United States Patent

Brevik

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[54] **FACE MASK**

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[51] **Int. Cl.** **A62b 23/00**

[58] **Field of Search**.....128/146.2, 146.3, 140, 139, 128/141, 142, 142.6, 146, 146.6, 205, 146.7, 132 R; 2/2, 9; 132/88.5

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[57] **ABSTRACT**

A mask for removing particulate airborne matter during inhalation employing a unique method of attachment to the face of the user consisting of an adhesive patch which attaches to the nose of the user.

9 Claims, 4 Drawing Figures

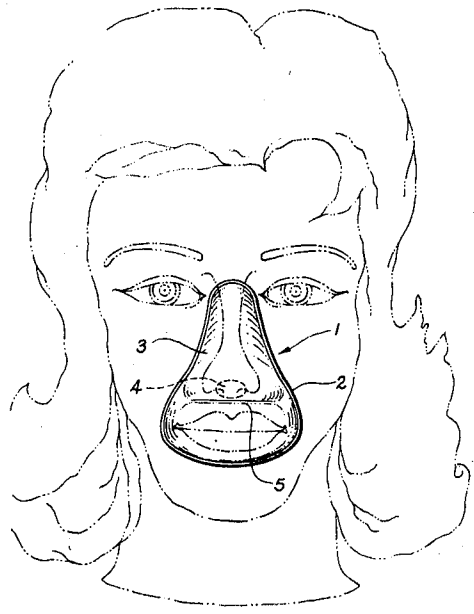


FIG. 1

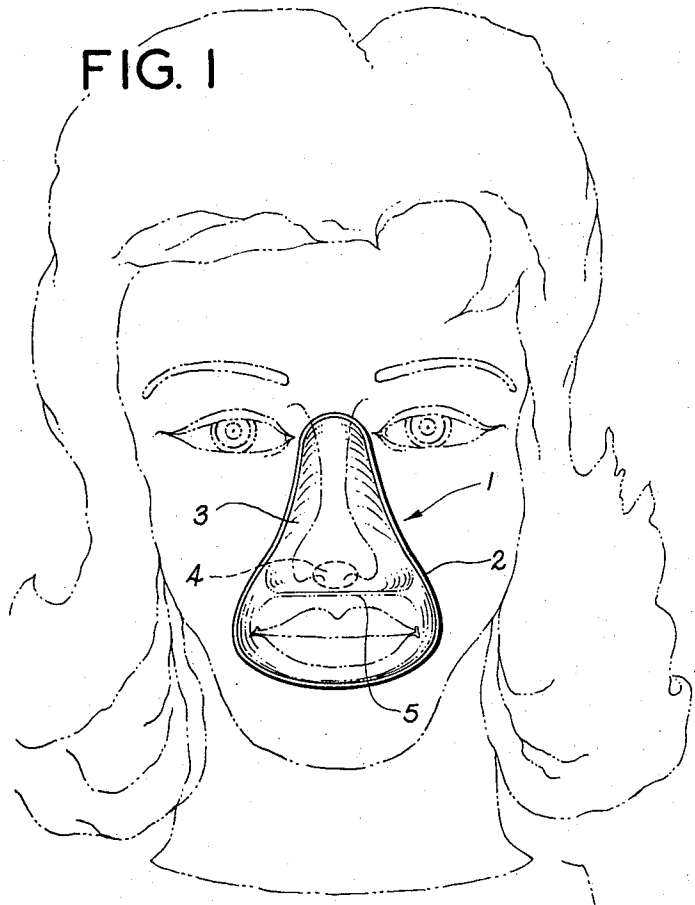


FIG. 2

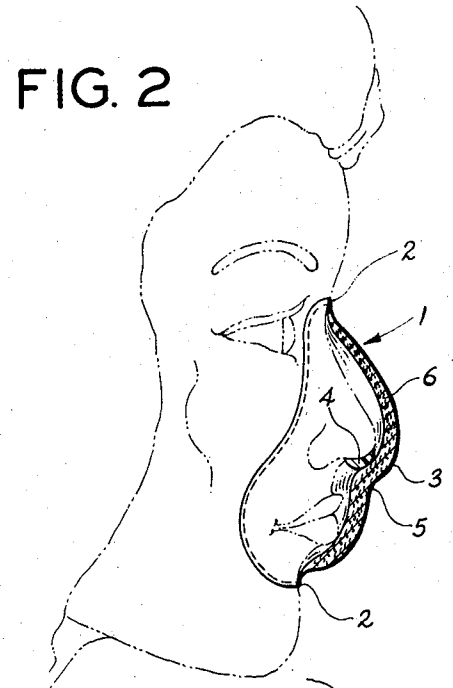


FIG. 3

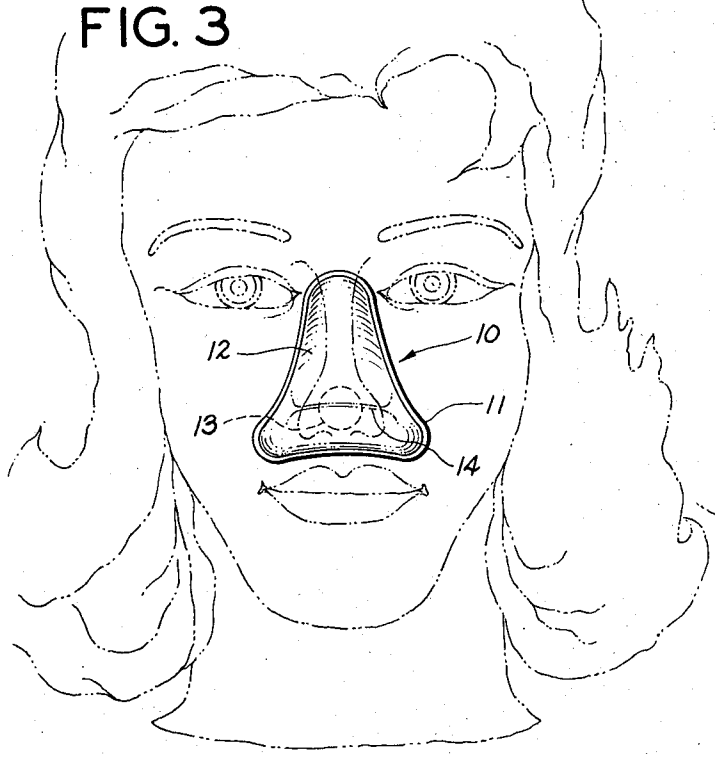
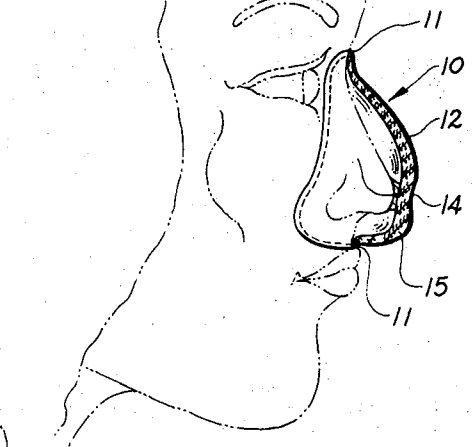


FIG. 4



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FACE MASK

This invention pertains to a new and novel method and apparatus for the prevention of inhalation of foreign particles, which are airborne and which are relatively small in dimension, such as dust and the like.

In the industrial nations of the world, human exposure to various forms of dust and particulate matter has increased tremendously in recent years due to man-made phenomenon such as automobile exhaust, industrial smoke, tobacco smoke, and the like. Much of this type of particulate matter is detrimental to the human body; in general, it is present only in relatively small concentrations so that, although it is irritating, most people are insufficiently agitated to protect themselves from the irritant. However, of a recent origin, man has become exposed in his daily routine to a much more concentrated from of particulate matter in the form of aerosol sprays; the pressurized can method dispensing almost everything used in the daily toilet, such as hair spray, deodorent spray, perfume, and the like. Less usual applications which are significant consist of spray paint, spray lubricant, stove cleaners, window cleaners, air freshners, waxes, and many others. In each of these aerosols, there exists particulate matter of a solid nature or high liquid which has not been inspected for its effects on the human body when inhaled or ingested. Although most of the materials are of a nature that they are not detrimental on infrequent exposure, the repetitive exposure of such particulate matter on a daily basis could be of considerable concern.

It is generally believed that the volatile solvents and propellent used in aerosols are non-toxic and non-cummulative; however, the solid material such as are found in deodorents, paint, and the like, and the low volatile solvents which are found in deodorents, paints, waxes, lacquers, and the like, are of a nature that they are not readily discharged from the lungs; daily exposure may cause an accumulation which is very detrimental to the human body particularly when it is considered that this chemical accumulation may be even more physically aggravating when it is compounded by the increasing accumulation of other particulate inhalation which cannot be eliminated from daily life, such as exposure to tobacco smoke, automobile fumes, industrial discharge, and the like.

It is, therefor, the purpose of my invention to provide new and novel methods for the prevention of the inhalation of particulate matter during periods of high concentration exposure, such as when aerosols are in use, as when hair spray is being applied, as when deodorent is applied, or when paint is sprayed. The method consists of the use of a fiber mask to cover the nose or the nose and mouth of the user, which mask is attached to the face in a unique manner which makes the application simple and inexpensive.

It is a further purpose of my invention to provide a mask of simple structure which will fit over the face of most people irrespective of the facial structure so that the mask can be mass produced at such low cost that it can be discarded after every use thereby assuring a clean mask after every application.

It is still a further purpose of my invention to provide a simple method of attachment to the face of the user so that the hair or facial make-up are not materially effected by its use.

It is still a further object of my invention to provide a simple inexpensive mask to protect the user of high concentration of micro-organisms and exposure to other persons when they exhale micro-organisms of the user.

The objects and purposes of my invention will become apparent by reference to the attached drawings in which

FIG. 1 is a planned view of the mask covering the nose and mouth.

FIG. 2 is a section of FIG. 1 showing the method of attachment at the points of contact of the mask of FIG. 1.

FIG. 3 is a plan view of the mask covering only the nose.

FIG. 4 is a section through the mask of FIG. 3 showing the method of attachment and the points of contact.

In FIG. 1, the mask 1 is shown in the position on the face of the wearer covering both the nose and the mouth. The mask is held in position on the face of the wearer through the adhesion of pressure sensitive material 4 which adhesive is so mounted as to produce compression in the mask and create indentation No. 5 in the outer surface material 3 thereby producing a compressive force on the face at the flexible edge 2, which tends to seal the mask to the face of the wearer.

FIG. 2 shows a section of the mask as it fits the wearer in which the mask 1, having an outer skin 3, is shown to be compressed against the wearer at the flexible edges 2 due to the relationship of the indentation 5, which is produced by the adhesion of the pressure sensitive spot of mask 4 at the under side of the nose, 6 represents the filter medium which may be the same as either the outer surface material of the mask 3 or may be composed of other suitable material which will be subsequently discussed.

FIG. 3 is another modification of the mask of my invention showing the mask applied only to the nose section of the wearer thereby permitting the wearer to be free to exhale through the mouth, but eliminating the intake of particulate matter by inhaling through the nose. The mask 10 shown in position on the wearer, having an outer skin 12 and a flexible periphery 11, which is held in place by the compressive force of the pressure sensitive adhesive 13, which creates indentation 14 in the mask, thereby producing the necessary compressive force on the flexible edges 11.

FIG. 4 shows a section of FIG 3 showing the mask 10 in position over the nose of the wearer, which mask has an outer surface material 12 and flexible edges 11. The mask is held in place due to the compressive forces resulting from the indentation of the mask 14. The filter medium 15 may be either the same material as the outer surface material 12 or may be composed of another material acceptable for filtering the particulate matter to which the wearer is exposed.

Although a broad scope of materials of construction are available for the manufacture of the filter, there are certain characteristics which must be inherent in its construction: 1) the material must be capable of filtering the air which passes through it with sufficient efficacy to remove a major portion of the particulate matter. The choice of the perosity of the material is one of practicality. It must be of a nature not to impede the normal breathing function. The quantity of air required

for the human being will vary according to the physical structure of the wearer as well as the exertion of the wearer.

Among the materials that I have found acceptable for the purpose of this invention are the various structural plastic foam; such as polyethylene and polypropolene having open cellular structures, multilayers of woven cloth-like material that have sized with stiffening agents such as starch so that the layers are held together and provide a form for the mask of which sizing material is limited in quantity such that the perosity of the weave is not materially effected; another material that effected; another material that I have found particularly effective and which is preferred material of the invention is a radom mat made of cellulose fibers or other types of fibers which produce a mask of substantial uniform thickness which can be produced from a wet slury as in the making of paper. Such a mask can be produced by forming over a screen mold by sucking the fibers from the slury and subsequently drying the mask on the form and further removing the mask from the form. The production of this type of mask is readily applicable to the mass production and has inherent features of quality control which are not permissable in other types of material of construction.

A further preferred method of construction would be to employ a vacuum to suck the cellulose fibers over a preformed metallic or plastic screen which would become an integral part of the mask as represented by 3 of FIG. 2 and by 12 of FIG. 4 and which would provide the necessary structure and resiliency.

It is, therefor, obvious to those skilled in the art that the great variety of materials of construction are permissable. As the gist of the invention does not lie in the construction, the above list is offered merely as alternatives and are in no way meant to limit the scope of the invention as defined subsequently.

The gist of my invention lies in the method of application of the mask to the face of the user. The method of application that I have found very effective is the use of a spot of pressure sensitive adhesive such that it will attach to the skin of the user at the tip or underside of the nose with sufficient adhesion to withstand the deformation pressure of the mask. The underside of the nose; that is, the area under the tip extending to the dividing member between the nostrils, is particularly good for this purpose because seldom is there any make-up or powder applied to this section of the anatomy and therefor adhesion is generally quite reliable at this point. The underside of the nose is particularly advantageous from a standpoint of not defacing or marring make-up of the female user at the point in time which the mask is applied as it is the general sequence of events in make-up preparation that the aerosol spray is applied as a final operation by the female user.

There are a number of pressure sensitive adhesives that are useful for the purpose herein defined, and one who is skilled in the art could find an almost infinite variety of compositions which would perform the task. The adhesive which I prefer to use is an adhesive of the type employed on adhesive tape or bandages used in the medical practice. The most modern of these adhesives are based upon silicon resins that have been compounded with non-toxic solvents in plasticizers which are the high boiling variety, and therefor, do not lose their tackiness through evaporation or aging. The adhesive may contain a highly powerful solvent to reduce the viscocity in its preparation and application stages, but the higher volatility of solvents, such as ascetone or methyl ethyl ketone, or the low boiling alaphatic alcohols are acceptable for this purpose and are completely volatized during the manufacturing process.

The adhesive may be applied to the mask in a number of methods such as pre-cut swatches of adhesive type tape having adhesive on both sides that one side is applied to the mask and adheres bare to, and the other side is for the purpose of adhering to the skin of the user. This type of application has advantage in that the adhesive, which will be used for adherence to the skin of the user, may be protected by a parting agent such as wax paper, or polyethelene plastic prior to die cutting so that when the adhesive is applied to the mask, the mask can be immediately stacked without adhering to each other. The parting agent is removed prior to application by the user. This method of application permits high volume mass production at low cost masks. Another method of application is the use of the application of the adhesive from a solvent system by dropping a pre-determined quantity of adhesive on the mask and permitting the solvent to evaporate, leaving a spot of adhesive at a pre-determined location on the inner-surface of the mask. The parting agent can subsequently be applied on either separating sheets between the mask, such as wax paper, or by placing a small piece of wax paper over each individual dot of adhesive. The adhesive is required to cover an area of about one quarter of an inch in diameter, although this area is not critical. The amount of adhesive required will be determined by the resiliency of the mask to return to its unstretched condition and will vary, therefor, with the thickness and material of the mask. In general, the masks will be so constructed that a force of less than 10 grams will be the required adhesion to hold the mask securely in place, but this is not critical, and it is intended that a great deal of latitude is to be allowed in this value, depending upon the ultimate use of the mask; for instance, a mask used for protection from hair spray, which is hazardous over long periods but not ultra hazardous in its application, may be a very low value of adhesion because of the risk is very low, whereas the wearer of a mask of my invention for use in an operating room would require a much more reliable adhesive pressure to ensure the mask remained in place during the operating period.

When the airborne contamination is reduced to an acceptable level or the users are no longer in an area of critical exposure, the mask is removed simply by grasping with the hand and gently detaching from the point of adhesion and discarding.

Another modification of the mask of my invention consists of employing the mask together with the other positive methods of attachment such as a string around the back of the head attached to both sides of the mask. The advantage of this application would ensure a positive placement of the mask and take advantage of the technique of this invention by assuring the positive fitting at the edges. This design would be particularly advantageous in the operating room to avoid blow by of

the air exhausted by the wearer during the period of exhaling. Other modifications will be apparent to those skilled in the art.

I claim:

1. A face mask for human use comprising

a. a porous filter body having a formed shape which conforms to the human facial structure at the periphery including,

b. a cup portion having a resilinacy to retain its unrestrained shape when released from an external force and of sufficient depth in relation to the periphery that the interior of the mask will contact the tip of the wearer's nose only when the mask is depressed, and

c. a spot of pressure sensitive adhesive attached only to the center of said cup portion on the interior side at a position whereby the adhesive contacts the nose of the wearer when the exterior of the mask is depressed and which adheres to the nose of the wearer and retains the mask in position by the positive force of deformation of the mask at the point of attachment to the nose and the opposing force exerted on the face at the periphery of the mask.

2. The mask of claim 1 wherein the mask is of a size to cover both the nose and mouth of the wearer.

3. The mask of claim 1 wherein the mask is of a size to cover the nose and adjacent areas of the face but leaves the mouth exposed.

4. The mask of claim 1 wherein the mask is constructed of cellulosic fiber.

5. The mask of claim 1 wherein the mask is constructed of a porous plastic foam.

6. The mask of claim 1 wherein the filtering material of the mask is cellulosic fiber and the resiliancy is imparted by a sized fabric.

7. The mask of claim 1 wherein the filtering material of the mask is cellulosic fiber and the resiliancy is imparted by a metal screen.

8. The mask of claim 1 wherein the filtering material is cellulosic fiber and the resiliancy is imparted by means of a plastic screen.

9. The mask of claim 1 wherein the periphery of the mask is more flexible than the central cup portion.

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