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(71) Applicant: **Schur Pack Denmark a/s**
8700 Horsens (DK)

(72) Inventor: **Holm, Poul Kackie**
8700 Horsens (DK)

(74) Representative: **Thomas, Götz**
Breitenburgerstrasse 31
25524 Itzehoe (DE)

(54) Drip catcher with aerator

(57) The invention refers to a drip-catcher (10) for insertion into a neck of a bottle for enabling drip-free pouring of liquid from said bottle, the drip-catcher (10) consisting of a piece (12) of resilient flexible sheet material, which for insertion into said bottle neck can be deformed from a planar shape to a tubular roll (14). In order to be able to use the drip-catcher (10) for aerating wine or other liquids when pouring them from a bottle, according to the invention said piece (12) of sheet material has a plurality of cuts (28) and fold lines (30) delimiting integral portions (26) of said piece (12), which portions (26), after deformation of said piece (12) from said planar shape into said tubular roll (14) and after insertion into said bottle neck, are apt to project into a hollow interior of said tubular roll (14) and to form obstacles in the liquid flow through said tubular roll (14) during pouring.

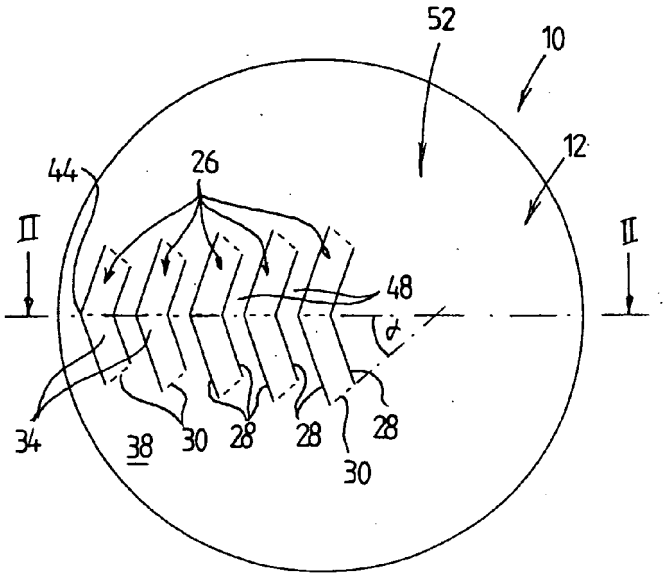

Fig. 1

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Description

[0001] The present invention relates to a drip-catcher for insertion into a neck of a bottle according to the preamble of claim 1.

[0002] Such a drip-catcher is disclosed in EP 0 560 777 B1 and is very popular in commerce under the trade mark DropStop®. The resilient flexible sheet material is usually a suitable thin laminated plastics material, which is rolled into a tubular shape before insertion into the bottle neck. The thickness and resiliency of the plastics material are chosen in such a way that the piece of material, when rolled into the tubular shape, tends to unroll so as to assume again its original planar shape and as a result tightly engages the cylindrical inner surface of the bottle neck. In this way the drip-catcher adapts itself to differing interior diameters of an existing range of bottle necks. The tubular drip-catcher is only partially inserted into the bottle neck so that it will project from the bottle neck and form a pouring spout for the liquid. The drip-catcher has a circumference with a relatively sharp edge and two opposite fluid repellent surfaces so that it will enable a drip-free pouring of liquid and will prevent any drops from falling from the pouring spout or from seeping down on the outside of the bottle.

[0003] A considerable number of wine drinkers prefer to decant the wine before drinking it. Apart from separating the wine from any solid residue in the wine bottle decanting also serves to aerate the wine or allow it to "breathe", i.e. to bring the wine in contact with air in order to trigger the release of more aroma compounds and to smooth some of the harsher aspects of the wine, like tannins. For decanting the wine is normally poured into a glass decanter with a form that will keep the residues back when pouring the wine and that will increase the surface area of the wine in contact with air.

[0004] However very often it will not be possible to decant the wine by pouring it into a decanter before drinking. In this case it is of advantage to use a pourer which will decant and aerate the wine during pouring.

[0005] EP 1 165 393 B1 discloses such a pourer which is capable of drawing air into the flow of liquid passing through the pourer and of mixing the air with the liquid within the pourer. The pourer comprises an elongated annular body which is adapted to be inserted into a bottle neck, the annular body defining a longitudinally extending through-going channel and having an air intake opening extending transversely to the channel and penetrating the body, so as to allow air to be sucked into the channel when liquid is flowing from the container through the channel. In order to generate a low pressure when liquid is flowing through the channel and thereby assist in sucking air into the channel through the air intake opening the channel defines a contraction near the air intake opening like in a Venturi-arrangement.

[0006] It is an object of the present invention to provide a pourer or drip-catcher made of a piece of a flexible resilient sheet material, like the Dropstopo® drip-catcher, which can be used for aerating wine or other liquids when pouring them from a bottle.

[0007] This object is achieved by the features in the characterizing part of claim 1. According to the invention the piece of sheet material is provided with a plurality of cuts and fold lines which delimit integral portions of said piece of sheet material. After having rolled the piece of sheet material from its original planar shape into a tubular shape and after having inserted the tubular piece of flexible sheet material into the bottle neck, these integral portions are apt to project into a hollow interior of said tubular roll and to create obstacles in the liquid flow through said tubular roll during pouring.

[0008] The effect of the obstacles in the liquid flow through the pourer or drip-catcher is similar to the effects of boulders in a rapid of a river: Due to the flow of liquid around such obstacles swirls, eddies and turbulences will arise behind the obstacles and due to the flow of liquid over the obstacles small falls and eddies will arise behind the obstacles. Both effects will mix the liquid with air. A further effect of the obstacles will be an increase of the velocity of the liquid flow passing the obstacles which will also enhance turbulence in the liquid flow. When the drip-catcher according to the invention is used for pouring wine from a bottle these effects will result in an aeration of the wine due to the mixing of wine and air.

[0009] In order to facilitate the production and the packaging of the drip-catcher according to a preferred embodiment of the invention the portions forming the obstacles in the liquid flow and the remainder of the piece each have two opposite surfaces which are flush or lie in the same planes, when the piece is in the planar shape, i.e. before use. In other words in the planar shape the drip-catcher preferably does not have any overlapping portions but is a single layer of the sheet material where the portions forming the obstacles in the liquid flow are separated from the remainder of the piece by the cuts and the fold lines so that they can be deformed after having rolled the piece of sheet material into a tubular form. In this way the portions can be simply stamped from the sheet material during production of the drip-catcher.

[0010] In the tubular form the opposite surfaces of the portions forming the obstacles in the liquid flow are preferably inclined with respect to the main direction of the liquid flow through the tubular roll in order to increase the resistance of these portions to the liquid flow, whereas the opposite surfaces of the remainder of the piece are essentially parallel to the main direction of the liquid flow through the tubular roll when liquid is poured through the drip-catcher. The inclination of the opposite surfaces of the portions forming the obstacles with respect to the longitudinal axis of the tubular roll is preferably more than 30 degrees, and more preferably from 60 degrees to 90 degrees. A relatively steep inclination will result in the formation of small falls of liquid passing over the obstacles which will enhance the mixing of air and liquid downstream of the obstacles. The inclination can be even more than 90 degrees in order to create an overhang on the

downstream side of the obstacles.

[0011] In order to enhance the aeration it is preferable when the portions projecting into the interior of the tubular roll and forming the obstacles for the liquid flow are only partially immersed in the liquid flow so that part of the liquid will flow around the obstacles and part of the liquid will flow over the obstacles. According to a further preferred embodiment of the invention another part of the liquid will pass below the obstacles so that the liquid flowing over the obstacles will fall onto the liquid passing below the obstacles.

[0012] According to the invention the portions forming the obstacles are partly delimited by fold lines which will act as hinges when deforming the portions such that they are apt to project into the interior of the tubular roll and do not return in the position before deformation.

[0013] After having deformed the integral portions holes or openings will be left in the piece of sheet material where the portions have been situated before in the planar shape of the piece. In order to avoid any liquid from flowing through these holes or openings none of the portions forming the obstacles is provided in the pour spout, i.e. the part of the drip-catcher or pourer projecting from the bottle neck. In other words the portions forming the obstacles are only provided on the part of the drip-catcher or pourer which is inserted into the bottle neck. Surprisingly it has been found that the forces which tend to return the tubular sheet material back in its original planar form are sufficiently high to press the rims of the holes or openings tightly against the interior surface of the bottle' neck so that no liquid will escape from the interior of the tubular roll through these holes or openings.

[0014] According to a further preferred embodiment of the invention the arrangement of the portions forming the obstacles on the piece of sheet material is such that during the pouring of liquid from the bottle they will project upwardly into the interior of the tubular roll or into the liquid flow. To this end in the planar shape of the piece of sheet material the portions are preferably arranged along a linear central axis of the piece which, after deforming the piece into the tubular roll, will be essentially parallel to a longitudinal axis of the tubular roll. Advantageously in said planar shape of said piece said portions are symmetrical to a linear central axis of the piece.

[0015] The portions forming the obstacles are preferably elongated strips having two opposite ends connected by fold lines to the remainder of the piece of sheet material and being delimited on opposite sides by cuts which preferably have a shallow V-shape or U-shape when the piece of sheet material is in its planar shape. Advantageously the strips are provided between their two opposite ends with at least one further transverse fold line, preferably one central fold line in the middle, which divides each strip into two halves. These fold lines facilitate the deformation of the strips from a first flat or planar orientation, when the piece of sheet material is in its planar shape, into a second orientation, when the piece of sheet material is in its tubular shape in order to have the strips project into the interior of the tubular roll. Furthermore due to the fold lines the strips will stay in their second orientation and will not return to the tubular shape of the remainder of the piece of sheet material.

[0016] The second orientation of the strips is preferably an angular orientation where two adjacent sections of the strips which are connected by a fold line are inclined with respect to each other and with respect to the direction of the liquid flow. ,In other words each of the two sections has two essentially planar opposite surfaces which are not only inclined with respect to the opposite surfaces of the other section but also with respect to the main direction of the liquid flow within the tubular roll.

[0017] Advantageously the piece of sheet material is provided with a plurality of elongated strips which project into the interior of the tubular roll and form the obstacles. Preferably the strips are arranged along a linear central axis of the piece of sheet material so that the obstacles created after deforming the strips are arranged one behind the other in the main direction of liquid flow through the tubular roll when pouring. According to a further preferred embodiment of the invention, a fold line in the middle of each strip is aligned with the linear central axis of the piece of sheet material whereas the two fold lines at the opposite ends of each strip are inclined with respect to the linear central axis of the piece of sheet material. The inclination is such that the opposite fold lines will converge in a direction towards the part of the piece of sheet materials which is used as pouring spout, i.e. the part which will project from the bottle neck and is not provided with an elongated strip or other portion forming an obstacle.

[0018] The angle of inclination of the two opposite fold lines with respect to the linear central axis of the piece of sheet material is preferably between 10 and 45 degrees and will determine the flow resistance of the strips which will reach a maximum when the angle of inclination is about 45 degrees.

[0019] Advantageously the piece of sheet material of the drip-catcher has a circular outline. However this need not necessarily be the case. Except for the pouring spout which should have a convexly rounded outline the shape or outline of the piece of sheet material can be chosen at will. However an outline with a continuous convexly rounded curvature is preferred.

[0020] In the following two preferred embodiments of the invention are described with regard to the accompanying drawings, wherein

Fig. 1 is a top view of a first embodiment of a drip-catcher according to the invention in a planar shape;

Fig. 2 is an enlarged sectional view of the first embodiment along the line II-II in Fig. 1;

Fig. 3 is an enlarged top view of the first embodiment after having been rolled into a tubular shape;

Fig. 4 is an enlarged bottom view of the first embodiment after having been rolled into a tubular shape;

Fig. 5 is an enlarged perspective view of the first embodiment in the tubular shape;

Fig. 6 is another perspective view of the first embodiment in the tubular shape;

Fig. 7 is a sectional view of the first embodiment along the line VII-VII in Fig. 3;

Fig. 8 is a top view of a second embodiment of a drip-catcher according to the invention in a planar shape;

Fig. 9 is an enlarged sectional view of the second embodiment along the line IX-IX in Fig. 8;

Fig. 10 is a sectional view of the second embodiment in a tubular shape, similar to Fig. 7;

Fig. 11 is a perspective view of the second embodiment in the tubular shape.

[0021] The drip-catchers 10 as depicted in Figures 1 to 11 of the drawing each consist of a circular piece 12 of a laminated resilient sheet material. For example the sheet material is a laminated plastics material, which comprises two surface layers of PET (Polyethylenterephthalate) and possibly a thin metal and/or printed layer between the two surface layers. The sheet material has a suitable flexibility and elasticity so that the drip-catchers 10 can be easily rolled from the planar shape, as depicted in Figures 1, 2, 8 and 9, into a tubular shape or roll 14 as depicted in the other Figures. In the tubular shape two opposite rim portions 16, 18 of the circular piece 12 will overlap each other, as can be best seen in Figures 5, 7, 10 and 11.

[0022] After having been rolled into the tubular shape the drip-catcher 10 can be partially inserted into the neck of a bottle (not shown), for example a wine bottle, where it can serve both as a pourer for enabling drip-free pouring of wine from the bottle and as an aerator for aerating the wine when it flows through the hollow interior of the tubular piece 12 of sheet material during the pouring operation.

[0023] After letting go the partially inserted drip-catcher 10 within the bottle neck due to the resiliency of the piece 12 of sheet material the drip-catcher 10 will tend to assume its original planar shape. As a result the cylindrical outer surface 20 of the tubular roll 14 will tightly and sealingly engage the cylindrical inner surface of the bottle neck. The friction between the two surfaces will hold the drip-catcher 10 within the bottle neck when pouring wine from the bottle. The part of the tubular roll 14 which projects from the bottle neck forms a pouring spout 22 having a convexly rounded thin and sharp edge 24 which is part of the circumference of the piece 12 of sheet material. This edge 24 will efficiently cut off any liquid flow when the bottle is returned to an upright position after the pouring operation. The cutting off will prevent the formation of drops at the mouth of the bottle neck, which would otherwise seep down on the outside of the bottle. The drip-free pouring is assisted by a liquid repellent surface characteristic of the laminated sheet material.

[0024] When pouring wine from the bottle the bottle is held in such an orientation that the convex edge 24 of the pouring spout 22 will be in the lowermost position of the tubular roll 14 such that the wine will flow over the edge 24. In this orientation of the bottle the two overlapping rim portions 16, 18 of the piece 10 will be in the uppermost position of the tubular roll 14 inserted into the bottle neck.

[0025] For the aeration of the wine during its passage through the hollow interior of the tubular roll 14 the planar piece 12 of sheet material of the drip-catchers 10 is provided with a plurality of integral portions 26 which are each delimited by two cuts 28 and by two fold lines 30.

[0026] The cuts 28 and the fold lines 30 are made by stamping during the production of the drip-catchers 10 when the piece 12 is cut from a blank or from continuous roll of the sheet material.

[0027] Each drip-catcher 10 depicted in the drawings has a total of five pairs of cuts 28 where each alternate pair delimits one of the deformable portions 26. However the number of cuts 28 and therefore the number of portions 26 can be higher or lower.

[0028] The portions 26 are in the form of elongate narrow strips which are lined up along a linear or diametrical axis 32 through the centre of the circular piece 12 which intersects the strips 26 and divides them in two halves which are symmetrical to the axis 32. The strips 26 are disposed in equal distances however are not equally distributed across the circular piece 12 but are disposed along a length of the axis 32 which length will be within the bottle neck after the drip-catcher 10 has been partially inserted into the latter. In other words the pouring spout 22 which projects from the bottle neck is not provided with any of the strips 26.

[0029] In the planar shape of the drip-catcher 10 the two opposite surfaces 34, 36 of each strip 26 are flush with the adjacent surfaces 38, 40 of the remainder 52 of the piece 12 as can best seen from figures 2 and 9. In other words the surfaces 34, 38 and 36, 40 are in one plane, so that there is no overlapping of the strips 26 with the remainder 52 of the piece 12.

[0030] In the embodiment in Figures 1 to 8 each cut 28 has the form of a shallow V and accordingly each strip 26 has an outline in the form of a shallow V. Neighbouring strips 26 are separated by elongate bridges 48 in the form of a shallow V and having a slightly narrower width. The apexes 44 of the pair of cuts 28 which delimit each strip 26 point away from the part of the piece 12 which will form the pouring spout 22 and are connected by an additional fold line 46. The additional fold lines 46 are

aligned with the axis 32. The two fold lines 30 at the opposite ends of each strip 26 converge towards the pouring spout 22 and are inclined with respect to the axis 32. In the embodiment in Fig. 1 the angle of inclination α is about 45 degrees, however α can be more or less than 45 degrees. Furthermore the lengths of the strips 26 increase along the axis 32 in the direction of the pouring spout 22.

[0031] When rolling the drip-catcher 10 from the planar shape into the tubular shape this is done in a direction perpendicular to the axis 32 so that in the tubular shape the axis 32 will be parallel to a central axis of the hollow tube 14, as can be, best seen in Fig. 5.

[0032] After having deformed the drip-catcher 10 into the tubular shape the elongate strips 26 can be deformed from a first position (not shown), where their opposite surfaces 34, 36 are still aligned with the adjacent surfaces 38, 40 of the remainder 52 of the piece 12, into a second position where the strips 26 will project into the interior of the hollow tubular roll 14. The deformation of the strips can be done by pushing them inwardly with respect to the remainder 52 of the rolled up piece 12.

[0033] When the strips 26 are deformed into their second position each strip will leave a hole or an opening 50 the rim of which is formed by the two cuts 28 and the two fold lines 30 delimiting each strip 26.

[0034] The second position is a stable position where the strips 26 will remain as long as the drip-catcher 10 is in its tubular shape during use, which is partly due to the fold lines 46. However when the drip-catcher 10 is taken from the bottle neck and resumes its original planar shape the strips 26 will automatically return to their first position

[0035] When wine is poured through the drip-catcher 10 the strips 26 in their second position will define obstacles in the flow of wine through the tubular roll, as can be best seen in Figures 5, 6 and 7. In this position each strip 26 will assume a V-shape where the two opposite surfaces 34, 36 of each strip 26 or of the two halves of each strip at either side of the fold line 46 respectively are steeply inclined with respect to the direction of flow and where the apexes 44 of the cuts 28 point into the flow direction. As can be best seen Fig. 7 the inclination of the surfaces 34, 36 with respect to the main direction of flow F through the tubular roll is about 85 degrees.

[0036] When wine is poured through the drip-catcher 10 without glugging the flow of wine will normally amount to less than half of the interior of the tubular roll 14, whereas the other half, or more, is filled with air entering the bottle in order to replace the poured wine. Within the part of the tubular roll 14 which is inserted into the bottle neck some of the wine will pass beneath the strips 26 or obstacles and will flow across the holes or openings 50. In addition some of the wine will pass over the strips 26 or obstacles. This will create small falls and turbulences behind the strips 26 or obstacles and will increase the velocity of the flow passing the strips 26 or obstacles. In order to enhance the formation of small falls behind the strips 26 the inclination of the surfaces 34, 36 with respect to the main direction of flow F can be even more than 90 degrees in order to create an overhang on the downstream side of the strips 26.

[0037] As a result of the falls, turbulences and eddies the wine will be mixed with air and an aeration of the wine will take place within the tubular drip-catcher 10 during the pouring operation.

[0038] Surprisingly it has been found that the engagement of the cylindrical outer surface 20 of the tubular roll 14 with the cylindrical inner surface of the bottle neck due to the resiliency of the sheet material is sufficient to prevent any wine from leaking through the holes or openings 50.

[0039] Depending on the lengths of the strips 26 some of them may emerge upwardly from the flow of wine in the second position, when wine is poured through the tubular roll 14. However this will also result in the formation of eddies and turbulences downstream from the partly immersed strips 26 or obstacles.

[0040] In the embodiment depicted in Figures 8 to 11 the outline of the strips 26 is different. There each strip 26 is delimited by two cuts 28 having a shallow convex curvature facing away from the pouring spout 22. Furthermore the two fold lines 30 at the opposite ends of each strip 26 are inclined to the axis 32 at a relatively small angle α of less than 10 degrees.

[0041] After having deformed each strip 26 into the second position the opposite surfaces 34, 36 of each strip 26 will be nearly parallel to the direction of flow as can be best seen in Fig. 10. Due to this the aeration of the wine will be much less pronounced. Therefore in order to achieve a higher rate of aeration the angle α enclosed by the fold lines 30 and the axis 32 should be more than 20 degrees.

Claims

1. Drip-catcher (10) for insertion into a neck of a bottle for enabling drip-free pouring of liquid from said bottle, the drip-catcher (10) consisting of a piece (12) of a resilient flexible sheet material, which for insertion into said bottle neck can be deformed from a planar shape to a tubular roll (14), **characterized in that** said piece (12) of sheet material has a plurality of cuts (28) and fold lines (30) delimiting integral portions (26) of said piece (12), which portions (26), after deformation of said piece (12) from said planar shape into said tubular roll (14) and after insertion into said bottle neck, are apt to project into a hollow interior of said tubular roll (14) and to form obstacles in the liquid flow through said tubular roll (14) during pouring.

2. Drip-catcher (10) according to claim 1, **characterized in that** opposite surfaces (34, 36; 38, 40) of said portions (26) and of a remainder (52) of said piece (12) are flush when said piece (12) is in said

planar shape.

3. Drip-catcher (10) according to claim 1 or 2, **characterized in that** in said planar shape said piece (12) does not have any overlapping portions.

4. Drip-catcher (10) according to any of the preceding claims, **characterized in that** said portions (26) project upwardly into said hollow interior of said tubular roll (14) during pouring.

5. Drip-catcher (10) according to any of the preceding claims, **characterized in that** said portions (26) are apt to form V-shaped obstacles pointing in a main direction of liquid flow (F) through said tubular roll (14) during pouring.

6. Drip-catcher (10) according to any of the preceding claims, **characterized in that** opposite surfaces (34, 36) of said portions (26) are inclined with respect to a main direction of liquid flow (F) through said tubular roll (14) during pouring.

7. Drip-catcher (10) according to claim 6, **characterized in that** the inclination of said opposite surfaces (34, 36) of said portions (26) with respect to the main direction of liquid flow (F) is more than 30 degrees.

8. Drip-catcher (10) according to any of the preceding claims, **characterized in that** said portions are in the form of elongated strips (26) having the fold lines (30) at opposite ends and having the cuts (28) on opposite sides.

9. Drip-catcher (10) according to claim 8, **characterized in that** the strips (26) are each provided with a transverse fold line (46) in a distance from the opposite ends.

10. Drip-catcher (10) according to any of the preceding claims, **characterized in that** at least some of said cuts (28) have a shallow V-shape or a shallow U-shape when said piece (12) is in said planar shape.

11. Drip-catcher (10) according to any of the preceding claims, **characterized in that** at least some of said fold lines (30) are inclined with respect to a linear axis (32) when said piece (12) is in said planar shape, and **in that** said linear axis (32) is essentially parallel to a longitudinal axis of said tubular roll (14).

12. Drip-catcher (10) according to claim 11, **characterized in that** said inclination of said fold lines (30) with respect to said linear axis (32) is more than 20 degrees.

13. Drip-catcher (10) according to any of the preceding claims, **characterized in that** due to the resiliency of the sheet material said portions (26) will automatically return into said planar shape when said piece (12) is withdrawn from the bottle neck.

14. Drip-catcher (10) according to any of the preceding claims, **characterized in that** none of said portions (26) is in a part of the piece (12) which after insertion into said bottle neck will project from said bottle neck and will form a pouring spout (22).

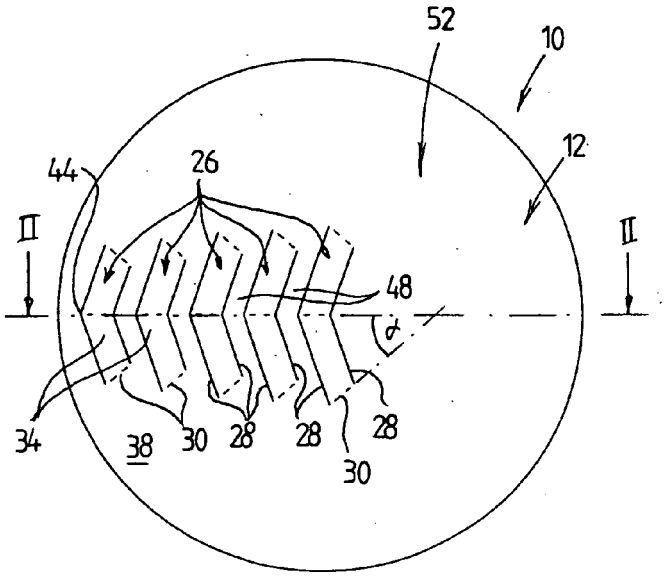

Fig. 1

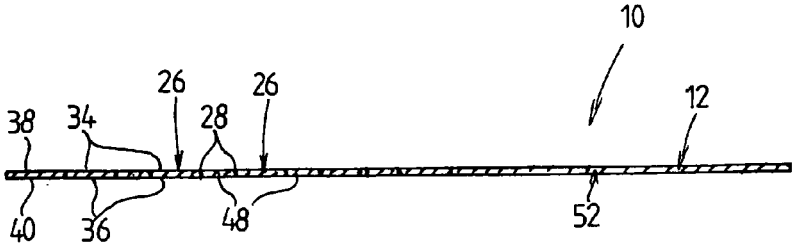

Fig. 2

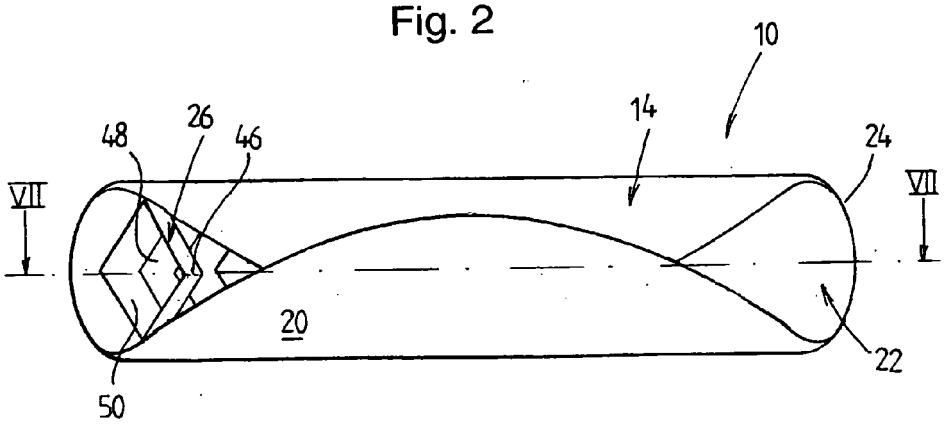

Fig. 3

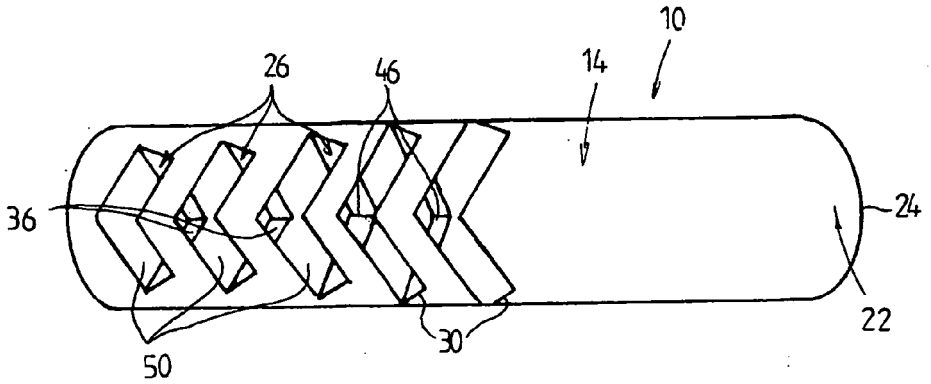

Fig. 4

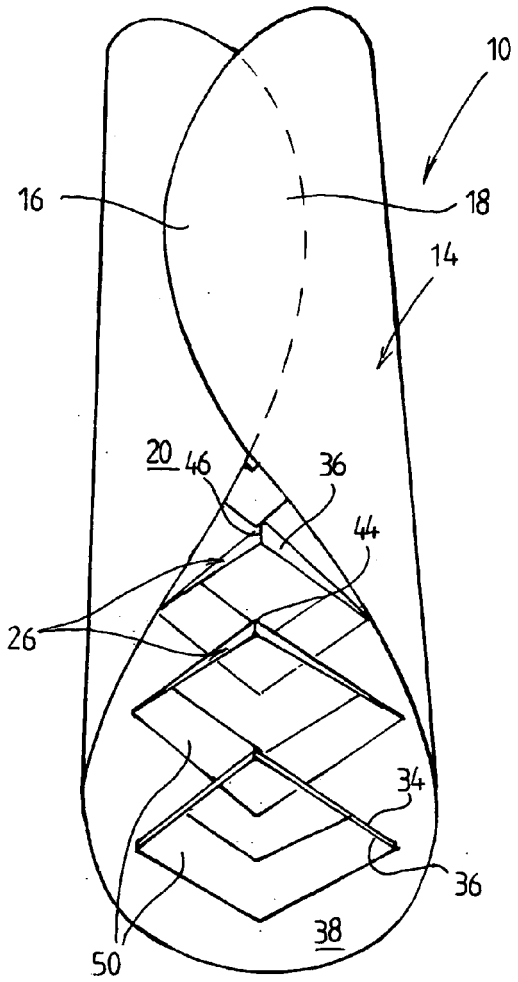

Fig. 5

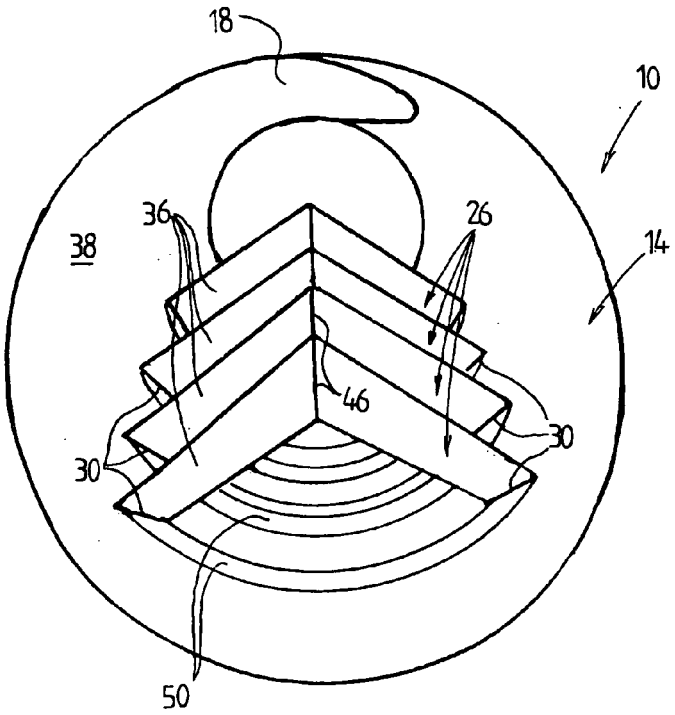
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Fig. 6

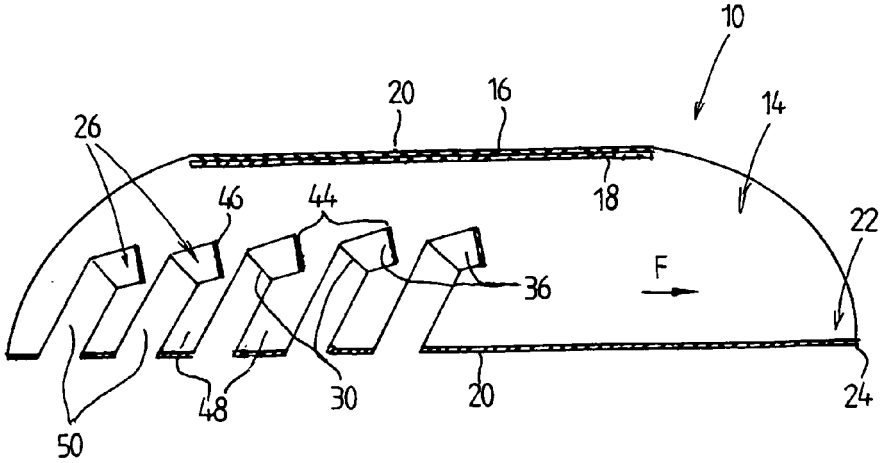
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Fig. 7

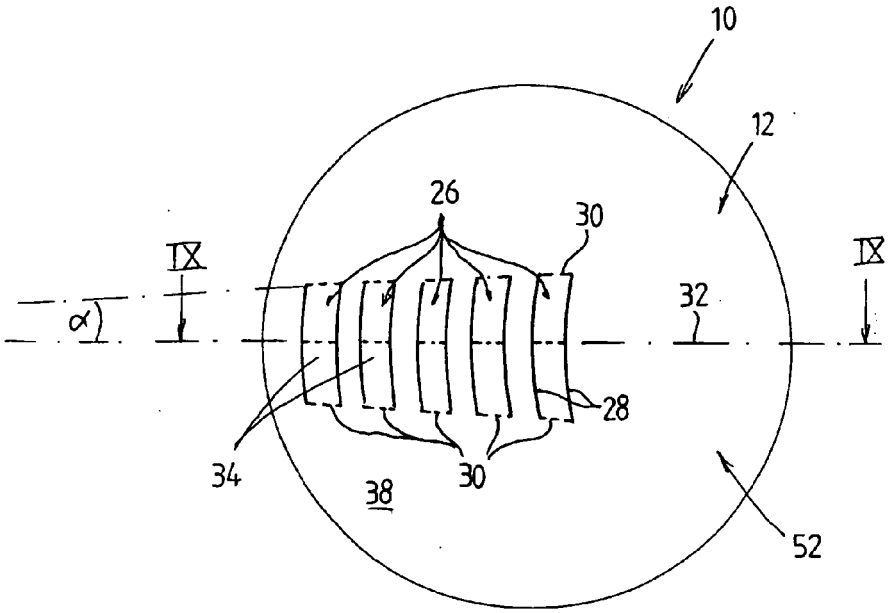

Fig. 8

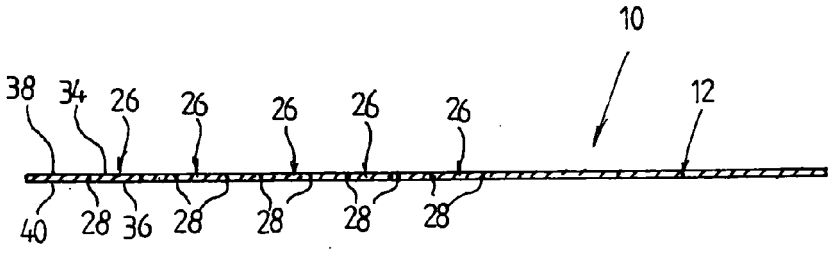

Fig. 9

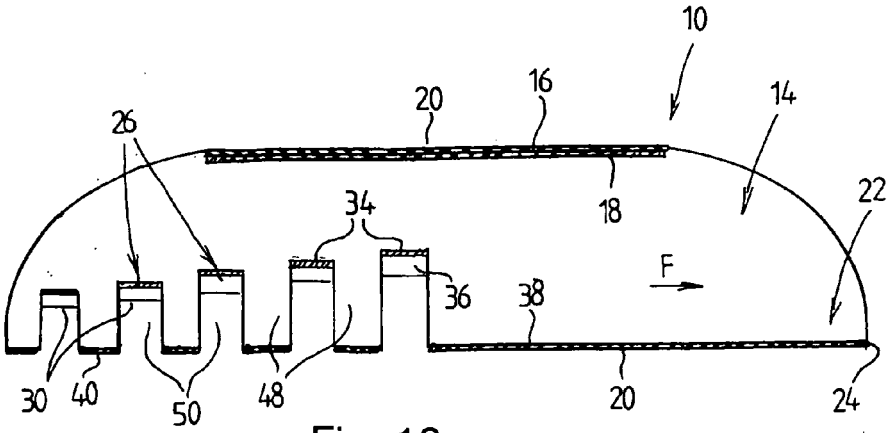

Fig. 10

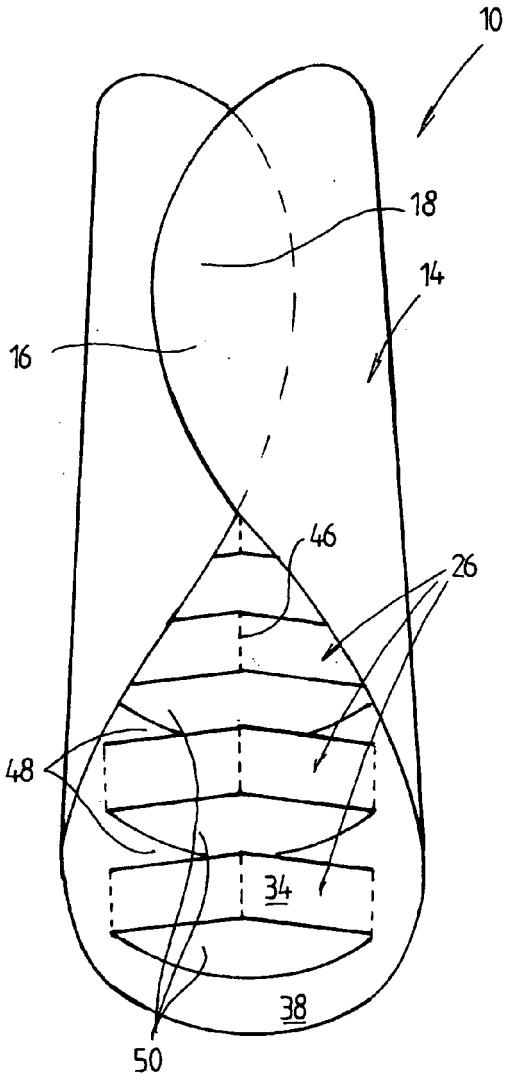

Fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 12 00 0443

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
E	EP 2 409 926 A1 (SANBRI [FR]) 25 January 2012 (2012-01-25) * paragraphs [0012] - [0018] * * paragraphs [0040] - [0042]; figures 9,10 * -----	1-10	INV. B65D23/06

TECHNICAL FIELDS SEARCHED (IPC)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	2 March 2012	Vigilante, Marco

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