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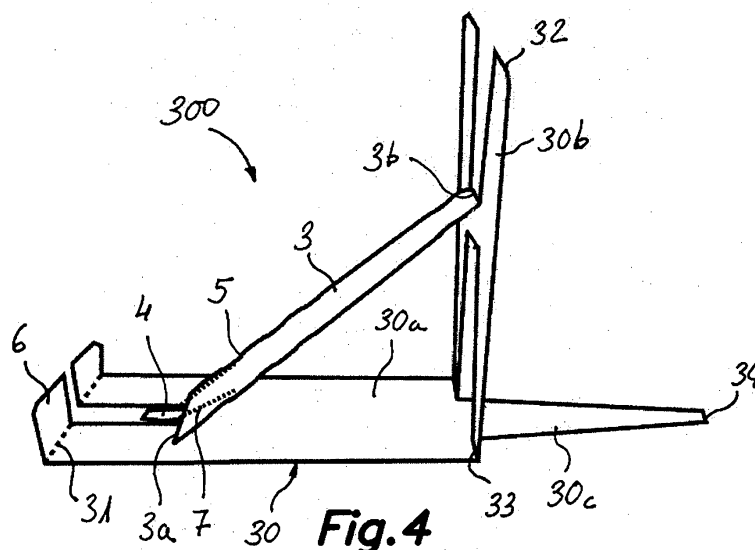
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(54) **EXPANDING DEVICE FOR A SELF-EXPANDING, FOLDABLE DISPLAY, AND SELF-EXPANDING, FOLDABLE DISPLAY PROVIDED WITH SUCH AN EXPANDING DEVICE**

(57) The expanding device (300) comprises a plate (30) with a hinge (33) between proximal and distal edges (31, 32) delimiting proximal and distal plate portions (30a, 30b), an elastic tensile element (7) which pulls the proximal and distal plate portions (30a, 30b) to bend the plate (30) around the hinge (33), and a limiting member (3), which limits the bending of the plate (30) to an angled working position. The proximal plate portion (30a) has a

plate extension (30c) rigidly joined thereto which extends from said distal edge (32) and that ends in an additional distal edge (34), so both the proximal plate portion (30a) and the plate extension (30c) remain coplanar when the plate (30) is bent to the angled position. The expanding device (300) is located between two panels of the display (100) to push the panels from the inside from a collapsed position to an expanded position.

**Fig. 4**

Description

Technical field

[0001] The present invention relates to an expanding device for expanding a self-expandable foldable display formed by two panels facing one another and joined by their respective lateral edges, wherein the expanding device is located between said two panels and acts pushing the panels from the inside to expand them from a collapsed position, in which the panels exhibit a flat arrangement, to an expanded position, in which the panels exhibit a three-dimensional arrangement able to stand upright.

[0002] The present invention is also related to a self-expandable foldable display provided with such expanding device.

Background of the invention

[0003] The international patent application WO 2006/067252 discloses an expanding device located between two panels of a self-expandable foldable display, wherein said two panels of the display face one another and are joined by their respective lateral edges. The expanding device comprises a plate that has a proximal edge connected to at least one of the panels of the self-expandable foldable display in or near one of said lateral edges, a distal edge opposite to said proximal edge, and a hinge located between said proximal and distal edges and that divides said plate into one proximal plate portion and one distal plate portion, a tensile elastic member arranged so as to pull said proximal and distal plate portions towards one another to bend the plate around said hinge from a flat resting position to an angled working position, and a limiting member arranged in such a way that when the plate is in said angled working position, it has a first end in contact with the proximal plate portion and a second end in contact with the distal plate portion to limit the bending of the plate to the angled working position.

[0004] When the plate of the expanding device of the international patent application WO 2006/067252 is bent to the angled working position, the distal edge of the plate presses one of the panels from the inside whereas the hinge of the plate presses the other panel from the inside to expand the display from a collapsed position to an expanded position.

[0005] Nevertheless, a drawback of the expanding device of the international patent application WO 2006/067252 is that given the particular arrangement of the plate, the distal edge contacts the corresponding panel at a point located at a distance, which is considerably further away from the lateral edge of the display than the point of the other panel where the hinge comes into contact, resulting in an irregular expansion of the display, which usually needs to be compensated by installing a second expanding device associated to the opposite lateral edge of the display and preferably placed in an re-

verse position relative to the first expanding device such that one of the panels of the display is pushed by the distal edge of the first expanding device and by the hinge of the second expanding device and the other panel of the display is pushed by the hinge of the first expanding device and by the distal edge of the second expanding device.

[0006] The need to incorporate two expanding devices associated to opposite edges has the drawback of providing a relatively complex and expensive-to-manufacture self-expandable foldable display, and in addition, such a self-expandable foldable display has the lateral edges of both sides of the panels occupied by the expanding devices, and is therefore unable to incorporate other arrangements.

Disclosure of the invention

[0007] According to a first aspect, the present invention contributes to mitigate the aforementioned and other drawbacks by providing an expanding device for a self-expandable foldable display, said self-expandable foldable display comprising two or more panels joined together by their respective lateral edges, said expanding device being located between two of said panels of the self-expandable foldable display so as to push the panels from the inside from a collapsed position, in which the panels exhibit a flat arrangement, to an expanded position, in which the panels exhibit a three-dimensional arrangement able to stand upright.

[0008] The expanding device of the present invention comprises a plate that has a proximal edge connected to at least one of the panels of the self-expandable foldable display, a distal edge opposite to said proximal edge, and a hinge located between said proximal and distal edges and that divides said plate into one proximal plate portion and one distal plate portion, a tensile elastic member arranged so as to pull said proximal and distal plate portions towards one another to bend the plate around said hinge from a flat resting position to an angled working position, and a limiting member that when the plate is in said angled working position, has a first end in contact with the proximal plate portion and a second end in contact with the distal plate portion to limit the bending of the plate to the angled working position.

[0009] The proximal plate portion has a plate extension, which extends beyond the hinge towards said distal edge and that ends in an additional distal edge, wherein said plate extension is not affected by the hinge and remains coplanar to the proximal plate portion when the plate is bent to the angled working position.

[0010] With this construction, when the plate is bent to the angled working position, the distal edge of the plate presses one of the panels of the display and the additional distal edge presses the other panel of the display, and given that the plate extension extends beyond the hinge towards the distal edge, the points at which the distal edge and the additional distal edge press the respective

panels of the display are at distances (in the direction of the width of the display) from the corresponding lateral edge of the display which are similar or have a comparable order of magnitude. Moreover, when the plate is bent into the angled working position, the distance in a cross-wise direction of the display between the distal edge and the additional distal edge is significantly larger than the distance in the cross-wise direction of the display between the distal edge and the hinge.

[0011] Thus, the expanding device of the present invention provides a much more efficient, regular and balanced expansion of the display than other expanding devices of the previous art, whereby it is unnecessary the installation of a second expanding device associated to the opposite lateral edge of the display if the expanding device is correctly sized relative to the display.

[0012] Preferably, although this is not a strictly necessary condition, the plate is made of cardboard, corrugated cardboard, or similar, and the hinge is formed by a first fold line that has an intermediate gap corresponding to the plate extension of the proximal plate portion, whereas the plate extension is formed by cut lines extending towards the inside of the distal plate portion from ends of said intermediate gap of the hinge.

[0013] In one embodiment, the limiting member is an integral part of the plate and has the mentioned second end hingedly connected to the distal plate portion by a second fold line near the distal edge. In that case, the mentioned first end of the limiting member is formed by a free edge thereof opposite to said second fold line.

[0014] In this same embodiment, the proximal plate portion has cutouts that form one or more first hook elements near the proximal edge, and the limiting member has cutouts that form one or more second hook elements, preferably on lateral edges thereof. The tensile elastic member is a tensile elastic ring, such as, for example, a rubber ring, hooked to said first and second hook elements.

[0015] Advantageously, the first and second hook elements may be arranged such that one portion of the tensile elastic member, i.e., of the tensile elastic ring, interferes with the first end of the limiting member when the plate is in the angled working position, thus limiting an ulterior slippage of the first end of the limiting member over the proximal plate portion and preventing the plate from being bent around the hinge beyond the angled working position.

[0016] Preferably, the limiting member has a plurality of the second hook elements formed therein and located at different distances from the first end thereof, so that one or more of these second hook elements can be selected to hook the tensile elastic member in order to regulate the tension of the tensile elastic member.

[0017] There are known self-expandable foldable displays of the referred type in which the lateral edges of the two panels are connected to inwardly-bent tabs and connected to one another by means of an elastic connector ring, such as, for example, a rubber ring, placed

surrounding both tabs. In that case, the plate of the expanding device of the present invention has at least one connection tab hingedly connected to the proximal edge of the proximal plate portion by a third fold line, and this at least one connection tab is configured to be hooked to the same elastic connector ring that connects the lateral edges of the panels of the self-expandable foldable display.

[0018] Depending on the particular embodiment, the connection tab of the plate of the expanding device may have an intermediate gap caused by the cutouts forming one or more first hook elements.

[0019] Preferably, the connection tab of the plate of the expanding device has a length in the direction of the height of the display substantially equal to the length of the inwardly-bent tabs of the panels of the display, so the elastic connector ring surrounds equally both the connection tab of the plate of the expanding device and the inwardly-bent tabs of the panels of the display.

[0020] In one embodiment, at least part of the proximal plate portion and the entire distal plate portion have a length in the direction of the height of the display shorter than the length of the connection tab in order to provide a free space inside the display.

[0021] According to a second aspect, the present invention provides a self-expandable foldable display of the previously described type equipped with at least one expanding device according to the first aspect of the present invention. The expanding device is located between the two panels of the self-expandable foldable display and with the proximal edge of the plate thereof connected to at least one of the panels in or near one of said lateral edges so as to push outwards from the inside said panels from a collapsed position, in which the panels exhibit a flat arrangement, to an expanded position, in which the panels exhibit a three-dimensional arrangement able to stand upright.

[0022] Given that the self-expandable foldable display only needs to have one or more expanding devices associated to the lateral edges of one side of the panels that forms it, the lateral edges of the other side of the panels remain free.

[0023] Thanks to that, in one embodiment the two panels of the self-expandable foldable display of the present invention have respective cupboard cutouts, adjacent to the lateral edge that is opposite to the expanding device. The mentioned cupboard cutouts have respective horizontal lower edges, vertical lateral edges and upper edges. One shelf panel is hingedly connected to at least one of the panels such that it can rotate between a folded position, in which said shelf panel is superimposed upon the panels of the display when the self-expandable foldable display is in said collapsed position, and a working position, in which the shelf panel is in a horizontal position and resting on lower edges of said cupboard cutouts.

[0024] In one embodiment, the shelf panel is joined to at least one of the panels of the display by a support plate that has an upper edge hingedly connected by a fold line

to a joining tab joined, for example with an adhesive, to a lower face of the shelf panel, and a lateral edge hingedly connected by a fold line to a connection tab configured to be hooked to the elastic connector ring that connects the lateral edges of the panels.

[0025] The connection tab of said support plate has substantially the same length in the direction of the height of the display as inwardly-bent tabs connected to the lateral edges of the panels, which are shortened because of the cupboard cutouts, and said elastic connector ring is arranged so as to surround the connection tab of the support plate as well as said inwardly-bent tabs of the panels.

[0026] The mentioned vertical lateral edges of the cupboard cutouts are hingedly connected by fold lines to closing panels, which in turn have free vertical edges hingedly connected by fold lines to inwardly-bent auxiliary tabs, which are mutually connected by an auxiliary connector ring, such as a rubber ring, arranged so as to surround said inwardly-bent auxiliary tabs. Said closing panels have a length in the direction of the width of the display shorter than the length of said lower edges of the cupboard cutouts, so that the closing panels remain mutually aligned and spaced apart from the lateral edges of the panels of the display when the self-expandable foldable display is in the expanded position.

[0027] The two panels of the display, as well as, the shelf panel and the support plate are preferably made of cardboard sheet, corrugated cardboard sheet, or a similar material.

[0028] In another embodiment, the self-expandable foldable display includes an external container that comprises a front wall hingedly connected by the lateral edges thereof to foldable lateral walls, which are provided with respective intermediate hinges formed by fold lines. These foldable lateral walls have free lateral edges hingedly connected to container connection tabs, which are configured to be hooked to elastic connector bands connecting the lateral edges of the panels.

[0029] The mentioned external container further comprises a foldable connection element formed by a plurality of vertical plates interlaced in the form of a bellows. This foldable connection element has, on a front end thereof, a front joining surface configured to be joined, for example with an adhesive, to a central region of said front wall and, on a rear end thereof, a rear joining surface configured to be joined, for example with an adhesive, to a central region of one of the panels of the display.

[0030] Moreover, the mentioned rear end of the foldable connection element is hingedly connected to an articulated connection tongue joined, for example, with an adhesive, to a central region adjacent to a rear end of a bottom plate sized to cover the entire space delimited by the frontal wall and foldable lateral walls of the external container and by the corresponding panel of the display. This bottom plate preferably has a curved rear edge so as to adapt to the three-dimensional arrangement of the panel of the display when the same is in the expanded

position.

[0031] Thus, the bottom plate moves between a folded position, in which said bottom plate is superimposed upon the panels when the self-expandable foldable display is in said collapsed position, and a working position, in which the bottom plate is in a horizontal position and resting on upper edges of said plates interlaced in the form of a bellows of the foldable connection element.

[0032] Preferably, the external container includes a tensile elastic member arranged so as to pull the bottom plate towards the foldable connection element. Thereby, the movements of the bottom plate entail movements of the front wall and the foldable lateral walls between a folded position, in which the lateral walls are folded and superimposed upon the front wall and the panels of the display, and a working position, in which the front wall is separated from the panel of the display and the lateral walls are unfolded and substantially perpendicular to the front wall.

[0033] The front wall, the foldable lateral walls, and the container connection tabs are preferably made of one single sheet of cardboard, corrugated cardboard, or a similar material. The plates interlaced in the form of a bellows forming the foldable connection element and the bottom plate are also preferably made of cardboard sheet, corrugated cardboard sheet, or a similar material.

[0034] Optionally, the self-expandable foldable display of the present invention includes a base plate connected to the panels of the display by a base connection plate configured so that it enables moving said base plate between a folded position, in which the base plate is superimposed upon the panels of the display when the display is in said collapsed position, and a working position, in which the base plate is in a position perpendicular to the panels of the display and in contact with a lower edge thereof when the display is in the expanded position. The base plate has an area that is larger than the base of the display when the same is in the expanded position, such that the base plate contributes to maintain the display in the upright position.

[0035] In one embodiment, said base connection plate comprises two end plate portions hingedly joined to opposite edges of an intermediate plate portion. The mentioned end plate portions have respective end edges hingedly joined to respective lateral connection tabs configured to be hooked to the elastic connector bands connecting the lateral edges of the panels of the display to one another, and said intermediate plate portion has a lower edge hingedly joined to one or more lower connection tabs configured to be hooked to one or more rubber bands, which in turn are hooked to one or more hook elements formed in the base plate.

[0036] The base plate is preferably made of a sheet of cardboard, corrugated cardboard, or a similar material, and may adopt any suitable shape relative to the shape of the display. The end plate portions, the intermediate plate portion and the lateral and lower connection tabs are preferably made of one single sheet of cardboard,

corrugated cardboard, or a similar material.

Brief description of the drawings

[0037] The foregoing and other features and advantages will become more apparent from the following detailed description of exemplary embodiments with reference to the accompanying drawings, in which:

Fig. 1 is a frontal view of an expanding device for a self-expandable foldable display, in a flat position, according to one embodiment of the first aspect of the present invention;

Figs. 2, 3 and 4 are different perspective views of the expanding device of the Fig. 1 in an angled working position;

Fig. 5 is a perspective view of two panels of a self-expandable foldable display, in a disconnected position, according to one embodiment of the second aspect of the present invention, and two expanding devices of Fig. 1 connected to one of said panels;

Fig. 6 is a perspective view of the self-expandable foldable display in an expanded position provided by the expanding devices;

Fig. 7 is a frontal view of an expanding device for a self-expandable foldable display, in a flat position, according to another embodiment of the first aspect of the present invention;

Fig. 8 is a frontal view of two panels and a shelf panel of a self-expandable foldable display, in a disconnected position, according to another embodiment of the second aspect of the present invention;

Fig. 9 is a perspective view of the display of Fig. 8 in an expanded position;

Fig. 10 is a perspective view of a self-expandable foldable display, in an expanded position, according to still another embodiment of the second aspect of the present invention;

Fig. 11 is a perspective view of a number of walls, a bottom plate and a foldable connection element of the display of Fig. 10;

Fig. 12 is a frontal view of an expanding device for a self-expandable foldable display, in a flat position, according to still another embodiment of the first aspect of the present invention;

Fig. 13 is a perspective view of the expanding device of Fig. 12 in an angled working position;

Fig. 14 is a schematic perspective view of a self-expandable foldable display according to still another embodiment of the second aspect of the present invention, kept in an expanded position by the expanding device of Fig. 12 in the angled working position;

Fig. 15 is a frontal view of an expanding device for a self-expandable foldable display, in a flat position, according to still another embodiment of the first aspect of the present invention;

Fig. 16 is a frontal view of a stiffening plate that may

be associated to the expanding device of Fig. 15; Fig. 17 is a plan top view of a self-expandable foldable display according to still another embodiment of the second aspect of the present invention, kept in an expanded position by the expanding device of Fig. 15 cooperating with the stiffening plate of Fig. 16; Fig. 18 is a plan view of a base plate belonging to a self-expandable foldable display according to another embodiment of the second aspect of the present invention;

Fig. 19 is a base connection plate that connects the base plate of Fig. 18 to the display;

Fig. 20 is a schematic perspective view of the display in the expanded position with the base connection plate of Fig. 19 installed therein and about to be connected to the base plate of Fig. 18;

Fig. 21 is a plan view of a base plate belonging to a self-expandable foldable display according to still another embodiment of the second aspect of the present invention;

Fig. 22 is a base connection plate that connects the base plate of Fig. 21 to the display;

Fig. 23 is a schematic perspective view of the display in the expanded position, with the base connection plate of Fig. 22 installed therein and about to be connected to the base plate of Fig. 21;

Fig. 24 is a perspective view of a self-expandable foldable display according to another additional embodiment of the second aspect of the present invention, including a shelf panel that is shown as it is about to be installed in wall panels in an expanded position;

Fig. 25 is a partial perspective view of the display of Fig. 24 with the shelf panel installed in the wall panels in an expanded position;

Fig. 26 is a plan view of the display of Figs. 24 and 25 in the expanded position, wherein dashed lines have been used to represent the wall panels;

Fig. 27 is a partial lateral view of one of the wall panels of the display of Figs. 24 and 25; and

Fig. 28 is a perspective view of the display of Figs. 24 and 25 in a collapsed position and partially folded into a folded compact position.

Detailed description of exemplary embodiments

[0038] Firstly, with reference to Fig. 1, the numeral reference 30 generally indicates a plate belonging to an expanding device 300 (shown in Figs. 2, 3 and 4) according to one embodiment of the present invention. The base plate 30 is made of a sheet of cardboard, corrugated cardboard, or similar, and comprises a proximal edge 31, a distal edge 32 opposite to said proximal edge 31, and a hinge 33 located between said proximal and distal edges 31, 32. The mentioned hinge 33 is formed by a first fold line and divides the plate 30 into a proximal plate portion 30a and a distal plate portion 30b.

[0039] A limiting member 3 extends from the distal

plate portion 30b. The limiting member has a first end 3a forming a free edge and a second end 3b, opposite to said first end, hingedly connected to the distal plate portion 30b by a second fold line. The proximal edge 31 of the proximal plate portion 30a is hingedly connected by a third fold line to a connection tab 6. This connection tab 6 has at least one intermediate gap caused by a cutout which forms a first hook element 4, and the limiting member 3 has on the lateral edges thereof a plurality of second hook elements 5 formed therein.

[0040] The hinge 33 has two end hinge portions starting from edges of the plate 30, and between these two end hinge portions there is an intermediate gap of the hinge. Cut lines 35 extend from ends of that intermediate gap of the hinge 33 and towards the inside of the distal plate portion 30b, said lines 35 defining a plate extension 30c which prolongs the proximal plate portion 30a and that ends at an additional distal edge 34. Thus, the mentioned plate extension 30c of the proximal plate portion 30a extends beyond the hinge, 33 towards the distal edge 32 of the distal plate portion 30b.

[0041] As shown in Figs. 2, 3 and 4, in an operational state the limiting member 3 is bent inwards around the second fold line that connects the second end 3b thereof to the distal plate portion 30b, and a tensile elastic member 7, which in this embodiment is a tensile elastic ring, and more specifically a rubber ring, is hooked to the first hook element 4 of the proximal plate portion 30a and to two of the second hook elements 5 formed on opposite sides of the limiting member 3. Thus, the elastic force exerted by the elastic tensile element 7 pulls the proximal and distal plate portions 30a, 30b one towards the other bending thereby the plate 30 around the hinge 33 from a flat resting position (not shown) to an angled working position (Figs. 2, 3 and 4).

[0042] Since the hinge 33 does not affect the junction area between the proximal plate portion 30a and the plate extension 30c, said junction area is rigid and the proximal plate portion 30a and the plate extension 30c remain coplanar when the plate 30 is bent to the angled working position, and as a result the distal edge 32 of the distal plate portion 30b and the additional distal edge 34 of the plate extension 30c that prolongs the proximal plate portion 30a are projected over comparable distances and in different directions with respect to the hinge 33.

[0043] The first and second hook elements 4, 5 are arranged such that one portion of the tensile elastic member 7 interferes with the first end 3a of the limiting member 3 when the plate 30 is in the angled working position, which limits the possibility of slippage of the first end 3a of the limiting member 3 over the proximal plate portion 30a beyond the first hook element 4 and prevents the plate 30 from being bent beyond the angled working position.

[0044] Moreover, given that the plurality of second hook elements 5 formed at both sides of the limiting member 3 are located at different distances of the first end 3a of the limiting member 3, it is possible to regulate the

tension of the tensile elastic member 7 by selecting a couple of second hook elements 5 where to hook the tensile elastic member 7.

[0045] It shall be understood that the tensile elastic member 7 may be shaped in any different form other than an elastic ring, provided that the first and second hook elements are configured such that they enable the hooking thereof.

[0046] It shall also be understood that alternatively the limiting member 3 may be an element separated from the plate 30 or an element hingedly connected to the plate 30 in a way different to that shown in Fig. 1, provided that it is configured and/or installed such that when the plate 30 is in the angled working position the limiting member 3 has a first end 3a contacting the proximal plate portion 30a and a second end 3b contacting the distal plate portion 30b limiting the bending of the plate 30 to the angled working position.

[0047] The expanding device 300 is intended for a foldable self-expandable display 100, such as the one shown in Figs. 5 and 6, which comprises two facing panels 10, 20 joined together by their respective lateral edges 12. The expanding device 300 is located between the two panels 10, 20 of the display 100 so as to push the panels 10, 20 from the inside and thus automatically expanding the display 100 from a collapsed position (not shown), in which the panels 10, 20 exhibit a flat arrangement, to an expanded position (Fig. 6), in which the panels 10, 20 exhibit a three-dimensional arrangement able to stand upright.

[0048] As shown in Fig. 5, the two panels 10, 20 of the display 100 have their lateral edges 12 hingedly connected to tabs 15 that in an operational state are bent inwards and connected to one another by an elastic connector ring 8 arranged so as to surround the inwardly-bent tabs 15 of the panels 10, 20 of the display 100.

[0049] The proximal edge 31 of the expanding device 300 is connected to the display 100 through the connection tab 6 thereof, which is configured to be superimposed upon the inwardly-bent tabs 15 of one of the lateral edges 12 of the panels 10, 20 of the display 100 and to be hooked by the mentioned elastic connector ring 8, which is thus arranged surrounding the connection tab 6 of the plate 30 of the expanding device 300 and the inwardly-bent tabs 15 of the panels 10, 20 of the display 100.

[0050] Preferably, the connection tab 6 of the plate 30 has substantially the same length in the direction of the height of the display as the inwardly-bent tabs 15 of the display 100, which ensures a reliable connection with a simple configuration and a very easy and quick mounting, without the need to use adhesives.

[0051] The display may be collapsed from the expanded position to the collapsed position by manually pressing the panels 10, 20 one towards the other from the outside, overcoming the elastic force exerted by the tensile elastic member 7. Each one of the panels 10, 20 of the display 100 has transverse fold lines 24 around which the display 100 may be manually folded from the collapsed position

to a compact folded position (not shown), in which the folds of the panels prevent the automatic expansion of the display 100. Nevertheless, by merely beginning to unfold the display from its compact folded position the resilient force exercised by the tensile elastic member 7 expands the expanding device 300 and the latter automatically expands the display 100 to its expanded service position.

[0052] Fig. 7 shows another embodiment of the expanding device 300, which is entirely analogous to the expanding device 300 previously described with reference to figures Figs. 1 a 4 except that here, one part of the proximal plate portion 30a and the entire distal plate portion 30b have a length in the direction of the height of the display shorter than the length of the connection tab 6, whereas the length of the connection tab 6 in the direction of the height of the display is still substantially equal to the length of the inwardly-bent tabs 15 of the display 100. As a result, the expanding device of Fig. 7 leaves room for other accessories of the display 100.

[0053] Figs. 8 and 9 show an embodiment of the display 100, which may advantageously use the expanding device 300 of Fig. 7. The display 100 of Figs. 8 and 9 is entirely analogous to the display 100 previously described with reference to figures Figs. 5 and 6 except that here, both panels 10, 20 of the display 100 have respective cupboard cutouts 13, 23 adjacent to one of the lateral edges 12 opposite to the lateral edge 12 in which the expanding devices 300 are connected (not shown in Figs. 8 and 9). The mentioned cupboard cutouts 13, 23 have respective lower edges 13a, 23a, vertical lateral edges 13b, 23b and upper edges 13c, 23c.

[0054] The mentioned vertical lateral edges 13b, 23b of the cupboard cutouts 13, 23 are hingedly connected by fold lines to closing panels 16, 26 which in turn have free vertical edges hingedly connected by fold lines to auxiliary tabs 25, which in an operational state are arranged bent inwards and are connected to one another by an auxiliary elastic connector ring (not shown) arranged so as to surround both inwardly-bent auxiliary tabs 25. The closing panels 16, 26 have a length in the direction of the width of the display shorter than the length of lower edges 13a, 23a of the cupboard cutouts 13, 23, such that when the display 100 is in the expanded position (Fig. 9), the closing panels are arranged mutually coplanar, thus creating an open space above the lower edges 13a, 23a of the cupboard cutouts 13, 23.

[0055] A shelf panel 70 is hingedly connected to one of the panels 10, 20 of the display 100 through a support plate 71, which has an upper edge hingedly connected by a fold line to a joining tab 72 joined, for example, with an adhesive, to said shelf panel 70 and a lateral edge hingedly connected by a fold line to a connection tab 73 configured to be hooked by the corresponding elastic connector ring 8 that connects the inwardly-bent tabs 15 on the lateral edge 12 of the display 100, opposite to the expanding device 300 below the lower edges 13a, 23a of the cupboard cutouts 13, 23.

[0056] The inwardly-bent tabs 15 of the lateral edge 12, opposite to the expanding device 300 and located below the lower edges 13a, 23a of the cupboard cutouts 13, 23, are shorter in the direction of the height of the display than those of the opposite side, and the connection tab 73 of the support plate 71 has substantially the same length in the direction of the height of the display as these shorter inwardly-bent tabs 15. The corresponding elastic connector ring 8 is arranged so as to surround the connection tab 73 of the support plate 71 and said shorter inwardly-bent tabs 15 of the panels 10, 20.

[0057] In this way, the shelf panel 70 may rotate between a folded position, in which said shelf panel 70 is superimposed upon the panels 10, 20 when the display 100 is in the collapsed position, and a working position (Fig. 9), in which the shelf panel 70 is in a horizontal position and resting on lower edges 13a, 23a of said cupboard cutouts 13, 23. Both the shelf panel 70 and the support plate 71 are made of cardboard, corrugated cardboard, or similar, and in the working position the shelf panel 70 provides a shelf resistant enough to support relatively heavy items A, such as bottles, books, small household appliances, etc.

[0058] Figs. 10 and 11 show another embodiment of the display 100, which may advantageously use the expanding device 300 of Fig. 7. The display 100 of Figs. 10 and 11 is entirely analogous to the display 100 previously described with reference to figures Figs. 5 and 6 except that here, the display 100 includes an external container 60, which comprises a front wall 61 hingedly connected by the lateral edges thereof to foldable lateral walls 62, 63 provided with respective intermediate hinges 62a, 63a. The mentioned foldable lateral walls 62, 63 have free lateral edges hingedly connected to container connection tabs 64, which are configured to be hooked by the corresponding elastic connector bands 7 connecting the lateral edges 12 of the panels 10, 20 to one another.

[0059] The external container 60 further comprises a foldable connection element 65 formed by a plurality of plates interlaced in the form of a bellows, which have lower edges configured to rest on the floor. This foldable connection element 65 has, on a front end thereof, a front joining surface 65a configured to be joined, for example with an adhesive, to a central region of the front wall 61 and, on a rear end thereof, a rear joining surface 65a configured to be joined, for example with an adhesive, to a central region of one of the panels 10, 20 of the display 100.

[0060] The mentioned rear end of the foldable connection element 65 is further hingedly connected to a connection tongue 65c joined to a central region of a bottom plate 66, in a place adjacent to a rear edge thereof. Thus, the bottom plate 66 may be moved between a folded position, in which the bottom plate 66 is superimposed upon the panels 10, 20 when the display 100 is in the collapsed position, and a working position, in which the bottom plate 66 is in a horizontal position and resting on upper edges of the plates interlaced in the form of a bel-

lows of the foldable connection element 65. A tensile elastic member 67 is arranged so as to pull the bottom plate 66 towards the foldable connection element 65.

[0061] Moreover, the external container 60 may be folded together with the bottom plate 66 by bending inwards the foldable lateral walls 62, 63 around the intermediate hinges 62a, 63a between a working position (Fig. 10), in which the foldable lateral walls 62, 63 are substantially perpendicular to the front wall 61, and a folded position (not shown) in which the frontal and lateral foldable walls 61, 62, 63 are superimposed upon the bottom plate 66 and the panels 10, 20 of the display 100 when the latter is in the collapsed position.

[0062] Preferably, the front wall 61, the foldable lateral walls 62, 63, and the container connection tabs 64 are preferably made of one single sheet of cardboard, corrugated cardboard, or a similar material, and the articulated connections between the same as well as the intermediate hinges 62a, 63a are formed by fold lines. The plates interlaced in the form of a bellows forming the foldable connection element 65 and the bottom plate 66 are also preferably made of a sheet of cardboard, corrugated cardboard, or a similar material.

[0063] Figs. 12 and 13 show another alternative embodiment of the expanding device 300, which is entirely analogous to the expanding device 300 previously described with reference to Figs. 1 to 4 except that here, the plate 30 of the expanding device 300 comprises a stiffening plate portion 37 hingedly connected to the distal edge 32 of the distal plate portion 30b through a connecting plate portion 38, which has an edge connected to the distal edge 32 by a fourth fold line 38a and a second edge connected to the stiffening plate portion 37 by a fifth fold line 38b. The stiffening plate portion 37 has one or more connection tabs 39 hingedly connected to a distal edge thereof by a sixth fold line 39a.

[0064] The expanding device 300 of Figs. 12 and 13 is intended to expand a self-expandable foldable display 100 provided with four panels 10, 20, 40, 50 (shown by means of dashed lines in Fig. 14). Two of the panels 10, 20 are made in one single piece of a sheet of cardboard, corrugated cardboard or a similar material, and separated by a fold line 101, and the other two panels 40, 50 are made in another single piece of a sheet of cardboard, corrugated cardboard or a similar material, and separated by another fold line 102. Both sheet pieces have lateral edges 12 connected to one another by respective inwardly-bent tabs 15 surrounded by respective elastic connector rings 8 (not shown). In the expanded position, the display 100 exhibits the shape of a rectangular prism wherein the inwardly-bent tabs 15 are located on the diagonally opposite lateral edges 12.

[0065] In an operational state, the expanding device 300 of Figs. 12 and 13 conveniently bent as shown in Fig. 13 is arranged with the connection tab 6 superimposed upon the inwardly-bent tabs 15 of one of the lateral edges of the display 100 and hooked to the corresponding elastic connector ring 8, and with the connection tab

39 superimposed upon the inwardly-bent tabs 15 of the other edge of the lateral edges of the display 100 and hooked to the corresponding elastic connector ring 8.

[0066] In this position, the proximal plate portion 30a along with the plate extension 30c are arranged superimposed upon an inner surface of one of the panels 10 of the display 100 while the stiffening plate 37 is arranged superimposed upon an inner surface of another panel 30 of the display 100 opposite to panel 10. To this end, the proximal plate portion 30a together with the plate extension 30c and the stiffening plate 37 are sized according to the corresponding panels 10, 30 of the display.

[0067] Fig. 15 shows another alternative embodiment of the expanding device 300, which is entirely analogous to the expanding device 300 previously described with reference to figures Figs. 1 to 4 except that here, the hinge 33 of the plate 30 of the expanding device 300 is located in an intermediate section and does not reach edges of the plate 30. Moreover, here the plate extension 30c of the proximal plate portion 30a is formed by cut lines 36 which extend from ends of the fold line forming the hinge 33 and that surround the distal plate portion 30b and part of the limiting member 3, thereby the additional distal edge 34 at the end of the plate extension 30c is significantly further way from the hinge 33 than the distal edge 32 at the free end of the distal plate portion 30b. The proximal plate portion 30a with the plate extension 30c has a substantially rectangular contour and a considerable extension.

[0068] The expanding device 300 of Fig. 15 is intended to expand a self-expandable foldable display 100 provided with three panels 10, 20, 40 (shown by means of dashed lines in Fig. 17). In the triangular expanding device of Fig. 17 a first panel 10 and a first portion 40b of a third panel 40 are made of one single piece of a sheet of cardboard, corrugated cardboard or a similar material, and separated by a fold line 103, whereas a second panel 20 and a second portion 40b of the third panel 40 are made of another piece of a sheet of cardboard, corrugated cardboard or a similar material, and separated by another fold line 104. Both pieces of sheet have lateral edges connected to one another by respective inwardly-bent tabs 15 surrounded by respective elastic connector rings 8 (not shown). In the expanded position, the display 100 exhibits the shape of a triangular prism wherein the inwardly-bent tabs 15 are located on a lateral edge 12 between the first and second panels 10, 20 and in the middle of the third opposite panel 40, which is foldable.

[0069] In an operational state, the expanding device 300 of Fig. 15 is arranged with the connection tab 6 superimposed upon the inwardly-bent tabs 15 of the lateral edge 12 of the display 100 and hooked by the corresponding elastic connector ring 8. The proximal plate portion 30a with the plate extension 30c acts as stiffening plate superimposed upon the inner surface of the first panel 10 of the display 100 and the distal edge 32 of the distal plate portion 30b presses from the inside against the second panel 20 of the display 100.

[0070] Optionally, the expanding device 300 of Fig. 15 cooperates with an additional stiffening plate 55 (Fig. 16), which has a proximal edge hingedly connected to a connection tab 56. In an operational state, this connection tab 56 is superimposed upon the connection tab 6 of the expanding device 300 and upon the inwardly-bent tabs 15 of the lateral edge 12 of the display 100, and hooked by the corresponding elastic connector ring 8. The additional stiffening plate 55 is superimposed upon the inner surface of the second panel 20 of the display 100, the distal edge 32 of the distal plate portion 30b presses from the inside against the additional stiffening plate 55, and the latter transmits the pressure to the second panel 20 of the display 100 keeping the flat arrangement thereof.

[0071] Both, the plate 30 of the expanding device 300 and the additional stiffening plate 55 are made of a sheet of cardboard, corrugated cardboard, or similar, wherein the hinge 33 and other articulated joints are formed by fold lines.

[0072] Fig. 20 shows a self-expandable foldable display 100 analogous to the one described above with reference to Figs. 5 and 6, which includes a base plate 80 (shown individually in Fig. 18) connected to the two panels 10, 20 of the display 100 by a base connection plate 81 (shown individually in Fig. 19). The mentioned base plate 80 has a circular shape with an extension that is larger than the extension of the base of the display 100 in the expanded position. In a central region of the base plate there is a cutout defining a hook element 84.

[0073] The mentioned base connection plate 81 comprises two end plate portions 81 b, 81c hingedly joined to opposite edges of an intermediate plate portion 81 a. Said end plate portions 81 b, 81 c have respective end edges hingedly joined to respective lateral connection tabs 83 configured to be hooked by elastic connector bands 8 (not shown in Fig. 20) connecting the inwardly-bent tabs 15 on the lateral edges 12 of the opposite sides of the panels 10, 20 of the display 100. The mentioned intermediate plate portion 81a has a lower edge hingedly joined to a lower connection tab 82.

[0074] In an operational state, the base connection plate 81 is bent in a "Z" shape, as shown in Fig. 19, the lateral connection tabs 83 are connected to the inwardly-bent tabs 15 of the display 100 by means of the corresponding elastic connector bands 8, and the lower connection tab 82 of the base connection plate 81 is superimposed upon said hook element 84 formed in the base plate 80. The lower connection tab 82 and the hook element 84 are connected to one another by an elastic ring (not shown) arranged so as to surround both of them.

[0075] With this arrangement, the base connection plate 81 enables moving the base plate between a folded position, in which the base plate 80 is superimposed upon the panels 10, 20, 40, 50 of the display 100 when the display 100 is in said collapsed position, and a working position, in which the base plate 80 is in a position perpendicular to the panels 10, 20, 40, 50 of the display 100 and in contact with a lower edge thereof when the display

100 is in the expanded position. Thus, the base plate 80 helps to support the display 100 in an upright position when the same is in the expanded position.

[0076] Fig. 23 shows another self-expandable foldable display 100 analogous to the one described above with reference to Fig. 14, which includes a base plate 80 (shown individually in Fig. 21) connected to the panels 10, 20, 40, 50 of the display 100 by a base connection plate 81 (shown individually in Fig. 22), analogously to what was described above with reference to Figs. 18 a 20. The only differences reside in the fact that the base plate 80 has in this case a square or rectangular shape with an extension larger than the extension of the base of the display 100 in the expanded position, and in the fact that the lateral connection tabs 83, once the base connection plate 81 has been bent in a "Z" shape as shown in Fig. 23, are connected by means of the corresponding elastic connector bands 8 to the inwardly-bent tabs 15 located on the diametrically opposite lateral edges 12 of the display 100.

[0077] In both embodiments of Figs. 18 to 20 and Figs. 21 a 23, both the base plate 80 and the base connection plate 81 are made of a sheet of cardboard, corrugated cardboard, or similar, wherein the hinges or articulated joints are formed by fold lines.

[0078] Figs. 24 a 28 show still another additional embodiment of the display 100, in which the expanding device 300 of Fig. 7 can be used advantageously. The display 100 of Figs. 8 and 9 is entirely analogous to the display 100 previously described with reference to figures Figs. 5 and 6 except that here, both panels 10, 20 of the display 100 have respective rack openings 17 at central regions between the opposite lateral edges 12 thereof. The aforementioned shelf openings 17 (one of which belongs to one of the two identical panels 10, 20 of the display, as shown in detail in Fig. 26) have respective lower horizontal edges 17a, two respective vertical lateral edges 17b, and respective upper edges 17c.

[0079] The aforementioned vertical lateral edges 17b of the shelf openings 17 are hingedly connected by fold lines to closing panels 18, which in turn have free vertical edges hingedly connected by fold lines to auxiliary tabs 19, which in an operational state are arranged bent inwards and are connected to one another by an auxiliary elastic connector ring (not shown) arranged so as to surround both inwardly-bent auxiliary tabs 19. The closing panels 18 have a length in the direction of the width of the display shorter than the length of said lower and upper edges 17a, 17c of the rack openings 17, such that when the display 100 is in the expanded position (Figs. 24 and 25), the closing panels 18 are arranged mutually coplanar thus creating an open space above the horizontal lower edges 17a of the rack openings 17.

[0080] As shown best in Fig. 27, the panels 10, 20 of the display 100 include small cuts 18a extending downwards from the horizontal lower edges 17a of the rack openings 17 aligned with the vertical lateral edges 17b of the rack openings 17. The function of these cuts 18a

will be explained below.

[0081] Fig. 26 shows a shelf panel 75 made of a sheet of cardboard, corrugated cardboard, or similar, which has an intermediate region 75a with a length approximately equivalent to the width of the rack openings 17 and end regions 75b, which have projections 76 protruding beyond the intermediate region 75a. The depth of the shelf panel 75 is deeper than the width of the display 100 in the expanded position. Prongs 77 protrude from the center of inner edges of the intermediate region 75a.

[0082] The shelf panel 75 is installed in the rack opening 17 such that it may pivot about the prongs 77 between a folded position (Fig. 28), in which the shelf panel 75 is superimposed upon the panels 10, 20 of the display 100 when the latter is in the collapsed position, and a working position (Fig. 25), in which the shelf panel 75 is perpendicular to the panels 10, 20 of the display 100 when the latter is in the expanded position, with the projections 76 coupled to the vertex formed by the fold lines that connect the closing panels 18 to the vertical lateral edges 17b of the rack openings 17 and with a lower surface of the shelf panel 75 resting on the horizontal lower edges 17a of the rack openings 17.

[0083] Thus, in the working position, the shelf panel 75 provides a shelf resistant enough to support relatively heavy items, such as bottles, books, small household appliances, etc.

[0084] The mentioned cuts 18a extending downwards from the ends of the horizontal lower edges 17a of the rack openings 17 facilitate the bending inwards of a portion of the panels 10, 20 adjacent to a lower side of the corresponding rack opening 17 by the shelf panel 75 when the display 100 is folded to the collapsed position and the shelf panel pivots to the folded position.

[0085] As shown in Fig. 28, from the collapsed position, the display 100 including the shelf panel 75 may be folded around the transverse fold lines 24 of the panels 10, 20 of the display 100 to the compact folded position.

[0086] A person skilled in the art will be able to introduce modifications and variations in the exemplary embodiments shown and described without departing from the scope of the present invention as defined in the attached claims.

Claims

1. An expanding device (300) for a self-expandable foldable display (100), said display (100) comprising two or more panels (10, 20, 40, 50) joined together by their respective lateral edges (12), said expanding device (300) being located between two of said panels (10, 20, 40, 50) of the display (100) to push the panels (10, 20, 40, 50) from the inside from a collapsed position, in which the panels (10, 20, 40, 50) exhibit a flat arrangement, to an expanded position, in which the panels (10, 20, 40, 50) exhibit a three-dimensional arrangement able to stand upright, said

expanding device (300) comprising: a plate (30) which has a proximal edge (31) connected to at least one of the panels (10, 20, 40, 50) of the display (100), a distal edge (32) opposite to said proximal edge (31), and a hinge (33) located between said proximal and distal edges (31, 32) that divides said plate (30) into one proximal plate portion (30a) and one distal plate portion (30b); an elastic tensile element (7) arranged to pull said proximal and distal plate portions (30a, 30b) towards one another to bend the plate (30) around said hinge (33) from a flat resting position to an angled working position; and a limiting member (3) that when the plate (30) is in said angled working position has a first end (3a) in contact with the proximal plate portion (30a) and a second end (3b) in contact with the distal plate portion (30b) to limit the bending of the plate (30) to the angled working position, **characterized in that:** the proximal plate portion (30a) has a plate extension (30c), which extends beyond the hinge (33) towards said distal edge (32) and that ends in an additional distal edge (34), wherein the hinge (33) does not affect the rigid junction between the proximal plate portion (30a) and said plate extension (30c) so both remain coplanar when the plate (30) is bent to the angled working position.

2. The expanding device (300) according to claim 1, **characterized in that** the plate (30) is made of cardboard, corrugated cardboard, or similar, wherein the hinge (33) is formed by a first fold line having an intermediate gap, and said plate extension (30c) of the proximal plate portion (30a) is formed by fold lines (35) extending to the inside of the distal plate portion (30b) from ends of said intermediate gap of the hinge (33).

3. The expanding device (300) according to claim 1, **characterized in that** the plate (30) is made of cardboard, corrugated cardboard, or similar, wherein the hinge (33) is formed by a first fold line that does not reach edges of the plate (30), and said plate extension (30c) of the proximal plate portion (30a) is formed by fold lines (36) extending from ends of the hinge (33) and delimiting the distal plate portion (30b).

4. The expanding device (300) according to claim 1, 2 or 3, **characterized in that** said limiting member (3) is an integral part of the plate (30) and the limiting member (3) has said second end (3b) hingedly connected to the distal plate portion (30b) by a second fold line and said first end (3a) located at a free edge thereof, opposite to said second fold line.

5. The expanding device (300) according to claim 4, **characterized in that** the proximal plate portion (30a) has at least one first hook element (4) formed

therein, the limiting member (3) has at least one second hook element (5) formed therein, and said tensile elastic member (7) is a tensile elastic ring hooked to said first and second hook elements (4, 5).

6. The expanding device (300) according to claim 5, **characterized in that** the first and second hook elements (4, 5) are arranged such that one portion of the tensile elastic member (7) interferes with the first end (3a) of the limiting member (3) when the plate (30) is in the angled working position to prevent the plate (30) from bending beyond the angled working position.
7. The expanding device (300) according to claim 5, **characterized in that** the limiting member (3) has a plurality of said second hook elements (5) formed therein and located at different distances from the first end (3a), the second hook elements (5) being able to be selected in order to regulate the tension of the tensile elastic member (7).
8. The expanding device (300) according to claim 4, **characterized in that** said cut lines (36) extending from said ends of the hinge (33) surround the distal plate portion (30b) and part of the limiting member (3).
9. The expanding device (300) according to claim 1, **characterized in that** the plate (30) has at least one connection tab (6) hingedly connected to the proximal edge (31) of the proximal plate portion (30a) by a third fold line, said at least one connection tab (6) being configured to be hooked by an elastic connector ring (8) which connects two of said lateral edges (12) of the panels (10, 20, 40, 50) of the display (100).
10. The expanding device (300) according to claim 9, **characterized in that** said connection tab (6) of the plate (30) has at least one intermediate gap caused by at least one cutout line that forms at least one first hook element (4) for said tensile elastic member (7).
11. The expanding device (300) according to claim 9 or 10, **characterized in that** the connection tab (6) of the plate (30) has substantially the same length in the direction of the height of the display as inwardly-bent tabs (15) connected to the lateral edges (12) of the panels (10, 20, 40, 50) of the display (100), and said elastic connector ring (8) is arranged so as to surround the connection tab (6) of the plate (30) of the expanding device (300) and said inwardly-bent tabs (15) of the panels (10, 20, 40, 50) of the display.
12. The expanding device (300) according to claim 11, **characterized in that** at least part of the proximal plate portion (30a) and the entire distal plate portion (30b) have a length in the direction of the height of

the display shorter than the length of the connection tab (6).

13. The expanding device (300) according to claim 4, **characterized in that** the plate (30) comprises a stiffening plate portion (37) hingedly connected to the distal edge (32) of the distal plate portion (30b) that is superimposed upon an inner surface of one of the panels (10, 20, 40, 50) of the display (100).
14. The expanding device (300) according to claim 13, **characterized in that** said stiffening plate portion (37) is connected to the distal edge (32) of the distal plate portion (30b) by means of a connecting plate portion (38) that has an edge connected to the distal edge (32) by a fourth fold line (38a) and a second edge connected to the stiffening plate portion (37) by a fifth fold line (38b).
15. The expanding device (300) according to claim 14, **characterized in that** the stiffening plate portion (37) has at least one connection tab (39) hingedly connected to a distal edge of the same by a sixth fold line (39a).
16. A self-expandable foldable display (100) provided with an expanding device (300), said display (100) comprising two or more panels (10, 20, 40, 50) joined by their respective lateral edges (12), and wherein said expanding device (300) is located between two of said panels (10, 20, 40, 50) and is configured to push the panels (10, 20, 40, 50) from the inside from a collapsed position, in which the panels (10, 20, 40, 50) exhibit a flat arrangement, to an expanded position, in which the panels (10, 20, 40, 50) exhibit a three-dimensional arrangement able to stand upright, **characterized in that** said expanding device (300) is an expanding device according to any one of the preceding claims.
17. The self-expandable foldable display (100) according to claim 16, **characterized in that** it comprises two panels (10, 20) joined by their respective lateral edges (12), and both panels (10, 20) have respective cupboard cutouts (13, 23) adjacent to one of the lateral edges (12) opposite to the expanding device (300), and a shelf panel (70) is hingedly connected to at least one of the panels (10, 20, 40, 50) such that said shelf panel (70) may rotate between a folded position, in which the shelf panel (70) is superimposed upon the panels (10, 20, 40, 50) when the display (100) is in said collapsed position, and a working position, in which the shelf panel (70) is in a horizontal position and resting on lower edges (13a, 23a) of said cupboard cutouts (13, 23).
18. The self-expandable foldable display (100) according to claim 17, **characterized in that** the shelf panel

(70) is joined to at least one of the panels (10, 20) by a support plate (71) that has an upper edge hingedly connected by a fold line to a joining tab (72) joined to said shelf panel (70) and a lateral edge hingedly connected by a fold line to a connection tab (73) configured to be hooked to an elastic connector ring (8), which connects said lateral edges (12) of the panels (10, 20).

19. The self-expandable foldable display (100) according to claim 18, **characterized in that** the connection tab (73) of said support plate (71) has substantially the same length in the direction of the height of the display as inwardly-bent tabs (15) connected to the lateral edges (12) of the panels (10, 20), and said elastic connector ring (8) is arranged so as to surround the connection tab (73) of the support plate (30) and said inwardly-bent tabs (15) of the panels (10, 20).
20. The self-expandable foldable display (100) according to claim 17, 18 or 19, **characterized in that** the cupboard cutouts (13, 23) of the panels (10, 20) have vertical lateral edges (13b, 23b) hingedly connected by fold lines to closing panels (16, 26), which in turn have free vertical edges hingedly connected by fold lines to inwardly-bent auxiliary tabs (25), and said inwardly-bent auxiliary tabs (25) are mutually connected by an auxiliary elastic connector ring arranged so as to surround the inwardly-bent auxiliary tabs (25), said closing panels (16, 26) having a length in the direction of the width of the display shorter than the length of said lower edges (13a, 23a) of the cupboard cutouts (13, 23).
21. The self-expandable foldable display (100) according to claim 16, **characterized in that** it includes an external container (60) comprising a front wall (61) hingedly connected by the lateral edges thereof to foldable lateral walls (62, 63) provided with respective intermediate hinges (62a, 63a) formed by fold lines, said foldable lateral walls (62, 63) having free lateral edges hingedly connected to container connection tabs (64), which are configured to be hooked by elastic connector bands (8) connecting said lateral edges (12) of the panels (10, 20, 40, 50).
22. The self-expandable foldable display (100) according to claim 21, **characterized in that** said external container (60) further comprises a foldable connection element (65) formed by a plurality of plates interlaced in the form of a bellows, which have lower edges configured to rest on the floor, said foldable connection element (65) having, at a front end thereof, a front joining surface (65a) configured to be joined to a central region of said front wall (61) and, at a rear end thereof, a rear joining surface (65a) configured to be joined to a central region of one of

the panels (10, 20, 40, 50).

23. The self-expandable foldable display (100) according to claim 22, **characterized in that** said rear end of the foldable connection element (65) is hingedly connected to a connection tongue (65c) joined to a central region adjacent to a rear edge of a bottom plate (66), said bottom plate (66) moves between a folded position, in which the bottom plate (66) is superimposed on the panels (10, 20, 40, 50) when the display (100) is in said collapsed position, and a working position, in which the bottom plate (66) is in a horizontal position and resting on upper edges of said plates interlaced in the form of a bellows of the foldable connection element (65).
24. The self-expandable foldable display (100) according to claim 23, **characterized in that** a tensile elastic member (67) is arranged so as to pull the bottom plate (66) towards the foldable connection element (65).
25. The self-expandable foldable display (100) according to claim 16, **characterized in that** it includes a base plate (80) connected to the panels (10, 20, 40, 50) of the display (100) by a base connection plate (81) that enables moving said base plate between a folded position, in which the base plate (80) is superimposed on the panels (10, 20, 40, 50) of the display (100) when the display (100) is in said collapsed position, and a working position, in which the base plate (80) is in a position perpendicular to the panels (10, 20, 40, 50) of the display (100) and in contact with lower edges thereof when the display (100) is in the expanded position.
26. The self-expandable foldable display (100) according to claim 25, **characterized in that** said base connection plate (81) comprises two end plate portions (81b, 81c) hingedly joined to opposite edges of an intermediate plate portion (81a), wherein said end plate portions (81b, 81c) have respective end edges hingedly joined to respective lateral connection tabs (83) configured to be hooked to elastic connector bands (8) connecting said lateral edges (12) of the panels (10, 20, 40, 50) of the display (100) and said middle intermediate plate portion (81a) has a lower edge hingedly joined to at least one lower connection tab (82) configured to be hooked by at least one elastic ring, and said at least one elastic ring in turn is hooked to at least one hook element (84) formed in the base plate (80).
27. The self-expandable foldable display (100) according to claim 16, **characterized in that** it comprises two panels (10, 20) joined by their respective lateral edges (12), and both panels (10, 20) have respective rack openings (17) in which a shelf panel (75) is in-

stalled, said shelf panel (75) may pivot between a folded position, in which the shelf panel (75) is superimposed upon the panels (10, 20) of the display (100) when the latter is in the collapsed position, and a working position, in which the shelf panel (75) is perpendicular to the panels (10, 20) of the display (100) when the latter is in the expanded position, with projections (76) of the shelf panel (75) coupled to vertical lateral edges (17b) of the rack openings (17) and with a lower surface of the shelf panel (75) resting on horizontal lower edges (17a) of the rack openings.

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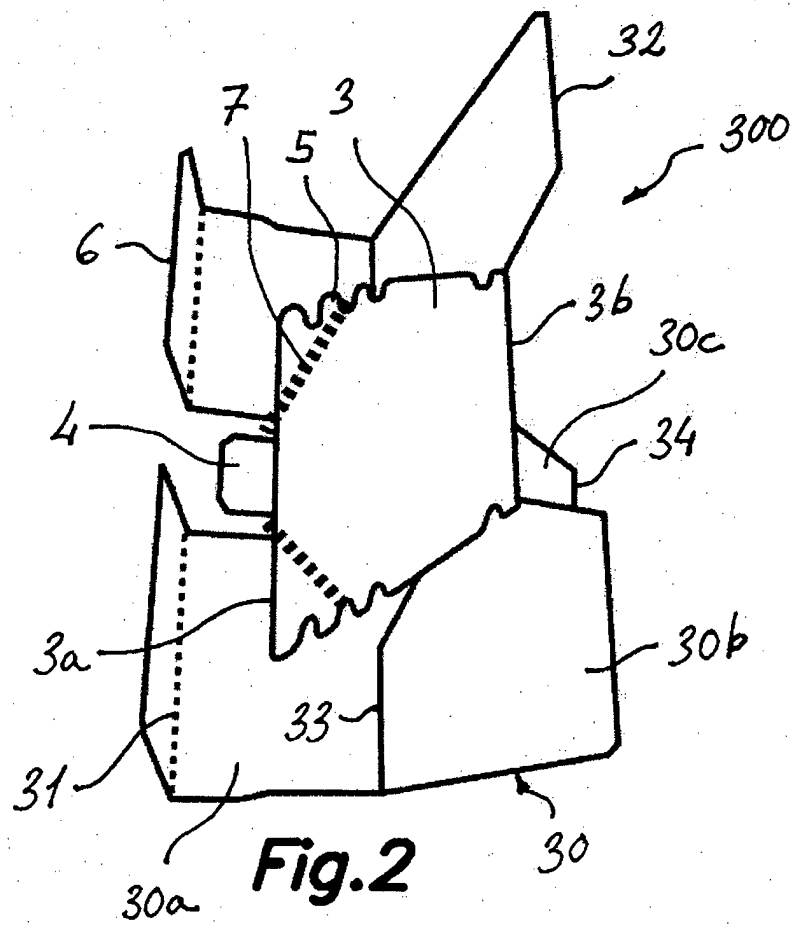
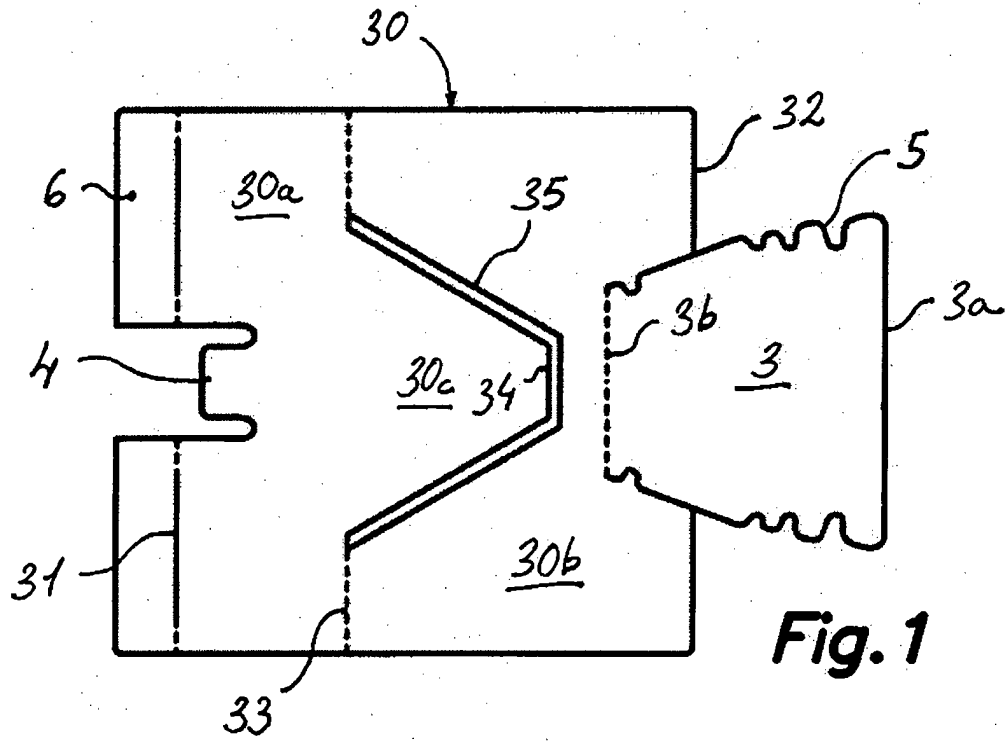
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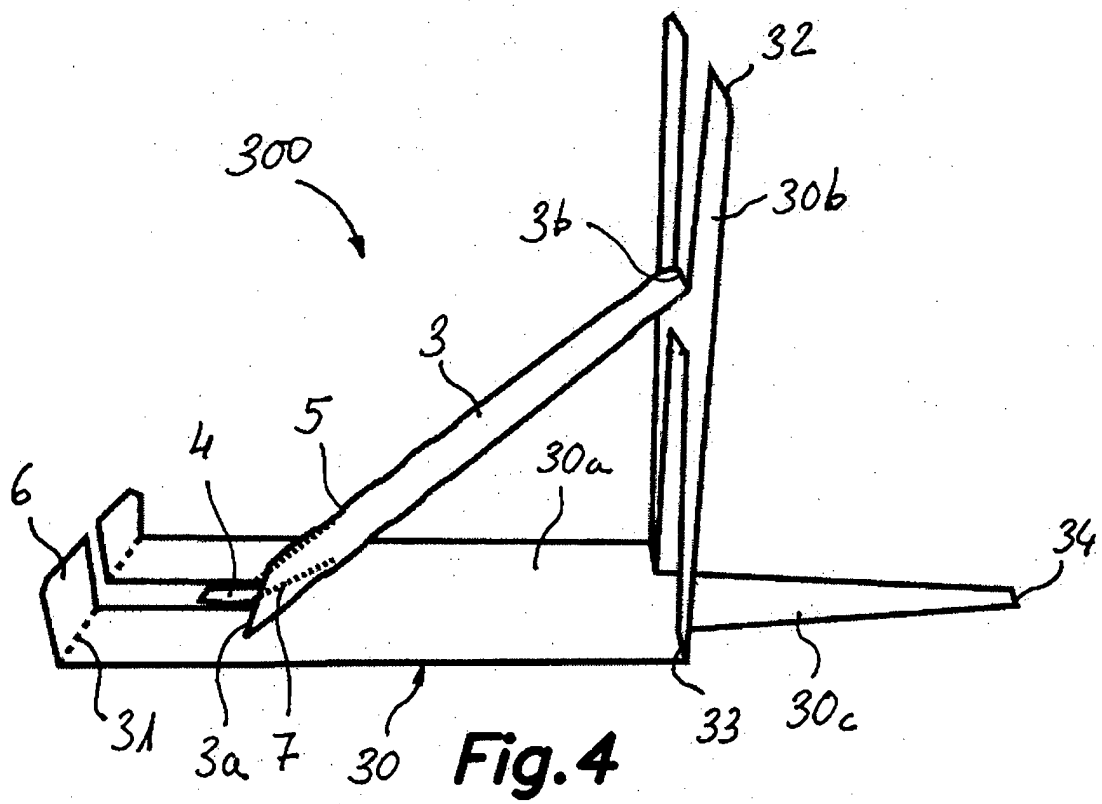
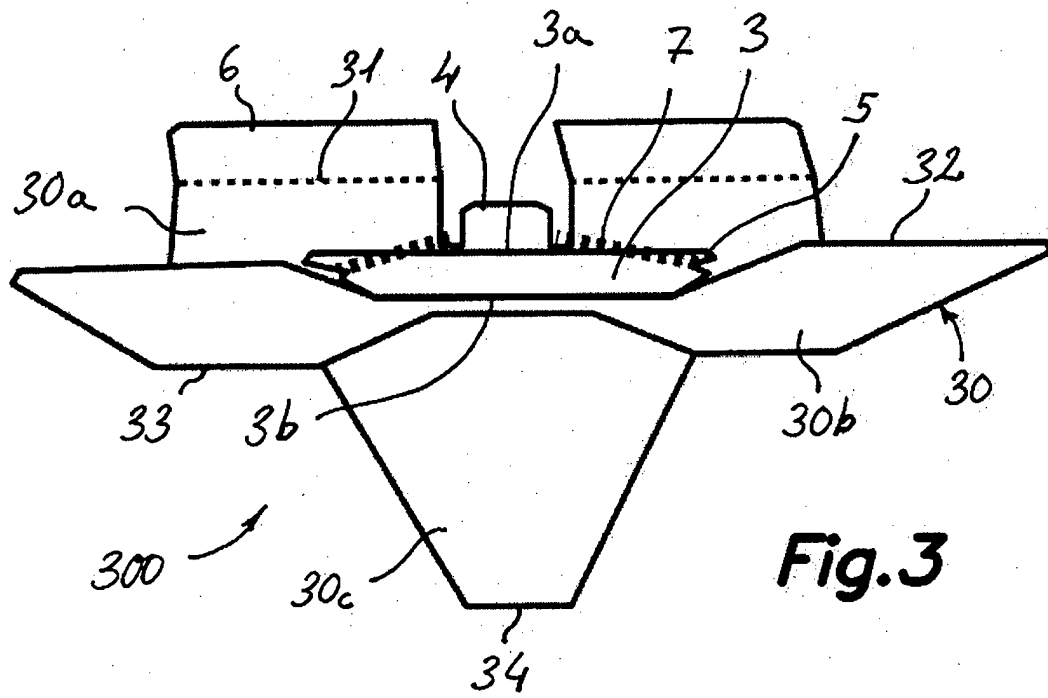
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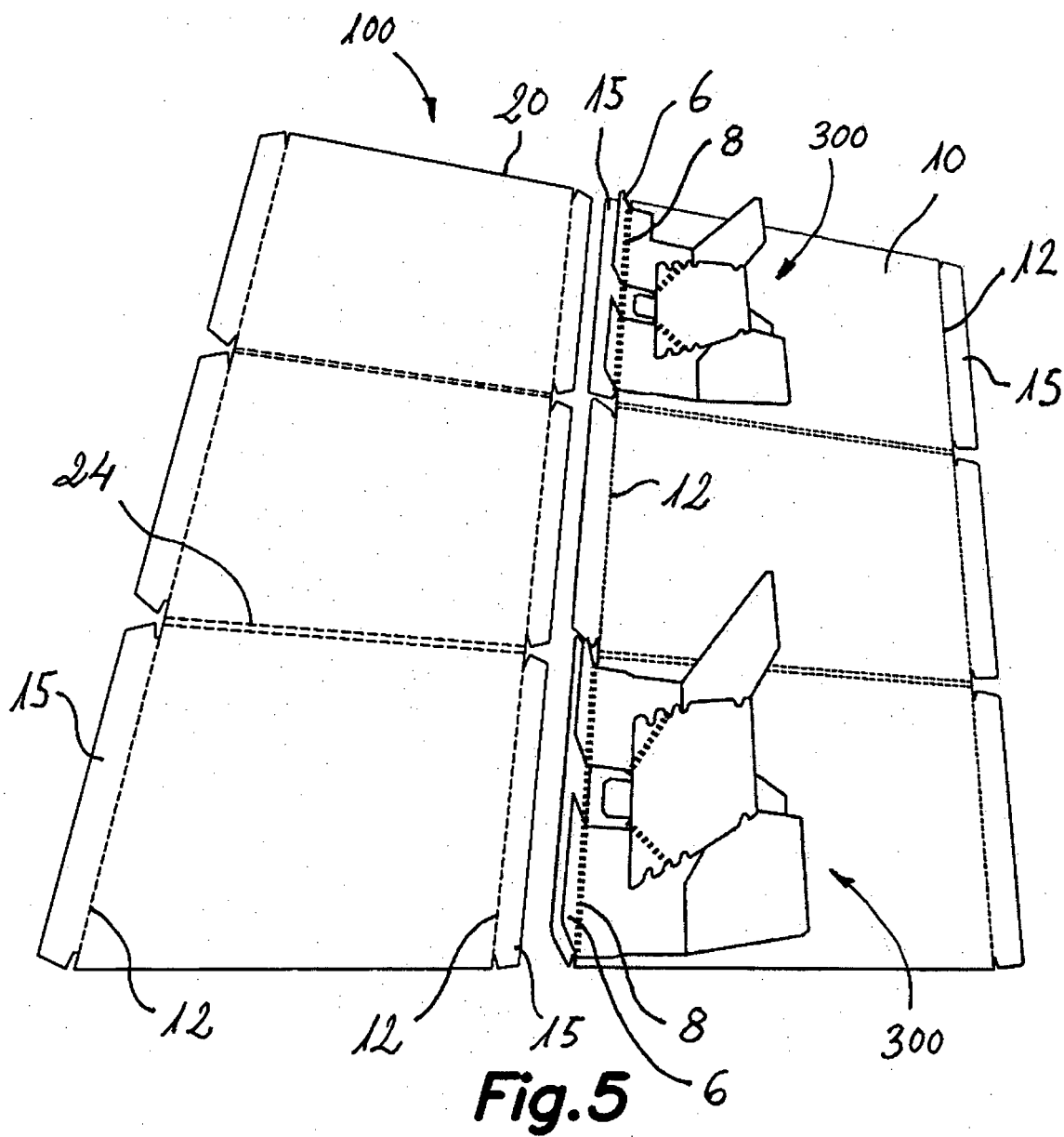
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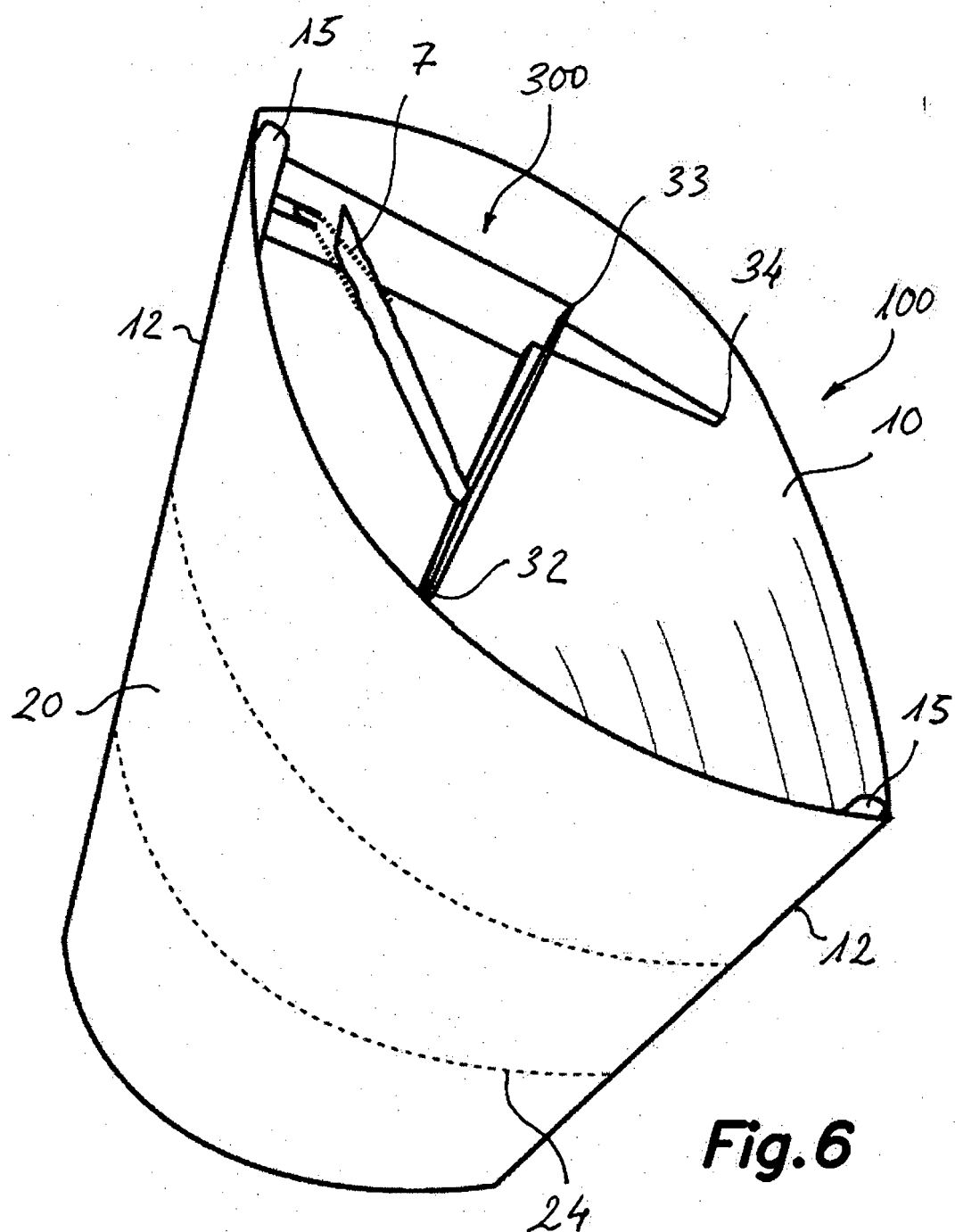
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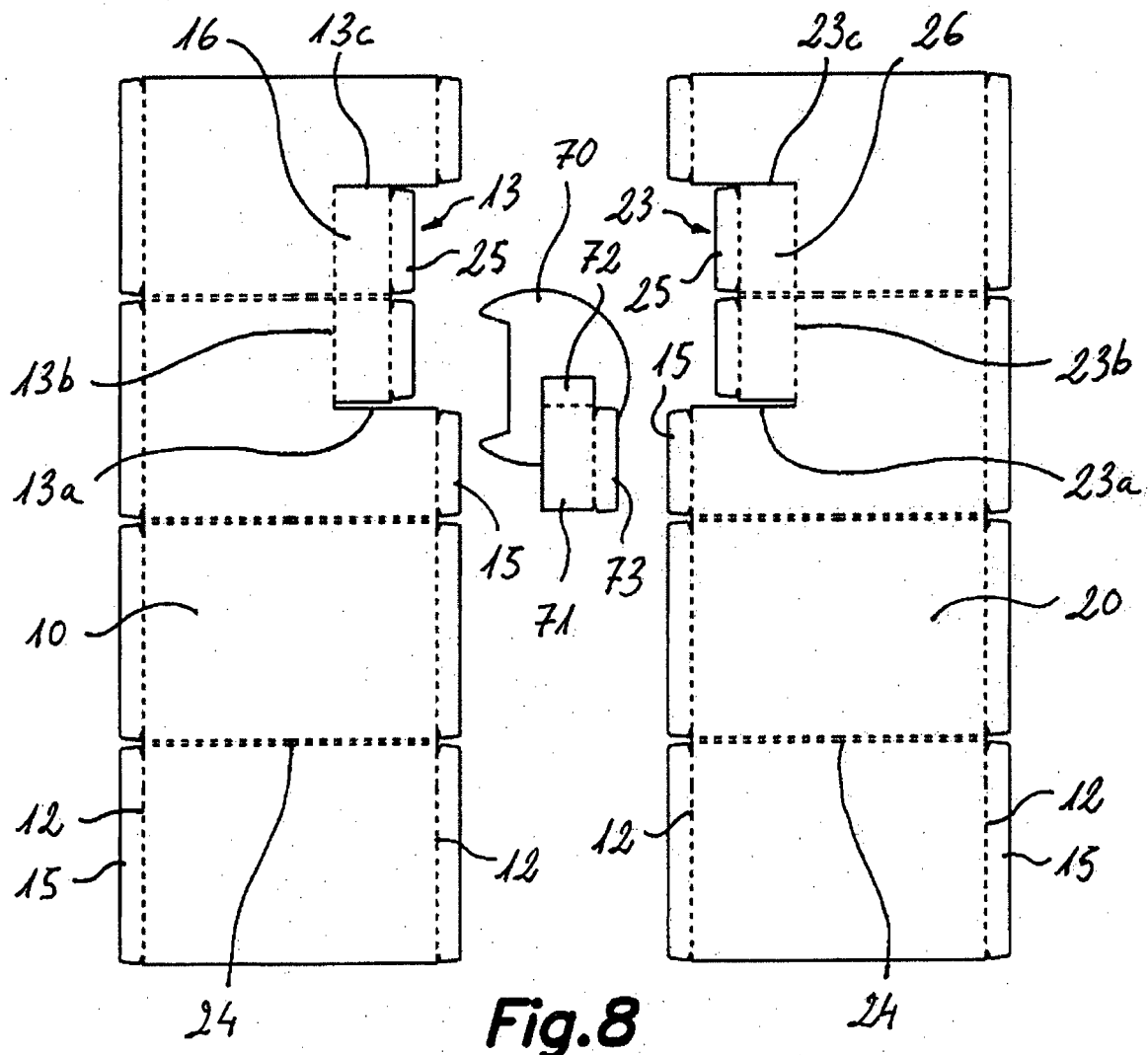
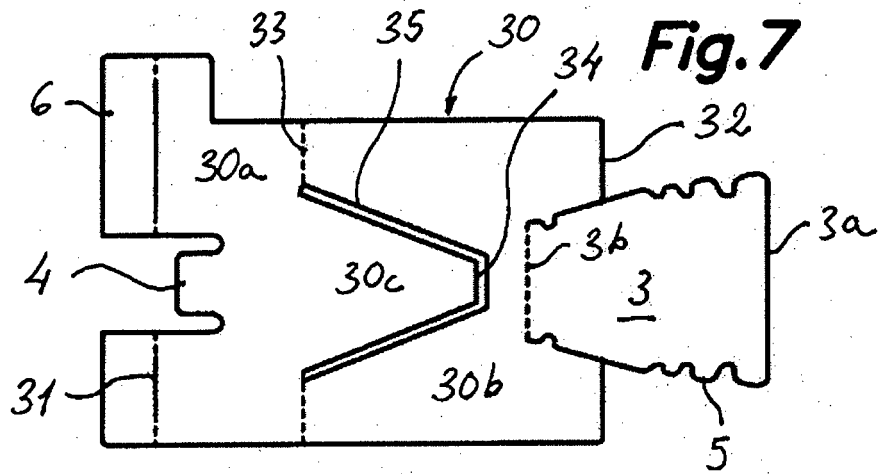
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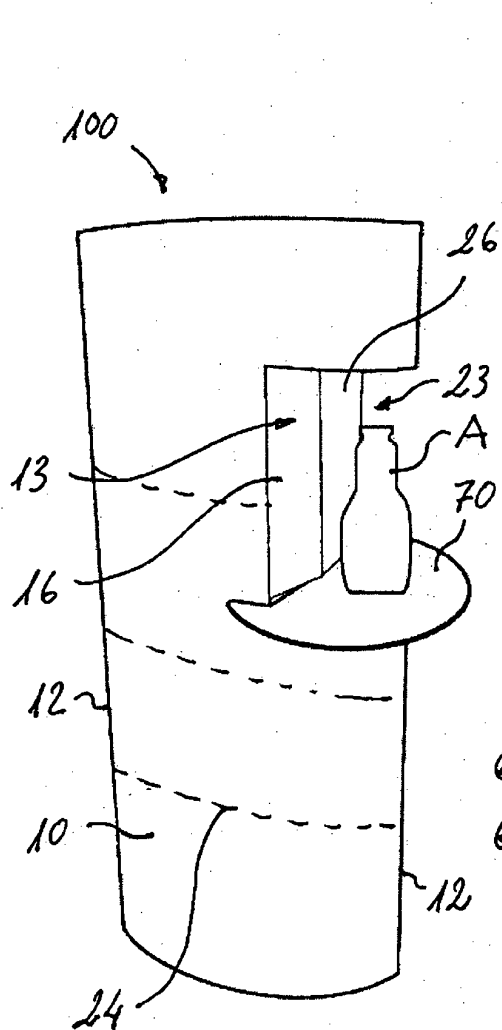


Fig. 9

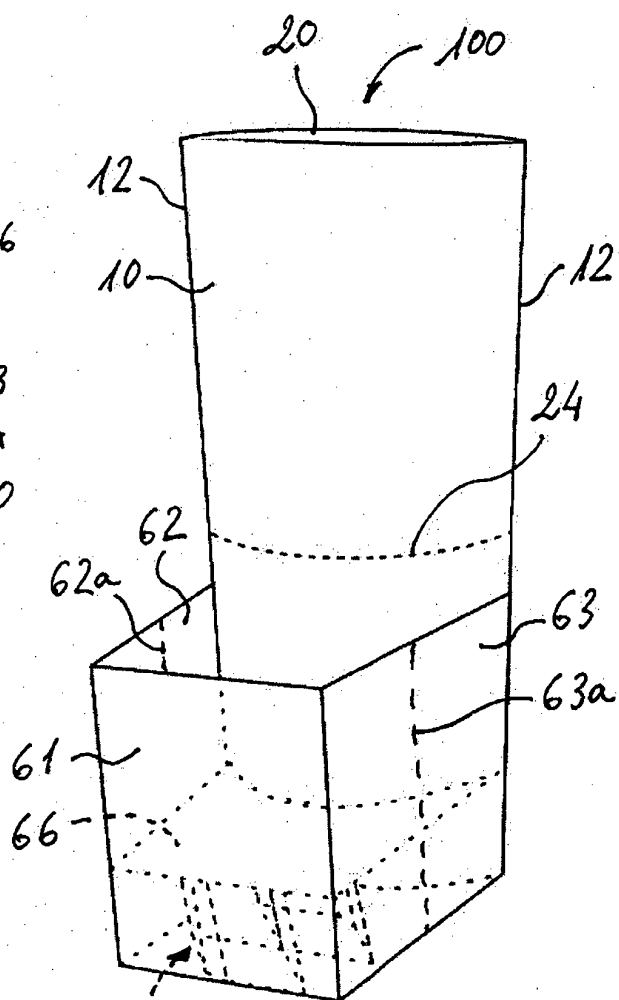
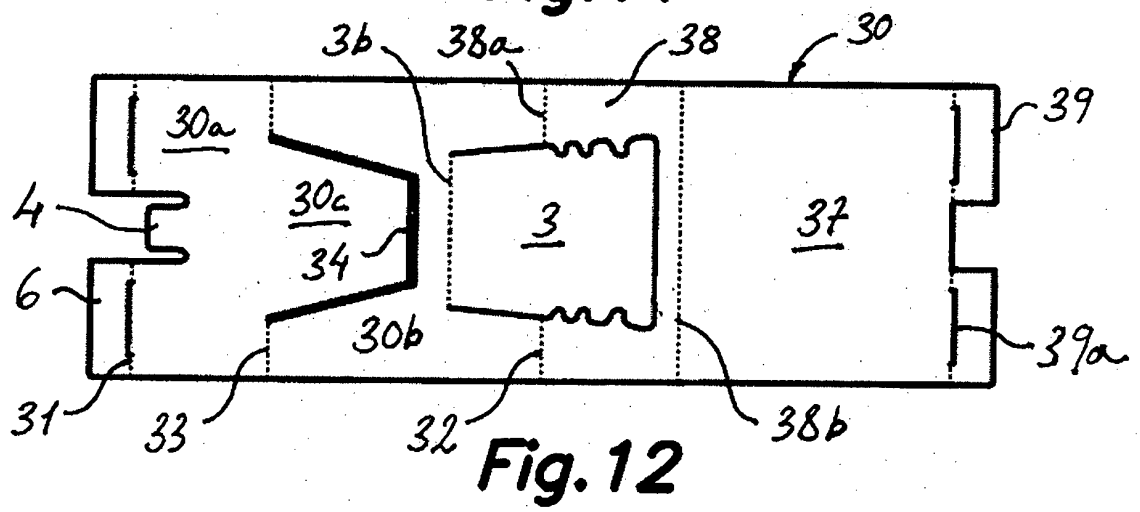
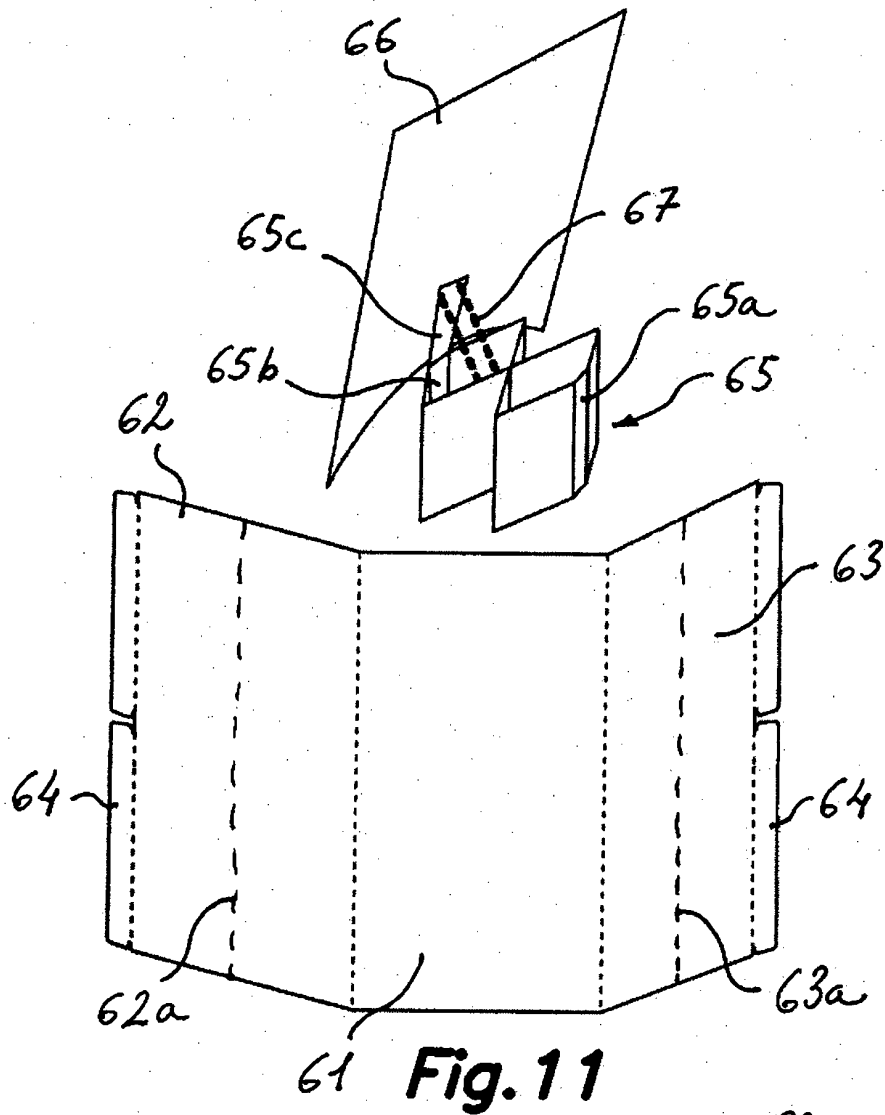
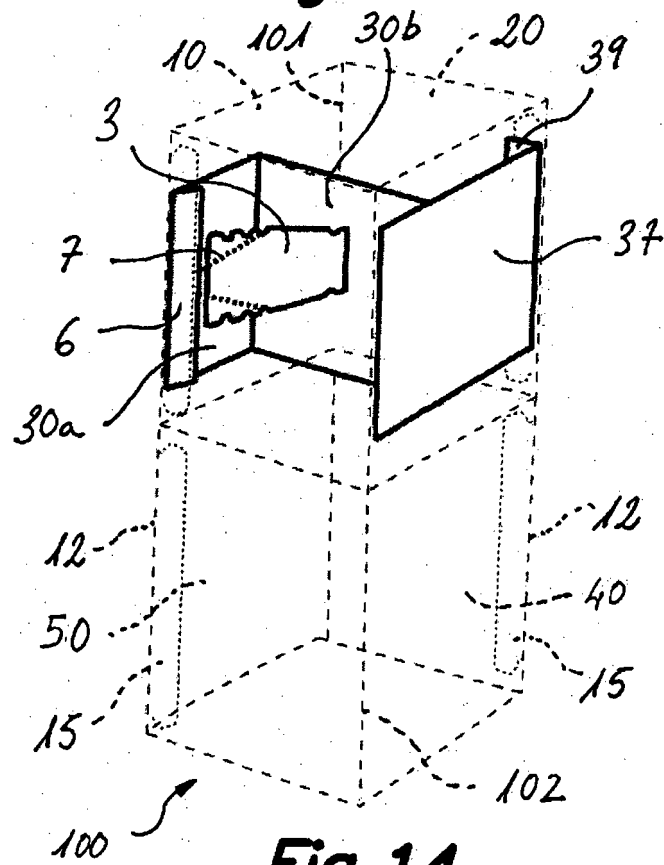
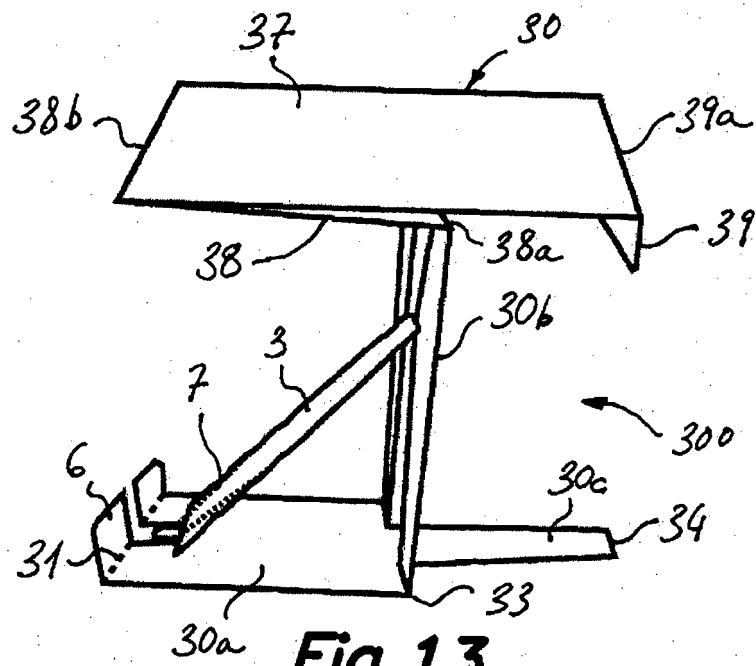
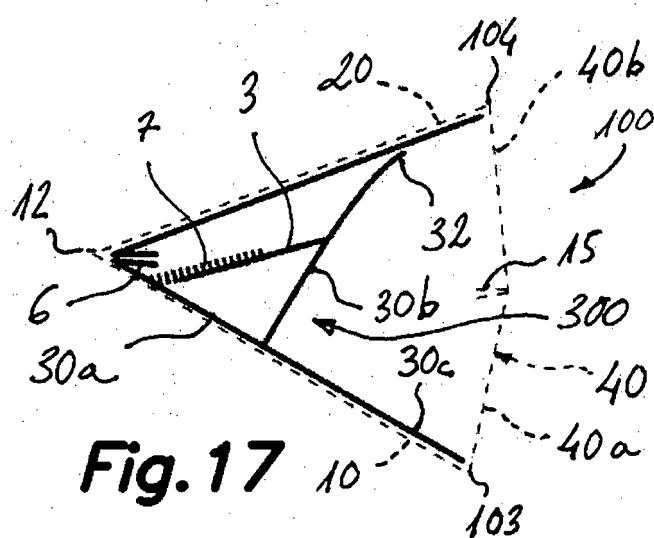
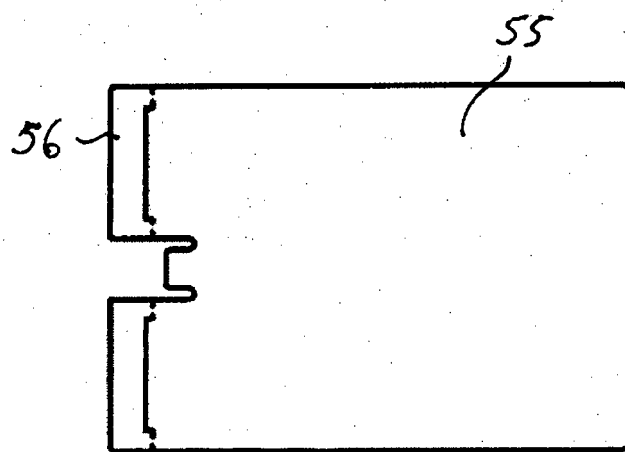
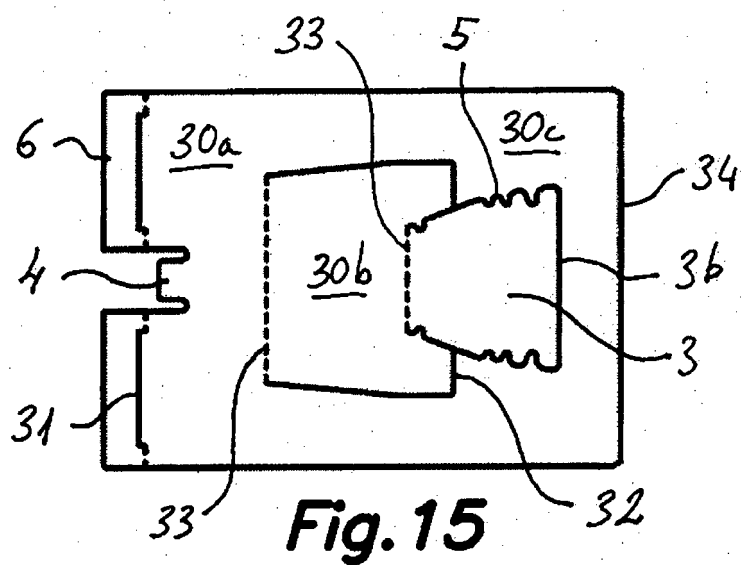


Fig. 10







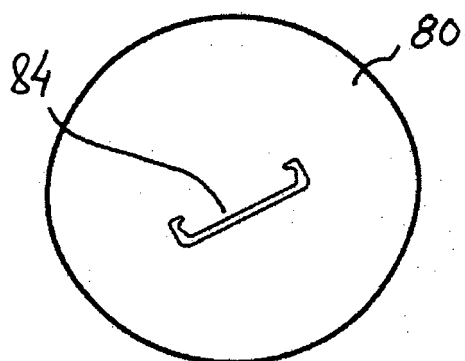


Fig. 18

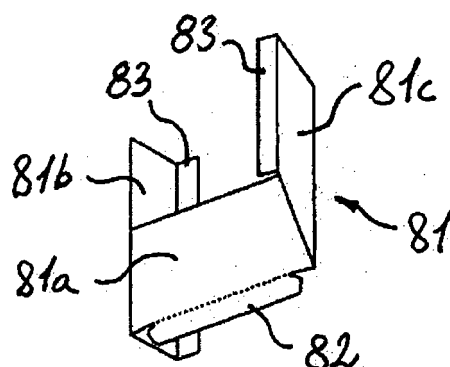


Fig. 19

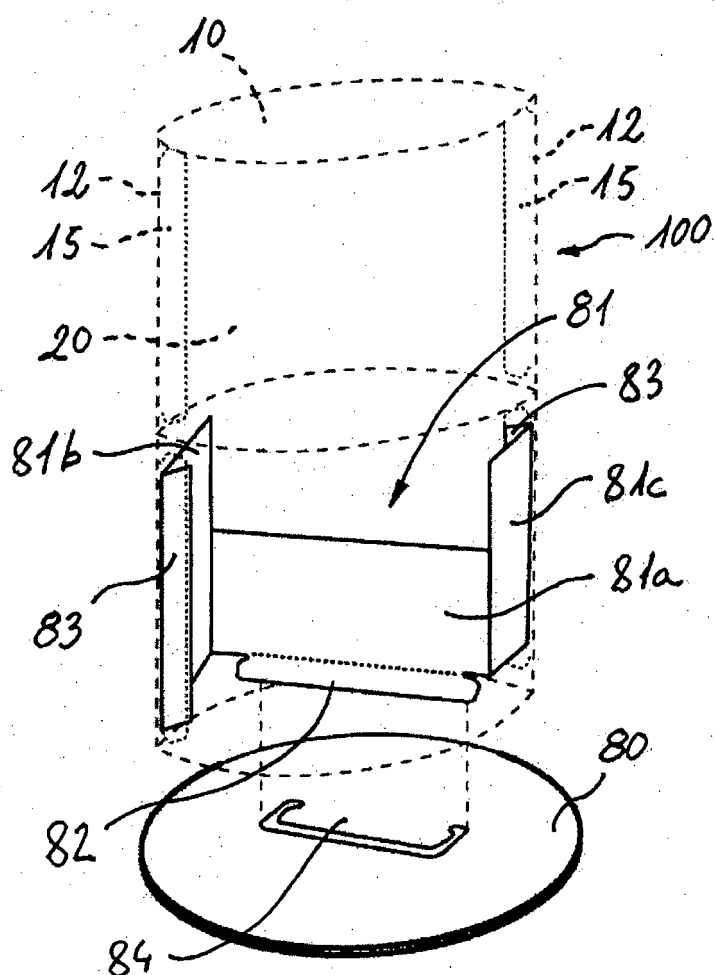


Fig. 20

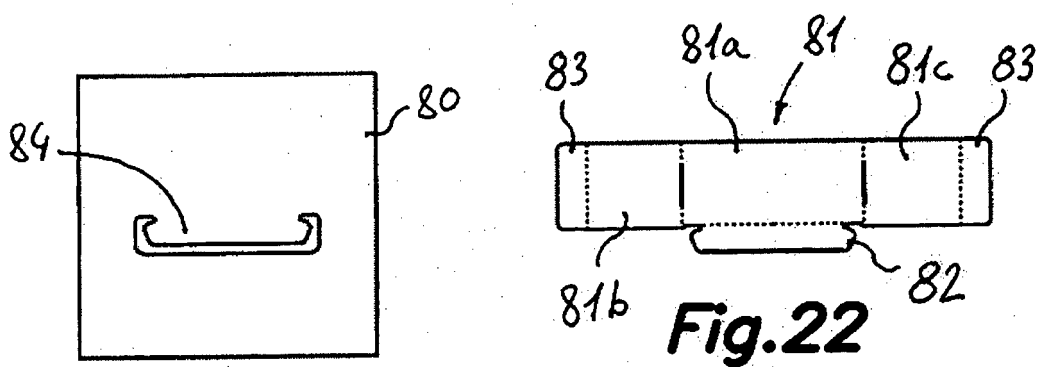


Fig. 21

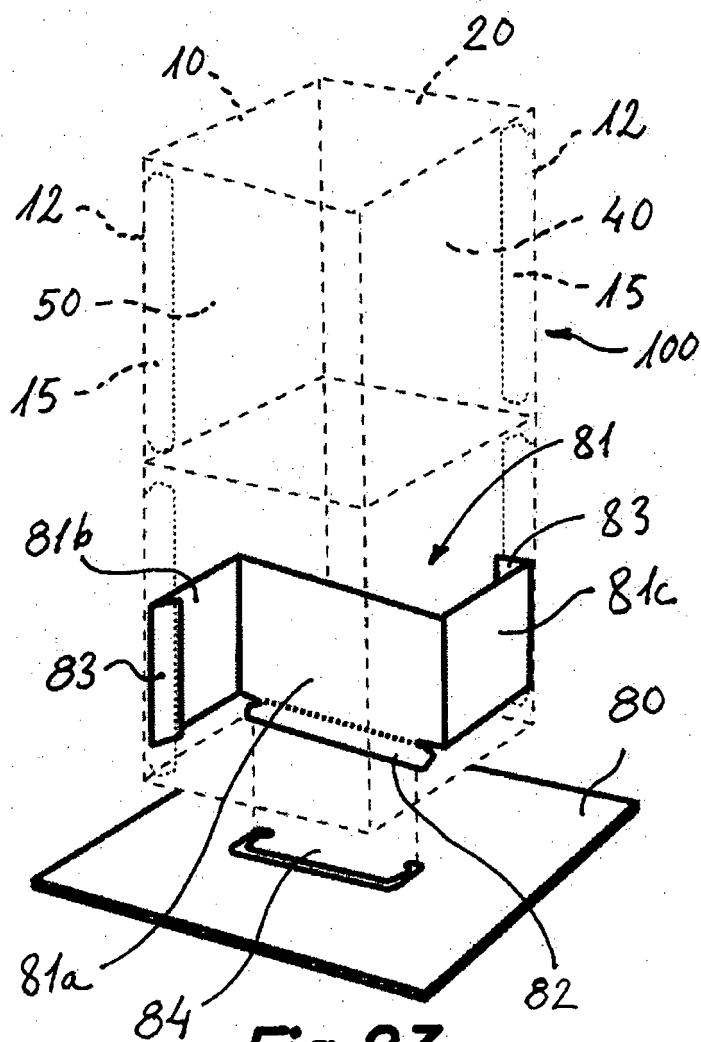
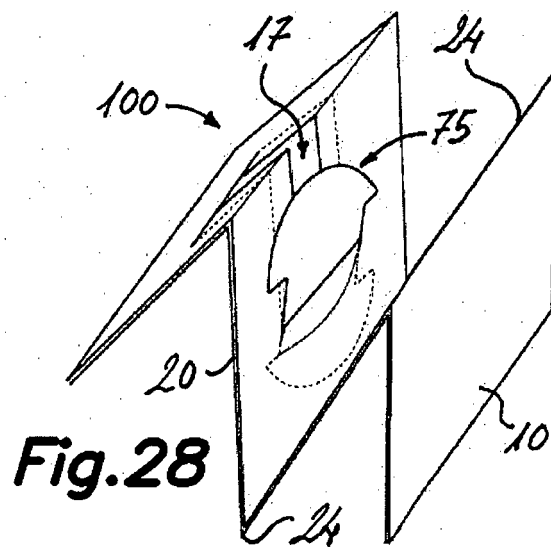
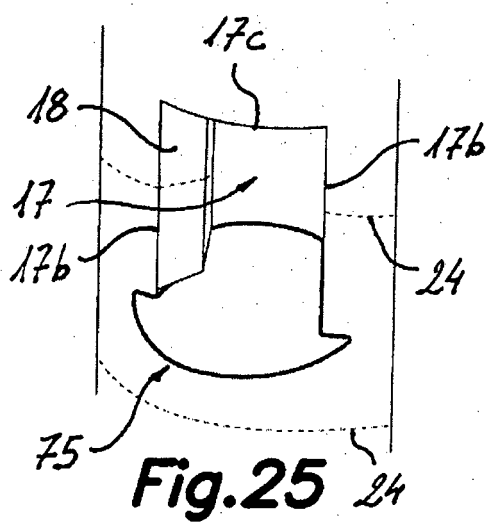
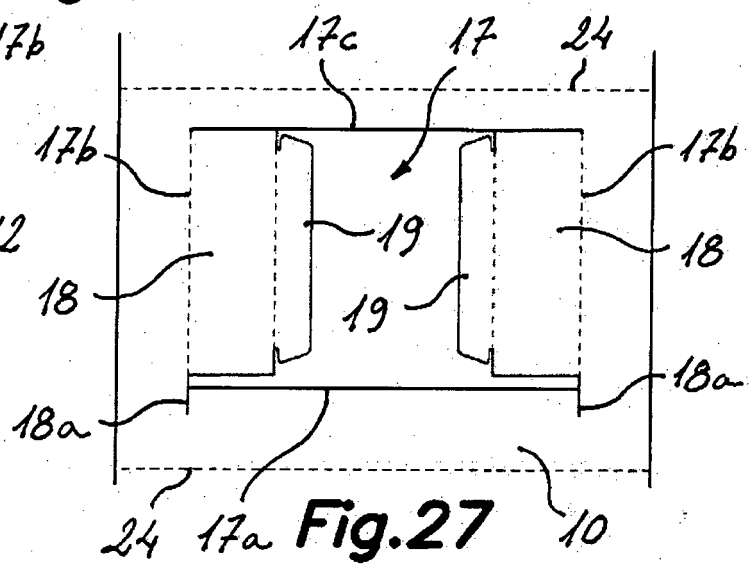
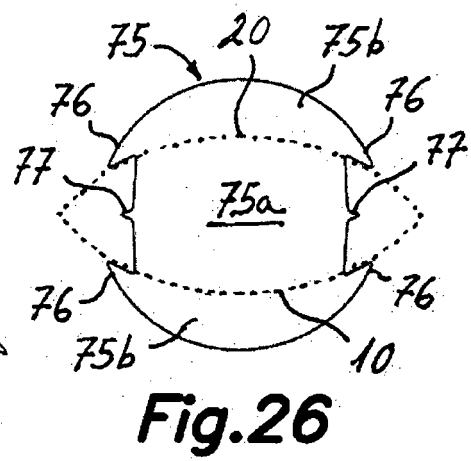
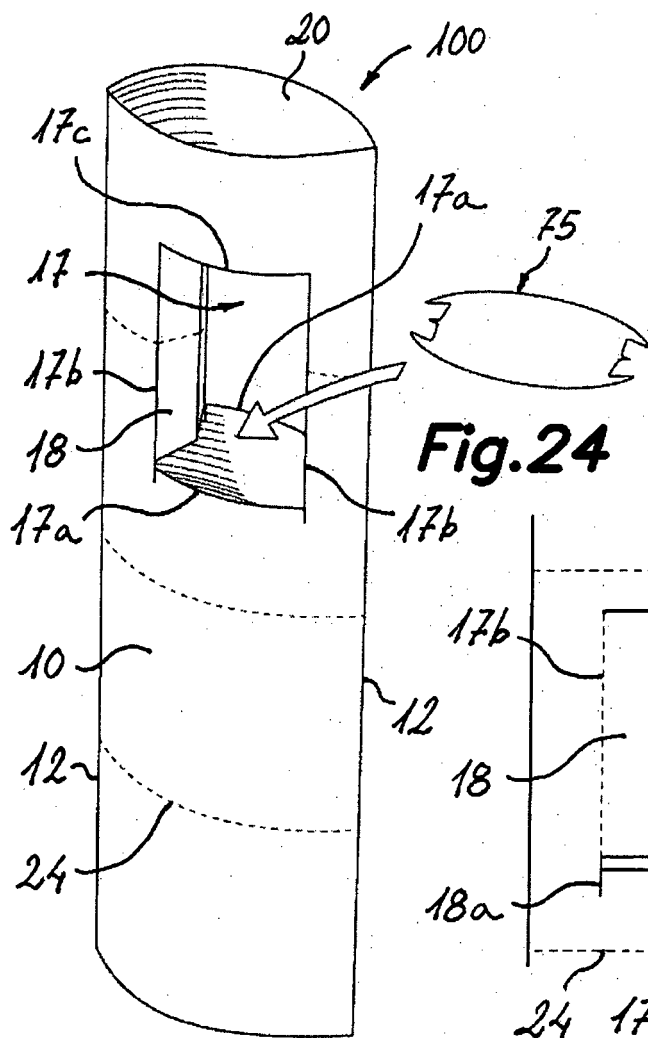


Fig. 23



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2013/000232

A. CLASSIFICATION OF SUBJECT MATTER

A47F5/11 (2006.01)

G09F1/06 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47F, G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2174573 A1 (MESTRES ARMENGOL FERRAN) 14/04/2010, abstract; figures.	1-27
A	ES 2265761 A1 (PROMOTEC PUBLICIDAD S L) 16/02/2007, abstract; figures.	1-27
A	US 2011088300 A1 (MARTIN PRESA RAUL SANTIAGO) 21/04/2011, abstract; figures.	1-27
A	EP 1918900 A2 (SCA PACKAGING LTD) 07/05/2008, abstract; figures.	1-27

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"E" earlier document but published on or after the international filing date	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
18/12/2013

Date of mailing of the international search report
(18/12/2013)

Name and mailing address of the ISA/

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Telephone No. 91 3495528

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2013/000232

Information on patent family members

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----- ES2265761 A1	----- 16.02.2007	----- US2010236117 A1 US8099883 B2 US2007245610 A1 US7726054 B2 WO2006067252 A1 EP2509056 A1 EP1830334 A1 EP1830334 A4	----- 23.09.2010 24.01.2012 25.10.2007 01.06.2010 29.06.2006 10.10.2012 05.09.2007 21.04.2010
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REFERENCES CITED IN THE DESCRIPTION

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- WO 2006067252 A [0003] [0004] [0005]