

The lower portion of the mask **10**, if formed of plastic, is preferably provided with an integral wall **28** that is coextensive with the rearwardly and downwardly lower wall portion **19** of the mask and forms therewith a flattened passageway **29** for the discharge of mouth exhalations. The passageway **29** is preferably filled with granular material **30** capable of adsorbing or absorbing bacteria and viruses and thus of purifying the exhaled air, but this is optional depending upon the use to which the mask is to be put.

The wall **28**, adjacent its upper edge, may be cut away to expose the interior of the passageway **29**, or the granular material **30** that may be provided therein. The resulting cutout **31** (FIGS. 1 and 2) is thus above the point of contact **18** with the chin of the wearer and, therefore, in communication with the space S. With the flap valve **25** closed, as would be the case during exhalation, the mouth air exhaled by the user of the mask is discharged through the cutaway portion **31** into the passageway **29** and exits through the open end **32** in the general direction of the neck of the wearer and below his chin.

This arrangement prevents the exhaled air from being directed outwardly through the mask toward or into the face of the other person or patient whom the wearer of the mask may be confronting. This would be the case, even if the passageway **29** were not filled with a material for filtering, absorbing or adsorbing the bacteria and/or viruses in the air exhalations of the user of the mask. If desired, the upper end **33** of the tubular passageway **29** may be closed since the cutaway **31** forms an adequate communication between the space S and the passageway **29**.

A suitable granular material for insertion in the passageway **29** is activated charcoal, particularly coconut charcoal. Coconut charcoal is capable of absorbing or adsorbing bacteria and most viruses.

During use of the mask, there is practically a continuous flow of air into the space S through the opening **24**,

due to the uncovering of such opening by the valve **25** when air is being inhaled, and also a substantially continuous flow of exhaled air out of the space S through the discharge passageway **29**. This more or less continuous flow of air affords comfort to the user, due to the lower temperature that obtains than that which would otherwise prevail and also due to the removal of water vapor and consequent lowering of the humidity within the space S. As a further convenience to the user of the mask, the cutaway portion **31** provides less resistance to voice sounds of the wearer of the mask and of a third person in communication with such mask wearer.

The mask of my invention may be used generally by the public to prevent the spreading of germs carried by the breath. As is well recognized, the spread of the common cold is frequently due to contact with the exhaled air of one harboring the disease. While this often occurs during close contact by reason of the exhalation in speaking, sneezing or coughing, in the case of a cough the velocity of expelled air may rise to 15 or 20 miles per hour and carry bacteria-laden air several feet. The greatest offenders in the spread of the common cold and other air-transmittable ailments or diseases are those persons who are compelled to work at close contact, such as the beautician, barber, dentist and the like, but personal contact in the home, office, classroom and places of amusement contributes its share of the contagion.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim:

1. A face mask comprising an outwardly convex, relatively thin-walled body portion integrally formed of plastic material adapted to be positioned against the user's face to include the nose and chin area and providing an included space in front thereof, the front wall of said body portion having an opening,

an inwardly opening hinged flap valve normally closing said opening and adapted to uncover said opening during an inhalation, and

means forming a discharge passage to direct exhaled aid toward the user's neck.

2. A face mask as defined by claim **1**, wherein

said means is a tubular member integrally formed with said body portion, and

filtering material positioned in said tubular member.

3. A face mask as defined by claim **2**, wherein

said tubular member is cut away at its forward upper end to form an opening into said passageway.

References Cited

UNITED STATES PATENTS

1,491,674	4/1924	Coletti	128—146.6
3,029,812	4/1962	Matheson	128—146.6
3,072,119	1/1963	Matheson	128—146.6
3,276,445	10/1966	Langdon	128—146.4
3,288,138	11/1966	Sachs	128—146.6

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U.S. Cl. X.R.

128—146.6