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(54) **IMPROVED TYPE INDIVIDUAL PROTECTION DEVICE**

VERBESSERTE EINZELSCHUTZVORRICHTUNG

DISPOSITIF DE PROTECTION INDIVIDUELLE DE TYPE AMÉLIORÉ

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WO-A1-2017/180620 WO-A2-2006/034227
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Description

Technical Field

[0001] The text of this description reveals a new type of personal protection device of improved type. It is the family of products and solutions that allows increasing the defenses against the attacks of viruses and bacteria present in the air due to situations with a high risk of contagiousness as, for example, the presence of infected individuals and/or epidemic seasonal situations, also of emergency kind.

Background Art

[0002] The recent pandemic events arising at the end of 2019, due to the viral strain SARS Covid 19, is testing the entire global health service. The event, which arose as a local epidemic in the Chinese geographical area, involved in a few months all the nations of the world.

[0003] This event was made possible by a mix of factors among which stand out the characteristics of diffusion and behavior of virus SARS_Cov19: the first one is the high contagiousness even in those apparently asymptomatic individuals. The second one is a long incubation period, which allows the infected individual to lead a normal life and to serve as a carrier in the geographical areas of the entire world. The third one is a low level of morbidity, in which the percentages of hospitalized and mortality turn out to be medium to low.

[0004] This last characteristic would seem to be a reassuring factor in itself; however, together with the second peculiarity, enables an extremely rapid and effective international dissemination.

[0005] In view of the high number of infected, therefore, even a small percentage of individuals can become an unmanageable number of persons to be hospitalized, this creating a worrying scenario also at the level of the stability of the same fabric of society as we know it today.

[0006] The first element of defense against respiratory viruses such as SARS_Cov19 consists of those barriers that allow to trap the droplets of the aerosol during breathing (nose - mouth) and do not allow them to be carried through the air; they are special masks in synthetic and natural fabrics placed on the face. There are many types of masks on the market, whose performances and fields of use are well differentiated.

[0007] Some of these Personal Protective Equipment (PPE) have very high performances, such as FFP2 and FFP3. They are products intended for professional categories for whom the risk of contagion is very critical (doctor and nurses in hospitals, first-aid departments, RSA staff etc.) and where certain safeguards against virus infection, such as mutual distancing, cannot be guaranteed.

[0008] The masks defined "of community" are instead that type of protection of common use, therefore more easily usable from the population. However, they can

contribute to an effective blocking of the rapid spread of viruses, and, therefore, also SARS_Cov19, only in conjunction with the above-mentioned safeguard rules (in addition to further prudential behaviors, such as a repeated hands hygiene).

[0009] The most common characteristics of such masks are well known to the State of the Art: they consist of a multilayer material specific for the capture of the droplets emitted by nose and mouth. Generally, these masks must not be approved or be subjected to approval rules, which ensure a predetermined level of effectiveness, such as flow resistance, cytotoxicity, biocompatibility and bacterial removal efficiency (BFE). It should be noted that this type of masks lower the risk of contagion due to emission of droplets towards third parties and do not act as a filter element for the inhaled atmospheric agents, unlike FFP2 and FFP3 devices.

[0010] These masks, however, show some unwanted peculiarities that restrict, in some areas, their use. The first of these limits is the visual concealment of a good part of the face, in this case and especially of the mouth. After wearing a community facial mask, lip reading is not possible. Moreover, the expressions and non-verbal communication of emotions are highly impaired.

[0011] For the whole hearing impaired category the face mask of the present State of the Art, represents a serious obstacle to communication and sociality. Moreover, in some areas of childhood, propaedeutic and all activities in support of learning, it is as important to maintain emotional contact through facial expressions and the use of masks does not facilitate the task of both operators in the sector and the recipients of such activities.

[0012] Devices made with transparent Plexiglas and wearable on the face that act as a screen against the emission of droplets are available on the market. Such solutions are, however, of little effectiveness and not certified by the agencies in charge, because they do not contain those materials that are suitable for the absorption of the water vapor emitted during breathing and carrier of virallbacterial contagion. That is why they are suggested only if they are used with face-masks, to improve the effectiveness of individual protection.

[0013] The Application US4323063A reveals a face-mask made of filtering materials equipped with a transparent element for lip reading; even Application WO2006034227A2 reveals a similar device; both of them, however, are not suitable to remedy some peculiarities of construction required by such protection devices, in order to provide excellent performances. Further refinements are then unveiled in Application WO2017180620A1, in which inside the individual protection device some elements are inserted that react to the increase in body temperature.

[0014] Another unwanted characteristic of the current community face-masks is the doubt that arises to the user for a proper disposal after use: these devices are generally thrown away in the undifferentiated waste.

[0015] An additional characteristic that emerges from the use of these masks is that the identification of the users of these devices can be difficult because face-mask operates a sort of levelling of anatomical peculiarities that allow an easy and unique identification of people.

[0016] Another problem related to the generic use of masks arises from the system of coupling via rubber bands to the face. There are solutions that exploit the ears as point of attachment for the rubber bands, others that use the nape instead. The size and the shape of face can, however, considerably change among the population: this involve that a part of it will have problems to obtain all the benefits from the use of a protective face-mask. It is indeed essential to reiterate that a face-mask not adequately worn loses considerably its efficacy.

[0017] The present invention therefore aims to introduce a new type of lay-out for the production of a facial mask of community; this lay-out will have the task of overcoming the problems of the known technique already exposed therein.

Summary of Invention

[0018] The device resulting from the idea of the invention reveals the use of peculiar materials and an assembling technique that allows the realization of protection masks with a washable transparent insert [Fig.1], homologable according to the directive in the article 16, clause 2, D.L. 17 March 2020 Nr.18 and in accordance with the indications of the Ministry of Health 0003572-P-18/03/2020. The device, realised according to the innovative procedure, also allows some further technical details linked to the affordability of the production cycle, the disposal of the device and the unambiguous identification of the user of the facial mask.

[0019] The invention is defined in the appended claims.

Advantageous Effects of Invention

[0020] The application, according to the idea of the invention, allows to realise community masks and/or even surgical masks equipped with an additional element for lip reading and for the sight of the face expression while maintaining appropriate and certified protection characteristics.

[0021] In particular, the transparent insert can be chosen beyond the categories of PU and PVC materials, in order to reach a better compatibility during the waste sorting.

[0022] The stability on the face of the facial mask is guaranteed by technical solutions that preserve the compatibility and the typical confidence of the use of the already existing personal protective devices.

[0023] The face attachment system is configurable with the rubber bands at the ears or with the rubber bands on the nape.

[0024] The facial mask is identifiable through the application of a peculiar and removable graphic element on the facial body.

Brief Description of Drawings

[0025] The illustration table is integrated in the documentation of this patent to exemplify the characteristics of the invention, even highlighting variations in the implementation therein described.

Fig.1

[Fig.1] illustrates the device resulting from the idea of the invention, in a generic representation.

Fig.2

[Fig.2] illustrates a detail of the mask's facial body.

Fig.3

[Fig.3] illustrates the transparent insert.

Fig.4

[Fig.4] illustrates the transparent insert, worked by the printing machine.

Fig.5

[Fig.5] illustrates the transparent insert applied to the facial body of the mask.

Fig.6

[Fig.6] illustrates the preforming through seam.

Fig.7

[Fig.7] illustrates a variant in the application of the rubber bands.

Fig.8

[Fig.8] illustrates a further variant in the application of rubber bands.

Fig.9

[Fig.9] illustrates the posterior tensor element.

Fig.10

[Fig.10] illustrates the rubber bands hooked to the rear tensor.

Fig.11

[Fig.11] illustrate an additional rubber bands tension regulator element.

Fig.12

[Fig.12] illustrates a peculiar visual element on the facial body of the mask.

Fig.13

[Fig.13] illustrates the configuration to the connection of a sealing strap.

Description of Embodiments

[0026] The description of the various forms of realization of the present invention is disclosed here for illustrative purposes and it is not intended to be completely exhaustive or restricted to the form of realization therein described.

[0027] The parameters of weight, length, pressure and surface of this Description comply with International System of Units (SI). According to the embodiment of the invention, the mask is made up of a main facial body made from a triple TNT layer, in which at least one is made of polypropylene, spun-bonded type, that is directly obtained from polymers and not from raw material or prior strands. The choice of the number of layers and their grammage was balanced in order to achieve both an immediate production process, easy and at low cost and to maintain the technical performances to ensure the correct absorption of droplets. It is possible, however, to change this balancing of the quantities and properties of the facial body's components provided that the above minimum condition is met.

[0028] According to the embodiment of the invention, the configuration of this material, at the level of typology, thickness, layers and extension, is also defined in relation to the presence of the transparent insert, because this element cannot guarantee an excellent breathability. The balancing of the necessary breathability is therefore the result of the relationship $Tr = Atnt/Ainsert$ where Tr is the breathability factor; $Atnt$ is the total surface of the facial mask; $Ainsert$ is the total surface of the transparent insert.

[0029] According to the embodiment of the invention, the use of the triple TNT layer, once suitably cut, allows to avoid further finishing operations, such as edging. Moreover, the material allows to be processed with appropriate germicidal treatments, even of a semipermanent type, to improve the protection characteristics. The chosen shape provides an oval type opening in the area of the mouth (20), while the outer perimeter of the whole facial body is comparable to the geometric shape of a rhombus with truncated vertices (21).

[0030] In the upper and lower vertices two "V"-shaped openings are obtained (22)(23). The relationship between the major radius (24) and the minor radius (25) of the oval opening is included between 1.25 and 1.55, for example 4,5 cm and 3,1 cm ($4,5/3,1 = 1,45$).

[0031] The practicable length intervals of the major radius and the minor one to obtain the facial mask resulting from the idea of the invention are the following. Major radius: interval from 3.75 cm to 4.75 cm, so 4.25 cm +/- 0.5 cm; Minor radius: interval from 2.6cm to 3.6cm, so 3.1cm +/- 0.5cm. The maximum dimensions of the mask's facial body in the two directions orthogonal to each other (height and length) are Height (26). 15.3 cm +/- 1 cm; Length (27): 20 cm +/- 1 cm.

[0032] The central opening is suitable to hold a transparent insert that allows the sight of the lip movement and, generally, the movements of the central part of the

face even in the external perimeter of the mouth.

[0033] According to the embodiment of the invention, two favored materials were considered to build the transparent insert. The first one is a PVC material (polyvinyl chloride). This substance has a high level of transparency but it has two perfectible features: the first one is a certain rigidity. The second one is its inability to be joined to TNT with different techniques from seaming.

[0034] Seaming of additional parts in a protective facial mask is not a procedure that is always considered as allowable when these parts contribute to the defensive barrier from the droplets, that is when they are parts of the active surface of protection. The seam, in fact, let the air passage and so of the water vapor that spreads the virus; this compromises the BFE tests.

[0035] The second material of choice is PU (polyurethane). This material is obtainable on the market in its heat-sealing form, so it is possible to join it efficaciously by heat, without seams. The PU, however, is poorly transparent compared to PVC, therefore it is deficient exactly in the essential component to the visual function.

[0036] According to the idea of the invention, it is possible to use alternatively the two materials through a new process that allows joining them without seams. Moreover, the technique of realization resulting from the idea of the invention allows the use of other transparent materials in place of PVC and PU, even of natural type.

[0037] According to the procedure of realization of the invention the transparent insert is cut from a 0.20 grams sheet in a shape that is equal to the one present in the TNT facial body, so oval. The proportions of this transparent insert are however bigger than the opening on the TNT, for the purpose of coming in touch on the edges when it is joined to it; for example, a size bigger of about 4-10mm. At this point, a thermal glue is applied by a screen-printing technique, that is to say a glue capable of activating when subjected to high temperature.

[0038] According to the procedure of the invention, the transparent insert (51) is stuck to the opening on the facial body of the mask (50) and subjected to a simultaneous thermal and compression process such as to reactivate the glue that, penetrating into the TNT, perfectly joins it to the transparent insert. At this stage, the further final processing to complete the facial mask are performed.

[0039] According to the embodiment of the invention, it has been possible not to use an additional deformable element to the facial body, called "lug". This element allows the facial mask to adhere more efficiently to the profile in the nose area. This element has been profitably replaced with a seam (60) that allows a sort or pre-forming along the surface of the TNT, precisely on the two "V"-shaped openings on the facial body of the facial mask: this solution allows the facial body of the mask to match the nasal profile properly. Moreover, this seam, suitable for the pre-forming of the facial body of the mask, is prepared also at the bottom of the same mask, that is, in the chin area, in order to make it adhere better to the face and give the finished product a concave shape consistent

with a nose-mouth-chin profile. Such a processing, however, does not exclude the possibility to apply a lug on the mask, even metallic, in order to assure an additional cohesion element with the user's face.

[0040] The last stage of manufacturing according to the idea of the invention, involves the seaming of the rubber bands to the edges of the facial mask, rubber bands that allow to fasten it to the face. A number of improvements of this technique are introduced here in order to better its advantages.

[0041] In one embodiment of the invention the rubber bands have a predisposition for assembly on the facial body (70)(80) but they are not provided already connected to it. Depending on how the final user choses to wear the facial mask, it is possible to tie the rubber bands in such a way to apply them to the ears (71) or to the nape (81). The rubber bands applied to the nape are characterized by a superior length as compared to those applied to the ears and the two extremities of a single rubber band are connected to the opposite vertices of the facial mask along the horizontal axis.

[0042] In another embodiment of the invention, when the rubber bands are applied to the ears, it is possible to prepare an improvement of the stability of the facial mask on the face by the use of a rear tensor placed on the nape. The tensor is made up of a combshaped support, flexible, placed on the nape, equipped with specific grooves at the respective two ends (90)(91) on which the rubber bands can be hooked (100), so increasing their tension and the mutual traction that stabilizes the facial mask on the face. This solution proves to be of choice for those with physical or mental disabilities, or temporarily unable to use the upper limbs, whose could not efficaciously reset the facial mask on the face in case of misalignment.

[0043] In another embodiment of the invention it is possible to apply a sphere-shaped element, or of other geometric form as rectangular or polyhedric, to block the rubber bands, that allows to decrease their length and so increase the strength that stabilises the facial mask on the face.

[0044] The facial mask resulting of the idea of the invention, can be moreover distinguished with an unique and peculiar graphic element, chosen by the customers, applied on the facial body by an adhesive element and/or by a mechanical coupling one, easily removable. This characteristic allows identifying individually persons or groups in communities or during events, for the purpose of simplify interpersonal communication.

[0045] In another embodiment, the facial mask resulting of the idea of the invention is equipped with a hook (130) where a little holding lace can be applied. This lace can be used to hold the facial mask around the neck, similar to eyeglasses laces, when it is not worn.

Examples

[0046] The field of application of the device, resulting of the idea of the invention, is that in which lip reading and

reading the facial expressions cannot be excluded from the start in the interpersonal relationships, but there is an obligation of protection against airborne pathogens. Examples of applications are schools, support activities for individuals with physical/cognitive disabilities and hearing impaired individuals.

Industrial Applicability

[0047] The test of the protective facial mask, result of the idea of the invention, was carried out by the Ministry of Health. The result of this test has allowed the certification according to the directive in article 16, clause 2, D.L. 17 March 2020 Nr.18 and in compliance with the recommendations of the Ministry of Health 0003572-p-18/03/2020.

Citation List

[0048] Citation List follows:

Patent Literature

[0049]

PTL 1: US4323063A

PTL 2: WO2017180620A1

PTL 3: WO2006034227A2

Claims

1. Procedure for the realization of a protective face mask against aerial bacterial agents, from viral agents and atmospheric pollution, also for community applications, equipped with a transparent insert wherein:

- a. the facial body is made by using three or more TNT layer wherein at least one layer is polypropylene layer, spunbonded type;
- b. the facial body is modeled in a rhomboid shape (Fig2), in which all vertices are cut off;
- c. the upper vertex in the vertical axis is V-shaped (22);
- d. the lower vertex in the vertical axis is inverted V-shaped (23);
- e. on the facial body, in the central area and at the mouth level, an oval-shaped opening is made in which the ratio between the major radius (24) and minor radius (25) is from 1.25 to 1.55;
- f. the major and minor radius lengths of the oval opening are respectively 4.25 cm +/- 0.5 cm and 3.1 cm +/- 0.5 cm;
- g. a transparent insert with the same shape of the opening on the mask facial body, therefore oval, with of larger proportions from 4mm to

- 10mm, is obtained from a transparent sheet of PU or PVC material, 0.20g type (30);
 h. a thermal glue deposit of the average width of 2mm to 8mm is applied on the transparent insert edge using a silkscreen technique (40);
 i. the transparent insert is made to join at high pressure and high temperature to all edges of the TNT facial body oval opening, so is left to cool (Fig5);
 j. the two flaps of the of V-shaped at the upper vertex of the facial body are sewn together (60);
 k. the two flaps of the inverted V-shaped at the lower vertex of the facial body are sewn together (61);
 l. two rubber bands are connected on the side of the facial body sides, near the cut off vertices of the horizontal axis of the facial body.
2. Protective face mask obtained by the procedure of Claim 1 in which the facial body maximum size in the two orthogonal to each other directions (height and length) is respectively of 15.3 cm +/- 1 cm and 20 cm +/- 1 cm.
 3. Procedure of Claim 1 in which the technique of depositing the thermal glue on the transparent insert edge is pad printing.
 4. Procedure of Claim 1 in which the thermal glue deposit on the transparent insert edge has, in an area of length between 1mm and 3mm, a reduction of width up to the measure of 1 mm.
 5. Protective face mask obtained by the procedure of Claim 1 in which the transparent insert is made of a rigid, semi-rigid or transparent flexible synthetic or natural material.
 6. Protective face mask obtained by the procedure of Claim 1 equipped with a tensor element for rubber bands made of a segment of natural or synthetic flexible material at the ends of which two or more vertical and / or oblique grooves are made with a maximum length equal to half of the tensor width.
 7. Protective face mask obtained by the procedure of Claim 1 equipped with two or more attachments for two or more nape rubber bands and/or two or more ear rubber bands.
 8. Protective face mask obtained by the procedure of Claim 1 equipped with a rubber band adjuster made of a natural or synthetic material with spheric or rectangular or polyhedric shape with a central perforation.
 9. Protective face mask obtained by the procedure of Claim 1 with a mechanical and/or adhesive predis-

position on the facial body, designed to hold one or more peculiar graphic elements (120).

10. Protective face mask obtained by the procedure of Claim 1 equipped with a predisposition for an attachment to a one or more holding straps (130).

Patentansprüche

1. Verfahren zur Herstellung einer Schutzmaske gegen bakterielle Erreger aus der Luft, gegen virale Erreger und gegen Luftverschmutzung, auch für kommunale Anwendungen, ausgestattet mit einem transparenten Einsatz, wobei:
 - a. der Maskenkörper wird unter Verwendung von drei oder mehr TNT-Schichten hergestellt, wobei mindestens eine Schicht eine Polypropylenschicht Spinnvlies ist;
 - b. der Maskenkörper wird rhombenförmig modelliert (Abb. 2), wobei alle Scheitelpunkte abgeschnitten werden;
 - c. der obere Scheitelpunkt in der vertikalen Achse ist V-förmig (22);
 - d. der untere Scheitelpunkt in der vertikalen Achse ist invertiert V-förmig (23);
 - e. der Maskenkörper im mittleren Bereich und auf Höhe des Mundes eine ovale Öffnung hat, bei der das Verhältnis zwischen dem großen Radius (24) und dem kleinen Radius (25) zwischen 1,25 und 1,55 liegt;
 - f. der große und der kleine Radius der ovalen Öffnung betragen 4,25 cm +/- 0,5 cm bzw. 3,1 cm +/- 0,5 cm;
 - g. ein transparenter Einsatz mit der gleichen Form wie die Öffnung im Maskenkörper, also oval, mit größeren Ausmaßen von 4 mm bis 10 mm, wird aus einer transparenten Platte aus PU- oder PVC-Material, Typ 0,20 g (30), hergestellt;
 - h. auf den transparenten Rand der Einlage wird im Siebdruckverfahren (40) ein durchschnittlich 2 mm bis 8 mm breiter Thermokleberauftrag aufgebracht;
 - i. der transparente Einsatz wird unter hohem Druck und hoher Temperatur mit allen Rändern der ovalen Öffnung des TNT-Maskenkörpers verbunden und muss dann abkühlen (Abb. 5);
 - j. die beiden Laschen des oberen V-förmigen Scheitelpunkts des Maskenkörpers werden zusammengenäht (60);
 - k. die beiden Laschen des unteren invertiert V-förmigen Scheitelpunkts des Maskenkörpers werden zusammengenäht (61);
 - l. zwei Gummibänder werden an den Seiten des Maskenkörpers, in der Nähe der abgeschnittenen Scheitelpunkte der horizontalen Achse des

Maskenkörpers, verbunden.

2. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird, wobei die maximale Größe des Maskenkörpers in den beiden orthogonal zueinander stehenden Richtungen (Höhe und Länge) 15,3 cm +/- 1 cm bzw. 20 cm +/- 1 cm beträgt. 5
3. Das Verfahren nach Anspruch 1, bei dem die Technik des Auftragens des Thermoklebers auf den transparenten Einsatzrand ein Tampondruck ist. 10
4. Das Verfahren nach Anspruch 1, bei dem der Thermokleberauftrag auf dem transparenten Einsatzrand in einem Längenbereich zwischen 1 mm und 3 mm eine Breitenreduzierung bis zu einem Maß von 1 mm aufweist. 15
5. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird, wobei der der transparente Einsatz aus einem starren, halbstarren oder transparenten flexiblen synthetischen oder natürlichen Material besteht. 20
6. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird und mit einem Tensorelement für Gummibänder ausgestattet ist, das aus einem Segment aus natürlichem oder synthetischem flexiblem Material besteht, an dessen Enden zwei oder mehr vertikale und/oder schräge Rillen mit einer maximalen Länge von der Hälfte der Tensorbreite angebracht sind. 25 30
7. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird, die mit zwei oder mehr Befestigungen für zwei oder mehr Nackengummis und/oder zwei oder mehr Ohrgummis ausgestattet ist. 35 40
8. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird und mit einer Gummibandeinstellung aus natürlichem oder synthetischem Material mit kugelförmiger oder rechteckiger oder polyedrischer Form mit einer zentralen Perforation ausgestattet ist. 45
9. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird, mit einer mechanischen und/oder klebenden Anordnung auf dem Maskenkörper, die dazu bestimmt ist, ein oder mehrere besondere grafische Elemente (120) aufzunehmen. 50
10. Gesichtsschutzmaske, die nach dem Verfahren nach Anspruch 1 hergestellt wird, ausgestattet mit einer Vorrichtung zur Befestigung an einem oder mehreren Haltebändern (130). 55

Revendications

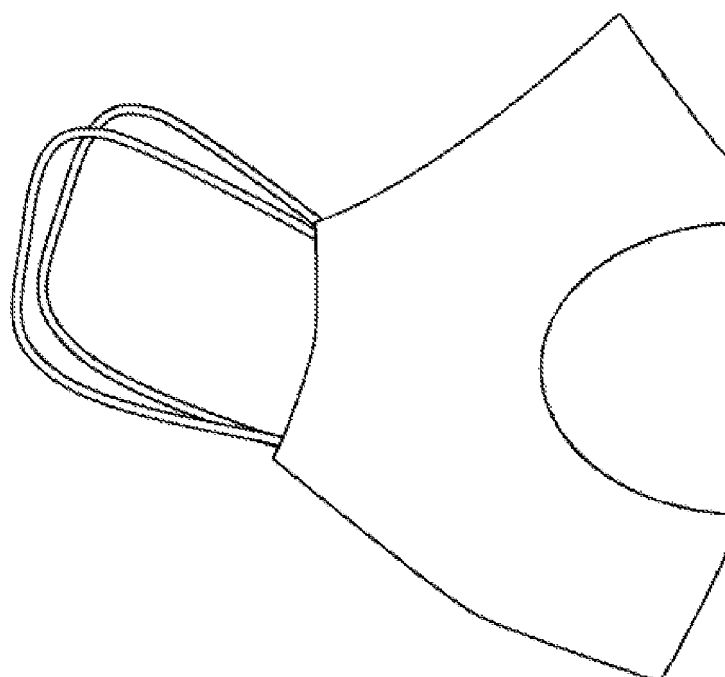
1. Procédure de réalisation d'un masque de protection contre les agents bactériens aériens, les agents viraux et la pollution atmosphérique, également destiné à des applications communautaires, équipé d'un insert transparent, dans laquelle :
 - a. le corps du masque se compose de trois couches de TNT minimum, dont au moins une couche de polypropylène de type spunbonded ;
 - b. le corps du masque est modélisé dans une forme rhomboïde (Fig. 2) dans laquelle tous les sommets sont découpés ;
 - c. le sommet supérieur dans l'axe vertical est en forme de V (22) ;
 - d. Le sommet inférieur dans l'axe vertical est en forme de V inversé (23) ;
 - e. sur le corps du masque, dans la zone centrale et au niveau de la bouche, une ouverture de forme ovale, dans laquelle le ratio entre le rayon majeur (24) et le rayon mineur (25) est compris entre 1,25 et 1,55 est exécutée ;
 - f. Les longueurs de rayons majeur et mineur de l'ouverture de forme ovale mesurent respectivement 4,25 cm +/- 0,5 cm et 3,1 cm +/- 0,5 cm ;
 - g. un insert transparent de la même forme que l'ouverture figurant sur le corps du masque, également de forme ovale, présentant de plus grandes dimensions de 4 à 10 mm, est obtenu à partir d'une feuille transparente de PU ou de matériau PVC de type 0,20 g (30) ;
 - h. une couche de colle thermique, d'une épaisseur moyenne comprise entre 2 et 8 mm, est appliquée sur le bord de l'insert transparent en utilisant une technique par sérigraphie (40) ;
 - i. l'insert transparent est créé en joignant à haute pression et haute température l'ensemble des bords de l'ouverture ovale du corps du masque en TNT, pour lui permettre de refroidir (Fig. 5) ;
 - j. les deux rabats de la forme de V au niveau du sommet supérieur du corps du masque sont cousus ensemble (60) ;
 - k. les deux rabats de la forme de V inversé au niveau du sommet inférieur du corps du masque sont cousus ensemble (61) ;
 - l. deux élastiques sont reliés sur les côtés du corps du masque, à proximité des sommets découpés de l'axe horizontal du corps du masque.
2. Masque de protection fabriqué conformément à la Revendication 1 dans laquelle la taille maximale du corps du masque dans les deux directions perpendiculaires l'une à l'autre (hauteur et longueur) mesure respectivement 15,3 cm +/- 1 cm et 20 cm +/- 1 cm.

3. Une procédure visée dans la Revendication 1 consistant en une technique d'application de colle thermique sur le bord de l'insert transparent appelée tampographie. 5
4. Une procédure visée dans la Revendication 1 consistant en une application de colle thermique sur le bord de l'insert transparent et ayant, sur une longueur comprise entre 1 et 3 mm, une réduction de la largeur jusqu'à un 1 mm. 10
5. Masque de protection obtenu en suivant la procédure visée à la Revendication 1 dans laquelle l'insert transparent est composé de matériel synthétique ou naturel rigide, semi-rigide ou transparent. 15
6. Masque de protection obtenu en suivant la procédure visée à la Revendication 1, équipé d'un élément tenseur pour les élastiques composés d'un segment de matériau flexible naturel ou synthétique aux extrémités dont deux rainures verticales et/ou obliques verticales minimum sont réalisées avec une longueur maximale correspondant à la moitié de la largeur du tendeur. 20
25
7. Masque de protection obtenu en suivant la procédure visée à la Revendication 1, équipé de deux attaches minimum pour accueillir deux élastiques minimum pour la nuque et/ou deux élastiques minimum pour les oreilles. 30
8. Masque de protection obtenu en suivant la procédure visée à la Revendication 1, équipé d'un dispositif de réglage d'élastique fabriqué en matériau naturel ou synthétique avec forme sphérique, rectangulaire ou polyédrique et une perforation centrale. 35
9. Masque de protection obtenu en suivant la procédure visée à la Revendication 1 avec prédisposition mécanique et/ou adhésive sur le corps du masque, conçue pour contenir un ou plusieurs éléments graphiques spécifiques (120). 40
10. Masque de protection obtenu en suivant la procédure visée à la Revendication 1, configuré de manière à pouvoir être attaché à une ou plusieurs languettes de retenue (130). 45

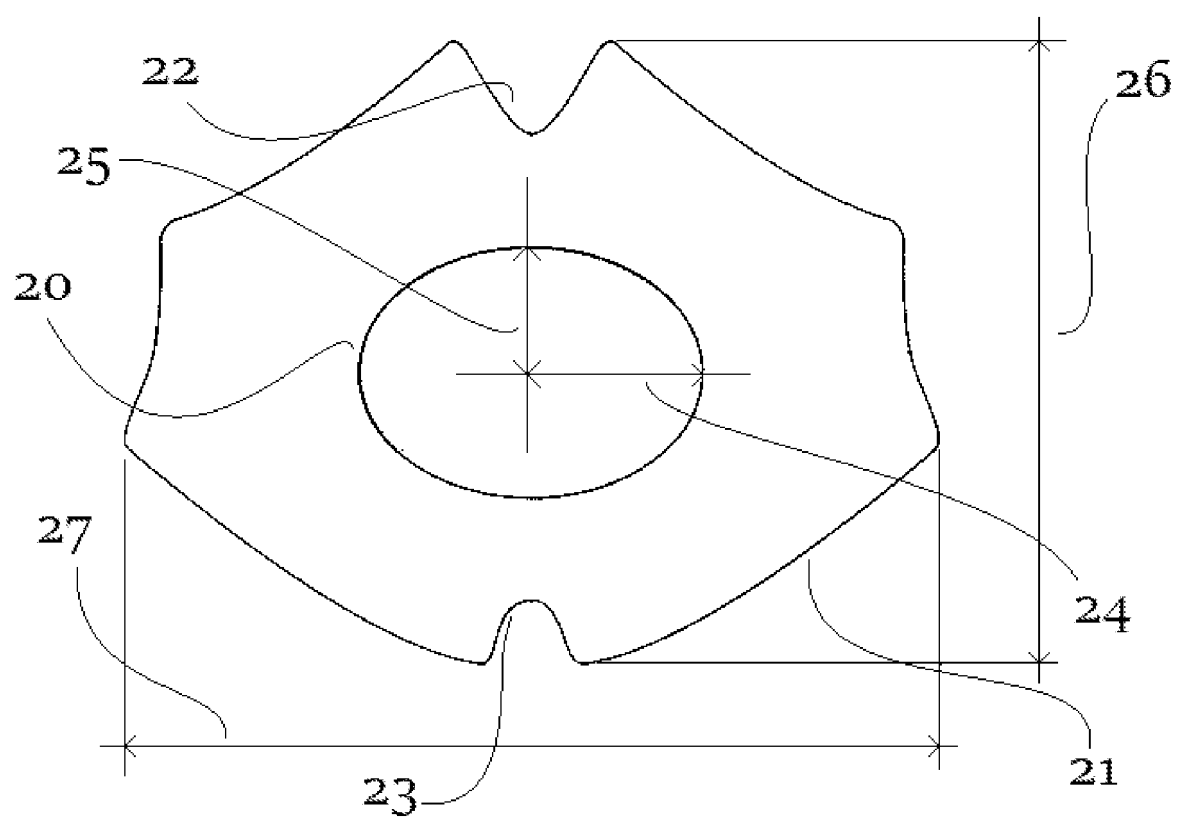
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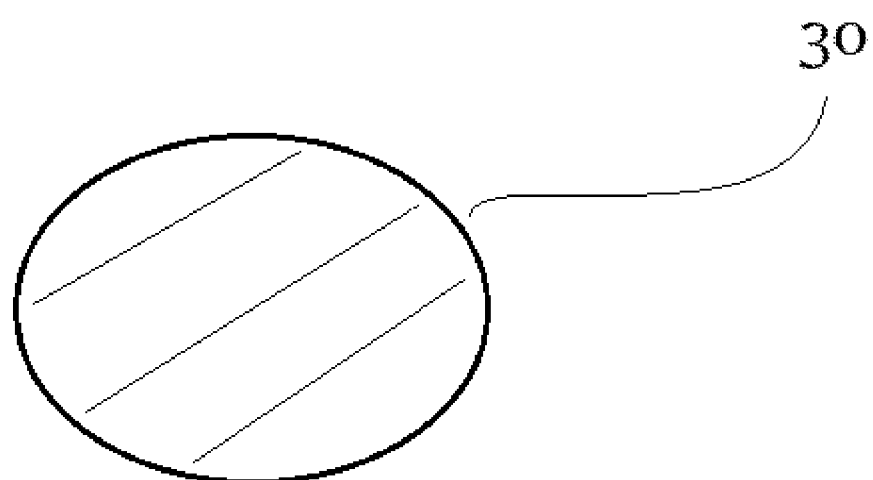
[Fig. 1]



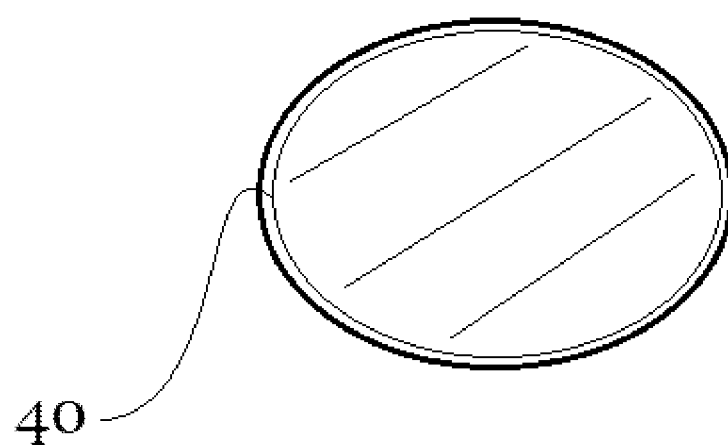
[Fig. 2]



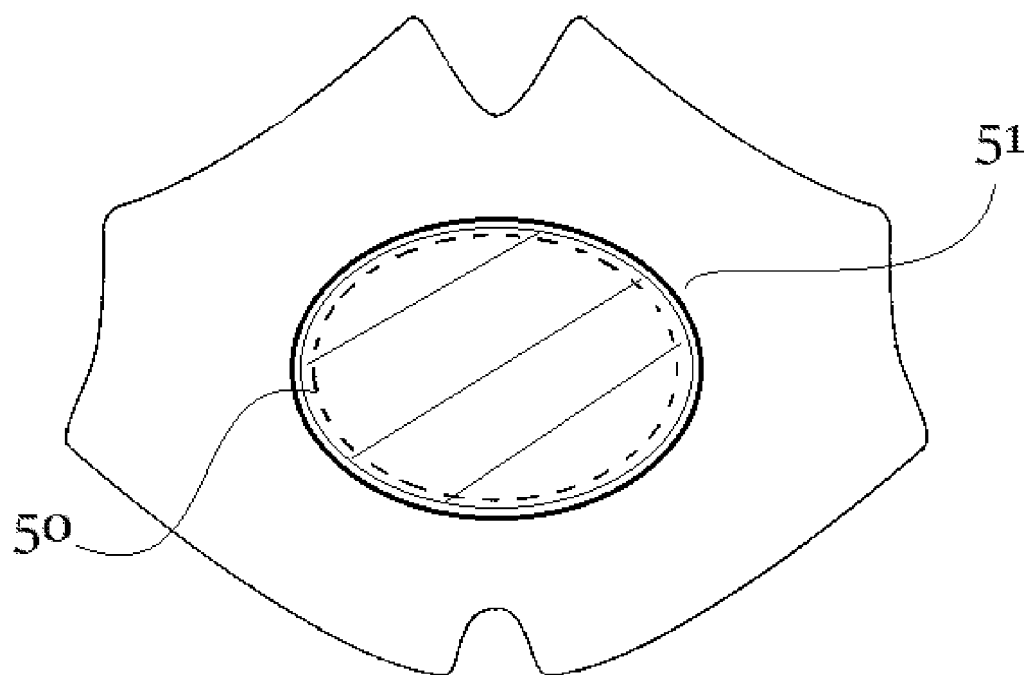
[Fig. 3]



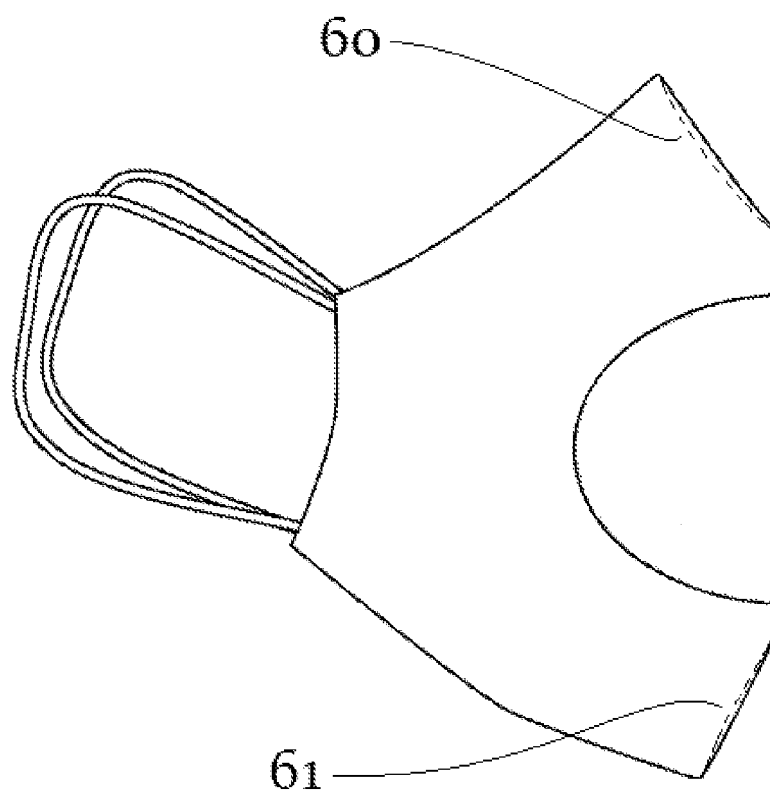
[Fig. 4]



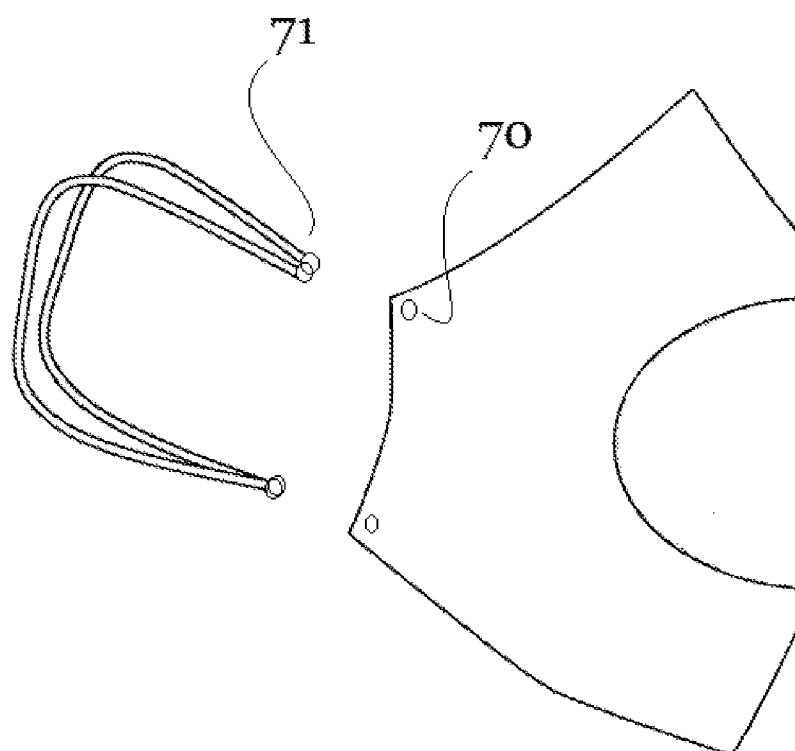
[Fig. 5]



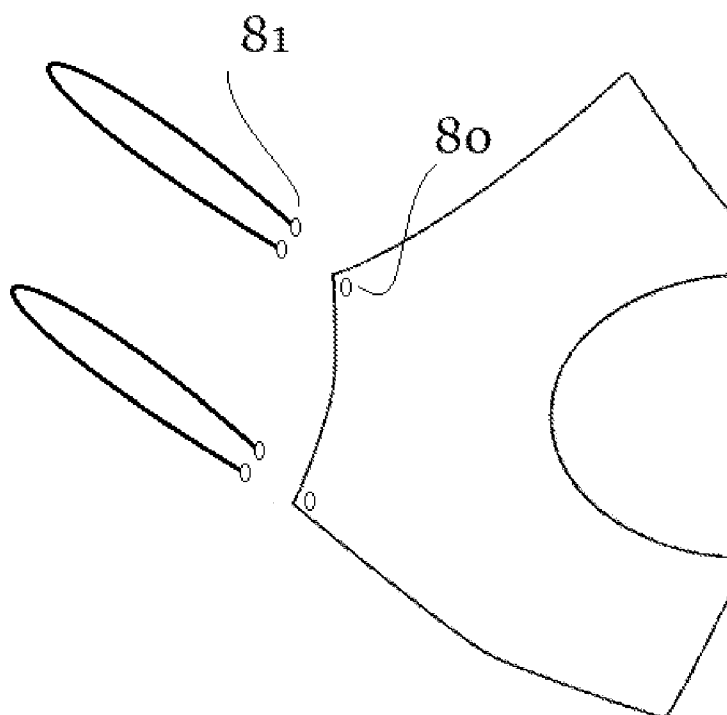
[Fig. 6]



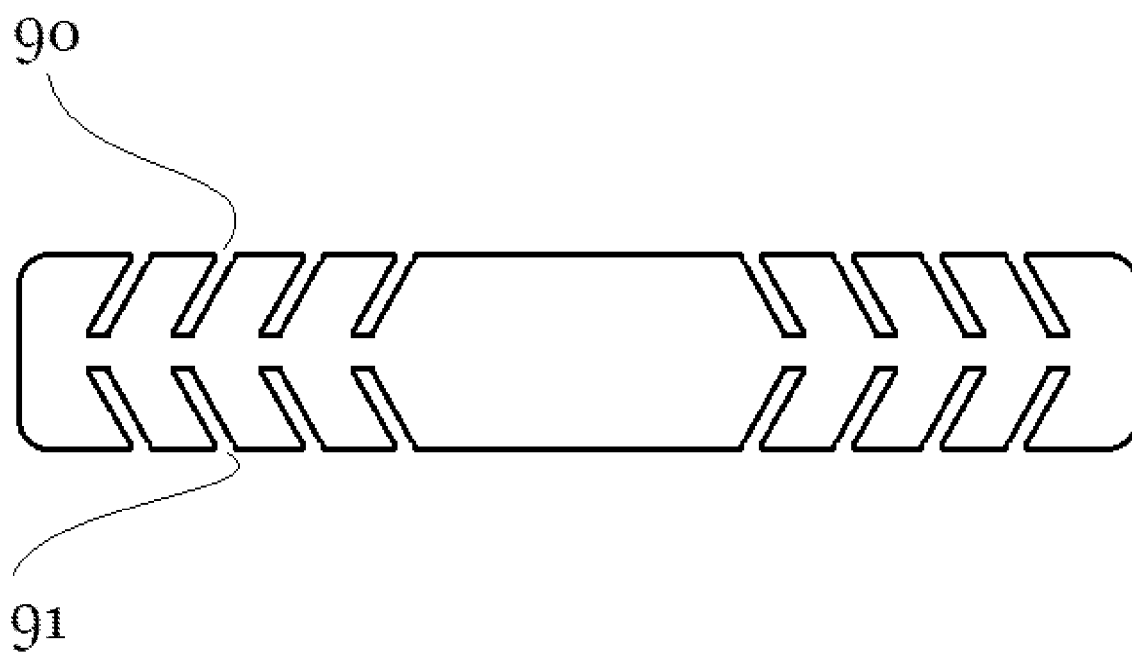
[Fig. 7]



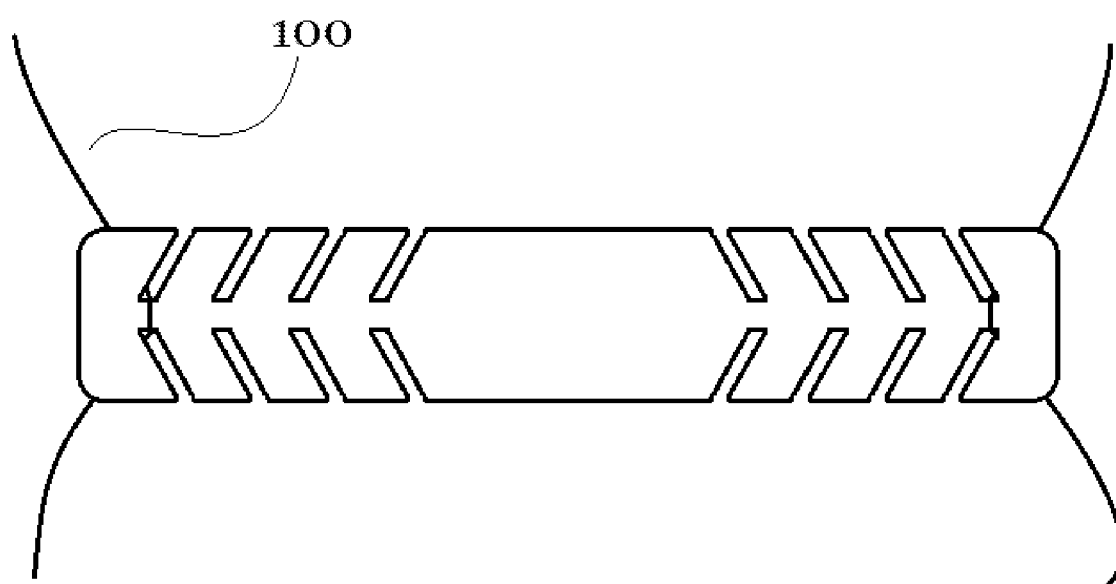
[Fig. 8]



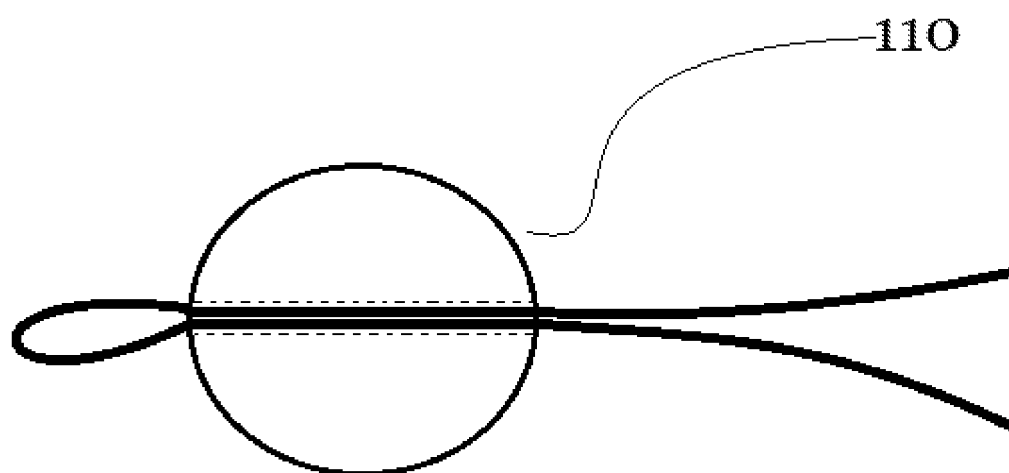
[Fig. 9]



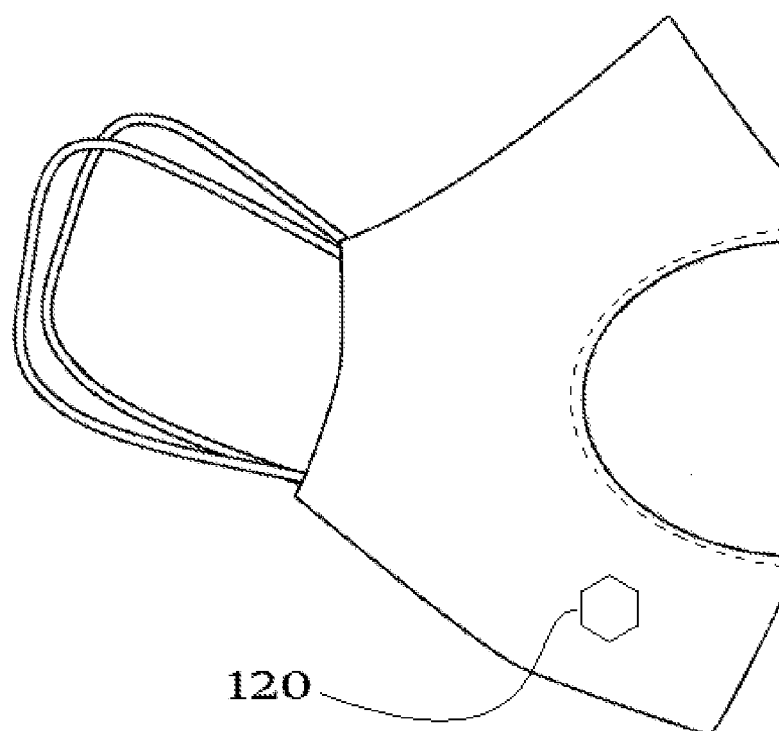
[Fig. 10]



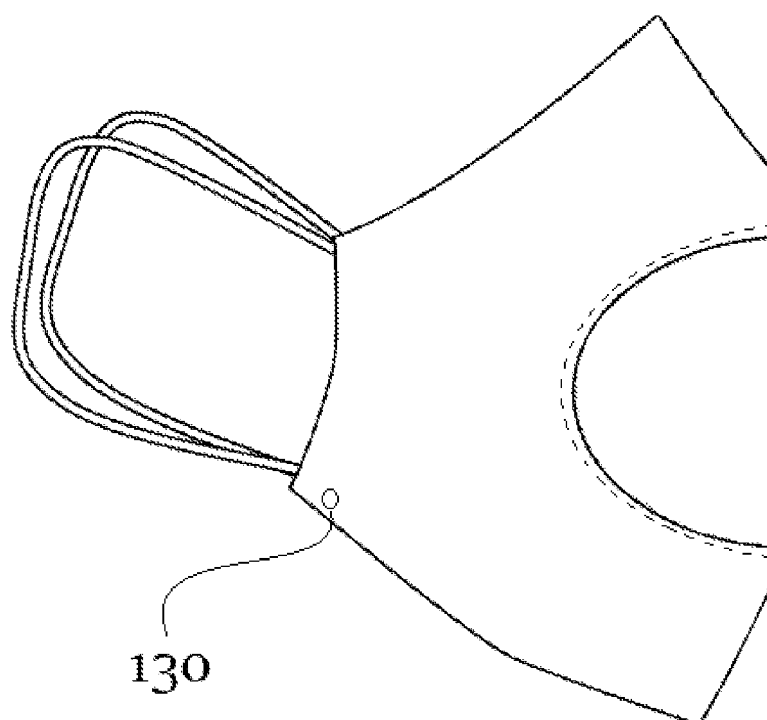
[Fig. 11]



[Fig. 12]



[Fig. 13]



REFERENCES CITED IN THE DESCRIPTION

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