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- (73) Patenthaver: **Topcap AB, Annerovägen 3, 644 36 Torshälla, Sverige**
- (72) Opfinder: **Johansson, Einar, Bergavägen 12 B, S-184 30 Åkersberga, Sverige**
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DESCRIPTION

[0001] The invention relates to a method for manufacturing a packaging container consisting of a cardboard bottom and from this bottom up-folded side walls which when erected are orientated and fixed relative to each other by means of liquid tight joints.

[0002] The background to the present invention is that there is a market need to replace plastic cups for ice cream, creme fraiche, yoghurt and similar products, with cups that are made of more renewable raw materials and thus provide less contribution of greenhouse gases, i.e. more environmentally friendly cups and pots. Furthermore, it is common with lower environmental fees on packaging that consists of at least 50% cardboard, which also creates incentives for such cups. Today the market place does not offer such liquid tight cups, the ones which do exist are plastic cups placed into cardboard sleeves, which results in higher manufacturing cost, and also uses more plastic, or they perform poorly in modern automatic filling lines.

[0003] The drawback of manufacturing a packaging container consisting of a cardboard bottom and from this bottom up-folded side walls, is that the ends of the side walls when exposed in an open cavity of an injection mold tool, in which the plastic mass forming the sealing joints is filled, is that the ends of the side walls can easily be pressed and pushed away by the plastic flow towards the inside or the outside of the cavity. It is sufficient with only a small difference in the cavities free flow channels resulting in displacement of the ends of the side walls, resulting in a packaging container with appearance defects. An unsymmetrical flooding of the plastic mass, resulting in such appearance defects, is due to that the plastic mass is injected at high pressure which pushes the side wall ends to one or the other side of the cavity in the injection mold-tool. Manufacturing methods previously known from GB 1 570 393 A and GB 1 504 527 A disclose the features of the preamble of claim 1. An object with the present invention is to eliminate the drawbacks mentioned above by a new method. The characterizing features of the invention are stated in the appended claim. Thanks to the invention it has now been provided for a method for manufacturing a packaging container of the kind mentioned above, which in an excellent way fulfills its purpose at the same time as the packaging container is both cheap and easy to manufacture. The packaging container, which by its conicity is stackable with equally shaped containers, consists of a cardboard based packaging material, preferably at least on one side coated with a heat sealable layer. The side joints are connectable in a liquid-tight manner by a melt consisting of preferably thermoplastic, while its top side comprises a circumferential opening edge along the container opening, which also is formed by e.g. thermoplastic. A solution to the above mentioned problem with the side wall ends moving inside of a cavity, is to arrange so that the packaging container have the side walls with its ends to rest directly rather than indirectly as previously, against the injection mold tool during the forming of the packaging. The plastic mass is filled only on the inside of the side walls and between the joints but not at the outside of the side walls. Thereby the packaging material is pressed towards the mold tool outer half by the force of the plastic mass and a stabilization of the entire packaging container position is obtained. The plastic mass creates a

pressure against the packaging material so that the packaging material with great force is held in place towards the outer half of the injection mold tool. This in turn means that the plastic mass can completely fill the cavities between the side wall ends and on their inside, for creating the side wall joints, without any plastic mass entering to the outside of the side walls, so that no appearance defects occur.

[0004] The invention is described closer below by the aid of some preferred embodiments with reference to the accompanying drawings, in which

Fig. 1

shows a perspective view of a packing container obtained with the method according to the invention.

Fig. 1b

shows a perspective view of a rectangular execution of the packaging container illustrated in Fig.1,

Fig. 2

shows separately in perspective a shell or strip formation of the thermoplastic mass contained in the Fig. 1 illustrated packaging container, and which is intended to form the liquid-tight joints to hold together the same,

Fig. 3

shows separately in a perspective view actual fiber based packaging laminate in an erected and formed state, and which is included in that of Fig. 1 illustrated packing container,

Fig. 4

shows the packaging container illustrated in Fig.1 in a view from below,

Fig. 5

shows the packaging container illustrated in Fig.1 in a view from above,

Fig. 6

shows schematically a partial sectional view of an injection mold used in the method according to the invention with their halves in a position with the packaging material fixed between these,

Fig. 7

shows a schematic partial cross sectional view of an existing, prior known, injection mold design, and with which follows the disadvantages as described, and

Fig. 8

shows schematically one joint area of the packaging container, where incoming plastic melt flow divided from one incoming main flow into two flow channels.

[0005] As in Fig. 1, here is shown an erected and formed packaging container 1 obtained with the method in accordance with the invention and consisting of a bottom 2 and from the bottom folded-up side walls 3-6, which are position-oriented and fixed relative to each other in the erected condition by liquid tight side joints 7-10. The side joints 7-10 consist of a suitable joint material, preferably a solidifiable plastic material such as a thermoplastic. The packaging

container 1 has a circumferential container opening 11, which has an opening edge 12 which also consists of the same material that connects the side walls 3-6, i.e. in the preferred embodiment, the thermoplastic. Against the opening edge 12 may, when appropriate and not shown in the drawing here, a heat sealable foil lid and re-closable snap-on lid be fixed. The illustrated erected packaging container (as in Fig 1) is mainly slightly conical rectangular with round opening but can also have other shapes such as rectangular-rectangular (as in Fig. 1b), triangular, multi-angular, oval etc. The triangular embodiment would subsequently have the thermoplastic resin illustrated in Fig. 2 in the form of a strip formation 17 with only three legs.

[0006] As shown in the drawings, the opening edge 12 of thermoplastic resin is integrally formed with the side walls 3-6 liquid-tight uniting the side joints 7-10 of thermoplastic, which enclose the side wall edges 13-16 and their around extending opening edge 12, wherein the cohesive strip formation 17 of thermoplastic resin integrally extending from the opening edge 12 along the edge parts 13-16 of the side walls 3-6 and down to the bottom 2 of the container 1 while also creating a simultaneous fixation in position of all edge parts relative to each other. The sidewalls 3-6 consist in a first variant of a fiber-based packaging material 18 with at least one side coated with a heat sealable layer, wherein the thermoplastic mass joins and creates the side joints 7-10 of the packaging material and the integrally formed circumferential the opening edge 12. In another low cost variant, the cup is made of a packaging fiber based material without a sealable layer, which may be the case when the cup is to be used for dry products.

[0007] A preferred packaging container 1 can be achieved by a fiber based packaging material 18 in the form of a laminate, preferably having at least one side coated with a heat sealable layer, formed into a packaging container 1 in a mold 19, comprising two halves, of which either the one or the other is movable or fixed relative to each other and consisting of an outer part 20 and an inner part 21, for injection molding, in which a plastic melt of e.g. thermoplastic, liquid tight unites the side joints 7-10 of the packaging material 18 and create one with these undivided circumferential opening edge 12 of thermoplastic. In the described and illustrated example the bottom 2 and the side walls 3-6 of the packaging container 1 are created by one and the same fiber based packaging blank.

[0008] During forming, the packaging material 18 is shaped to a geometry defined by the three-dimensional shape of the mold, as in the depicted example with a fixed outer mold half or part 20 of the mold 19 and the movable inner part 21 of the mold 19 presses the packaging material 18 against the outer fixed part 20 of the mold 19, at the same time as the mold parts 20 and 21 thereby fix the packaging material 18 when finalizing the movement and lock the packaging material 18 in its final position lying against the outer part 20 of the mold 19, after which the plastic melt during injection fill first cavities 23, which are on the inside of the packaging material 18 and secondly those cavities 22, which are designed to accommodate the edges parts 13-16 of the side walls 3-6. The plastic melt fills these cavities 22, 23 without coming into contact with the outside of the packaging material 18 and connects the sidewalls 3-6 of the packaging material 18 to each other while forming the liquid tight joints 7-10 while the plastic melt also fills the cavities of the circumferential container opening 11 and by so then

creating the liquid tight cup-shaped packaging container.

[0009] Fig. 6 shows a mold 19 in a schematic, partial cross-sectional view of the packaging container 1. The mold 19 comprises two halves, an outer part 20 and an inner part 21. The outer part 20 is designed with flat surfaces for receiving the packaging material 18 which is placed against the same without overlap. The inner part 21 comprises a longitudinal recess 24 provided with edges, said edges 25,26 are intended to push the packing material 18 between themselves and the outer part 20 of the mold 19, and are extending just outside and on each side along the side joints 7-10, said edges 25,26 when pressing against the packaging material 18 during the injection molding forming the inner, first cavities 23 inside of the second cavities 22, which are designed to accommodate the side joints 7-10 for enabling a filling of the plastic mass both between the side wall edge parts 13-16 of the side walls 3-6 and in the inner first cavities 23 forming the recesses 24.

[0010] Fig. 8 is schematically showing the actual device of a packaging container 1 where the side walls 3-6 have been pressed against the outer part 20 of the mold 19 by incoming plastic melt 27 through flow channels 28-29, and so that the plastic melt from the injection point until it reaches the cavity 22 at the joining area, is distributed into two main flow channels 28-29 separated from each other and ending toward the edges 25,26 of the recess 24, so that the plastic melt thereby first fills the cavity 23 of the mold 19 closest to the edges 25,26 and only after that fills the cavity 22 at the joint area, by flowing of the plastic melt in upwards extending flow channels 30, so that the packaging material 18 is pressed against the outer part 20 of the mold 19 before the plastic melt 27 reaches the cavity 22 at the joint area, so that the forth coming wave front of the injected plastic melt presses the packaging material against the outer part 20 of the mold 19 before the plastic melt reaches the cavity 22 of the joint area, so that the plastic melt cannot enter the packaging material outside, which if it did would result in a container with appearance defects. Furthermore a protruding part 31, working as a stacking device for stacking multiple cups into each other, lowers the pressure of the plastic melt when reaching this point. The protruding part 31, located just adjacent to the packaging material side ends, creates a controlled deceleration of the rushing plastic flow, by the relatively large volume of the protruding part 31, which when filled with plastic melt lowers the pressure and thus creates a delay in the filling of the cavity which facilitates for the plastic flow to press the packaging material against the outer part 20 of the mold 19 while first thereafter is also filling the strip-formed legs and side joints 7-10 upwards.

REFERENCES CITED IN THE DESCRIPTION

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PATENTKRAV

1. Fremgangsmåde til fremstilling af en emballagebeholder (1), bestående af en bund (2) og fra denne bund op-foldede sidevægge (3-6), som kan fikseres i forhold til hinanden i en oprejst tilstand ved hjælp af væsketætte sidesammenføjninger (7-10), hvorved et fiberbaseret emballagemateriale (18), fortrinsvis med mindst én side belagt med et lag, som kan varm-forsegles, formes til emballagebeholderen (1) i en støbeform (19), hvorved støbeformen består af to halvdele, der kan forskydes i forhold til hinanden, og som dannes af en ydre del (20) og en indre del (21) med henblik på sprøjtestøbning, hvorved plastsmelten, fortrinsvis væsketæt termoplast, sammenføjer emballagematerialets (18) sidevægge (3-6) med deres kantdele (13-16) via sidesammenføjningerne (7-10) og frembringer en omløbende åbningskant (12) af termoplast, og som er dannet integreret med sidesammenføjningerne (7-10), hvilken plastsmelte under sprøjtestøbning kun fylder første kaviteter (23) på emballagematerialets inderside, og anden kaviteter (22), som er udformet til at modtage sidevæggenes (3-6) kantdele (13-16), hvorved plastsmelten ved indsprøjtningen fylder disse kaviteter (22, 23) uden derved at komme i berøring med emballagematerialets (18) yderside og således forbinder emballagematerialets sidevægge (3-6) med hinanden, mens plastsmelten også fylder den omløbende åbningskants (12) kavitet med henblik på dannelse af en væsketæt, kopformet emballagebeholder, hvorved, ved sprøjtestøbning af emballagebeholderen, emballagematerialets sidevægge (3-6) presses mod støbeformens (19) ydre del (20) af den indkommende plastsmelte (27), der styres således, at plastsmelten fra indsprøjtningstedet, indtil den når kaviteten (23), fordeles i to hovedstrømningskanaler (28, 29), der indbyrdes er adskilt, og videre op til sidesammenføjningerne (7-10) eller til de såkaldt ben-formede kaviteter (23) og der forgrener sig således til et antal kanaler (30), at den formende yderdel (20) af støbeformen (19) udføres med flade overflader til modtagelse af emballagematerialet (18), som presses direkte mod samme uden at overlappe, og at støbeformens (19) indre del (21) omfatter en kant, der er udstyret med aflange udsparinger (24), hvis kanter (25, 26) er bestemt til at presse emballagematerialet (18) mellem dem selv og støbeformens (19) ydre del (20) og strækker sig lige uden for og på hver side langs sidesammenføjningerne (7-10), hvilke kanter (25, 26) under deres berøring med emballagematerialet (18) vil blive presset mod emballagematerialet (18) under sprøjtestøbningen og danner første kaviteter (23) mellem dem selv i eller inden for anden kaviteter (22), der er udformet og bestemt til at modtage emballagematerialets (18) sidesammenføjninger (7-10) med henblik på at fylde plastmassen både mellem sidevæggenes (3-6) kantdele (13-16) og i første kaviteter (23), idet der dannes udsparinger (24) mellem kanterne (25, 26),
kendetegnet ved, at
en udragende del (31), der fungerer som en stablingsindretning med henblik på stabling af et antal kopper inden i hinanden, reducerer trykket fra plastsmelten, når dette punkt nås, hvorved den udragende del (31), der befinder sig grænsende op til emballagematerialets sideender, forårsager en kontrolleret bremsning af den flydende plastmaterialestrøm på grund af et forholdsvis stort volumen af den udragende del (31), der efter fyldning med plastsmelte sænker trykket og

således skaber en forsinkelse ved fyldningen af kaviteten, hvilket gør det nemmere for plaststrømmen at presse emballagematerialet mod støbeformens (19) ydre del (20), mens først derefter også de strimmel-formede ben og sidesammenføjningerne (7-10) fyldes opadtil.

DRAWINGS

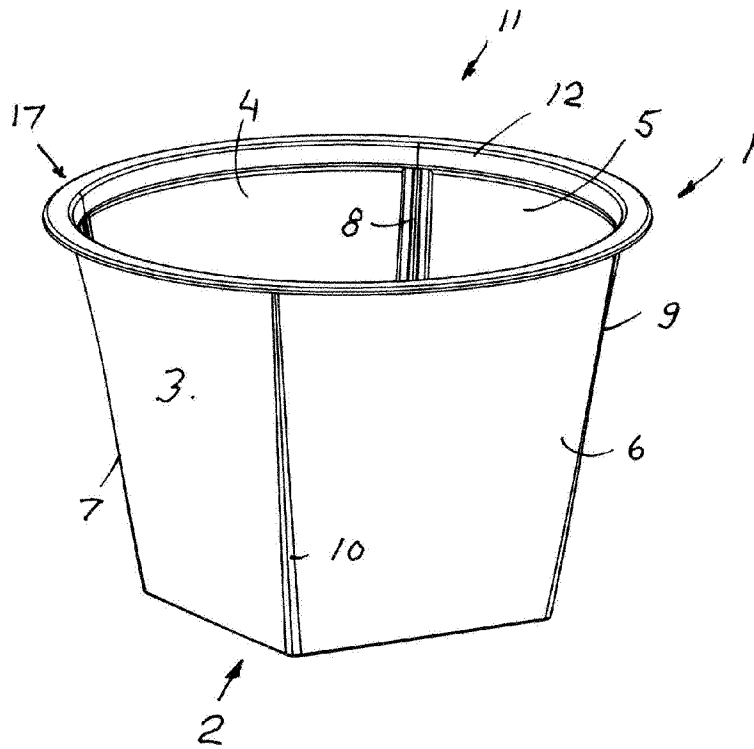


Fig. 1

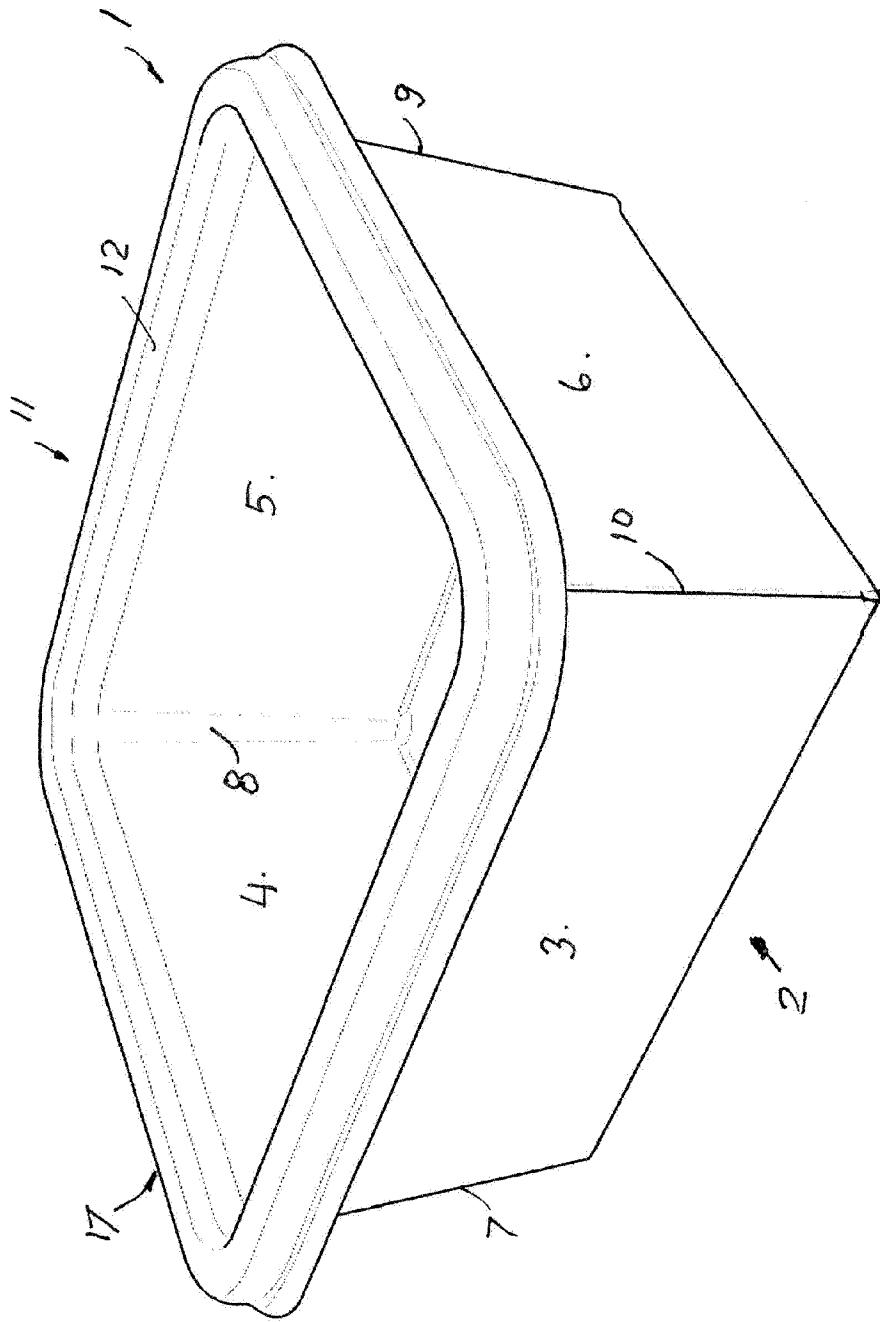


Fig. 16

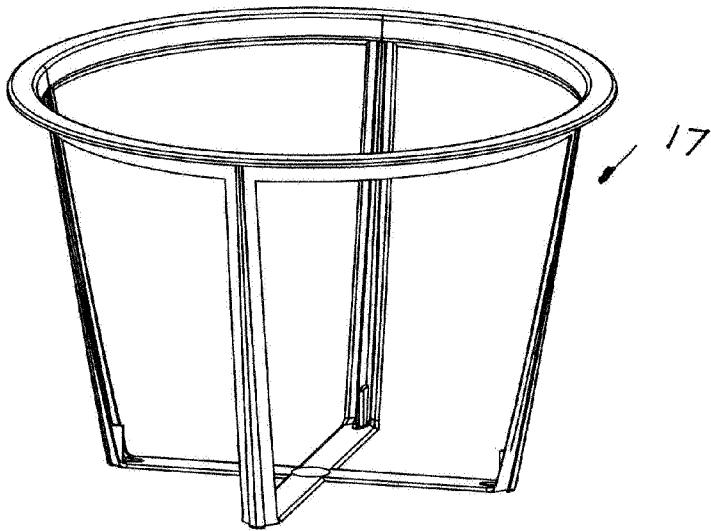


Fig. 2

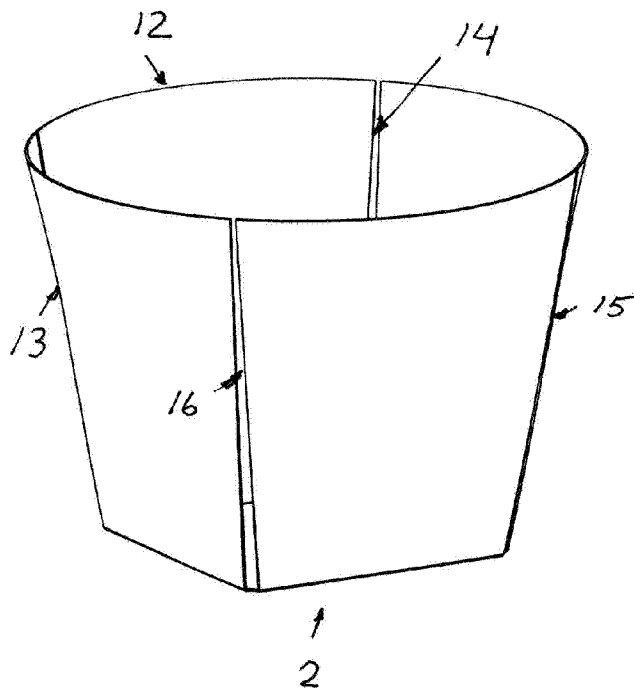


Fig. 3

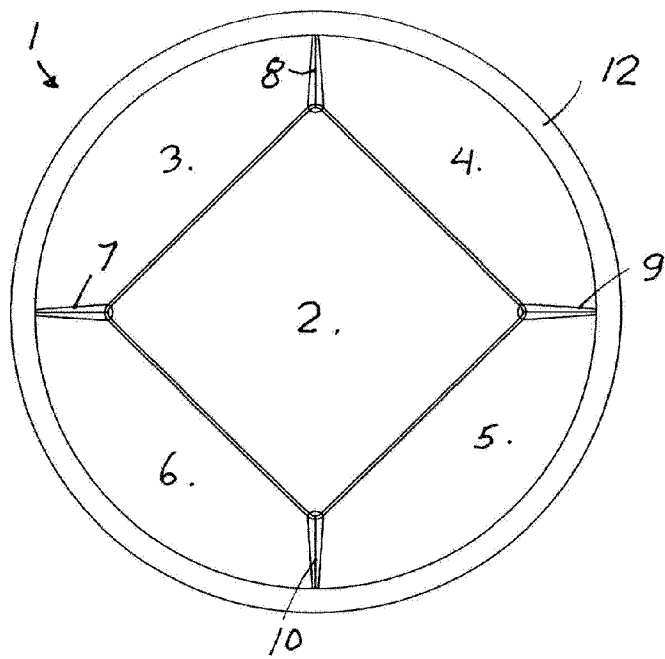


Fig. 4

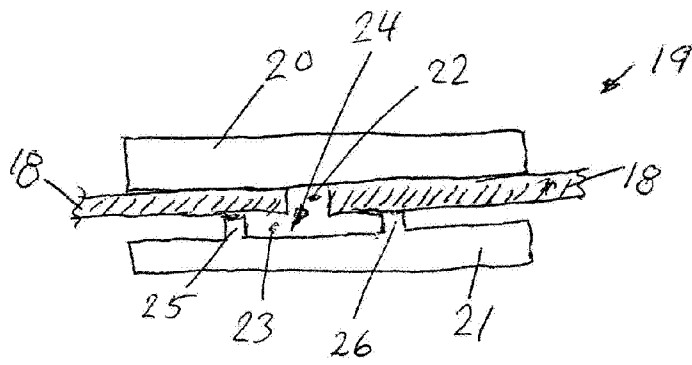


Fig. 6

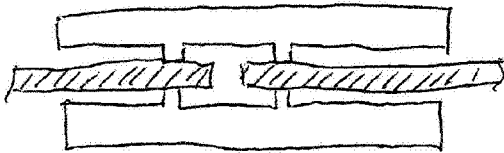


Fig. 7

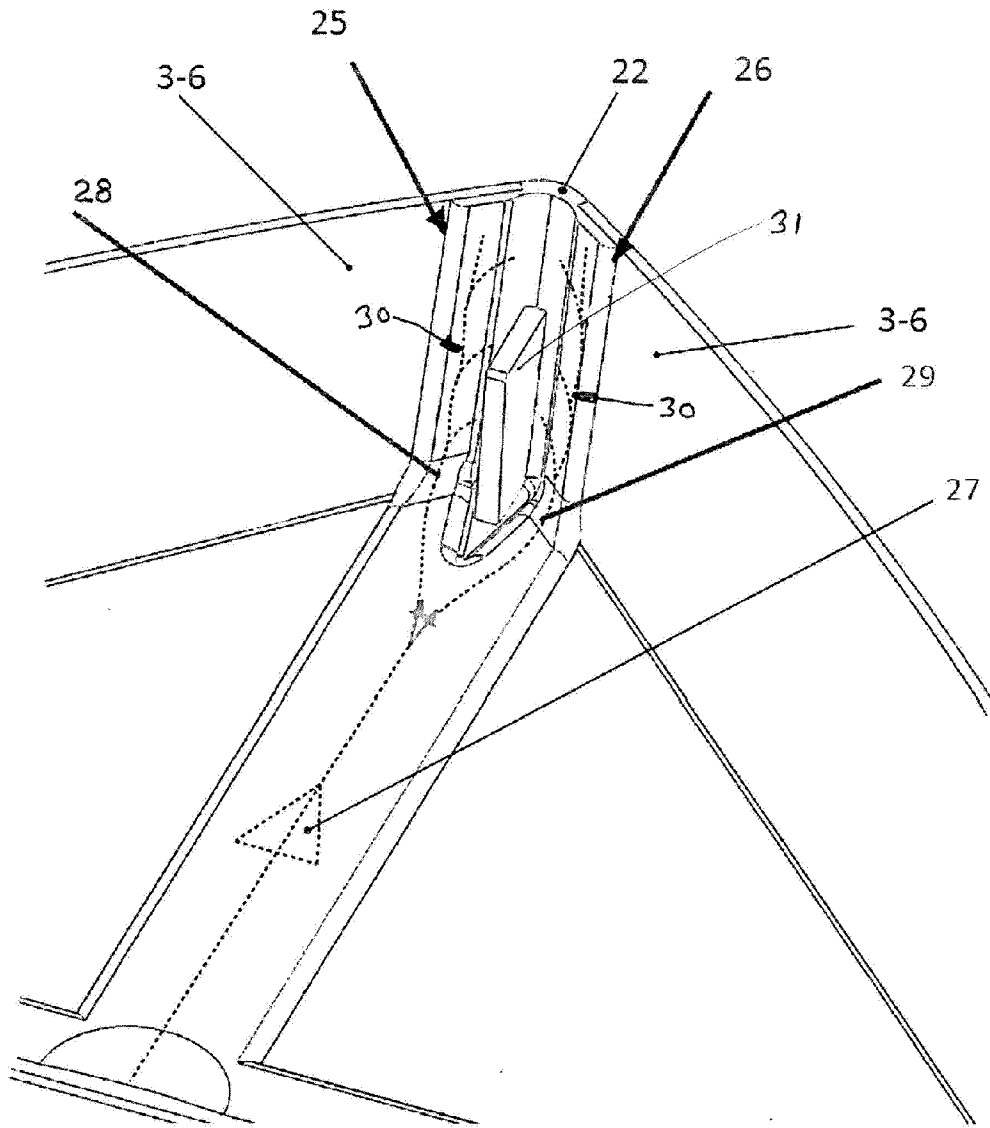


Fig. 8