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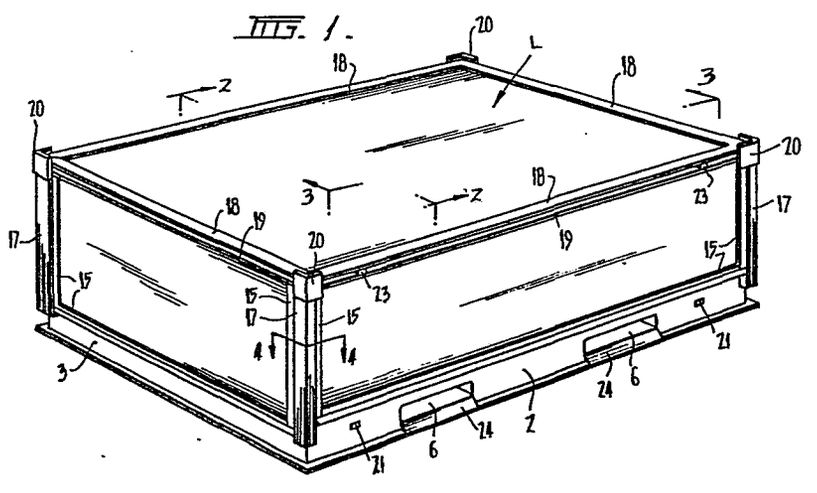
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(54) **Returnable container.**

(57) A returnable container has a light-weight, generally rectangular, base frame (1) with wall members hingedly attached thereto. A lid (L) has portions receiving the upper edges of the wall members to define a closed container. Each frame member of the base forms one part of a hinge of which the other part is a preformed substantially continuous edge portion of the co-operating wall member. The hinges permit at least a plurality of the wall members to pivot at least inwardly of the container whilst remaining connected to the base frame members, and at least one wall member (R) to pivot outwardly.




EP 0 048 577 A1

# RETURNABLE CONTAINER

## DESCRIPTION

This invention relates to returnable containers of the type adapted to operate as a protective container for goods of various kinds and to be capable of being collapsed once emptied for return to the sender.

In the past, shipping and other packing containers have been relatively roughly contructed from wood on the basis that they would be destroyed by the receiver of the goods being shipped. However, in this time of dimished natural resources, it is becoming increasingly important to avoid wastage of articles manufactured from wood and other natural resources.

Returnable shipping containers for articles such as automotive components are being damanded by an increasing number of companies shipping goods into and out of Australia and other countries. One returnable shipping container which is presently in use comprises a welded steel base frame to which wooden beams and plywood cladding are secured to define a closed pallet base to which plywood sides are attached by standard hinges which allow the sides to be collapsed onto the base for return shipping. The lid of the container is similarly heavily constructed and the sides must be bolted together before the goods in the container can be shipped. Returnable shipping containers of this general type (with the exception of the

steel base frame) are disclosed in U.S. Patent Nos. 1,508,266 Barrie and 1,745,317 Sherman. A similar container constructed from pressed metal components is disclosed in Australian Patent No. 449,050 (14791/70).

The manufacture of containers of the above described type is extremely labour intensive, involving a number of separate fabrication steps which involve of the order of 14 man/hours in the manufacture of each container. Furthermore, the component parts of the container are particularly heavy, especially the base, and this further increases the difficulties involved in manufacture. In addition, the assembly of the container for shipping is time-consuming due to the necessity for alignment of bolt holes and the container when collapsed for return shipping is both bulky and heavy. Similar comments apply to the container of Australian Patent No. 449,050 and in addition the components are relatively complex in construction and use.

Although a simple returnable shipping container having aluminium frame components has been proposed, the component parts of the container are not easily collapsible, requiring the wooden sides to be slid vertically out of the retaining frames, and the container is substantially more expensive than the known returnable containers described above. Thus, although such a container would have the advantage of being lighter and more compact than prior art containers referred to above, the disadvantages referred to above tend to negate the advantages.

A more complex aluminium framed container is disclosed in Australian Patent No. 209,815 (11631/55).

While this containter has a particularly strong construction and, due to its mating side walls, is particularly waterproof, the extrusions and mouldings forming the construction are extremely complex and the interlocking connections between the base and the side walls require disengagement of the walls from the base for the collapsing procedure. Thus, such a container would be prohibitively expensive compared to the containers presently in use.

It is the object of the present invention to provide an improved returnable container which has the advantages of being easy to fabricate, easy to erect and collapse and which occupies less volume than the prior art steel framed containers referred to above.

The invention provides a returnable container comprising a light-weight base member including preformed frame members connected to define a generally rectangular frame, wall members hingedly attached to said base frame members, releasable means for rigidly connecting said wall members at the edge of said container, and lid means having portions positively receiving the upper edges of said wall members to define a closed container, characterised in that each said base frame member is formed to define one component of a hinge construction while said wall members include preformed substantially continuous edge portions formed to define the co-operating component of said hinge construction, said hinge construction permitting direct pivotal movement of at least a plurality of said wall members at least inwardly of said container to faciliate collapsing of said container whilst

retaining said wall members in connected relationship with said base frame members, and in that at least one hinge construction is such as to enable at least one wall member to be pivoted outwardly of said base member.

The frame members are preferably formed with flanges supporting a sheet of plywood or other suitable material to define the floor of the container while the edge portions of said side wall members are formed in or secured to the edges of panels defining said side wall members. The lid means may comprise a central panel having frame members attached to the edges thereof, said frame members incorporating means for positively receiving the upper edges of said side wall members.

The base frame members, said side wall edge portions and said lid frame members are preferably formed as extrusions of a light-weight metal such as aluminium or a plastics material having the required strength properties. Since the side wall members are hinged to the base frame members by means of integral hinge components, the container is easy to erect and collapse and is considerably easier to manufacture than the prior art steel frame containers. By the use of extrusions having the required strength characteristics, the resulting container is not only lighter and easier to construct but is also sufficiently sturdy to withstand the harsh treatment received during shipping.

In the preferred returnable container at least three of said co-operating hinge components are designed to prevent pivotal movement of the connected side wall members outwardly of the base frame such that these side wall members may

only be folded inwardly towards the base frame. At least one of the hinge components associated with the fourth side wall member is preferably modified to facilitate removal of said side wall member from the base frame. The modification is preferably such as to enable outwardly pivoting movement of said wall member relative to the base frame, removal being effected when said side wall member is at a predetermined angle to said base frame member.

Preferably, at least one of said base frame members has it hinge component positioned at a level above the hinge components of the other base frame members to enable the side wall members associated therewith to be foled on to at least two of the other side wall members when folded.

In a particularly preferred form of the invention, each frame member is formed with an upstanding hinge component of substantially cylindrical cross-section, said edge portions of said wall members being formed with sockets adapted to captively receive said cylindrical hinge component. Preferably said edge portion is shaped to contact part of said base frame member when said wall member is substantially vertical to said base frame while allowing pivotal movement inwardly of the base frame of the container. In the case of the modified hinge component, the cylindrical portion is formed with a flat which enable the wall member to be lifted off the frame member when it is disposed at about $45^{o}$ to the frame member.

To faciliate lifting of the container by

means of a fork lift truck, at least two of the base frame members are provided with spaced apertures for receiving the forks of a fork lift truck. Similarly, to strengthen the base frame of the container, bracing channels may be secured between opposed base frame members, preferably on either side of each fork access aperature.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a container embodying the present invention;

Figure 2 is a sectional end elevation taken along the line 2-2 in Fig. 1;

Figure 3 is a fragmentary sectional side elevation taken along the line 3-3 in Fig. 1;

Figure 4 is a fragmentary sectional plan view taken along the line 4-4 in Fig. 1;

Figure 5 is a schematic view of the container showing the method of collapsing;

Figure 6 is a sectional end elevation of the container in the collapsed state ready for return shipping;

Figures 7, 8 and 9 are sectional end elevations of the components of the box frame of the container, and

Figure 10 is a sectional end elevation of the lid frame component.

Referring firstly to Figs, 1 to 4 of the drawings, the returnable shipping container embodying the invention comprises a base frame 1 including four extruded aluminium frame members 2, 3, 4 and 5 mitred and welded at the corners to define a generally rectangular frame. The frame members 2 and 5 are formed with fork access openings 6

and the base frame 1 is strengthened by means of channel section cross members 7 extending between the frame members 2 and 5 on either side of each fork access opening 6.

Consideration of Figs. 7 to 9 of the drawings will show that each frame member 2 to 5 has a modified I-beam configuration having spaced flanges 8 and 9 adapted to receive a sheet of marine grade plywood or other suitable material defining the floor 10 of the base member 1. It will be noted that the frame member 5 is of the same height as the frame members 3 and 4.

Each frame member 2, 3 and 4 is formed with an upstanding generally cylindrical hinge component 11 while the frame member 5 is formed with a modified cylindrical hinge component 12 formed with a flat 13 extending at approximately $45^{o}$ to the horizontal. Each hinge component 11 and 12 is adapted to be received within a similarly shaped socket 14, defining the other hinge component, in an edge member 15 secured by means of flanges 16 to the edges of four wall components which in use define the walls of the container. Similar edge members 15 are also attached to the vertical edges of the wall panels, leaving the upper edges of each wall panel free, and these members 15 co-operate with a locking bar 17 (Fig.4) which sidably engages the edge members 15 when mutually perpendicular to each other as shown in Fig. 4 of the drawings to lock the walls of the container together in their erected positions.

Referring to Fig. 2 of the drawings, the edge member 15 on the wall panel pivoted to the modified hinge component 12 on the frame member 5 is reversed, compared to the edge members 15 on the other walls, to allow pivotal movement of the

corresponding wall R outwardly of the confines of the base frame 1. The other walls cannot pivot outwardly due to engagement between the abutments 15a and the neck between the hinge componets 11 and the frame members 2, 3 and 4 (Figs. 2 and 3). Furthermore, the flat 13 formed on the hinge component 12 faciliates removal of the corresponding wall when it is disposed at about $45^{o}$ to the base frame (Fig. 2). However, when the wall is placed on the frame member 5, it may be pivoted to the vertical position in the same manner as the other walls and is similarly locked in position by means of locking bar 17.

The lid L of the container comprises a peripheral frame formed from aluminium extrusions (Fig. 10)mitre cut and welded to form a rectangular frame. The extrusion shown in Fig. 10 of the drawings comprises a pair of laterally extending flanges 18 and a pair of downwardly extending flanges 19 respectively adapted to receive the panel defining a lid L and the upper edges of the wall members of the container when in their erect positions. To provide a certain degree of weather protection at the upper edges of the corner of the container and to provide location members for similar contatiners to be stacked one on top of the other, angle brackets 20 are welded to each corner of the peripheral frame of the lid L. Of course, a similar degree of weather protection may be provided by forming a downwardly extending extension on the outwardly projecting lip on the outer most flange 19 of the lid frame componet (as shown in broken outline in Fig. 10) although the member 20 is still required to provide location means for

the stacking of containers.

Figures 5 and 6 of the drawings show the manner in which the walls and lid L are stacked when the container is in the collapsed or folded condition and it will be noted that the corner members 20 also serve to contain the removable side wall in the packaged position.

When the container is in the erected condition of Fig. 1 of the drawings, or in the collapsed condition of Figs. 5 and 6 of the drawings, metal bands (not shown) are passed around the container or the base frame, walls and lid to hold the assembly together. To facilitate proper location of the bands, small openings 21 are formed in the frame members 2 and 5 and rectangular tubes 22 extend between the respective openings 21 to ensure proper guidance of the bands during the insertion procedure. Reinforcing elements 23 may be positioned as shown in the frame of the lid L to prevent crushing of the frame by means of the bands. Similarly, the outer portions of the opening 21 may be smoothly rounded in any suitable manner to prevent crimping of the bands in use.

As shown in Figs. 1, 2 and 6 of the drawings, the fork access openings 6 may be provided with guards 24 to suitably guide the forks within the frame 1 and prevent damage to the frame members 2 and 5.

The side walls of the container may be extended in height to accommodate articles of larger dimensions by means of extension panels seamed to the upper edges of the wall panels by H-section extensions.

It will be appreciated from the above description that the embodiments of the invention provide a particularly compact and easily manufactured

returnable container of robust construction. Since the various frame components of the container are formed from extruded aluminium sections, the overall number of components required to be manufactured is reduced. Furthermore, the use of aluminium extrusions is preferred since this results in the container having a scrap value of approximately 25% of its original cost. This compares most favourably with the substantially nil scrap value of the steel framed returnable container of the prior art.

The frame components and edge portions are considerably less complex than the equivalent components of the container of Australian Patent 209,815 and as a result the cost of the containers are comparatively competitive with the cost of the returnable shipping containers presently in use.

CLAIMS

1. A returnable container comprising a light-weight base member including preformed frame members connected to define a generally rectangular frame, wall members hingedly attached to said base frame members, releasable means for rigidly connecting said wall members at the edges of said container, and lid means having portions positively receiving the upper edges of said wall members to define a closed container, characterised in that each said base frame member is formed to define one component of a hinge construction while said wall members include preformed substantially continuous edge portions formed to define the co-operating component of said hinge construction, said hinge construction permitting direct pivotal movement of at least a plurality of said wall members at least inwardly of said container to facilitate collapsing of said container whilst retaining said wall members in connected relationship with said base frame members, and in that at least one hinge construction is such as to enable at least one wall member to be pivoted outwardly of said base member.

2. The returnable container of claim 1, wherein the or each hinge construction permitting outward pivoting is modified to permit that wall member to be lifted out of engagement with its base frame member whilst still facilitating pivotal movement of said wall member in connected relationship with its base frame member.

3. The container of claim 1 or 2, wherein the components of said hinge construction include a substantially continuous substantially cylindrical member and an open faced substantially continuous socket of complementary shape to said cylindrical member and capable of receiving said cylindrical member for permitting pivotal movement between said components while said cylindrical member is physically retained within said socket.

4. The returnable container of claim 3, wherein said cylindrical member is formed on the upper edge of each of said base frame members and is connected to its base frame member by a narrow neck.

5. The returnable container of claim 4, wherein said base frame members are formed as extrusions.

6. The returnable container of claim 4 or 5, wherein said socket is formed in said edge portions, said edge portions having an abutment portion which engages said neck to prevent pivotal movement of said edge portion in one direction from the erected position of its wall member.

7. The returnable container of any one of claims 3 to 6, wherein at least one said cylindrical member is formed with a flat portion which enables the co-operating socket to be lifted off said cylindrical portion at one angular position of said socket with respect to said cylindrical portion.

8. The returnable container of claim 6 or 7, wherein each said edge portion is formed as an extrusion which is attached to the edges of said wall members.

9. The returnable container of any preceding claim, wherein each base frame member has an upstanding web terminating at its lower end in at least one lateral flange and terminating at its upper end in one of said hinge components, said web having a pair of lateral flanges directed inwardly of said base frame and adapted to receive a panel defining the floor of said container.

10. The returnable container of any preceding claim, wherein each edge portion has a pair of parallel flanges between which panels defining said wall members of said container are received.

11. The returnable container of any preceding claim, wherein the hinge component on at least one

base frame member is disposed at a higher level to the hinge components on the other base frame members to facilitate the stacking of said walls on said base member.

12. The returnable container of any preceding claim, wherein similar edge portions are provided on the vertical edges of each wall and said releasable means includes inwardly directed projections for partly engaging said sockets to rigidly connect adjacent wall members at the edges of said container, said releasable means slidably engaging said edge portions to permit said releasable rigid connection.

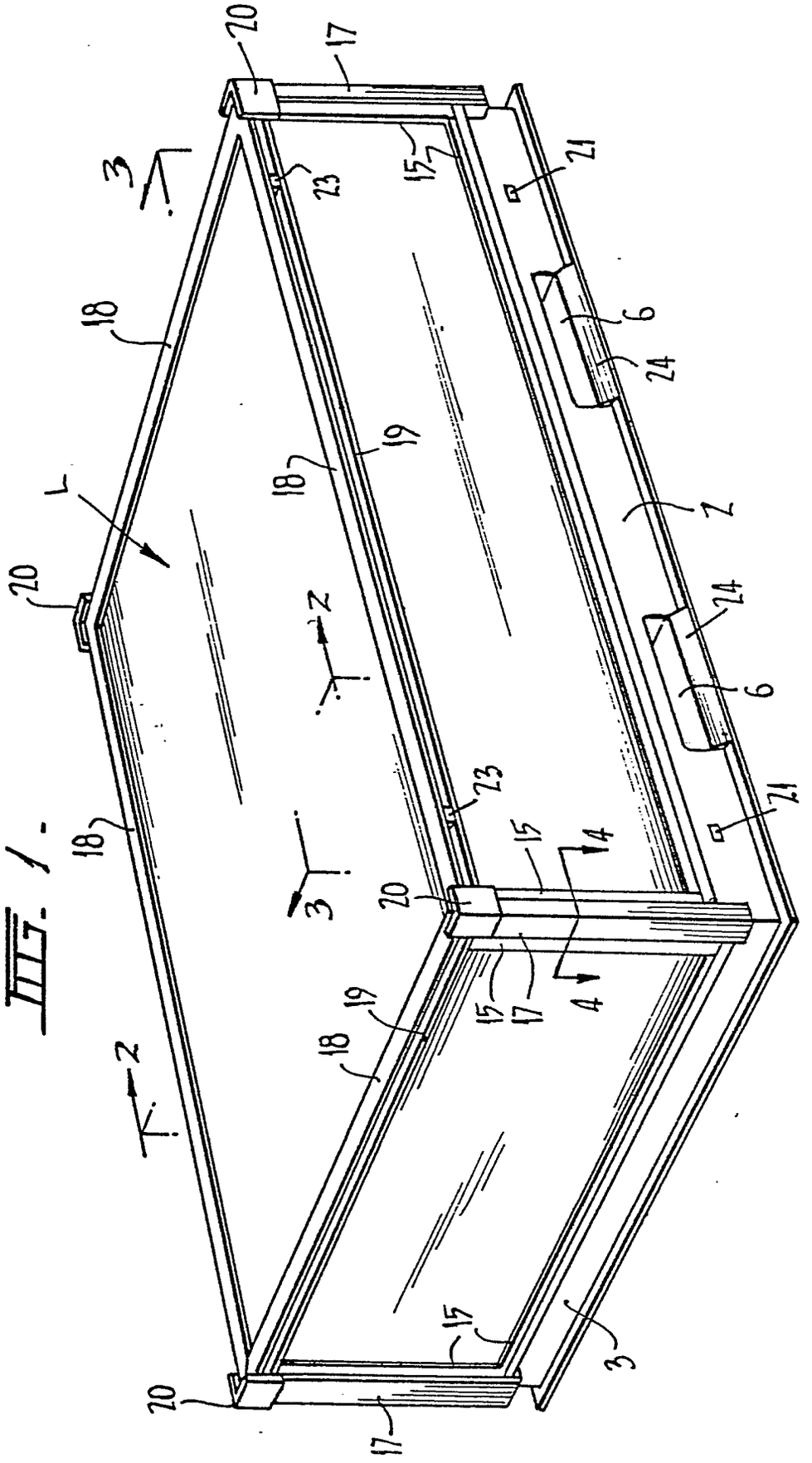



FIG. 1.

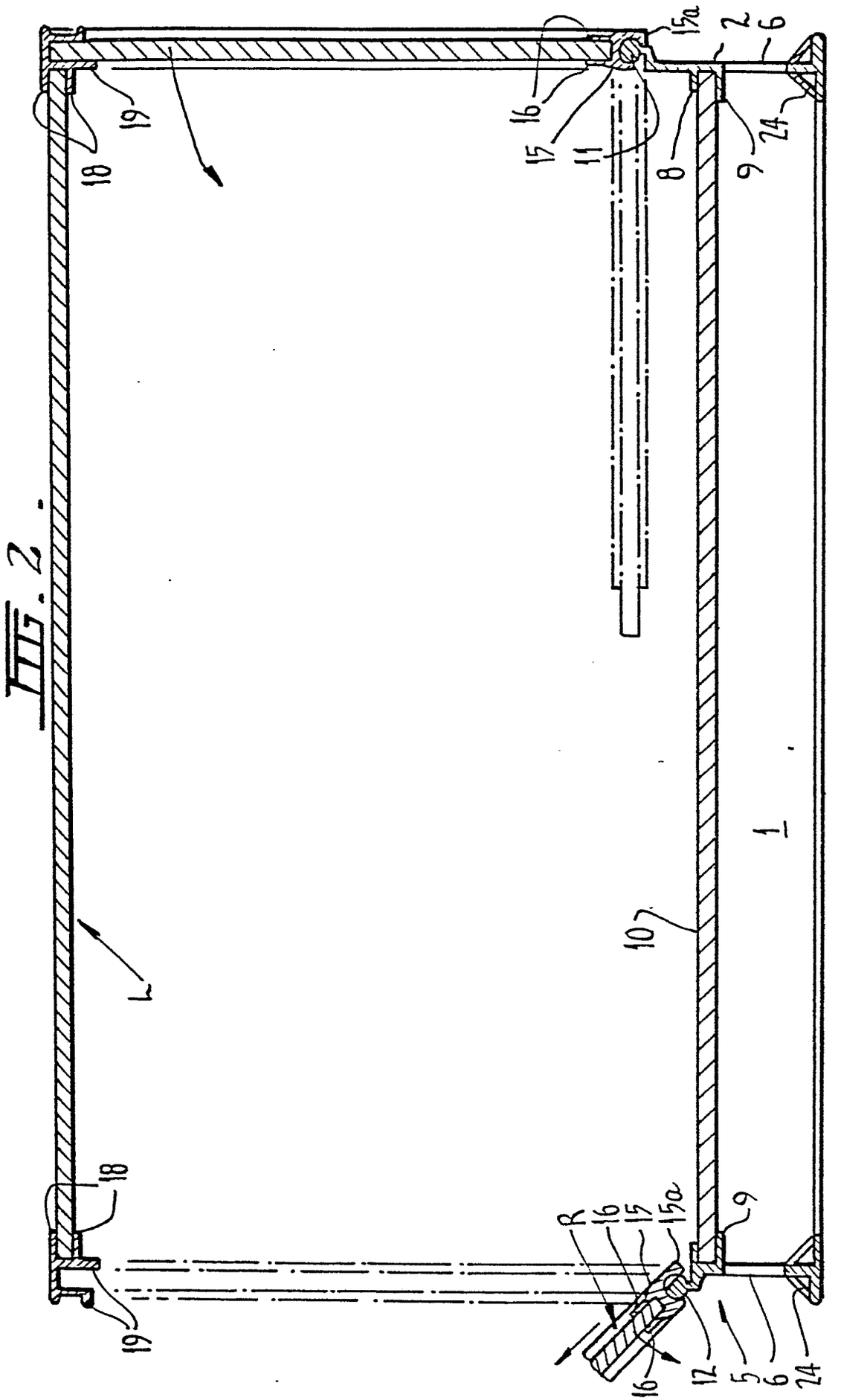



FIG. 2.

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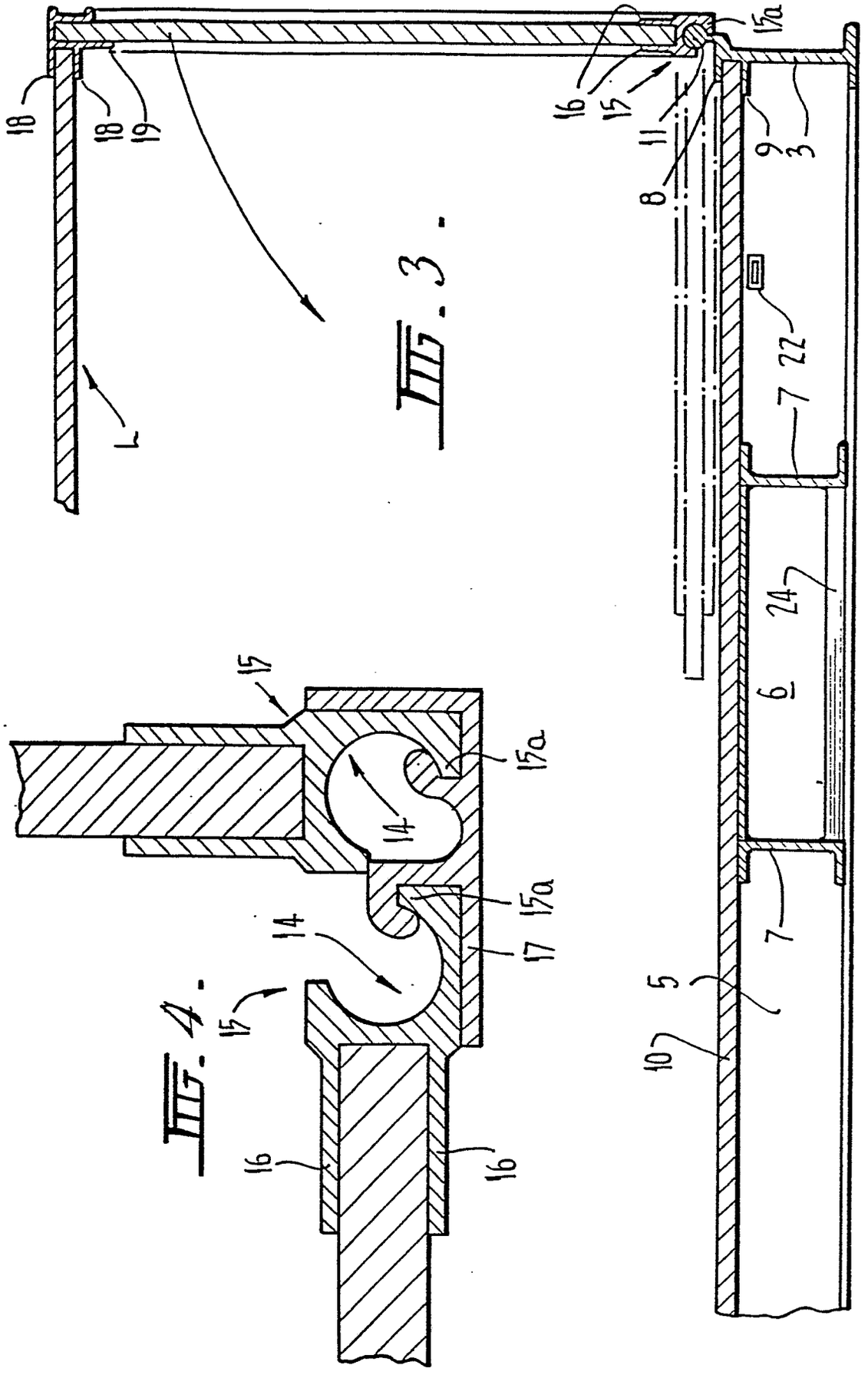
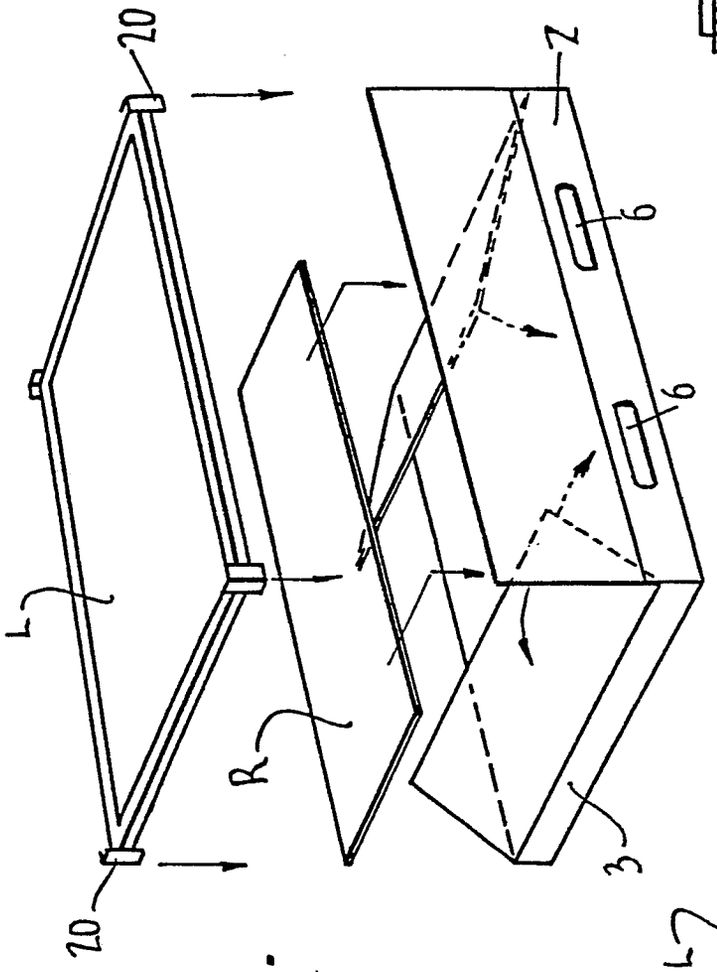


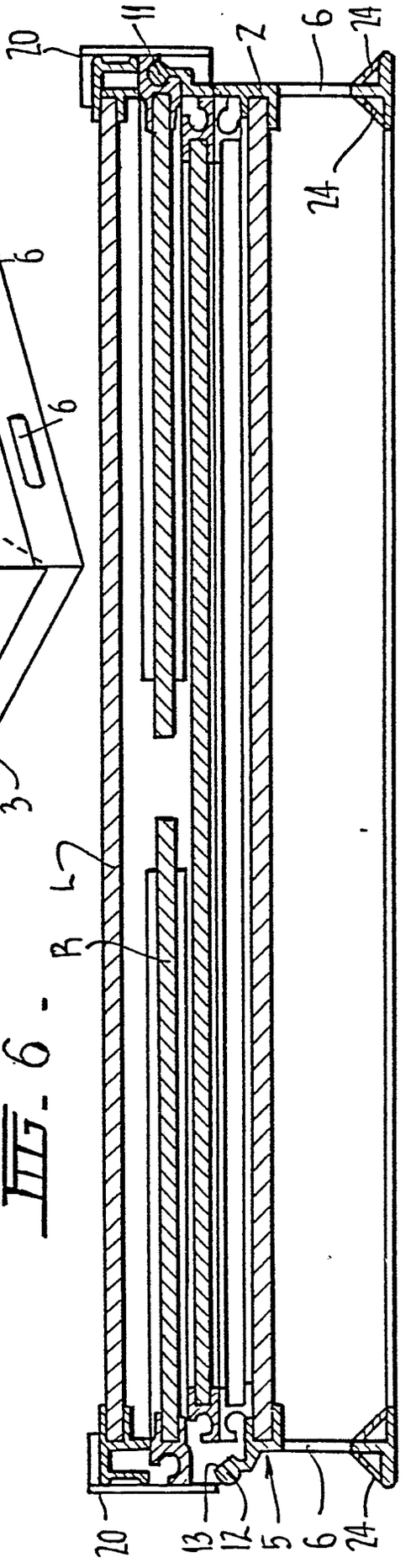

Fig. 3.




Fig. 4.




Фиг. 5.




Фиг. 6

FIG. 7.

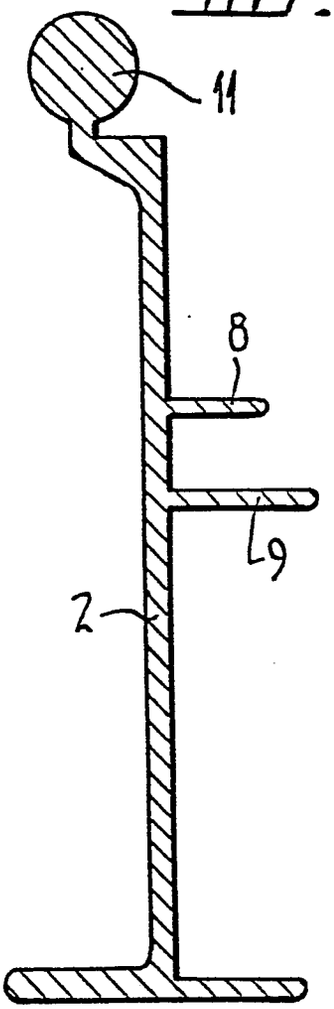



FIG. 8.

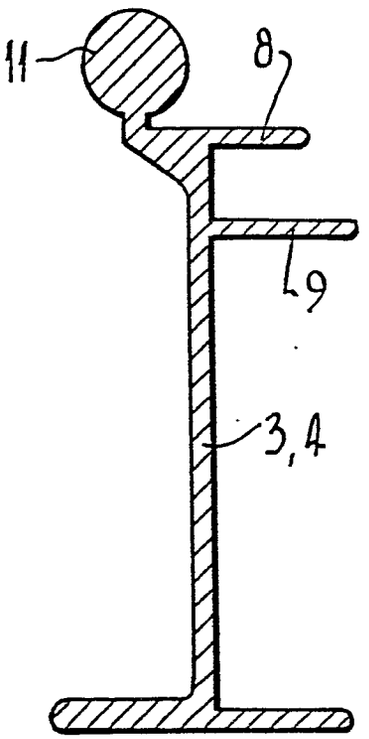
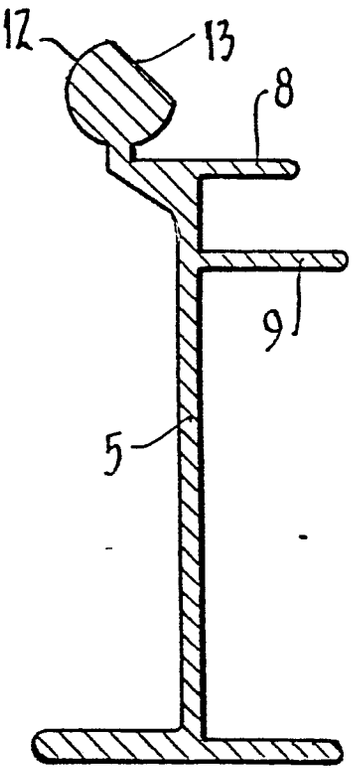



FIG. 9.



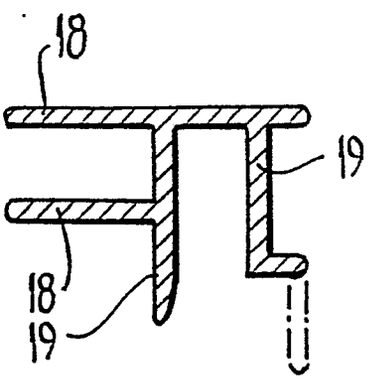




FIG. 10.

European Patent Office

# EUROPEAN SEARCH REPORT

EP 81 30 4181

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim |
|---|---|---|
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CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

B 65 D 88/52
19/12
6/22

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

B 65 D

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 15-12-1981 | OSTIJN |