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(54) Fruit and vegetable box.

(57) A fruit and vegetable box made from fibreboard comprises a base (1, 41), side walls (2, 42) and end walls (3, 43). Each corner of the box includes a hinged extension panel (25, 47) which is creased to provide a plurality of parallel panels so that the box may be erected in either of two configurations. In a first configuration, the hinged extension panels (25, 47) are folded to form a hollow triangular pillar section (28, 44) in each corner of the erected box whilst in a second configuration the hinged extension panels (25, 47) are folded to extend around the inside of each corner and lie substantially parallel to an adjacent side and end wall.

Fig.2.

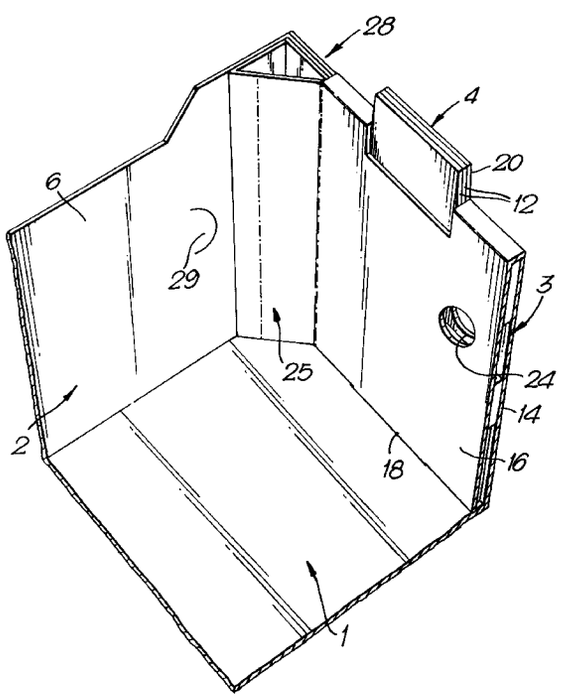

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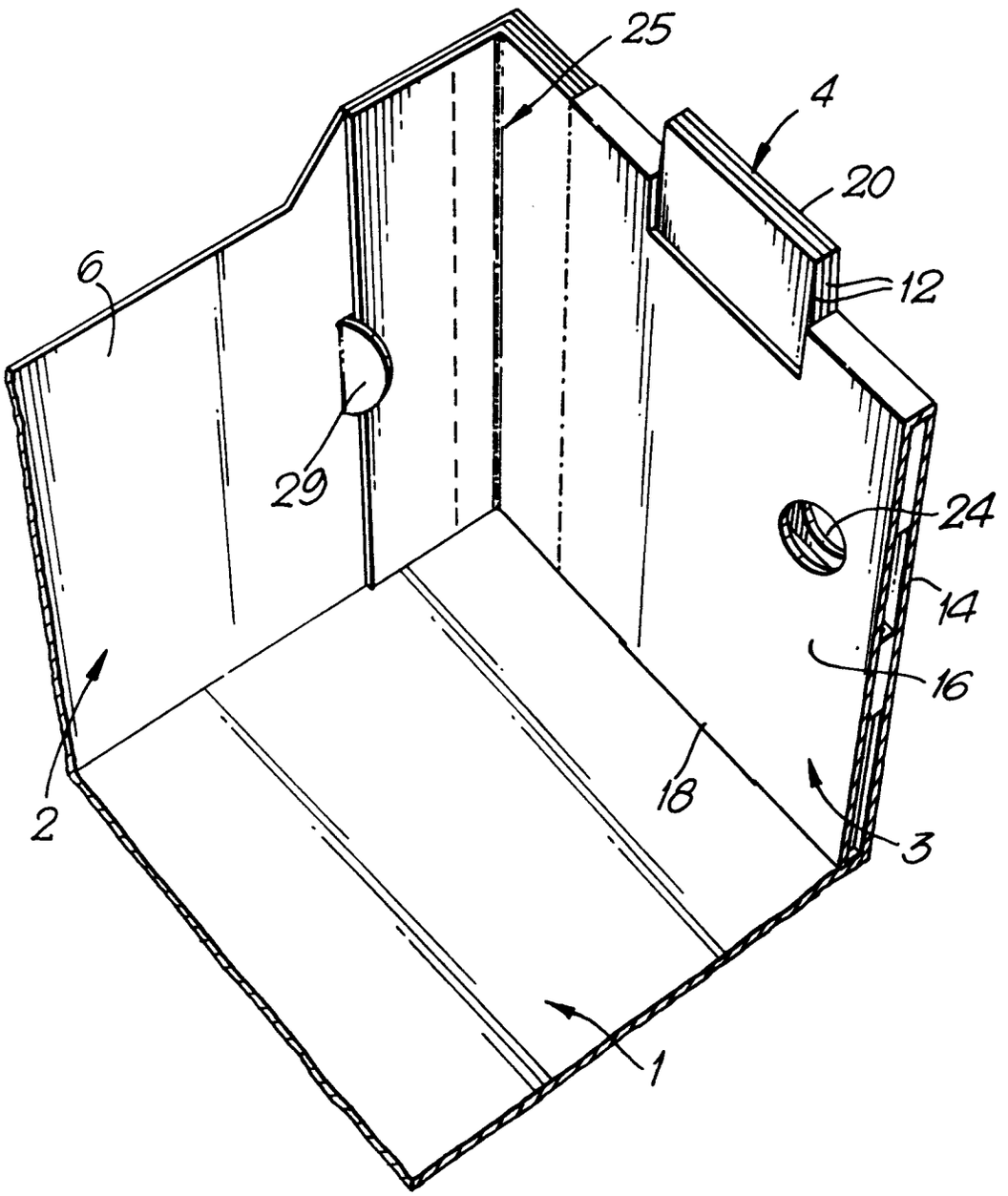
Fig.3.



Fruit and vegetables are conventionally packaged for handling and transport in fibreboard boxes - preferably such boxes include stacking means to enable them to be stacked one on top of another.

There is now a growing trend, especially in supermarkets, for fruit and vegetables to be displayed for sale directly from their transport boxes. For this reason, it is now desirable that the boxes must not only be strong and robust enough to protect their contents by withstanding rough handling during packing and transport, but also must be of smart appearance. The anticipated bulk use of the boxes by supermarkets makes it even more desirable to achieve benefits in terms of cost of manufacture and ease of use. It would thus be particularly desirable for the boxes to be capable of being erected from a fibreboard blank in a simple manner, either by hand or by machine. Furthermore, the boxes must be capable of transporting an extensive range of loads which vary in size, shape and weight.

It has been found that in conventional fruit and vegetable boxes a substantial proportion of the load from one or more similar boxes stacked above a particular box is applied to the end walls and corner sections of the box with the result that the side and end walls of the box tend to open outwards at their top edge so allowing boxes stacked above to fall into the lower box.

According to the present invention, a fruit and vegetable box made from fibreboard comprises a base, side walls and end walls, each corner including a hinged extension panel which is creased to provide a plurality of parallel panels so that the box may be erected in either of two configurations such that in a first configuration the hinged extension panels are folded to form a hollow triangular pillar section in each corner of the erected box or in a second configuration the hinged extension panels are folded to extend around the inside of each corner and lie substantially parallel to an adjacent side and end wall.

Preferably, the hinged extension panels are formed as extensions to the sides of the end walls or as extensions to the ends of the side walls.

Preferably, the box walls include integral locking means to lock the hinged extension panel against an adjacent wall when the box is erected.

In a first embodiment of the present invention, preferably each of the side walls includes a single panel hinged to the base, and each of the end walls includes a double panel formed from a first panel hinged to the base and a second panel hinged to the first panel to be foldable over it so that the first panel becomes an outer panel and the second panel becomes an inner panel, each side of each of the second panels including the hinged extension panel, each end of each of the side walls including an extension in the form of a hinged flap to be trapped between the first and second panels of the end walls, and stacking means being provided to allow the box to register with a substantially identical box.

Preferably, a fold connecting the side wall and the hinged flap is creased at an angle so that the length of the top of the side wall is less than the bottom of the side wall. Once erected, the angled fold has the effect of tightening the end wall up against the side wall to improve the stability of the end wall under load.

Preferably, the stacking means comprise at least one tab projecting upwards above the top of the walls of the box. Preferably, the upwardly projecting tab is formed as part of the hinged flap and extends upwards from between the first and second panels of the end wall, to project upwards above the folded top edge of the box and register with a box thereabove. The stacking means may additionally comprise an upwardly projecting tab formed by cutting a slot in the top folded edge of the box which, in use, also serves to provide an aperture through which the projecting tab of the hinged flap can project in alignment with this additional projecting tab when the box is erected to form a projecting tab which comprises at least two layers of fibreboard.

Preferably, the hinged flaps may also be folded back on themselves to provide further vertical support and to allow the projecting tab to be formed by three or more layers of fibreboard.

Preferably, the outer panels of the end walls also include complementary apertures which, in use, receive the projections of a box therebelow. Moreover, preferably, the projecting tabs are tapered upwards and the apertures are correspondingly shaped so that nesting of the projecting tabs into the apertures and hence stacking of boxes one on top of another is facilitated.

If the amount of light instant on the contents of the box during transport and storage is to be restricted, the box may be provided with a separate lid section. The lid section may be designed to cooperate with the stacking means to be held in place and the lid section may also include ventilation holes to allow air to circulate.

In a second embodiment of the present invention, preferably, in a box erected in the first configuration, the triangular corner pillars are formed by folding the adjacent parallel panels provided on the hinged extension panels of the end walls into a triangular tube which is held together and connected at its upper end to an adjacent side wall by a cap of plastics material and when erected in the second configuration, each of the hinged extension panels is folded to extend around the corner of the box and folded back on itself to extend back around the corner and is secured to the adjacent side and end walls by a cap of plastics material.

Preferably, locking means are formed as an integral part of the fibreboard blank which in the first con-

figuration, secures each triangular corner pillar with respect to an adjacent side wall and/or the base of the box.

The boxes may be made from solid fibreboard or from single, twin or triple ply corrugated board or solid board depending upon the strength required of the finished box. The direction of the corrugations is preferably but not necessarily lengthwise, i.e. from end to end, the end walls usually being shorter than the side walls. The box may also include hand holds in its side walls or end walls and ventilation holes.

Examples of the two embodiments of the present invention will now be described in detail with reference to the accompanying drawings, in which;

Figure 1 shows a corner section of the foldable blank from which a box according to the first embodiment of the present invention is made;

Figure 2 shows a first example of the erection of the blank of Figure 1;

Figure 3 shows a second example of the erection of the blank of Figure 1;

Figure 4 shows a perspective view of a box erected from the blank of Figure 1;

Figure 5 shows a lid section for fitting to the erected box of the blank shown in Figure 1;

Figure 6 shows a corner section of the foldable blank from which a box according to the second embodiment of the present invention is made;

Figure 7 shows a first example of the erection of the blank of Figure 6; and,

Figure 8 shows a second example of the erection of the blank of Figure 6.

Referring initially to Figures 1 to 5, an example is shown of a box according to a first embodiment of the present invention, which is particularly intended to contain fruit or vegetables.

The box comprises a base 1, side walls 2 and end walls 3, and further comprises projecting tabs 4 which, in use, engage in complementary apertures 5 formed in the end walls of a box stacked above it.

More particularly, each of the side walls 2 includes a single panel 6 which is hinged to the base 1 by a "Valley" fold 7. A two-part flap 8, 9 is hinged onto each of the ends of each of the panels 6 by a valley fold 10 which is creased at an angle so that the length of the top of the side wall is several millimetres less than the bottom of the side wall. The two parts 8, 9 of the flap are themselves connected together by a double valley fold 11. Each of the parts 8, 9 of the flap is also formed with a tongue 12. Part 9 also includes a cutout 13. In use, each pair of the tongues 12 forms one of the projecting tabs 4, and cutout 13 helps to form one of the complementary apertures 5.

In addition, each of the end walls 3 includes a double panel formed with a first outer (external) panel 14 which is hinged to the base by a valley fold 15 and a second inner (internal) panel 16 which is hinged to the panel 14 by a double valley fold 17. In use, the double valley fold 17 forms a flat smooth top edge for the end walls of the box. Locking tabs 18 on the panel 16 engage in locking apertures 19 adjacent the valley fold 15 in the base 1. A projecting tab 20 is provided by cutting slots 21, 22 and an aperture 23 in the double valley fold 17 and panel 16. Further apertures 24 extend through the panels 14, 16 for use as hand holds.

The second panel 16 further comprises a hinged extension panel 25 at each side which is creased to form three parallel panels which are capable of being folded in either of two configurations described in detail below. The chain dotted creases 26 and 27 are known generally as "Hill" folds.

To erect a box in accordance with the first embodiment of this invention, from the blank shown in Figure 1, the part 8 is first folded around the double valley fold 11 and placed on top of the part 9. Both of the parts 8, 9 of the hinged flap are then folded up at right angles to the panel 6 around the angled fold 10. The panel 6 together with the above described flap is then folded at right angles to the base around the fold 7. The first panel 14 of the end wall 3 is then folded up at right angles to the base 1 around fold 15 to lie against the flap part 9.

The second panel 16 of the end wall 3 is then folded over the top of the flap parts 8, 9 such that the tongues 12 extend through the aperture 23 and align with the tab 20 and project upwards above the top folded edge of the box to form a projecting tab 4 comprising three fibreboard layers. The hinged extension panel 25 is folded inwards about fold 27 initially to allow the second panel to fold over the flap parts 8, 9. Folding of the second panel 16 continues until it lies against the flap part 8 and the tabs 18 are located in the apertures 19. The box is thus held erect with the flap parts 8, 9 being trapped between the first panel 14 and the second panel 16 of the end wall 3.

In a first configuration shown in Figure 2, the parallel panels of the hinged extension panel are folded to define a triangular corner pillar 28 in each corner. In a second configuration shown in Figure 3, the hinged extension panel 25 is folded at 90° to extend around the corner of the box. A tab 29 is provided to lock the end of the hinged extension panel 25 against the side wall panel 6. The angled fold 10 has the effect of tightening the end wall up against the side wall to improve the stability of the end wall under load.

Figure 4 shows a perspective view of the erected box which illustrates how the projecting tabs 4 of a similar box are able to cooperate with the complementary apertures 5 in the end walls 3.

In both of the above examples, the load bearing capacity of the end wall is improved. The present invention is therefore extremely versatile and strong. The example shown in Figure 3 may be used to carry rectangular loads such as small punnets which require a rectangularly shaped base, whereas the ex-

ample shown in Figure 2 is particularly strong and is suitable for carrying vegetables such as cauliflowers, cabbages, potatoes or onions or fruit such as apples, oranges and tomatoes.

If the amount of light instant on the contents of the box during transport and storage is to be restricted, the box may be provided with a separate lid section, an example of which is shown in Figure 5.

The lid blank 30 comprises a single piece of fibreboard 31 which includes slots 32 to 35 which are designed to cooperate with the projecting tabs 4 of the end walls of the box. Each side of the lid blank includes a panel 36 which is hinged to the panel 31 along a fold line 37.

In use, the panels 36 are folded at 90° to the panel 31 to lie within and adjacent to the side walls 2 of the box with the slots 32 to 35 cooperating with the projecting tabs. One or more ventilation holes 38 may be provided to allow air to circulate.

In the box shown in Figures 1 to 4 the second panel 16 is shown folded over the first panel 14 and locking tabs 18 engage apertures in the base. In an alternative arrangement (not shown) the hinged extension panel 25 is formed so that, when erected, the panel 16 only extends over the panel 14 to a point just below the handle 24.

The box is erected in the same way as before except that the panel 16 must be glued to the inner face of the two part flap 8, 9. Likewise, the hinged extension panel 25 is folded into either of the two possible configurations and glued to the inner face of the panel 6. Typically a machine will be programmed to erect and glue the box automatically.

As the panel 16 has been shortened the panel 8 is also shortened by substantially the same length. In this manner substantial savings in the amount of material used to form the blank can be made, thus reducing the overall cost of the box.

A second embodiment of the present invention will now be described with reference to Figures 6 to 8.

Figure 6 shows a corner of a rectangular fibreboard box comprising a base 41, a side wall 42 and an end wall 43. The tray also includes a generally triangular plastics cap 45 including an up-standing spigot 46 (see Figures 7 and 8).

The box is formed from a twin or triple ply, corrugated fibreboard, or solid fibreboard blank shown most clearly in Figure 6. Each corner post includes a hinged extension panel 47 comprising three parallel panels 48, 49 and 50 which are formed as an extension of the end wall 43. "Valley" fold lines are provided between adjacent panels 48, 49 and 50 and between the walls 42 and 43 and the base 41. A further "Hill" fold line is provided in the central panel 49 so that this panel is capable of being folded in either of two ways. The central panel 49 which forms the hypotenuse of the corner post 44 includes an integral projecting tab 51. The corner of the base 41 includes a parallel sided slot 52 which merges with a D-shaped aperture 53. Slots 54 and 55 in the panel 48 are arranged in an inverted "T" shaped configuration and slots 56 and 57, which are arranged in a dovetail configuration, are provided in the side wall 42 to define a dovetailed key 58. Slots 59 and 60 are provided in the end wall 43 and panel 50, respectively.

Figure 7 shows the box blank of Figure 6 erected in a first configuration. To erect a fibreboard box in accordance with this invention in the first configuration the panel 50 is folded towards the panel 49 and then these two panels folded towards the panel 48 to form a triangular tube 44. The resulting triangular tube 44 is then folded until the panel 50 lies against the end wall 43. The end wall 43 is then raised so that it forms a right angle with the base 41. As the end wall 43 is folded upwards the projecting tab 51 of the panel 49 enters and engages the parallel sided slot 52 on the base 41. The side wall 42 is then raised to form a right angle with the base 41 and to rest against the side of the panel 48 of the corner post 44. With both the side wall 42 and the end wall 43 held in this position the dovetailed shaped key 58 is pushed inwards into the middle of the tubular corner post 44 folding the board between the slots 54 and 55 inwards. As the dovetail shaped key 58 is folded downwards into the inside of the tubular corner post 44 it locks against the sides of the aperture formed by the slots 54 and 55 to hold the side wall 42 onto the corner post 44 to keep the walls 42 and 43 erected. Subsequently the plastics cap 45 is fitted on top of the tubular corner post 44 covering the top of the end wall 43 and side wall 42 and fits into the slot 59. The spigot 56 in the top of the plastics cap 55 in use enters the D-shaped opening 53 in the base 41 of a box stacked on top of it. Projections (not shown) formed within the plastics cap engage the semicircular slot 61 in the end wall 43 to help prevent separation of the plastics cap from the box.

The locking means and other features of this box are claimed in our co-pending British patent application GB-9306293.3.

In a second configuration, shown in Figure 8, the hinged extension panel 47 is folded so that it extends 90° around the corner of the box and is then folded back on itself to extend back about the "Hill" fold of panel 49 around the corner. The end of the extension panel is trapped against the adjacent end wall 43 by the plastics corner post which is fitted into both slots 59 and 60.

In both of the above examples, the load bearing capacity of the end wall is improved. The present invention is therefore extremely versatile and strong. The example shown in Figure 8 may be used to carry rectangular loads such as small punnets which require a rectangularly shaped base, whereas the example shown in Figure 7 is particularly strong and is

suitable for carrying vegetables such as cauliflowers, cabbages, potatoes or onions or fruit such as apples, oranges and tomatoes.

Claims

1. A fruit and vegetable box made from fibreboard comprising a base (1, 41), side walls (2, 42) and end walls (3, 43), each corner including a hinged extension panel (25, 47) which is creased to provide a plurality of parallel panels so that the box may be erected in either of two configurations such that in a first configuration the hinged extension panels (25, 47) are folded to form a hollow triangular pillar section (28, 44) in each corner of the erected box or in a second configuration the hinged extension panels (25, 47) are folded to extend around the inside of each corner and lie substantially parallel to an adjacent side and end wall.

2. A box according to claim 1, in which the hinged extension panels (25, 47) are formed as extensions to the sides of the end walls (43).

3. A box according to claim 1 or 2, in which the box walls include integral locking means (29, 54, 55, 58) to lock the hinged extension panel (25, 47) against an adjacent wall when the box is erected.

4. A box according to any preceding claim, in which each of the side walls (2) includes a single panel (6) hinged to the base (1), and each of the end walls (3) includes a double panel formed from a first panel (14) hinged to the base (1) and a second panel (16) hinged to the first panel (14) to be foldable over it so that the first panel (14) becomes an outer panel and the second panel (16) becomes an inner panel, each side of each of the second panels (16) includes the hinged extension panel (25), each end of each of the side walls (2) includes an extension in the form of a hinged flap (8, 9) to be trapped between the first and second panels (14, 16) of the end walls (3), and stacking means (5, 12, 13, 20) to allow the box to register with a substantially identical box.

5. A box according to claim 4, in which a fold (10) connecting the side wall (2) and the hinged flap (8, 9) is creased at an angle so that the length of the top of the side wall is less than the bottom of the side wall.

6. A box according to claim 4 or 5, in which the stacking means comprise at least one tab (4) projecting upwards above the top of the walls of the box.

7. A box according to claim 6, in which the upwardly projecting tab (4) is formed as part of the hinged flap (8, 9, 12) and extends upwards from between the first and second panels of the end wall (3), to project upwards above the folded top edge of the box.

8. A box according to claim 6 or 7, in which the stacking means further comprises an upwardly projecting tab (20) formed by cutting a slot in the top folded edge of the box.

9. A box according to claim 8, in which the hinged flaps (8, 9) are folded back on themselves to provide further vertical support and to allow the projecting tab (4) to be formed by three or more layers of fibreboard (12, 20).

10. A box according to any preceding claim when dependent upon claim 4, in which the outer panels (14) of the end walls include complementary apertures (15) which, in use, receive the projections (4) of a box therebelow.

11. A box according to claim 10, in which the projecting tabs (4) are tapered upwards and the apertures (5) are correspondingly shaped so that nesting of the projecting tabs into the apertures and hence stacking of boxes one on top of another is facilitated.

12. A box according to any preceding claim when dependent on claim 4, in which in an erected box the inner panels (16) extend over only a portion of the outer panels (14) and the inner panels (16) and hinged extension panel (25) are glued into position.

13. A box according to any one of claims 1 to 3, in which when the box is erected in the first configuration, the triangular corner pillars (44) are formed by holding the adjacent parallel panels (48, 49, 50) provided on the hinged extension panels (47) of the end walls into a triangular tube which is held together and connected at its upper end to an adjacent side and end wall by a cap of plastics material (45) and when the box is erected in the second configuration, each of the hinged extension panels (48, 49, 50) is folded to extend around the corner of the box and folded back on itself to extend back around the corner and is secured to the adjacent side and end walls by a cap of plastics material.

14. A box according to claim 13, in which locking means (52 - 58) are formed as an integral part of the fibreboard blank which in the first configuration, secures each triangular corner pillar with re-

spect to an adjacent end wall and/or the base of the box.

Fig.1.

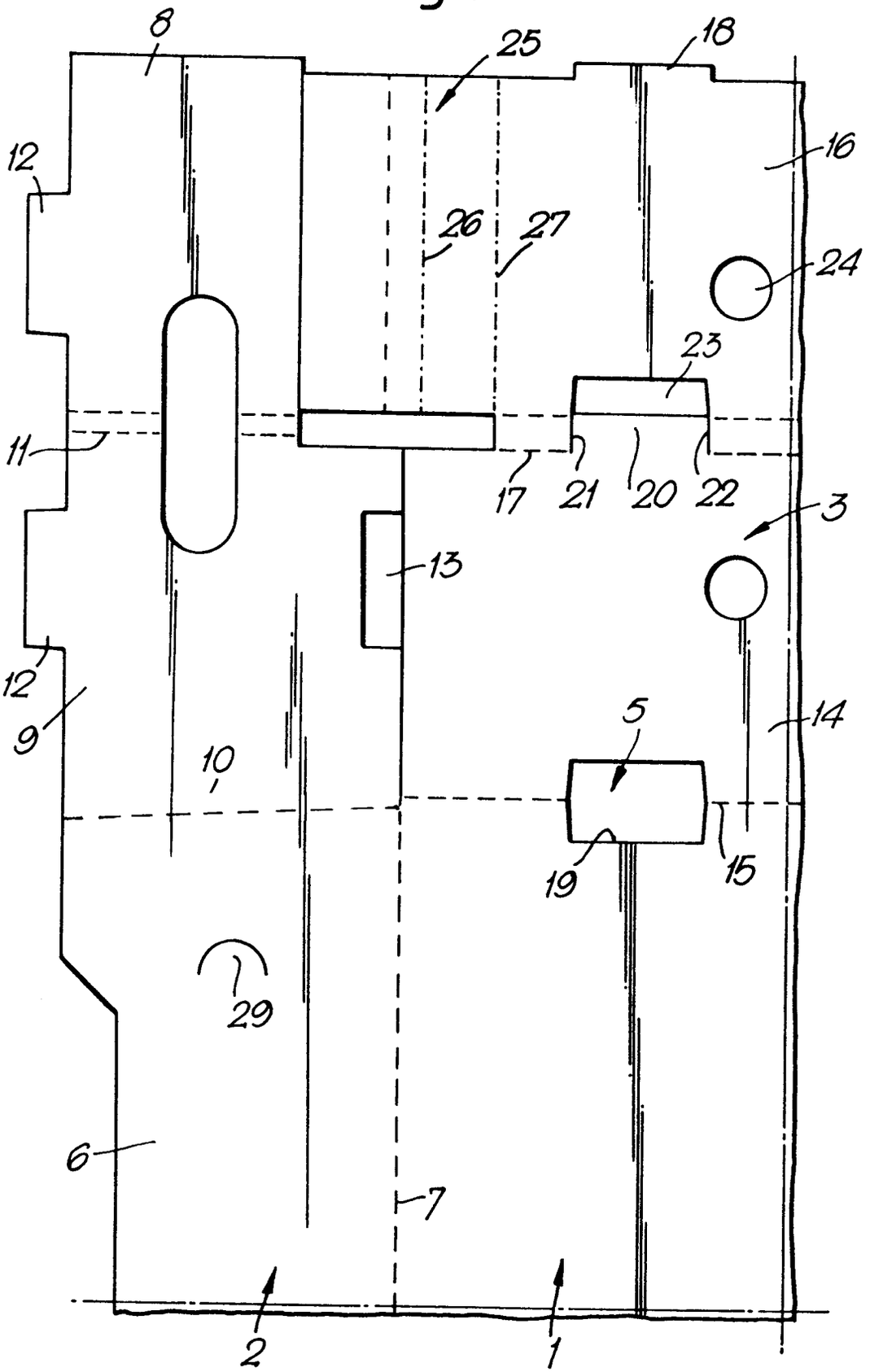


Fig.2.

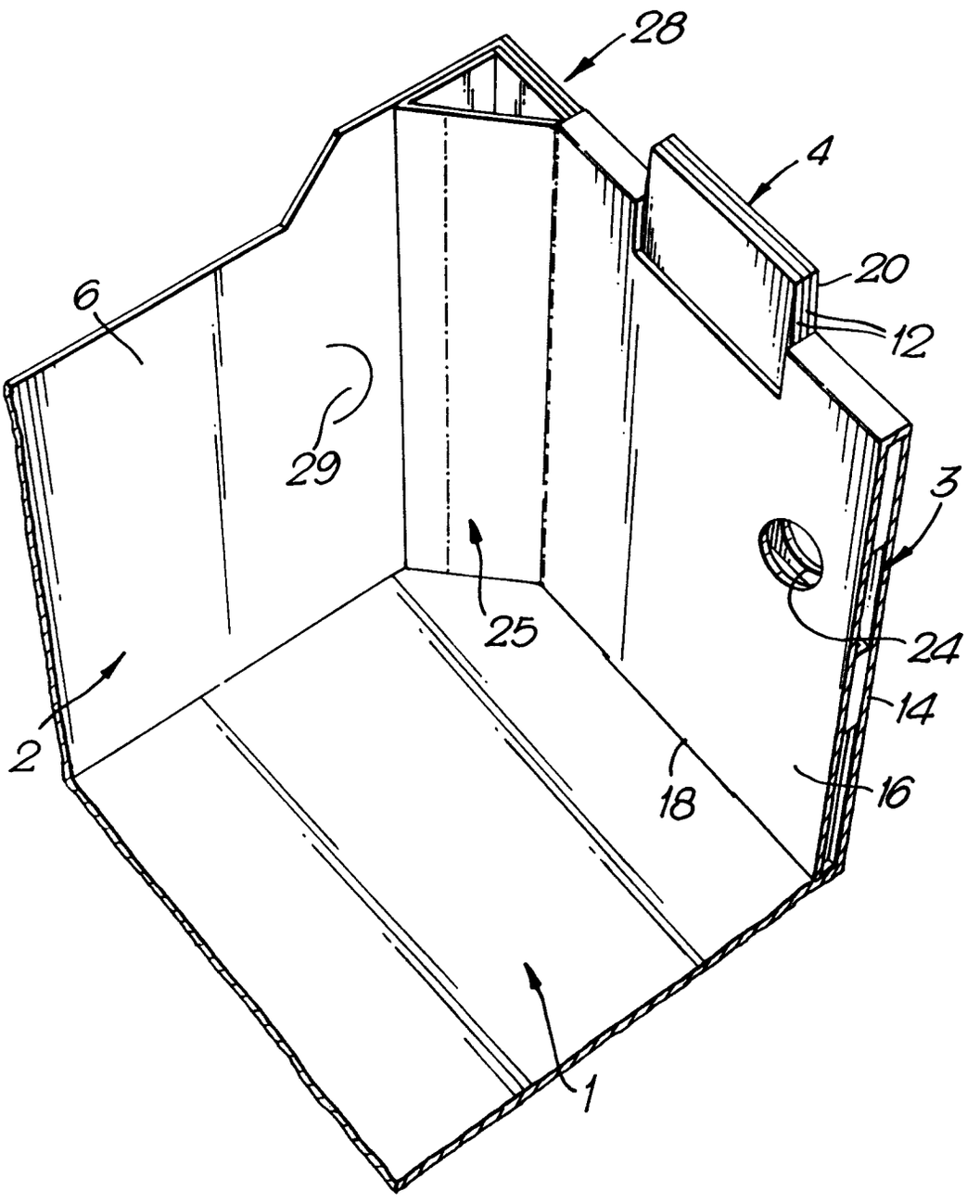
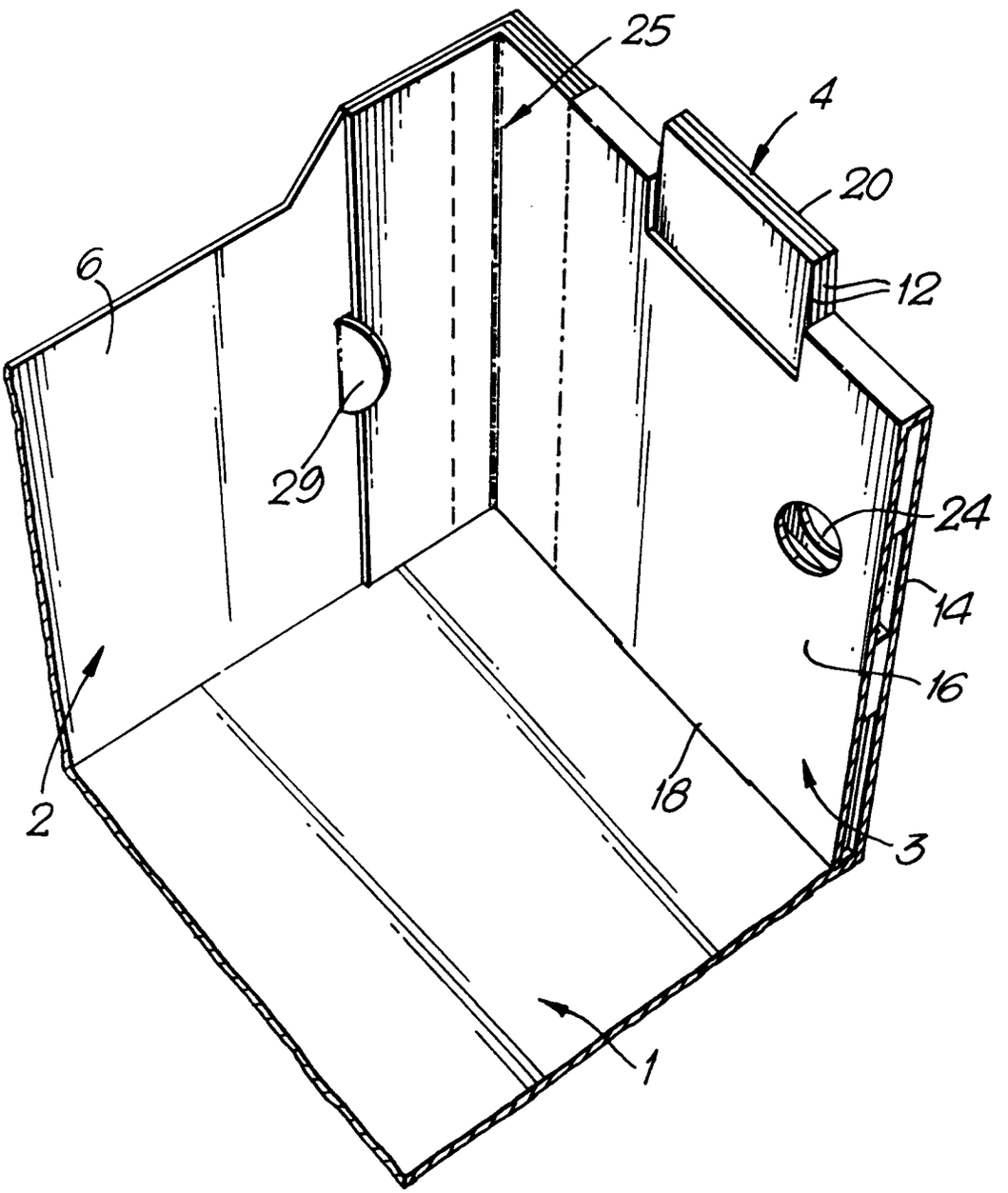


Fig.3.



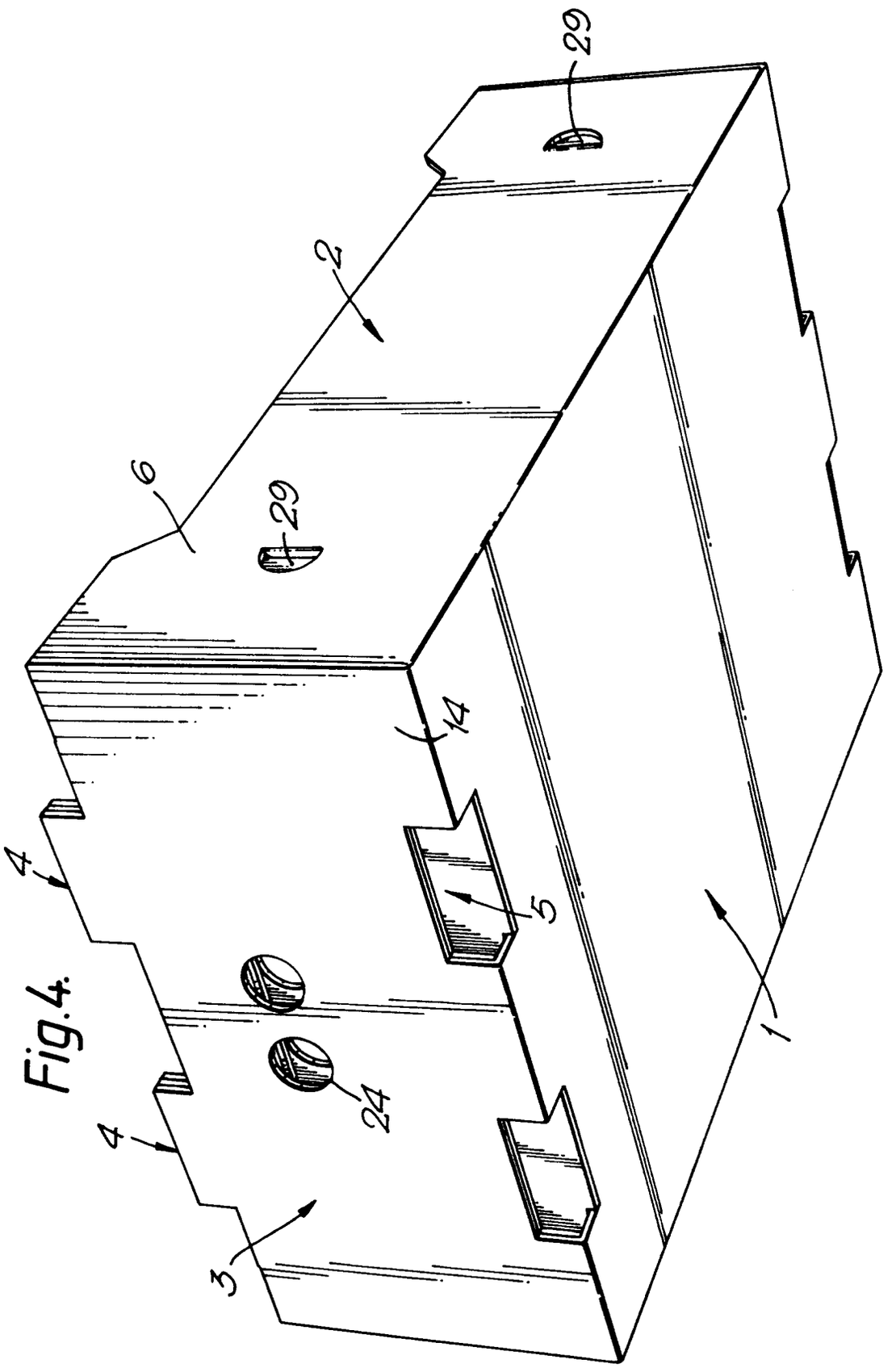


Fig.4.

Fig. 5.

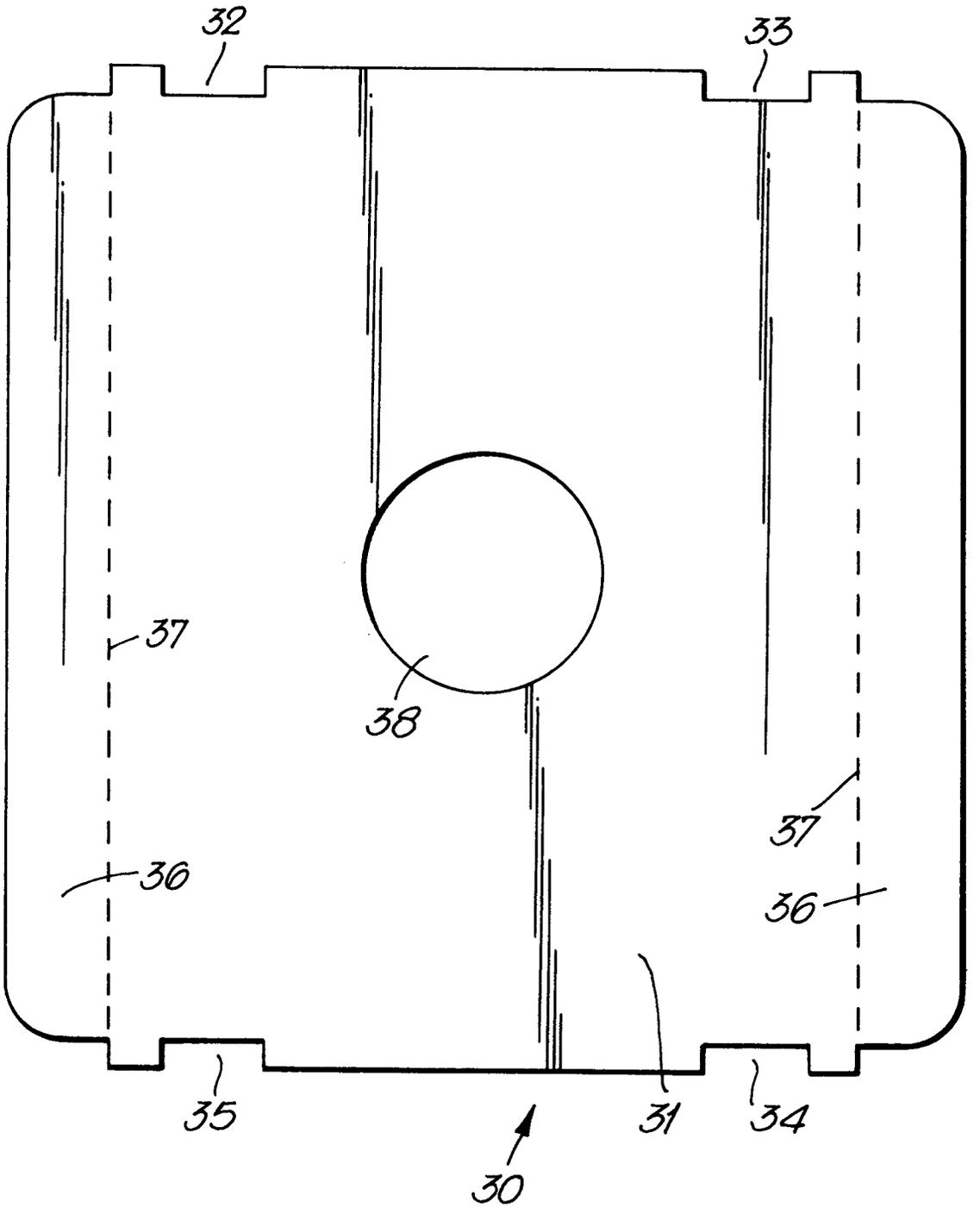


Fig.6.

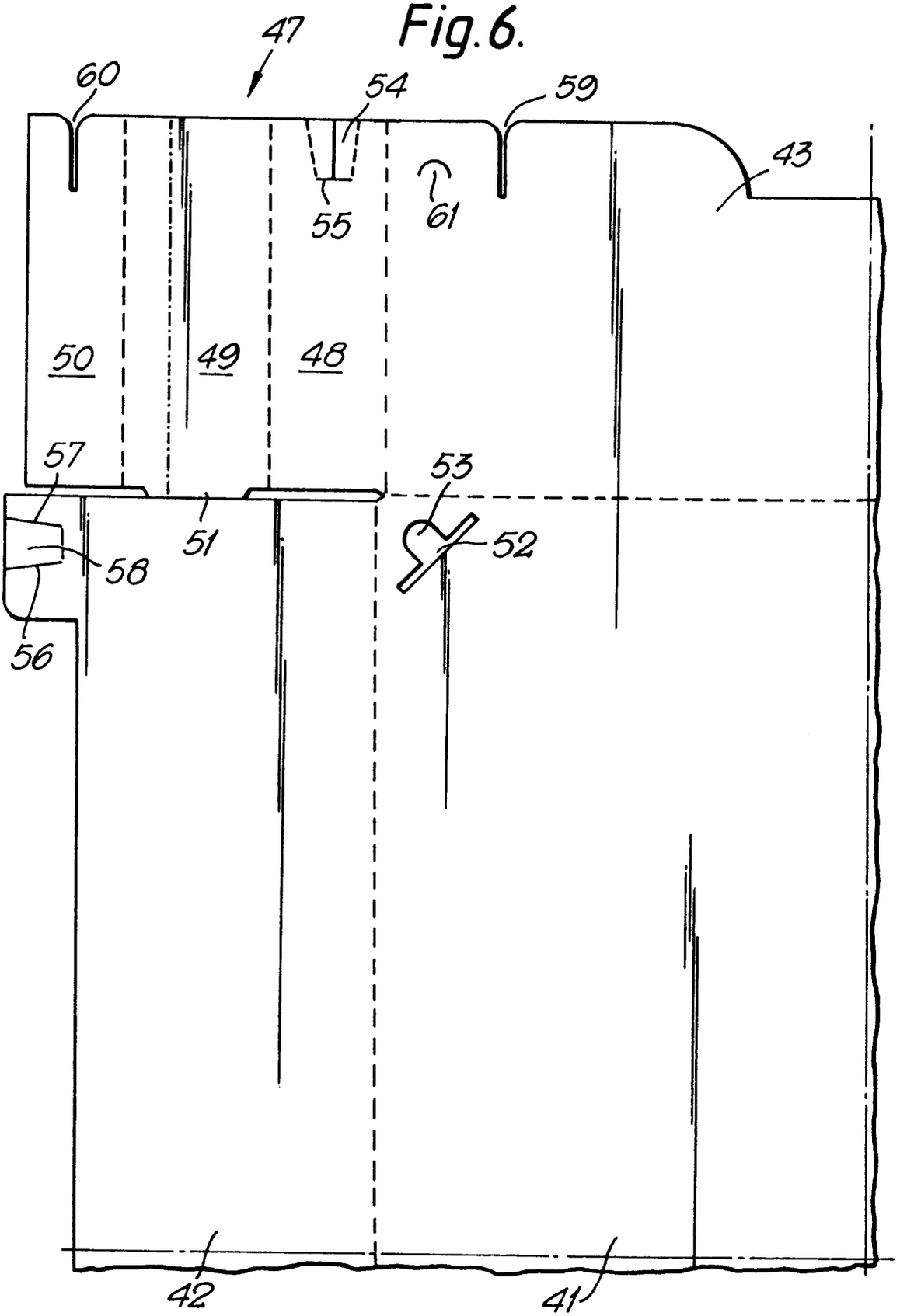


Fig.7.

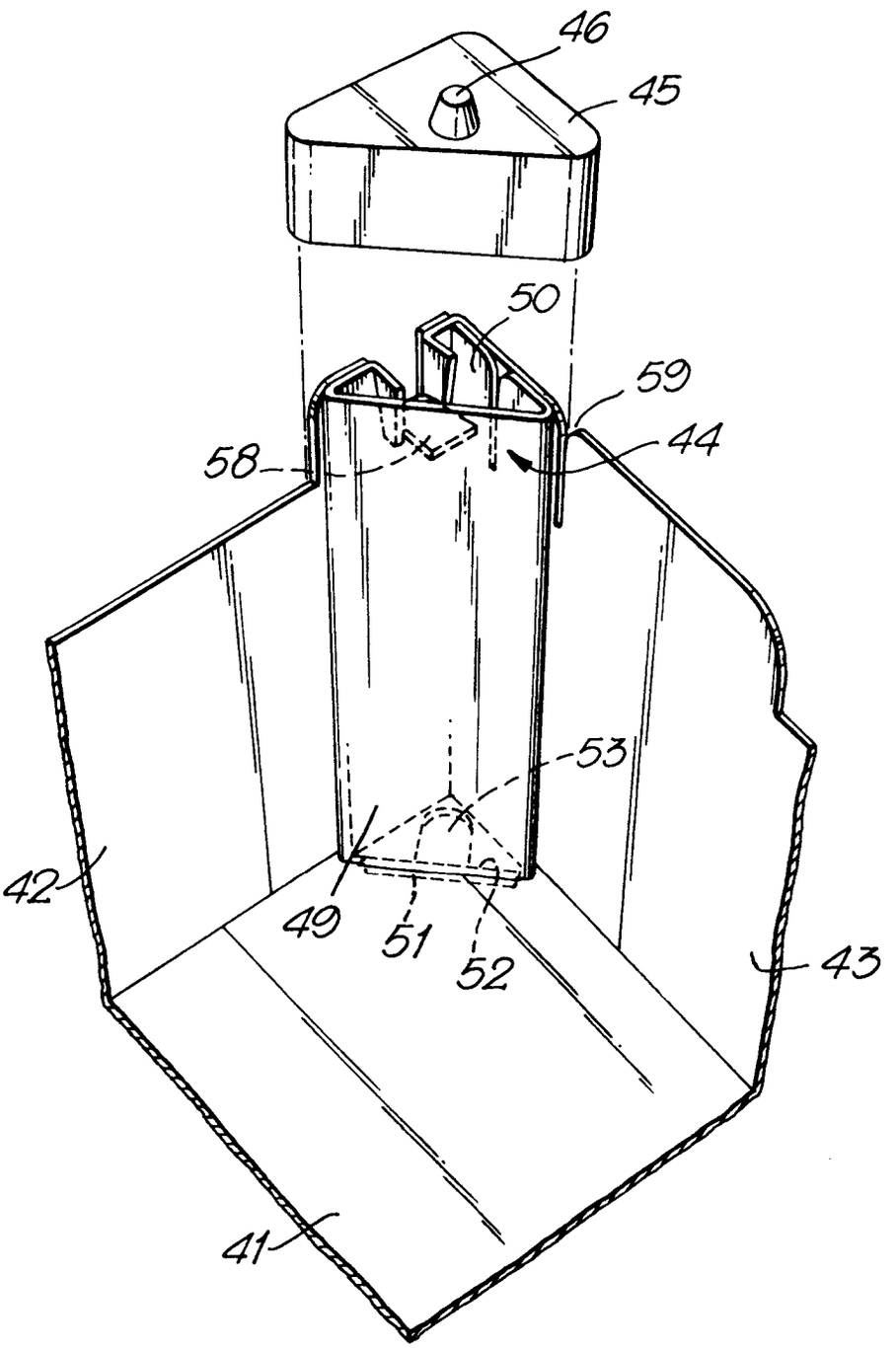
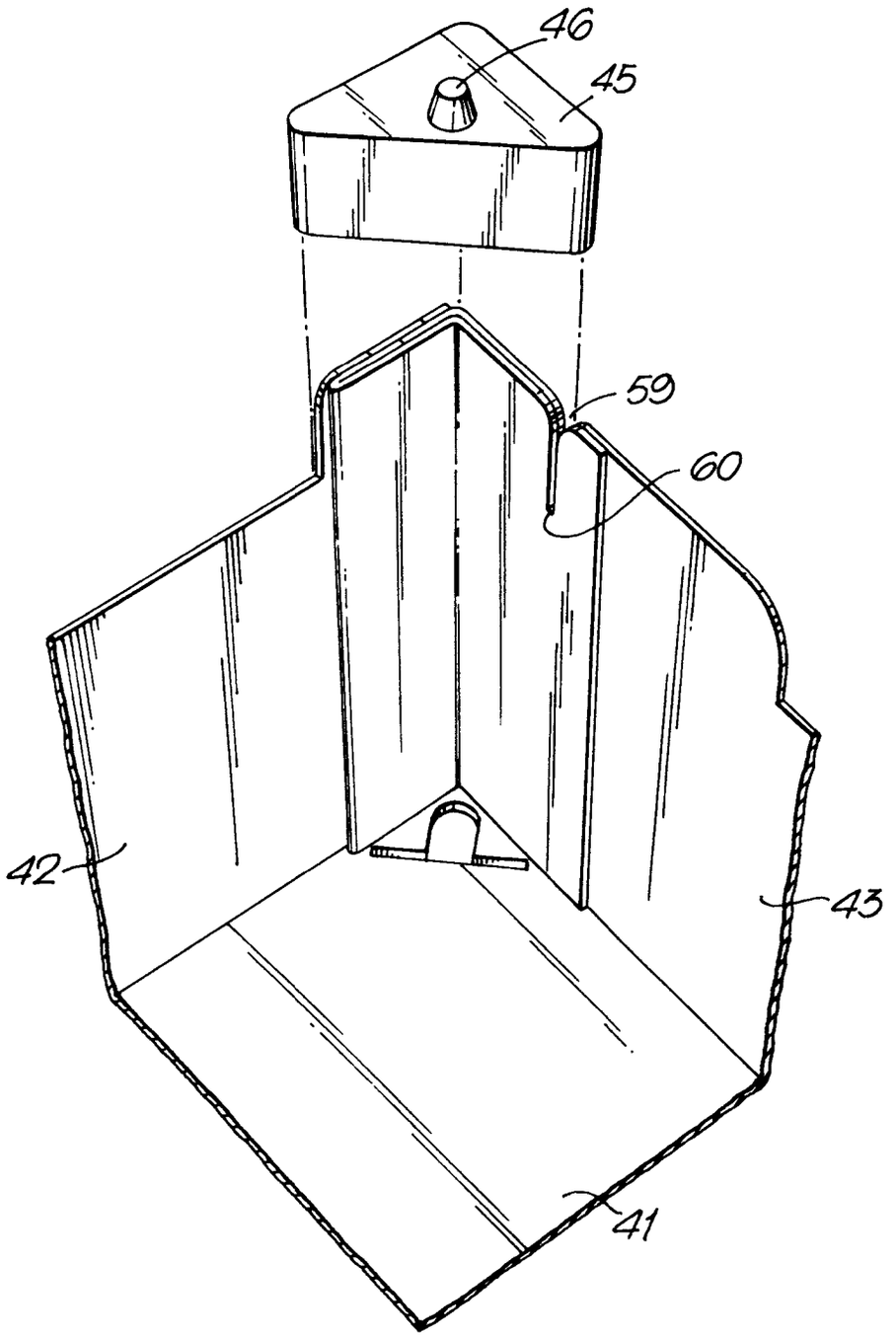


Fig.8.



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EUROPEAN SEARCH REPORT

Application Number
EP 93 30 5476

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 444 004 (SCA PACKAGING BELGIUM N.V.) * the whole document *	1,2,4, 6-8, 10-12	B65D5/22 B65D5/44
Y		5,9	
X	US-A-5 002 224 (MUISE) * the whole document *	1-3	
Y		9	
X	GB-A-2 198 121 (DANIEL AGUILO PANISELLO S.A.) * the whole document *	1,2,13	
Y	GB-A-2 043 596 (TILLOTSONS CORRUGATED CASES) * figure 6 *	5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	22 OCTOBER 1993	SMITH C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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