(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 112 483 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
06.11.2024 Bulletin 2024/45

(21) Application number: **22172565.8**

(22) Date of filing: **10.05.2022**

(51) International Patent Classification (IPC):
B65B 9/20 *(2012.01)* ***B65B 9/22*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65B 9/22; B65B 19/34

(54) **DEVICE FOR PACKAGING MACHINES**

VORRICHTUNG FÜR VERPACKUNGSMASCHINEN

DISPOSITIF POUR MACHINES D'EMBALLAGE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **29.06.2021 IT 202100016976**

(43) Date of publication of application:
04.01.2023 Bulletin 2023/01

(73) Proprietor: **Landopack S.r.l.**
31037 Loria, Frazione Castione (TV) (IT)

(72) Inventors:
- **ANACORETO, Marco**
  31050 VEDELAGO TV (IT)
- **LANDO, Massimo**
  36028 ROSSANO VENETO VI (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

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Description

[0001] The present invention relates to a device for packaging machines, particularly for machines for the continuous packaging of products with a predominantly longitudinal extension like spaghetti, breadsticks, pencils or the like.

[0002] Nowadays for the continuous packaging of products with a predominantly longitudinal extension like spaghetti or breadsticks, usually machines are used that comprise a device with a flat region that ends with a collar with a substantially vertical (or horizontal) axis of extension and which is inclined with respect to the plane of arrangement of the flat region.

[0003] The collar has a slit, along the wall that lies opposite to the flat region, which is parallel to the axis of extension of the collar.

[0004] Inside the collar there is a hopper with an axis of extension that substantially coincides with the axis of extension of the collar.

[0005] To package the products, in a continuous process, a sheet of paper-like and/or polymeric material is unwound from a spool and slides over the substantially flat region of the device and is conveyed inside the collar and shaped around the hopper, adhering to the internal wall of the collar, making the two opposing longitudinal flaps of the sheet come together inside the slit.

[0006] The sheet is heat-sealed in a longitudinal direction at the two opposing facing flaps, creating a tubular package, and is subjected to a first cut and simultaneous heat-sealing, in a transverse direction, at the exit from the collar, creating a bag.

[0007] The products are then directed, through the hopper, into the bag being created.

[0008] The bag containing the products then slides through the collar and is sealed with a second cut and simultaneous heat-sealing, in a transverse direction, opposite to the previous transverse direction, again at the exit from the collar.

[0009] Such conventional techniques have a number of drawbacks.

[0010] The collar has an internal profile that is normally rectangular with sharp corners, rectangular with rounded corners, circular or slot-shaped, with some straight sections and along its axis of extension it has first a substantially tubular portion, and then a semi-tubular portion.

[0011] The device is obtained by bending and welding sheet metal.

[0012] In particular the production process, carried out by an operator, begins with two metal sheets, a first metal sheet for making the substantially flat region and a second metal sheet rolled in a closed shape, via successive folds, to create the profile of the collar.

[0013] These two separate components are then welded together.

[0014] The process is therefore long and laborious and inconvenient.

[0015] Furthermore, it is not possible to mass-reproduce such devices.

[0016] Also, the internal profile of the collar is the origin of at least two critical points for the sliding of the sheet (particularly if the sheet is made of paper) at the connecting points between the various folds of the sheet metal, at the interface between the tubular portion and the semi-tubular portion, at least at the ends of the semi-tubular shape, which causes the onset of unwanted wrinkles and creases on the sheet itself, as well as tears or rips, in addition to producing visually unpleasant longitudinal fold lines on the sheet.

[0017] Devices with a collar, used for packaging machines are also known from e.g. DE 20320160 U.

[0018] The aim of the present invention is to provide a device for packaging machines that is capable of improving the known art in one or more of the above mentioned aspects.

[0019] Within this aim, an object of the invention is to provide a device for packaging machines, in which the collar has no critical points for the sliding of the sheet inside it, and which makes it possible to guide the sheet evenly, thus increasing the speed of packaging with respect to similar conventional devices.

[0020] Another object of the invention is to provide a device for packaging machines that enables a method for its production that is easier and less laborious with respect to similar conventional devices and which does not entail the need for welds.

[0021] A further object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0022] Another object of the invention is to provide a device for packaging machines that is highly reliable, easy to implement and of low cost.

[0023] This aim and these and other objects which will become better apparent hereinafter are achieved by a device for packaging machines, which comprises a substantially flat region that ends with a collar, the plane of arrangement of said region being inclined with respect to the axis of extension of said collar, said collar having a slit along its wall that lies opposite to said region, parallel to the axis of extension thereof, said device being characterized in that said collar has an internal profile with a continuous curve with at least four changes of curvature with respect to circularity.

[0024] Further characteristics and advantages of the present invention will become better apparent from the description of a preferred, but not exclusive, embodiment of the device for packaging machines according to the invention, which is illustrated for the purposes of non-limiting example in the accompanying drawings wherein:

- Figure 1 is an overall perspective view of a device for packaging machines, according to the invention;
- Figure 2 is a front elevation view of the device of Figure 1;
- Figure 3 is a view from above of the device of Figure 1;

- Figure 4 is a cross-sectional view of the device of Figure 1.

[0025] With reference to the figures, the device for packaging machines according to the invention is generally designated by the reference numeral 10.

[0026] Such device 10 is preferably used in a machine for continuous packaging, not shown in the figures, in which the products are moved horizontally.

[0027] However, it can also be used in continuous packaging machines in which the products are moved vertically.

[0028] In particular, the invention is used to provide packages made of paper.

[0029] The device 10 comprises a substantially flat region 11 that ends with a collar 12.

[0030] The plane of arrangement of this region 11 is inclined with respect to the axis of extension of the collar 12, the configuration of which is normally vertical or horizontal.

[0031] The collar 12 has a slit 13 along the wall 17 that lies opposite to the region 11, which is parallel to the axis of extension of the collar.

[0032] One of the peculiarities of the invention consists in that the device 10 is monolithic.

[0033] In particular, the entire device 10 is made of metallic material, using 3D printing and/or stock-removal machining.

[0034] The device 10 is obtained, for example, with the use of a machine with computer numerical control (CNC).

[0035] It should be noted that, differently from similar conventional devices, such a device 10 takes a solid form that is homogeneous and mass-reproducible using 3D printing or using stock-removal machining with CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) methods.

[0036] Another peculiarity of the invention consists in that the collar 12 has an internal profile with a continuous curve, therefore without straight sections and/or sharp corners, in which there are at least four changes of curvature with respect to circularity.

[0037] The internal profile of the collar 12 is, for example, elliptical and/or oval and/or defined by four blended circular arcs.

[0038] Specifically, the oval is composed of four circular arcs in succession, while the ellipse has infinite changes of curvature, it being the geometric place of points of the plane where the sum of the distances from the two focal points remains constant.

[0039] It should be noted that such a profile makes it possible to uniformly distribute the tension of the wrapping evenly on all of the profile of the collar 12 during the forming of the bag.

[0040] The region 11 is shaped like an isosceles triangle with the vertex 14, which is comprised between the congruent sides 15a, 15b of the triangle, coinciding with the central point of the wall 16 of the collar 12 that is proximate to the region 11, on the inlet rim 19 of the collar 12.

[0041] The region 11 has an angle K between the congruent sides 15a, 15b, which is comprised between 60° and 70°.

[0042] The region 11 is inclined with respect to the wall 16 of the collar 12 that is proximate thereto, at an angle W comprised between 50° and 60°.

[0043] The device 10 comprises two wings 18a, 18b, which are mirror-symmetrical with respect to the plane of symmetry of the region 11 that passes through the vertex 14.

[0044] These wings 18a, 18b extend starting from the sides 15a, 15b, and have a curved profile that defines the inlet rim 19 of the collar 12, for the packaging sheet.

[0045] This rim 19 has a substantially teardrop-shaped contour with the vertex at the slit 13, which is arranged on a horizontal plane that is parallel to the horizontal plane of arrangement of the vertex 14 of the region 11.

[0046] The device 10 comprises two tabs 20a, 20b, which extend parallel to the axis of extension of the collar 12 and define substantially the wall 17 of the collar 12 that lies opposite the region 11.

[0047] The slit 13 extends in the interface region between the two tabs 20a, 20b, and passes through the thickness of the wall 17.

[0048] The tabs 20a, 20b have a surface directed toward the axis of extension of the collar 12 with a curved profile.

[0049] In particular, the tabs 20a, 20b extend starting from a plane that is perpendicular to the axis of extension of the collar 12 and is arranged proximate to/at the end of the wall 16 of the collar 12 that is proximate to the region 11.

[0050] In practice the wall 16 of the collar 12, which lies proximate to the region 11, and the wall 17 of the collar 12, which lies opposite the region 11, extend on different levels and are not parallel or are only partially parallel.

[0051] The device 10 can comprise a hopper, not shown in the figures, which is inserted in the collar 12 for introducing the products into the shaped wrapping, and which is also provided by 3D printing.

[0052] The use of the device 10 is the following.

[0053] A sheet of paper-like material is unwound from a spool, neither of which are shown in the figures, slides over the region 11 of the device 10 and is conveyed inside the collar 12 and shaped around the hopper, also not shown, adhering to the internal wall of the collar 12, along its inlet rim 19, and making the two opposing longitudinal flaps of the sheet come together inside the slit 13.

[0054] The sheet is heat-sealed in a longitudinal direction at the two opposing facing flaps, creating a tubular package, and is subjected to a first cut and simultaneous heat-sealing, in a transverse direction, at the exit from the collar 12, creating a bag.

[0055] The products are then directed, through the hopper, into the bag that has just been created.

[0056] The bag containing the products then slides

through the collar 12 and is sealed with a second cut and simultaneous heat-sealing, in a transverse direction, opposite to the previous transverse direction, at the exit from the collar 12.

[0057] In practice it has been found that the invention fully achieves the intended aim and objects by providing a device for packaging machines that has no critical points for the sliding of the sheet inside the profile of the collar, and which makes it possible to guide the sheet evenly, thus increasing the speed of packaging with respect to similar conventional devices.

[0058] Furthermore, with the invention a device for packaging machines is provided that enables a method for its production that is easier and less laborious with respect to similar conventional devices and which does not entail the need for welds.

[0059] Using such an invention prevents the sheet of paper for the package from being damaged or torn during the provision of the package.

[0060] Also, from laboratory tests it has been found that such a device for packaging machines makes it possible to provide packages made of paper at a similar speed to packages made of polymeric material and to transit from one type of package to the other without major losses of time.

[0061] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0062] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0063] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device (10) for packaging machines, which comprises a substantially flat region (11) that ends with a collar (12), the plane of arrangement of said region (11) being inclined with respect to the axis of extension of said collar (12), said collar (12) having a slit (13) along its wall (17) that lies opposite said region (11), parallel to the axis of extension thereof, said device (10) being **characterized in that** said collar (12) has an internal profile with a continuous curve with at least four changes of curvature with respect to circularity, said device (10) further comprising two tabs (20a, 20b) which extend parallel to the axis of extension of said collar (12) and define substantially the wall (17) of said collar (12) that lies opposite said region (11), said slit (13) extending in the interface region between said two tabs (20a, 20b), said slit (13) passing through the thickness of said wall (17) of said collar (12) that lies opposite said region (11).

2. The device (10) according to claim 1, **characterized in that** said internal profile of said collar (12) is elliptical.

3. The device (10) according to claim 1, **characterized in that** said internal profile of said collar (12) is oval.

4. The device (10) according to one or more of the preceding claims, **characterized in that** it is monolithic.

5. The device (10) according to one or more of the preceding claims, **characterized in that** it is made of metallic material and is provided by 3D printing and/or stock-removal machining.

6. The device (10) according to one or more of the preceding claims, **characterized in that** said region (11) is shaped like an isosceles triangle with the vertex (14), which is comprised between the congruent sides (15a, 15b) of said triangle, coinciding with the central point of the wall (16) of said collar (12) that is proximate to said region (11), said vertex (14) of said triangle being on an inlet rim (19) of said collar (12).

7. The device (10) according to claim 6, **characterized in that** said region (11):

   - has an angle (K) between said congruent sides (15a, 15b) which is comprised between 60° and 70°,
   - is inclined with respect to said wall (16) of said collar (12) that is proximate to said region (11), by an angle (W) comprised between 50° and 60°.

8. The device (10) according to one or both claims 6 or 7, **characterized in that** it comprises two wings (18a, 18b) which are mirror-symmetrical with respect to the plane of symmetry of said region (11) that passes through said vertex (14) of said triangle, said wings (18a, 18b) extending starting from said sides (15a, 15b) and having a curved profile that defines said inlet rim (19) of said collar (12).

9. The device (10) according to claim 6, **characterized in that** said inlet rim (19) of said collar (12) has a substantially teardrop-shaped contour with the vertex at said slit (13), said vertex of said teardrop shape being arranged on a horizontal plane that is parallel to the horizontal plane of arrangement of said vertex (14) of said region (11).

10. The device (10) according to one or more of the preceding claims, **characterized in that** said tabs (20a, 20b) have a surface directed toward the axis of extension of said collar (12) with a curved profile.

11. The device (10) according to one or more of the preceding claims, **characterized in that** said tabs (20a, 20b) extend starting from a plane that is perpendicular to the axis of extension of said collar (12) and is arranged proximate to/at the end of said wall (16) of said collar (12) that is proximate to said region (11).

12. The device (10) according to one or more of the preceding claims, **characterized in that** it comprises a hopper inserted in said collar (12) which is provided by 3D printing.

Patentansprüche

1. Eine Vorrichtung (10) für Verpackungsmaschinen, die einen im Wesentlichen flachen Bereich (11) umfasst, welcher in einer Einfassung (12) endet; wobei die Anordnungsebene des Bereichs (11) im Verhältnis zur Erstreckungsachse der Einfassung (12) geneigt ist; wobei die Einfassung (12) einen Schlitz (13) entlang ihrer Wand (17) hat, der dem Bereich (11), parallel zu dessen Erstreckungsachse, gegenüberliegt; wobei die Vorrichtung (10) **dadurch gekennzeichnet ist, dass** die Einfassung (12) ein Innenprofil mit kontinuierlicher Krümmung mit mindestens vier Krümmungsänderungen in Bezug auf Zirkularität hat; wobei die Vorrichtung (10) weiter zwei Nasen (20a, 20b) umfasst, die sich parallel zur Erstreckungsachse der Einfassung (12) erstrecken und im Wesentlichen die Wand (17) der Einfassung (12) bestimmen, die dem Bereich (11) gegenüberliegt; wobei der Schlitz (13) sich im Grenzflächenbereich zwischen den zwei Nasen (20a, 20b) erstreckt, wobei der Schlitz (13) durch die Dicke der Wand (17) der Einfassung (12) verläuft, die dem Bereich (11) gegenüberliegt.

2. Die Vorrichtung (10) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Innenprofil der Einfassung (12) elliptisch ist.

3. Die Vorrichtung (10) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Innenprofil der Einfassung (12) oval ist.

4. Die Vorrichtung (10) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie monolithisch ist.

5. Die Vorrichtung (10) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie aus Metallmaterial besteht und durch 3-D-Druck und/oder spanende Bearbeitung hergestellt wird.

6. Die Vorrichtung (10) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Bereich (11) wie ein gleichschenkeliges Dreieck geformt ist, dessen Spitze (14), die zwischen den kongruenten Seiten (15a, 15b) des Dreiecks geformt ist, mit dem Mittelpunkt der Wand (16) der Einfassung (12) zusammenfällt, die an den Bereich (11) angrenzt, wobei die Spitze (14) des Dreiecks auf einem Einlassrand (19) der Einfassung (12) liegt.

7. Die Vorrichtung (10) gemäß Anspruch 6, **dadurch gekennzeichnet, dass** der Bereich (11)

- einen Winkel (K) zwischen den kongruenten Seiten (15a, 15b) hat, der zwischen 60° und 70° beträgt,
- im Verhältnis zu der Wand (16) der Einfassung (12), die an den Bereich (11) angrenzt, in einem Winkel (W) geneigt ist, der zwischen 50° und 60° beträgt.

8. Die Vorrichtung (10) gemäß einem oder beiden der Ansprüche 6 oder 7, **dadurch gekennzeichnet, dass** sie zwei Flügel (18a, 18b) umfasst, die spiegelsymmetrisch mit Bezug auf die Symmetrieebene des Bereichs (11) sind, der durch die Spitze (14) des Dreiecks verläuft, wobei die Flügel (18a, 18b) sich ausgehend von den Seiten (15a, 15b) erstrecken und ein gekrümmtes Profil haben, das den Einlassrand (19) der Einfassung (12) bestimmt.

9. Die Vorrichtung (10) gemäß Anspruch 6, **dadurch gekennzeichnet, dass** der Einlassrand (19) der Einfassung (12) eine im Wesentlichen tropfenförmige Kontur mit dem Scheitelpunkt an dem Schlitz (13) hat, wobei der Scheitelpunkt der Tropfenform auf einer horizontalen Ebene angeordnet ist, welche parallel zu der horizontalen Anordnungsebene der Spitze (14) des Bereichs (11) ist.

10. Die Vorrichtung (10) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Nasen (20a, 20b) eine Oberfläche haben, die der Erstreckungsachse der Einfassung (12) mit gekrümmtem Profil zugewandt ist.

11. Die Vorrichtung (10) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Nasen (20a, 20b) sich ausgehend von einer Ebene erstrecken, die senkrecht zur Erstreckungsachse der Einfassung (12) und in der Nähe der/am Ende der Wand (16) der Einfassung (12) angeordnet ist, die an den Bereich (11) angrenzt.

12. Die Vorrichtung (10) gemäß einem oder mehreren

der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie einen Trichter umfasst, der in die Einfassung (12) eingesetzt und durch 3D-Druck hergestellt wird.

Revendications

1. Dispositif (10) pour machines à emballer, comprenant une région substantiellement plate (11) qui se termine par un collier (12), le plan d'agencement de ladite région (11) étant incliné par rapport à l'axe d'extension dudit collier (12), ledit collier (12) comportant une fente (13) le long de sa paroi (17) qui se trouve à l'opposé de ladite région (11), parallèle à l'axe d'extension de celle-ci, ledit dispositif (10) étant **caractérisé en ce que** ledit collier (12) a un profil intérieur formant une courbe continue ayant au moins quatre changements de courbure par rapport à la circularité, ledit dispositif (10) comprenant en outre deux pattes (20a, 20b) qui s'étendent parallèlement à l'axe d'extension dudit collier (12) et qui définissent substantiellement la paroi (17) dudit collier (12) qui se trouve à l'opposé de ladite région (11), ladite fente (13) s'étendant dans la région d'interface entre lesdites deux pattes (20a, 20b), ladite fente (13) traversant l'épaisseur de ladite paroi (17) dudit collier (12) qui se trouve à l'opposé de ladite région (11).

2. Dispositif (10) selon la revendication 1, **caractérisé en ce que** ledit profil intérieur dudit collier (12) est elliptique.

3. Dispositif (10) selon la revendication 1, **caractérisé en ce que** ledit profil intérieur dudit collier (12) est ovale.

4. Dispositif (10) selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce qu'**il est monolithique.

5. Dispositif (10) selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce qu'**il est fait d'un matériau métallique et est fourni par impression 3D et/ou par usinage à enlèvement de matière.

6. Dispositif (10) selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ladite région (11) a la forme d'un triangle isocèle dans lequel le sommet (14), qui est compris entre les côtés congruents (15a, 15b) dudit triangle, coïncide avec le point central de la paroi (16) dudit collier (12) qui est proche de ladite région (11), ledit sommet (14) dudit triangle étant sur un rebord intérieur (19) dudit collier (12).

7. Dispositif (10) selon la revendication 6, **caractérisé en ce que** ladite région (11) :

   - a un angle (K) entre lesdits côtés congruents (15a, 15b) qui est compris entre 60° et 70°,
   - est incliné par rapport à ladite paroi (16) dudit collier (12) qui est proche de ladite région (11), d'un angle (W) compris entre 50° et 60°.

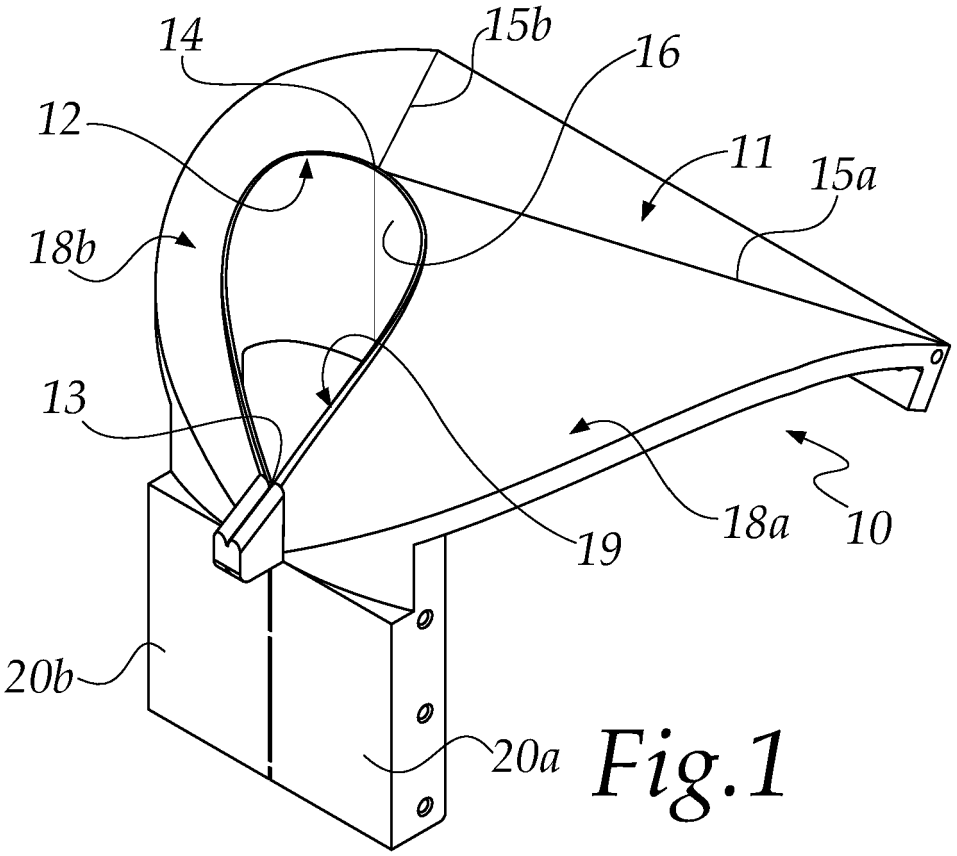
8. Dispositif (10) selon l'une des revendications 6 et 7, ou les deux, **caractérisé en ce qu'**il comprend deux ailes (18a, 18b) qui sont symétriques par rapport au plan de symétrie de ladite région (11) qui passe par ledit sommet (14) dudit triangle, lesdites ailes (18a, 18b) s'étendant depuis lesdits côtés (15a, 15b) et ayant un profil courbé qui définit ledit rebord intérieur (19) dudit collier (12).

9. Dispositif (10) selon la revendication 6, **caractérisé en ce que** ledit rebord intérieur (19) dudit collier (12) a un contour substantiellement en forme de goutte d'eau dont le sommet est au niveau de ladite fente (13), ledit sommet de ladite forme de goutte d'eau étant placé sur un plan horizontal qui est parallèle au plan horizontal d'agencement dudit sommet (14) de ladite région (11).

10. Dispositif (10) selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** lesdites pattes (20a, 20b) ont une surface orientée vers l'axe d'extension dudit collier (12) avec un profil courbé.

11. Dispositif (10) selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** lesdites pattes (20a, 20b) s'étendent depuis un plan qui est perpendiculaire à l'axe d'extension dudit collier (12) et est placé à proximité de/à l'extrémité de ladite paroi (16) dudit collier (12) qui est à proximité de ladite région (11).

12. Dispositif (10) selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce qu'**il comprend une trémie insérée dans ledit collier (12) qui est fournie par impression 3D.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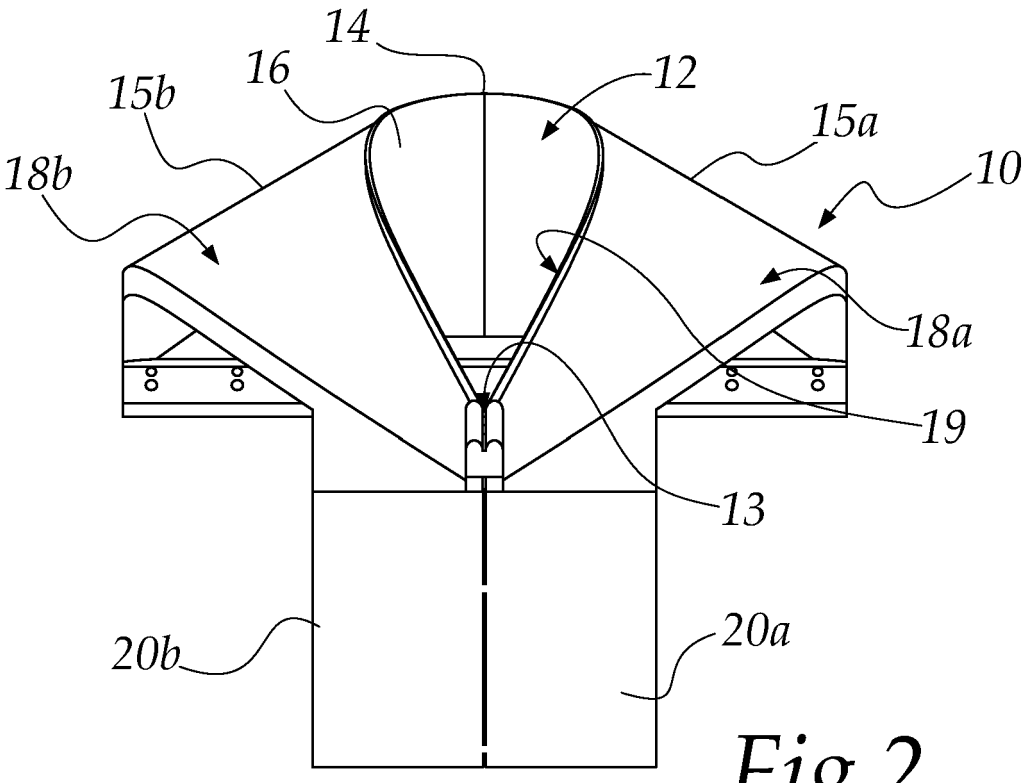
15b
16
12
11
15a
18b
13
19
18a
10
20b
20a

Fig.1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18b
10
18a
19
13
20b
20a

Fig.2

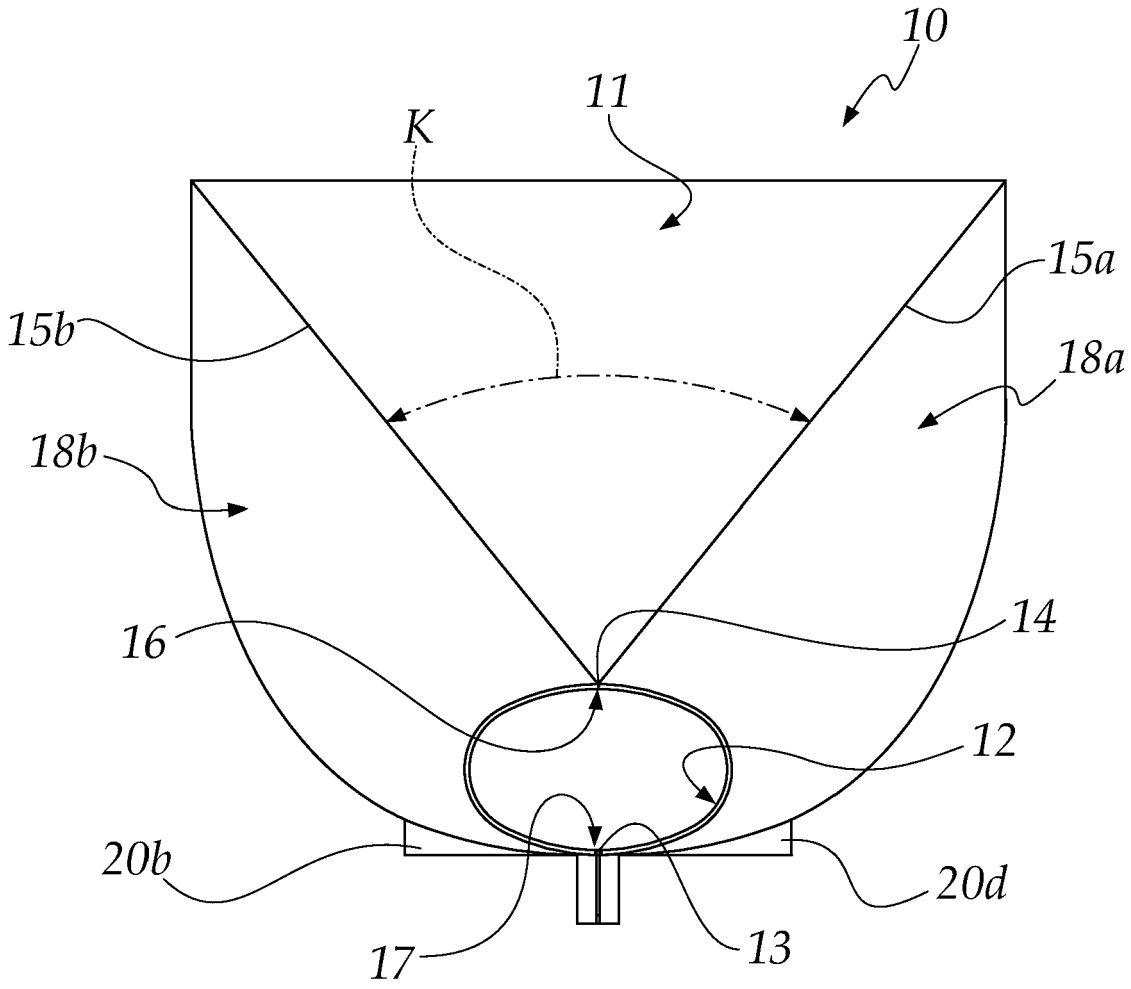

Fig.3

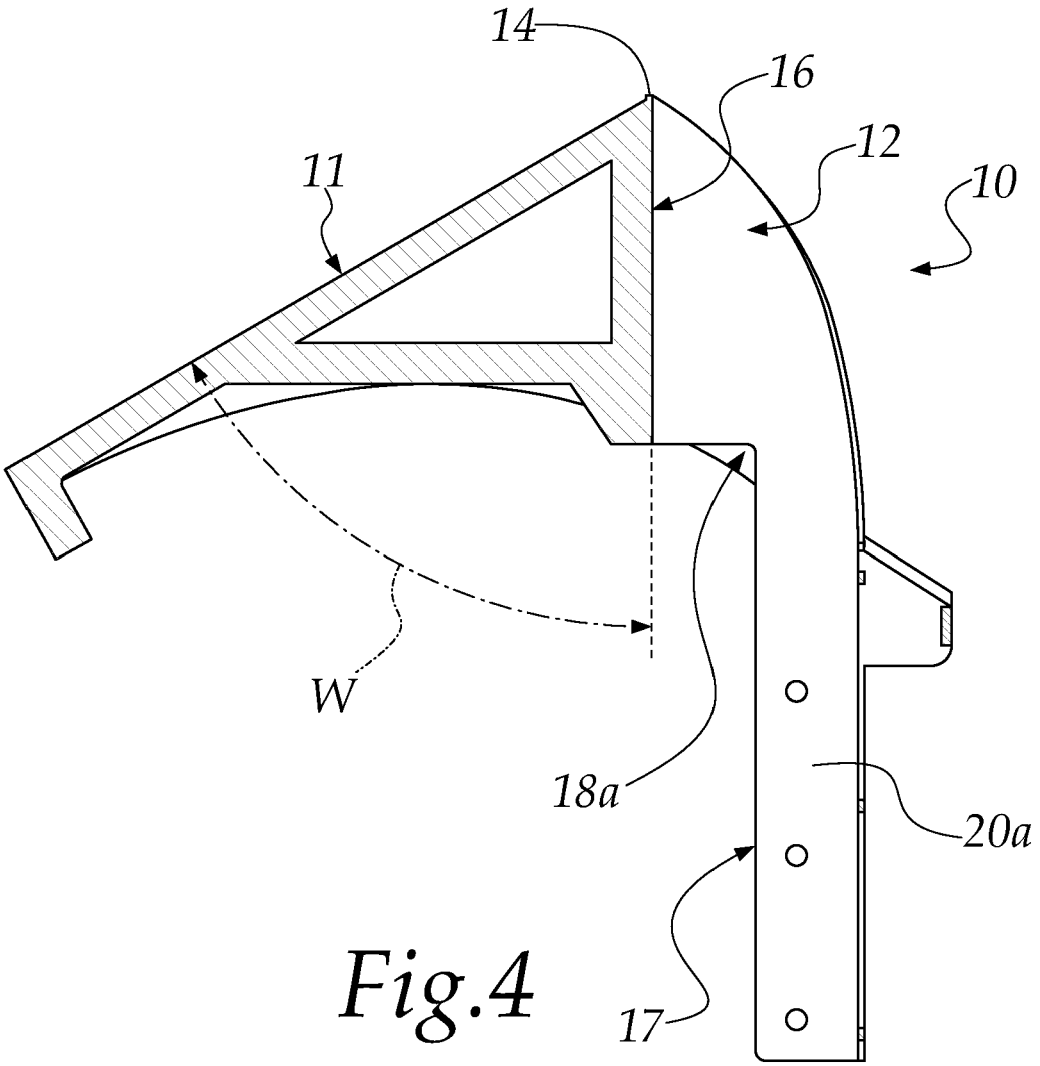

Fig.4

REFERENCES CITED IN THE DESCRIPTION

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