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DISPOSABLE MASK

This invention relates to a disposable mask and more particularly to a disposable mask used in hospital, food plant, dusty operation site or the like.

Japanese Patent Application Publication Gazette No. 1997-149945A describes a disposable hygienic mask comprising a covering body adapted to cover at least a wearer's mouth and a pair of ear straps extending rearward from transversely opposite side edges of the covering body both formed with a stretchable sheet of nonwoven fabric or the like and integrated together. The hygienic mask disclosed in this Gazette is certainly suitable as a disposable hygienic mask from the viewpoint that a process for assembling the components is relatively simple and a cost required for such assembling is correspondingly low.

However, the hygienic mask of prior art is disadvantageous in that the ear strap is stretched also around the pavilion's root supporting the ear strap and a tension generated by such stretching may be exerted on a relatively small region of the pavilion's root. In this case, some of the mask wearers may have a pain around their ears as the ear straps are tensioned around the ears.

To solve the problem as has been described above, it is an object of this invention to provide a mask being capable to relieve the mask wearer from such pain.

The object set forth above is achieved, according to this invention, by an improvement in the mask comprising a main covering body adapted to cover a wearer's mouth and a pair of ear straps extending rearward from transversely opposite side edges of said main covering body.

The improvement according to this invention is characterized in that each of said ear straps composed an elastically stretchable composite sheet composed of a stretchable layer made of stretchable fibers and an elastic layer having an elastic stretchability laminated upon each other.

This invention includes preferred embodiments as follow:

(1) The main covering body and ear straps comprise continuous the elastically stretchable composite sheet.

(2) The elastically stretchable composite sheet consisting of the elastic layer and a pair of the stretchable layers sandwiching the elastic layer therebetween.

Fig. 1 is a perspective view showing a typical embodiment of the mask according to this invention;

Fig. 2 is a sectional view taken along line II-II in Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing an alternative embodiment of the ear strap; and

Fig. 4 is a plan view showing the mask having a configuration different from that of the mask shown in Fig. 1.

Details of the disposable mask according to this invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

A mask 1 shown by Fig. 1 in a perspective view comprises a main covering body 2 adapted to cover a wearer's mouth and a pair of ear straps 3 extending rearward from transversely opposite side edges of the main covering body 2 and each provided with an opening 4 adapted to receive the wearer's ear. The main covering body 2 comprises a pair of transversely symmetric first sheets 11 made of thermoplastic and stretchable or non-stretchable which are put flat and heat-sealed with each other along respective inner side edges 13 of these two sheets 11. Each of the ear straps 3 comprises a thermoplastic and elastically stretchable sheet 12 heat-sealed with an outer side edge 13 of the associated first sheet 11. The inner and outer side edges 12, 13 of the main covering body 2 along which the

pair of first sheets 11 are heat-sealed with each other, on one hand, and with the respective ear straps 3, on the other hand, are more stiff than the remaining region and serve to hold a desired shape of the mask 1.

Fig. 2 is a sectional view taken along a line II-II in Fig. 1. A second sheet 12 forming each of the ear straps 3 comprises an elastically stretchable layer 16 destined to come in contact with a mask wearer's skin and an inelastically stretchable layer 17 defining a surface opposed to the layer 16, both layers being placed upon and integrated with each other. The elastic layer 16 in the illustrated embodiment comprises a fibrous layer made of component fibers which are elastically stretchable at least in one direction defined from the mouth toward the ear. The stretchable layer 17 opposed to the elastic layer 16 comprises a fibrous layer made of component fibers which are inelastically stretchable at least in one direction defined also from the mouth toward the ear. These two layers 16, 17 are bonded together by heat-sealing their component fibers one with another, or by adhesively bonding together or mechanically intertwining their component fibers one with another to form a composite sheet. The elastic layer 16 is partially stretched and simultaneously the stretchable layer 17 also is partially inelastically stretched in the one

direction in each of the ear straps 3 as the ear straps 3 are grasped with the wearer's hands and at least partially stretched in the one direction. Upon relieving the ear strap 3 of the grasp with the wearer's hand, the elastic layer 16 having been partially stretched elastically restores its initial length and the stretchable layer 17 having been partially stretched is forced by an elasticity of the elastic layer 16 to restore its initial length but with a plurality of gathers formed with its component fibers remaining stretched.

Substantially only a force required to stretch the elastic layer 16 suffices to stretch the relevant part of the ear strap 3 again since merely the gathers are smoothed out and requires substantially no stretching force. In this way, the ear straps 3 partially become easy to be elastically stretched.

Of the ear strap 3, the part once having been stretched now defines a region in which the ear strap 3 is stretched again with a stretch stress lower than that with which the ear strap 3 is stretched in the remaining region. The mask wearer may select such region to adjust the optimum length of the ear strap 3 for a specific contour of his or her face. It is particularly preferable that the ear strap 3 is easily stretched in the intermediate region of the ear strap 3 defined between the mouth and the pavilion root of the mask wearer. In this way, there

is no apprehension that the wear have a pain around the ear due to the strap being stretched also around the pavilion root as the conventional ear strap comprising an elastic cord or the like has been the case.

The ear strap 3 may alternatively comprise the skin-contacting stretchable layer 17 and the opposed side facing elastic layer 16. Disposition of the stretchable layer 17 comprising a plurality of component fibers on the skin-contacting side is extremely preferable since a plurality of gathers are formed after the stretchable layer 17 has been stretched and these gathers make the layer 17 sufficiently bulky to give the wearer a comfortable touch. The elastic layer 16 is apt to have a rubber-like touch which is unfavorable for some wearers and, from this viewpoint, it is preferred to dispose the elastic layer 16 on the outer side of the mask 1.

Fig. 3 is a view similar to Fig. 2 showing an alternative embodiment of the ear strap 3. The ear strap 3 according to this embodiment is provided in the form of a three-layered composite sheet comprising the elastic layer 16 and a pair of stretchable layers 17 sandwiching the elastic layer 16 therebetween. The elastic layer 16 is elastically stretched and the stretchable layers 17 are inelastically stretched as the ear strap 3 is stretched in a direction back and forth of

the wearer partially between the mouth and the ear. Upon relieving the ear strap 3 of a stretching force exerted thereon, the elastic layer 16 having been partially stretched elastically restores its initial length and the stretchable layers 17 having been partially stretched are forced by an elasticity of the elastic layer 16 to restore their initial length but with a plurality of gathers formed thereon. The ear strap 3 according to this embodiment operates in the same manner as those shown in Figs. 1 and 2.

Fig. 4 is a plan view showing the mask 1 having a configuration different from that of the mask 1 shown in Fig. 1. In accordance with this embodiment, the mask 1 comprises the main covering body 2 and the ear straps 3 integrally and continuously formed with a single elastically stretchable composite sheet similar to the composite sheet used to form the ear straps 3 of Fig. 2 or Fig. 3. The mask 1 according to this embodiment also is worn with the ear straps 3 having previously been stretched in the direction back and forth of the wearer (right and left as viewed in Fig. 4) partially between the mouth and the ears. The mask 1 of Fig. 4 is suitable as the disposable mask since a process for making the same is relatively simple and a feeling to wear this is comfortable.

For implementation of this invention, the elastic layer

16 constituting the elastically stretchable composite sheet used for the ear straps 3 of the mask 1 may be formed with nonwoven fabric, woven fabric, fibrous web of indeterminate form or the like using elastic threads made of thermoplastic synthetic resin elastomer, urethane or the like. It is also possible to use elastically stretchable film as stock material for the elastic layer 16. The elastic layer 16 is elastically stretchable in one direction preferably by 30 %, more preferably by 100 % and most preferably with 200 %. The stretchable layer 17 may be formed with inelastically stretchable threads made of thermoplastic synthetic resin such as polyethylene, polypropylene or the like. Such threads are provided in the form of nonwoven fabric, woven fabric, fibrous web of indeterminate form or the like and bonded to the elastic layer 16. The stretchable layer 17 preferably has a breaking extension of at least 70 % and is preferably stretchable to the degree equal to or higher than the maximum elastic stretchability of the elastic layer 16. Specific examples of the stretchable layer 17 include nonwoven fabric comprising continuous polypropylene fibers which are unstretched or stretched at a low ratio and heat-sealed one with another to obtain a basis weight of 20 - 200 g/m² and nonwoven fabric comprising continuous fibers of ethylene-propylene copolymer

or ethylene-propylene-butene copolymer heat-sealed one with another to obtain a basis weight of 20 - 200 g/m².

The mask according to this invention enables a desired region of the ear strap to be made easily stretchable. The mask wearer may previously select such region over a longer or shorter extent and thereby to adjust a tension of the ear strap so that the mask may be worn in compatibility with the individual wearer's face contour. This easily stretchable region may be selected in the intermediate region of the ear strap defined between the mouth and the pavilion root of the mask wearer to avoid an apprehension that the wearer might have a pain around the ear due to the strap being stretched also around the pavilion root.



WHAT IS CLAIMED IS:

1. A disposable mask comprising a main covering body adapted to cover a wearer's mouth and a pair of ear straps extending rearward from transversely opposite side edges of said main covering body, said mask being characterized in that:

each of said ear straps comprises an elastically stretchable composite sheet consisting of a stretchable layer made of stretchable fibers and an elastic layer having an elastic stretchability laminated upon each other.

2. The mask according to Claim 1, wherein said main covering body and ear straps comprise continuous said elastically stretchable composite sheet.

3. The mask according to Claim 1, wherein said elastically stretchable composite sheet consisting of said elastic layer and a pair of said stretchable layers sandwiching said elastic layer therebetween.