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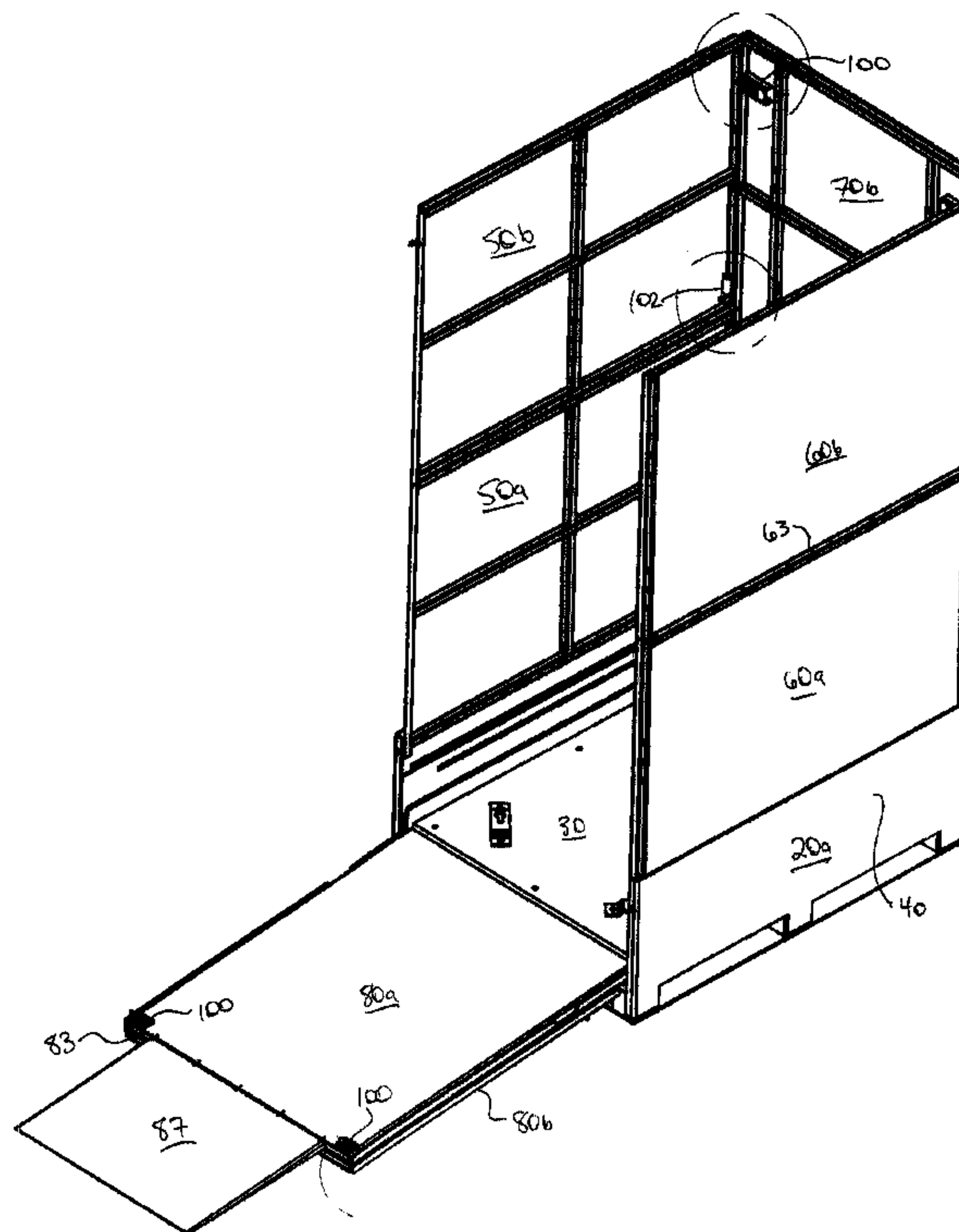
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(54) Titre : CONTENANT DE TRANSPORT PLIANT

(54) Title: COLLAPSIBLE TRANSPORT CONTAINER



(57) Abrégé/Abstract:

A collapsible, reusable shipping container having a base frame into which the sides of the container slide and/or fold when the container is not in use. Thus, the collapsed container takes up essentially the same volume as the base frame, but when erected the container provides a fully protective enclosure for shipping large articles, especially fragile articles. The base frame can be stacked on another base frame to maximizing the use of space for shipping containers back to the source of origin.

Abstract

A collapsible, reusable shipping container having a base frame into which the sides of the container slide and/or fold when the container is not in use. Thus, the collapsed container takes up essentially the same volume as the base frame, but when erected the container provides a fully protective enclosure for shipping large articles, especially fragile articles. The base frame can be stacked on another base frame to maximizing the use of space for shipping containers back to the source of origin.

COLLAPSIBLE TRANSPORT CONTAINER

Field of Invention

This invention relates to shipping. In particular, this invention relates to a container for transporting goods.

5 **Background of the Invention**

Goods of many types, shapes and sizes are packaged for shipping through a typical chain of distribution, from the factory to a distributor, to a retailer or dealer and ultimately to the customer. Conventionally goods are packed, often along with a cushioning material such as foam padding, pellets or "bubble wrap," in a corrugated
10 cardboard carton which usually has been designed and manufactured specifically for the product being shipped and is intended to be discarded after shipment.

The volume of cardboard and cushioning material used and discarded on a daily basis in the United States alone is staggering. This is not only expensive for the customer, who ultimately pays for the cost of the packaging along with the goods, but
15 is also harmful to the environment in many ways. Many natural resources are used and various types of toxins are expelled into the environment during the manufacture of such packaging materials. After shipping the disposal of the packaging materials becomes a waste management problem, particularly since many types of packing and cushioning materials are not biodegradable.

20 Reusable containers such as metal transport or shipping containers are often used for shipping product in bulk. However, there is a high cost associated with the use of a reusable shipping container. Not only must it be shipped to the intended destination, but it also must be shipped back to the source after the goods are unloaded. Accordingly, such containers tend to be used only when large volumes of
25 articles can be shipped in a single container, for example from a factory to a distribution point. Moreover, reusable containers are typically used along busy two-way shipping routes where they can be reloaded for the return trip, so as not to waste the cost of shipping an empty container back to the source.

Thus, reusable metal shipping or transport containers are used to ship goods between the higher levels in the chain of distribution, for example from the manufacturer to distributor or dealer. But in general reusable metal shipping containers are not practical for shipping goods from a dealer or retailer to a customer,
5 because the high cost of returning the container to the shipper.

Shipping fragile goods presents additional problems. For example, computer servers and related equipment are often assembled into a secure cabinet before shipping to the customer. The server cabinet, which is intended to remain with the customer to house the goods after installation, is bolted to a skid which may be
10 specially built to cushion the server cabinet. The server cabinet is then carefully packed in protective materials and covered with cardboard, to protect the cabinet and the computer equipment that it contains during shipping, and the packed article is shipped to the customer for installation.

However, no matter how well the server cabinet is packed it cannot be
15 completely protected against percussive impacts. Not only is the packing material (typically cardboard and foam layers) soft and flexible, so that it yields easily to external forces, but the packing material is supported by the cabinet itself, so any impact which cannot be completely absorbed by the packing material must be absorbed by the cabinet. There is no space between the protective packaging and the
20 cabinet to serve as a buffer or "crumple zone" for impacts which are sufficiently forceful to cause the packaging to buckle.

It would accordingly be much safer to ship such a fragile article in a self-supporting metal shipping container. However, because of the costs associated with returning the container to the shipper, it is often impractical to use a reusable metal
25 shipping container to ship goods to a customer.

There is accordingly a need for a reusable shipping container which provides a suitable protective structure for the goods during shipping, but which can be returned to the shipper at a reasonable cost so it is not cost-prohibitive for transporting small volumes of articles.

Summary of the Invention

The present invention provides a reusable shipping container which is collapsible, so that when empty the container can be collapsed to a fraction of its erected volume. Thus, the cost of returning the container to the shipper is
5 considerably reduced, while during shipping the container provides a secure and impact-resistant protective structure for the goods.

The invention accomplishes this by providing a base frame into which the sides of the container slide or fold when the container is not in use. The collapsed container takes up essentially the same volume as the base frame, but when erected
10 the container provides a fully protective enclosure for shipping large articles, especially fragile articles. The base frame can be stacked on another base frame, maximizing the use of space for shipping collapsed containers back to the source of origin.

The present invention thus provides a collapsible container, comprising a
15 substantially rectangular base defined by a base frame, a first wall having a bottom end pivotally connected along a first side of the base frame at a first level, pivotable between an erect position and a position contained within the base at the first level; a second wall having a bottom end pivotally connected along a second side of the base frame opposite the first side at a second level, pivotable between an erect position and
20 a position contained within the base at the second level; a third wall having a bottom end pivotally connected along a third side of the base frame, slidable along a first track at a third level between a position contained within the base and a position outside of the base, and in the position outside of the base pivotable between an erect position and an orientation parallel to the base; a fourth wall having a bottom end
25 pivotally connected along a fourth side of the base frame, slidable along a second track at a fourth level between a position contained within the base and a position outside of the base, and in the position outside of the base pivotable between an erect position and an orientation parallel to the base; and connectors for affixing the walls in the erect position.

The present invention further provides a method of collapsing a container having a substantially rectangular base, comprising the steps of a. pivoting a fourth wall from an erect position to a generally horizontal position and sliding the fourth wall along a second track at a fourth level to a position contained within the base; b.

5 pivoting a third wall to from erect position to a generally horizontal position and sliding the third wall along a first track at a third level to a position contained within the base; c. pivoting a second wall from an erect position to a position contained within the base at a second level; and d. pivoting a first wall from an erect position to a position contained within the base at a first level.

10 The present invention further provides a method of erecting a container having a substantially rectangular base, comprising the steps of a. pivoting a first wall from collapsed position contained within the base at a first level to an erect condition; b. pivoting a second wall from a collapsed position contained within the base at a second level to an erect condition; c. sliding a third wall along a first track at a third

15 level from a collapsed position contained within the base to a position outside the base and pivoting the third wall to an erect condition; d. sliding a fourth wall along a second track at a fourth level from a collapsed position contained within the base to a position outside the base and pivoting the fourth wall to an erect condition; and e. connecting the erected walls together.

20 In a further embodiment of the container, each wall comprises a plurality of panels hinged together, and the method further includes the step of, before pivoting each wall, folding each wall so that the panels are in an overlaying orientation.

Brief Description of the Drawings

In drawings which illustrate by way of example only a preferred embodiment

25 of the invention,

Figure 1 is a perspective view of a container of the invention in an erect condition,

Figure 2 is a perspective view of the container of Figure 1 showing a preferred embodiment of the reinforcing means,

Figure 3 is an end elevation of the container of Figure 1,

Figure 4 is a side elevation of the container of Figure 1,

Figure 5 is a perspective view of a container of the invention in a collapsed condition,

5 Figure 6 is an exploded view of the collapsed container of Figure 5,

Figure 7 is a front elevation of the collapsed container of Figure 5,

Figure 8 is a perspective view of the base of the container of Figure 1,

Figure 9 is a top plan view of the base of Figure 8,

Figure 10 is a side elevation of the base of Figure 8,

10 Figure 11 is an end elevation of the base of Figure 8,

Figure 12 is a perspective view of a latch for locking lower panels of the end walls in an erected condition,

Figure 13 is a perspective view of a latch for locking upper panels of the end walls in an erected condition,

15 Figure 14 is a perspective view of a latch for locking the side walls in an unfolded condition,

Figure 15 is a perspective view of a latch for locking the top of the container, and

Figure 16 is a perspective view of the container showing one end wall
20 positioned as a ramp.

Detailed Description of the Invention

A container 10 according to the invention is illustrated in Figures 1 to 7. Although the invention is described and illustrated in the context of an embodiment which is particularly advantageous for use in the shipping of delicate or fragile

articles, such as computer equipment, the invention is not so limited and certain features may not be necessary when the container 10 is used to ship other types of goods.

In the preferred embodiment the container 10 comprises a substantially rectangular base defined by a base frame 20. The base frame 20 comprises a floor support frame 22 welded to feet 24, and optionally a bottom frame 26 welded to the bottom of feet 24 to form a skid structure. The space between the floor support frame 22 and bottom frame 26 is advantageously left open, as shown in Figures 10 and 11, to allow the base frame 20 to be captured and raised by a fork lift (not shown).

The floor support frame 22 supports a floor 30, which in the preferred embodiment for transporting fragile articles may comprise resilient members such as medium density foam (MDF) strips 32 sandwiched between 3/4 inch plywood sheets 34. The resilient strips 32 provide a cushioning action in the floor which helps to absorb shocks encountered during shipping. The floor support frame 22 surrounds the floor 30 and may be bolted, screwed or otherwise fastened to the floor 30 to retain the floor 30 securely in position within the base frame 20.

The base frame 20 further comprises means for securing the walls 50, 60, 70, 80, in the preferred embodiment comprising a first upstanding support plate 40 affixed (for example welded) along a first side 20a of the base frame 20, and a second upstanding support plate 44 is similarly affixed along a second side 20c of the base frame 20 opposite to the first side 20a.

A first wall 50, in the preferred embodiment comprising panels 50a, 50b joined together by a hinge 53 in a bifold fashion, has its bottom end 51 pivotally connected along the first side 20c of the base frame 20, in the preferred embodiment by hinge pins 52 extending through holes disposed in support flanges 42, at a first level within the base frame 20. The wall 50 can thus be folded along hinge 53 and pivoted from the erect position, shown in Figure 4, to a position contained within the base frame 20 at the first level, as shown in Figure 7.

A second wall 60, in the preferred embodiment comprising panels 60a, 60b joined together by a hinge 63, similarly has its bottom end 61 pivotally connected along a second side 20a of the base frame 20, opposite the first side 20c, in the preferred embodiment by hinge pins 62 extending through holes disposed in flanges 46, at a second level within the base frame 20. The wall 60 can thus be folded in half along hinge 63 and pivoted between an erect position, shown in Figure 1, and a position contained within the base frame 20 at the second level, as shown in Figure 7. It can be seen that the second level, at which the wall 60 is hinged to the support plate 40, is below the first level, at which the wall 50 is hinged to the support plate 44. Thus, when the walls 50, 60 are collapsed, they nest within the base frame 20 between the support plates 40, 44 in a layered fashion, one over the other.

A third wall 70, in the preferred embodiment comprising panels 70a, 70b joined together by a hinge 73, has its bottom end 71 pivotally connected along a third side 20b of the base frame 20, for example by hinge pins 72. In this case the hinge pins 72 are disposed in opposed channels 75 forming a track extending at a third level, which is below the second level, along the support plates 40, 44. The third wall 70 is thus both pivotable between the erect position and a collapsed position substantially parallel to the floor 30, and slidable along the channels 75, best seen in Figures 10 and 11. The channels 75 each comprise a generally horizontal portion 75a and a generally vertical portion 75b, so that the bottom end 71 can be slid up above the level of the floor 30 and over the floor 30 to a point near the opposite end of the base frame 20, to be contained within the base frame 20, as shown in Figure 7.

The fourth wall 80, in the preferred embodiment comprising panels 80a, 80b joined together by a hinge 83, has its bottom end 81 pivotally connected along a fourth side 20d of the base frame 20, for example by hinge pins 82. The hinge pins 82 are disposed in opposed channels 85 forming a track extending at a fourth level, which is below the third level, along the support plates 40, 44. The fourth wall 80 is thus both pivotable between the erect position and an orientation parallel to the floor 30, and slidable along the channels 85. The channels 85 each comprise a generally horizontal portion 85a and a generally vertical portion 85b, so that the bottom end 81 slides up and over the floor 30 to a point near the opposite end of the base frame 20,

so that the fourth wall 80 is also contained within the base frame 20, as shown in Figure 7.

In the preferred embodiment the support plates 40, 44 are double-walled for at least a part of their height, and the channels 75, 85 are formed in the inner walls, as shown in Figure 8, so that the channels 75, 85 do not expose the contents of the container 10 to the environment outside of the container 10.

A lid 90 having flanges 92 is dimensioned to fit over the container 10. The lid 90 may be engaged to the top of the container 10 by a pair of engaging pins 94 extending through holes 94 in one wall of the container (in the embodiment illustrated end wall 70), shown in Figure 2, and latches such as toggle latches 96 affixing the lid 90 to the opposite wall (in the embodiment illustrated wall 80), shown in Figure 1. The latches 96 may optionally be locked for increased security. The particular locations of the pins 94 and latches 96 are a matter of selection. Any other suitable means may be employed to engage the lid 90 to the container 10, and the invention is not limited thereby. Preferably a short length of angle bar 98 extending above the lid 90 is welded to the corners of the lid 90, which allows collapsed containers 10 to be stacked on top of one another for convenient transport when shipping containers 10 back to their source of origin.

In the preferred embodiment the base frame 20 is composed of steel for strength, and the walls 50, 60, 70 and 80 and lid 90 are composed of aluminum to reduce the weight of the container 10. The walls 50, 60, 70 and 80 for example may be formed from sheet aluminum overlaying a frame and struts of aluminum tubing, shown in phantom in Figure 2. However, it will be appreciated that the composition and structure of the various components is a matter of selection for any particular application, and the container 10 of the invention could alternatively be formed from other metals, wood, plastic and/or any combination of these or other suitable materials, without departing from the principles of the invention.

In the preferred embodiment each wall 50, 60, 70 and 80 respectively comprises a pair of panels 50a, 50b joined by hinge 53; 60a, 60b joined by hinge 63; 70a, 70b joined by hinge 73; and 80a, 80b joined by hinge 83; respective panel pairs

being hinged together in a bifold fashion, to fold into an overlaying position. This allows the erected container 10 to assume a height which is significantly greater than the dimensions of the base frame 20, while still allowing the side walls 50, 60, 70 and 80 to be contained entirely into the base frame 20 in the collapsed position. It will be appreciated that depending upon the size and proportions of the intended cargo, it may also be possible to form each of the side walls 50, 60, 70 and 80 as an integral rigid panel. If hinged bifold panels are used as shown, the hinges 53, 63, 73 and 83 are preferably piano hinges which extend substantially the full width of each respective panel, to avoid leaving a gap between panels and to thus help keep dust and other contaminants out of the container 10.

The walls 50, 60, 70 and 80 are retained in the erect position by a combination of edge flanges, for example flanges 79 along the side edges of wall 70 and flanges 89 along the side edges of wall 80, respectively, which wrap around the side edges of walls 50 and 60, as shown in Figure 2; and connectors, for example releasable latches 100 that lock the walls 70 and 80 to the side edges of the walls 50 and 60, as shown in Figures 12 and 13, and releasable latches 102 that lock the walls 50 and 60 into the unfolded condition, as shown in Figure 14.

In operation, the collapsed container 10 is in the position shown in Figures 5 and 7. The lid 90 is removed and set aside. The uppermost wall 50 is pivoted to an upright position about pins 52 and locked into the unfolded condition by latches 102, and the next lower wall 60 is then pivoted to an upright position about pins 62 and similarly locked into the unfolded condition by latches 102. The wall 80 at one end of the container 10 is lifted slightly and pulled generally horizontally out of the front end of the base frame 20. The pins 82 slide along the horizontal portions 85a of the channels 85 until the pins 82 fall into the vertical portions 85b of the channels 85, best seen in Figure 10, at which point the bottom end 81 drops to the level of the floor support frame 22. The hinged edge of panel 80b can be placed on the ground or surrounding floor and the folded wall 80 can be left in this position as the rest of the container 10 is assembled, to serve as a ramp (with an optional wedge-shaped ramp extension 87 to accommodate the height of the hinged edges of the panels 80a, 80b)

for wheeling the article (for example a computer server cabinet, not shown) into or out of the container 10, as shown in Figure 16.

The wall 70 at the other end of the container 10 is lifted slightly and pulled generally horizontally out of the end of the base frame 20. The pins 72 slide along the horizontal portions 75a of the channels 75 until the pins 72 fall into the vertical portions 75b of the channels 75, seen in Figure 10, at which point the bottom end 71 drops to the level of the floor support frame 22. The wall 70 is then unfolded about hinge 73, the walls 50 and 60 are unfolded about hinges 53, 63, respectively, and the latches 100 are secured through the edges of walls 50, 60 and flanges 79 so that walls 50, 60 and 70 are supported in the erect position.

The article is then placed in the container 10, for example wheeled up the ramp formed by extended wall 80. In the case of a server cabinet (not shown) it is advantageous to fasten the cabinet to the floor 30, which retains it generally centered within the container and away from the walls 50, 60, 70, 80. For this purpose brackets 31, best seen in Figure 9, are fastened to the top plywood layer 34, and complementary bolts are fastened to the underside of the cabinet base.

Once the article has been fastened to the floor 30, the wall 80 is pivoted to the vertical position about pins 82 such that edge flanges 89 wrap around the side edges of wall panels 50a and 60a. Latches 100 are engaged to flanges 79 and panel 80b is unfolded about hinge 83 so that edge flanges 89 wrap around the side edges of wall panels 50b and 60b. The lid 90 is placed over the container 10 by inserting pins 94 into the holes in panel 80b, drawing the lid toward the wall 80 until it drops into position, and closing latches 96. Optionally a lock can be applied to each of the latches (for example hasps) 96, as shown in Figure 15. The article is then ready for shipping. The container 10 can be lifted by a fork lift and packed in any desired vehicle for transport.

Following delivery, the container 10 is unloaded at the destination by forklift. The latches 96 are disengaged, and the lid 90 is removed. The wall 80 is folded about hinge 83, the latches connecting wall 80 to walls 50 and 60 are disengaged, and wall

80 is then pivoted about pins 82 until hinge 83 rests on the ground, so that wall 80 can serve as a ramp for unloading the article from the container 10.

The latches 100 securing the wall 70 to walls 50 and 60 are disengaged, and the top panels 50b, 60b and 70b are folded down about their respective hinges 53, 63 and 73. Wall 70 is pivoted about pins 72 until it is generally horizontal, and then the lower end 71 is lifted to raise pins 72 to the top of the vertical portions 75b of channels 75. Wall 70 is then pushed across the base frame 20, with the pins 72 traveling along the horizontal portions 75a of channels 75 until the wall 70 is wholly contained within the base frame 20. To collapse the container 10, the lower end 81 of wall 80 is similarly lifted to raise pins 82 to the top of the vertical portions 85b of channels 85, and wall 80 is pushed across the base frame 20, with the pins 82 traveling along the horizontal portions 85a of channels 85, until the wall 80 is wholly contained within the base frame 20. Walls 60 and 50 are pivoted in order to nest in a generally horizontal position within the base frame 20, and the lid 90 is placed over the base frame 20.

A preferred embodiment of the invention has been described by way of non-limiting example only. Those skilled in the art will appreciate that certain modifications and adaptations may be made without departing from the scope of the invention as claimed.

WE CLAIM:**1. A collapsible container, comprising**

a substantially rectangular base defined by a base frame,

a first wall having a bottom end pivotally connected along a first side of the base frame at a first level, pivotable between an erect position and a position contained within the base at the first level;

a second wall having a bottom end pivotally connected along a second side of the base frame opposite the first side at a second level, pivotable between an erect position and a position contained within the base at the second level;

a third wall having a bottom end pivotally connected along a third side of the base frame, slidable along a first track at a third level between a position contained within the base and a position outside of the base, and in the position outside of the base pivotable between an erect position and an orientation parallel to the base;

a fourth wall having a bottom end pivotally connected along a fourth side of the base frame, slidable along a second track at a fourth level between a position contained within the base and a position outside of the base, and in the position outside of the base pivotable between an erect position and an orientation parallel to the base;

a lid, and

connectors for affixing the walls in the erect position.

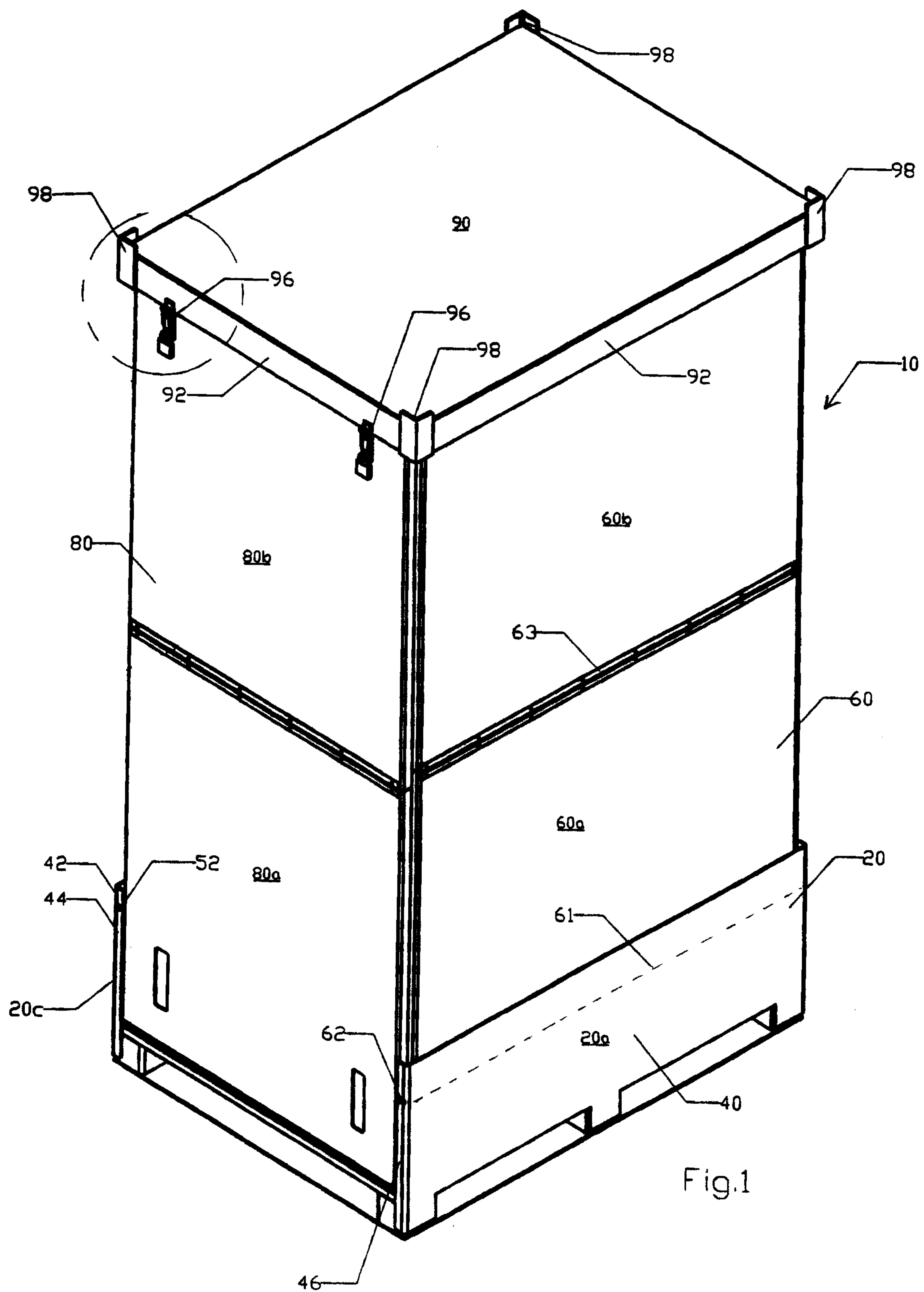
2. The container of claim 1 wherein each wall comprises a plurality of panels hinged together and foldable into an overlaying position.

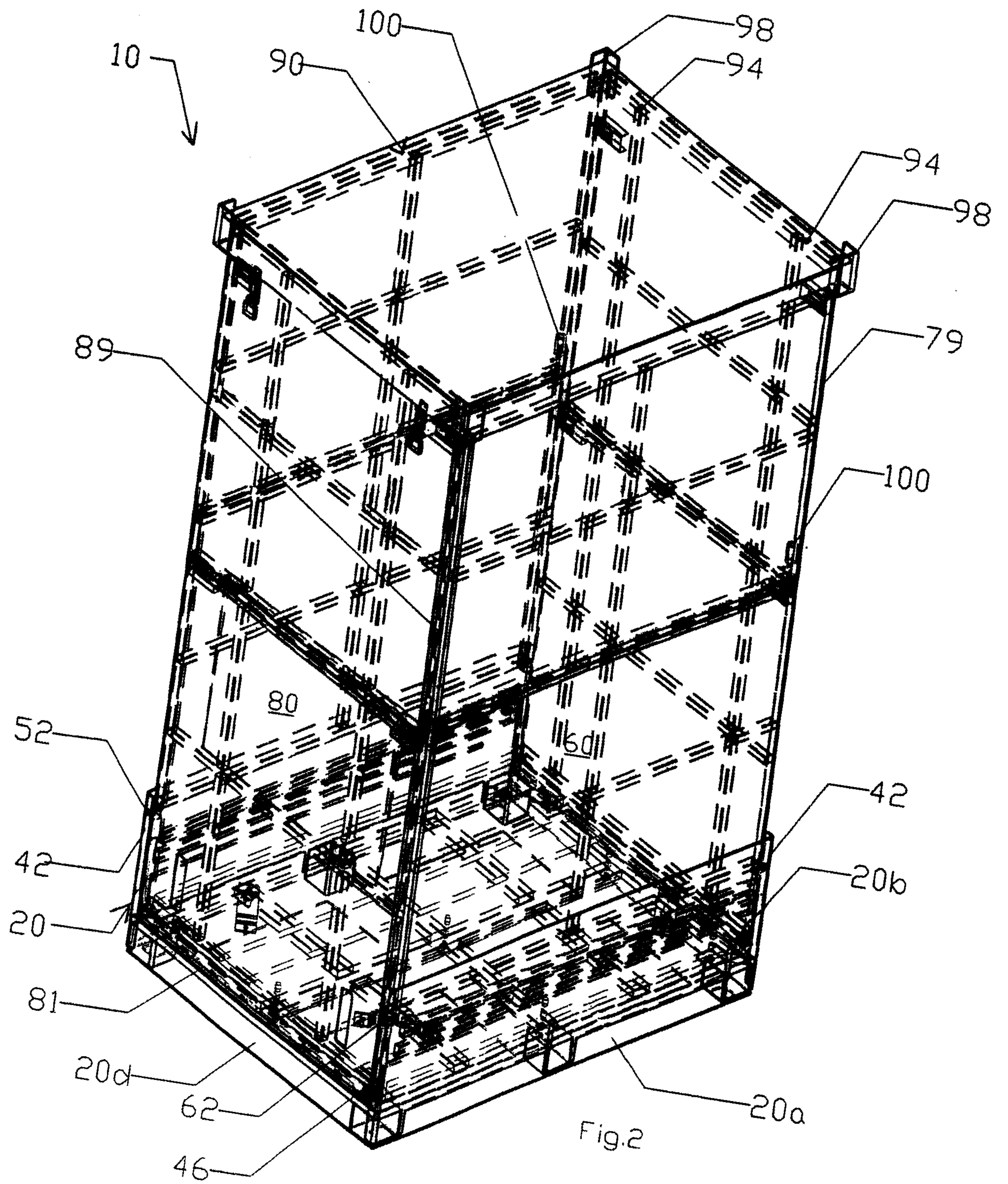
3. The container of claim 1 wherein the first wall is pivotally connected to a first support plate along the first side of the base frame.

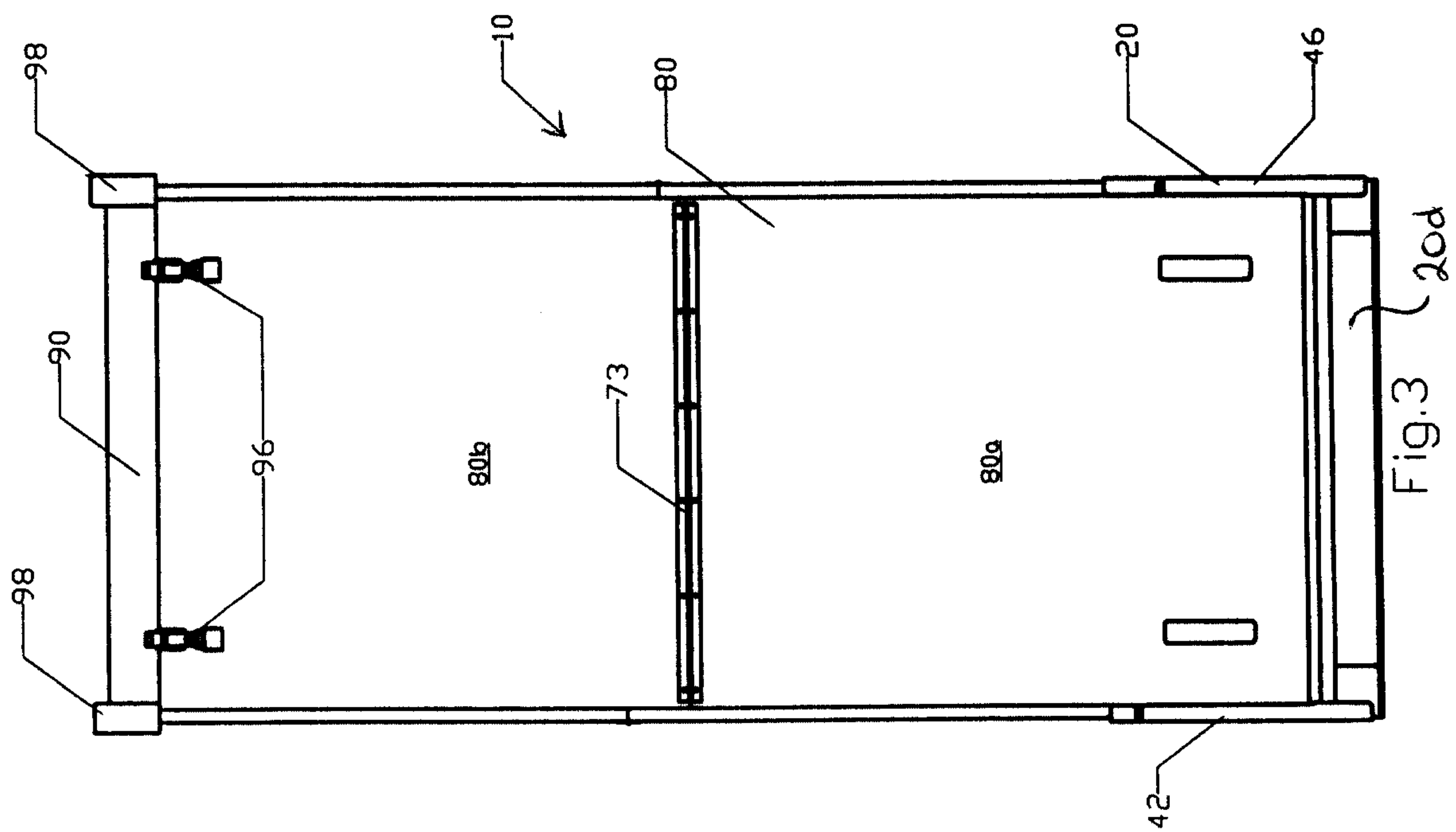
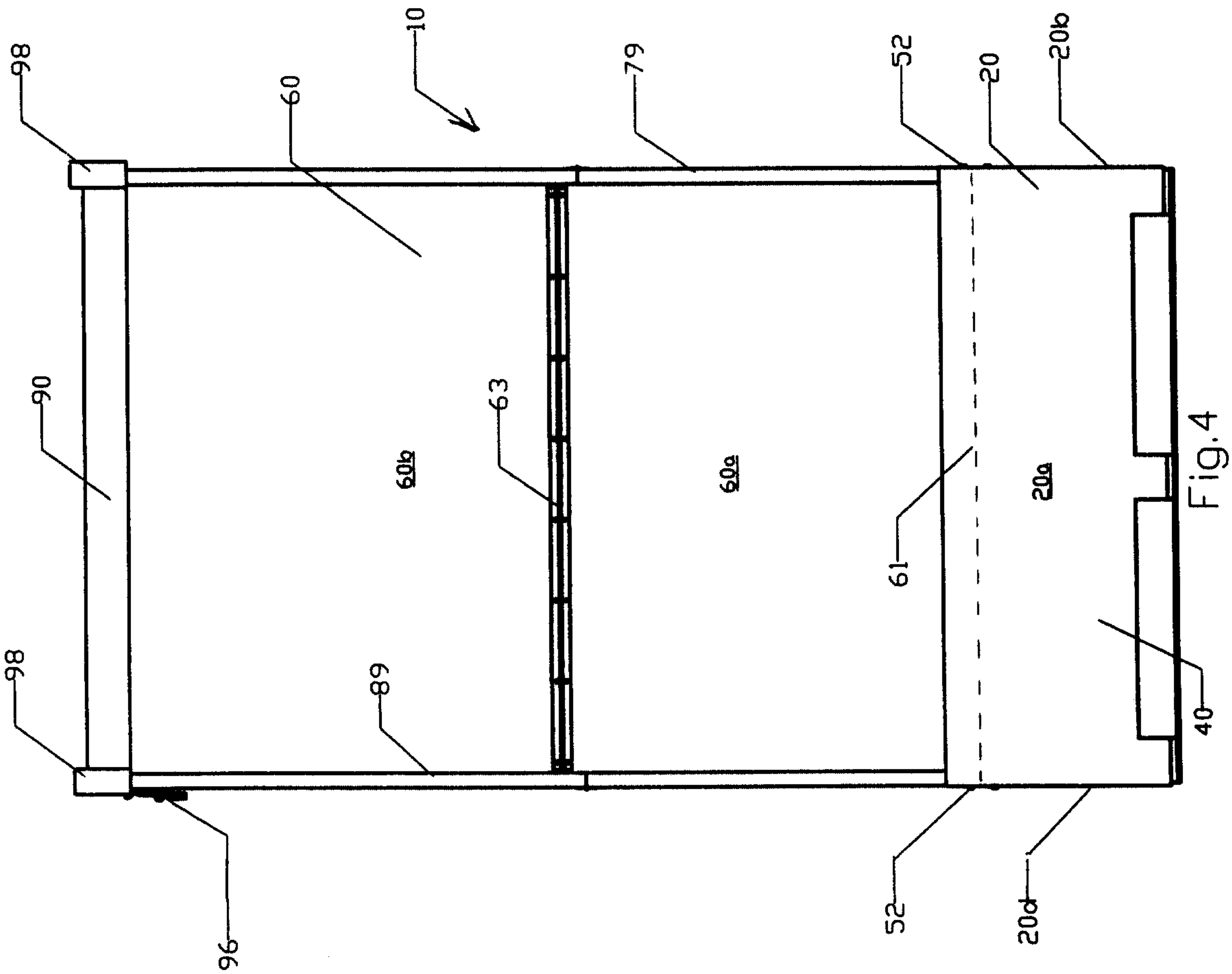
4. The container of claim 3 wherein the second wall is pivotally connected to a second support plate along the second side of the base frame.
5. The container of claim 4 wherein the tracks for the third and fourth walls are disposed along the first and second support plates.
6. The container of claim 5 wherein the support plates are double-walled for at least a part of their height and the tracks are formed in inner walls of the support plates.
7. The container of claim 1 wherein the fourth wall can be laid on the ground or surrounding floor to serve as a ramp for wheeling an article into or out of the container.
8. The container of claim 4 wherein the lid can be supported by the support plates when the container is in the collapsed condition.
9. The container of claim 8 wherein the lid is provided with corner bars into which a base of another container can be retained, for stacking containers in the collapsed condition.
10. The container of claim 4 wherein the support plates are provided with openings for receiving a fork of a fork lift.
11. A method of collapsing a container having a substantially rectangular base, comprising the steps of
 - a. pivoting a fourth wall from an erect position to a generally horizontal position and sliding the fourth wall along a second track at a fourth level to a position contained within the base;
 - b. pivoting a third wall to from erect position to a generally horizontal position and sliding the third wall along a first track at a third level to a position contained within the base;
 - c. pivoting a second wall from an erect position to a position contained within the base at a second level; and

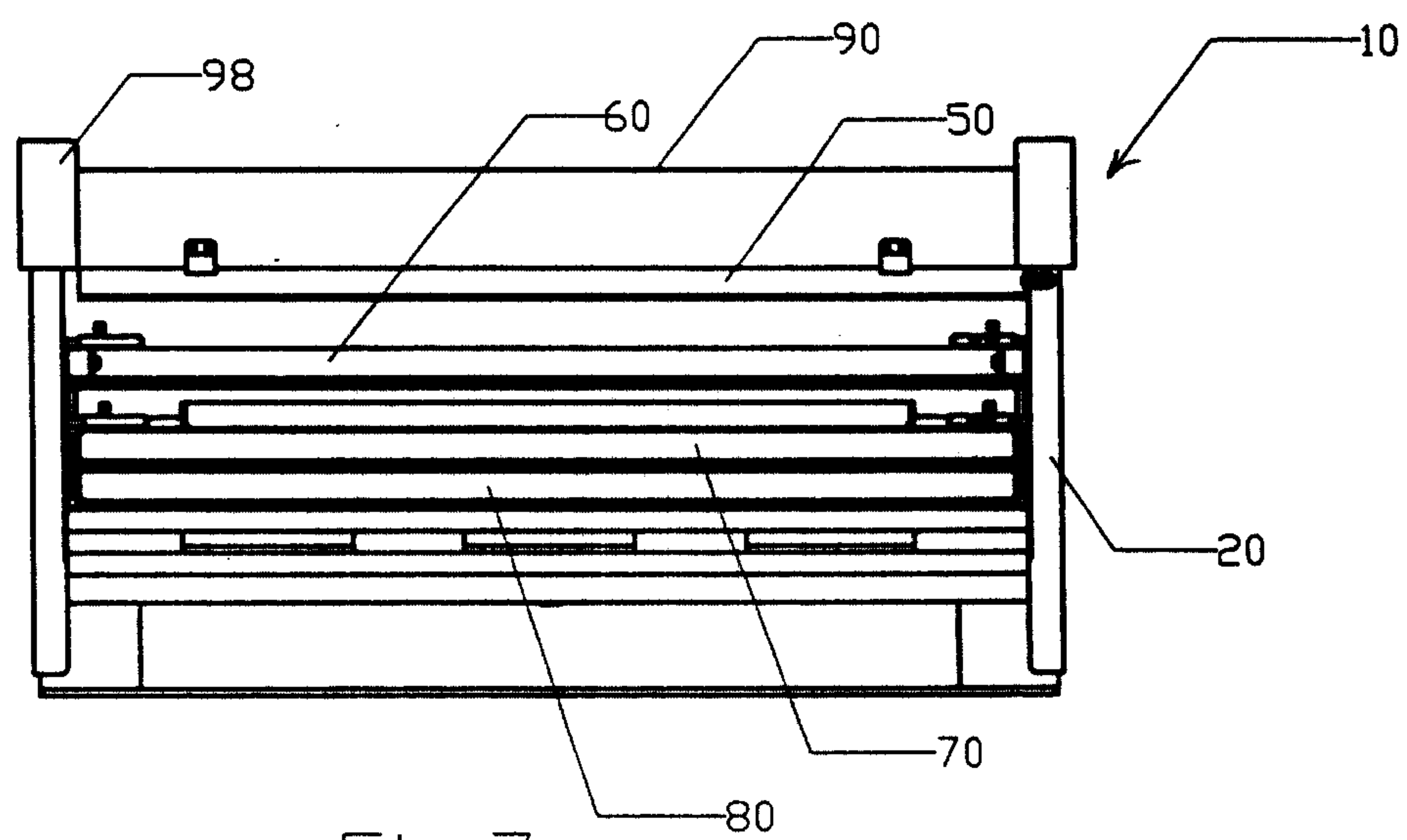
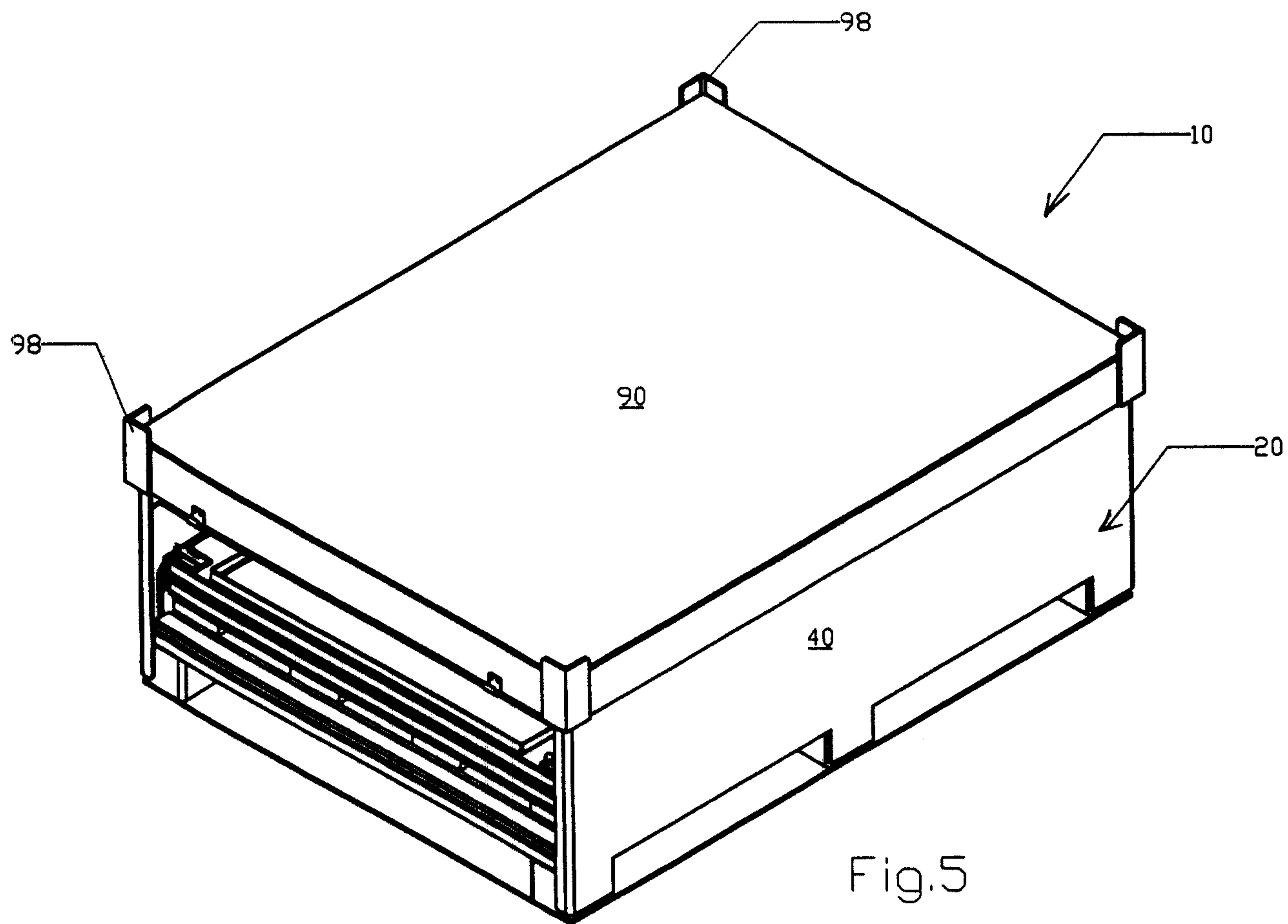
- d. pivoting a first wall from an erect position to a position contained within the base at a first level.
12. The method of claim 11 wherein each wall comprises a plurality of panels hinged together, further including the step of, before pivoting each wall, folding each wall so that the panels are in an overlaying orientation.
13. The method of claim 11 including, before step a., the step of laying the fourth wall outside the base to serve as a ramp for wheeling an article out of the container.
14. The method of claim 11 wherein the first wall is pivotally connected to a first support plate along a first side of the base frame and the second wall is pivotally connected to a second support plate along a second side of the base frame, and including, after step d., the step of placing a lid on the support plates.
15. The method of claim 14 including the step of, after placing a lid on the support plates, stacking containers in the collapsed condition.
16. A method of erecting a container having a substantially rectangular base, comprising the steps of
- a. pivoting a first wall from collapsed position contained within the base at a first level to an erect condition;
 - b. pivoting a second wall from a collapsed position contained within the base at a second level to an erect condition;
 - c. sliding a third wall along a first track at a third level from a collapsed position contained within the base to a position outside the base and pivoting the third wall to an erect condition;
 - d. sliding a fourth wall along a second track at a fourth level from a collapsed position contained within the base to a position outside the base and pivoting the fourth wall to an erect condition; and
 - e. connecting the erected walls together.

17. The method of claim 16 wherein each wall comprises a plurality of panels hinged together, further including the step of, before pivoting each wall, unfolding each wall.
18. The method of claim 16 including, during step d., the step of laying the fourth wall outside the base to serve as a ramp for wheeling an article into the container.
19. The method of claim 16 including, after step e., the step of placing a lid on the walls.
20. The method of claim 19 including the step of, when placing the lid, engaging the lid at one end to at least one pin and latching the lid at the other end.









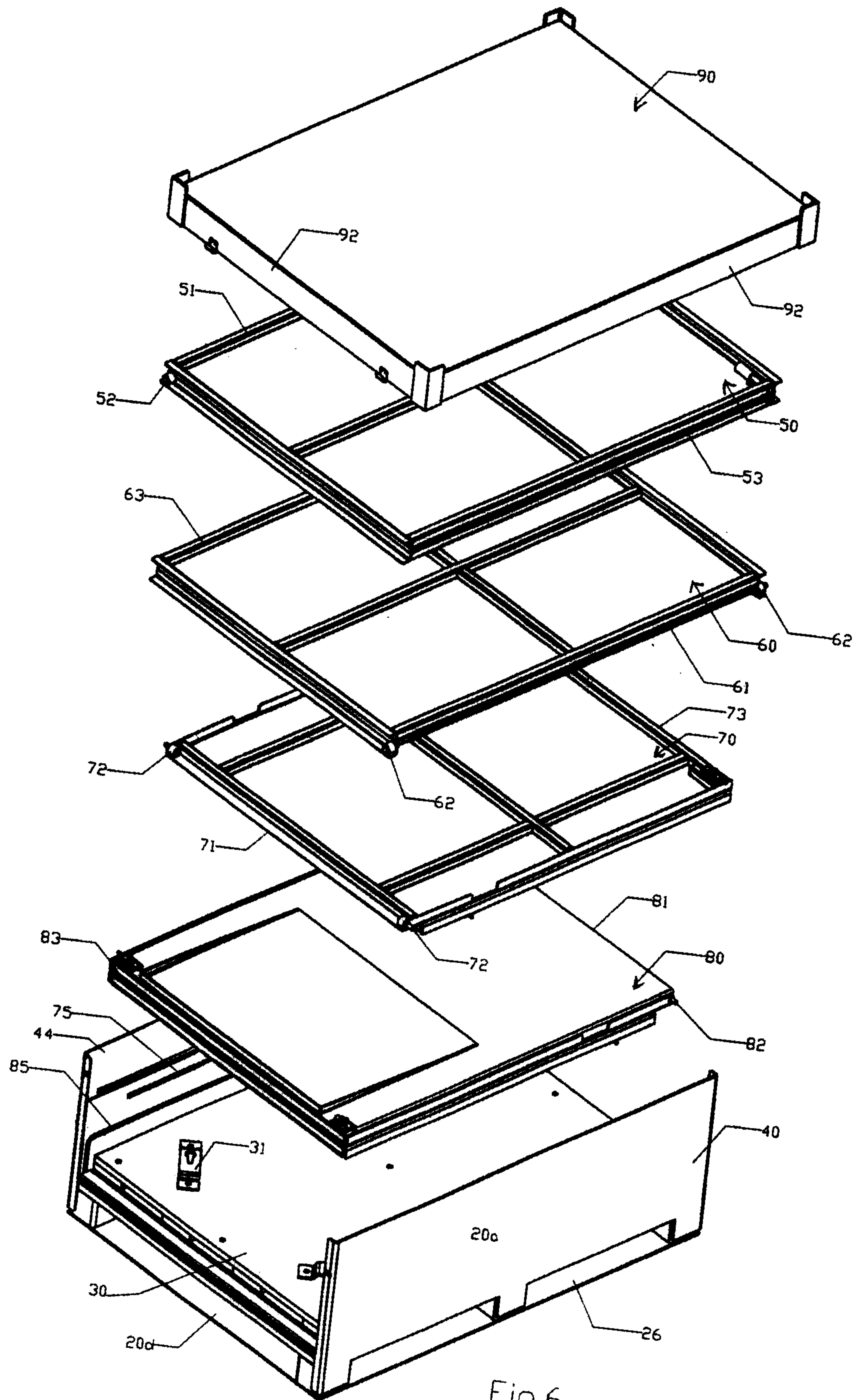


Fig.6

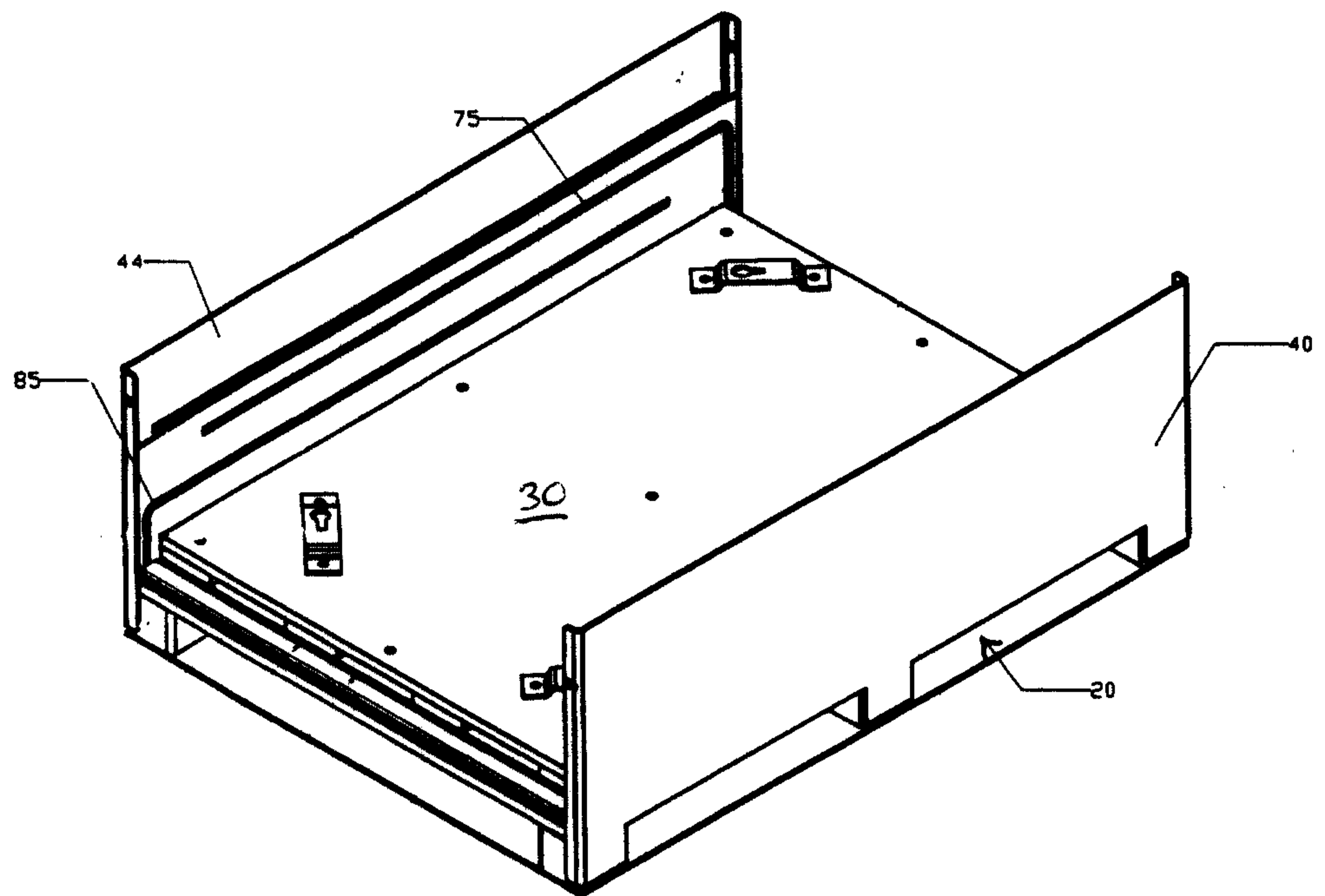


Fig. 8

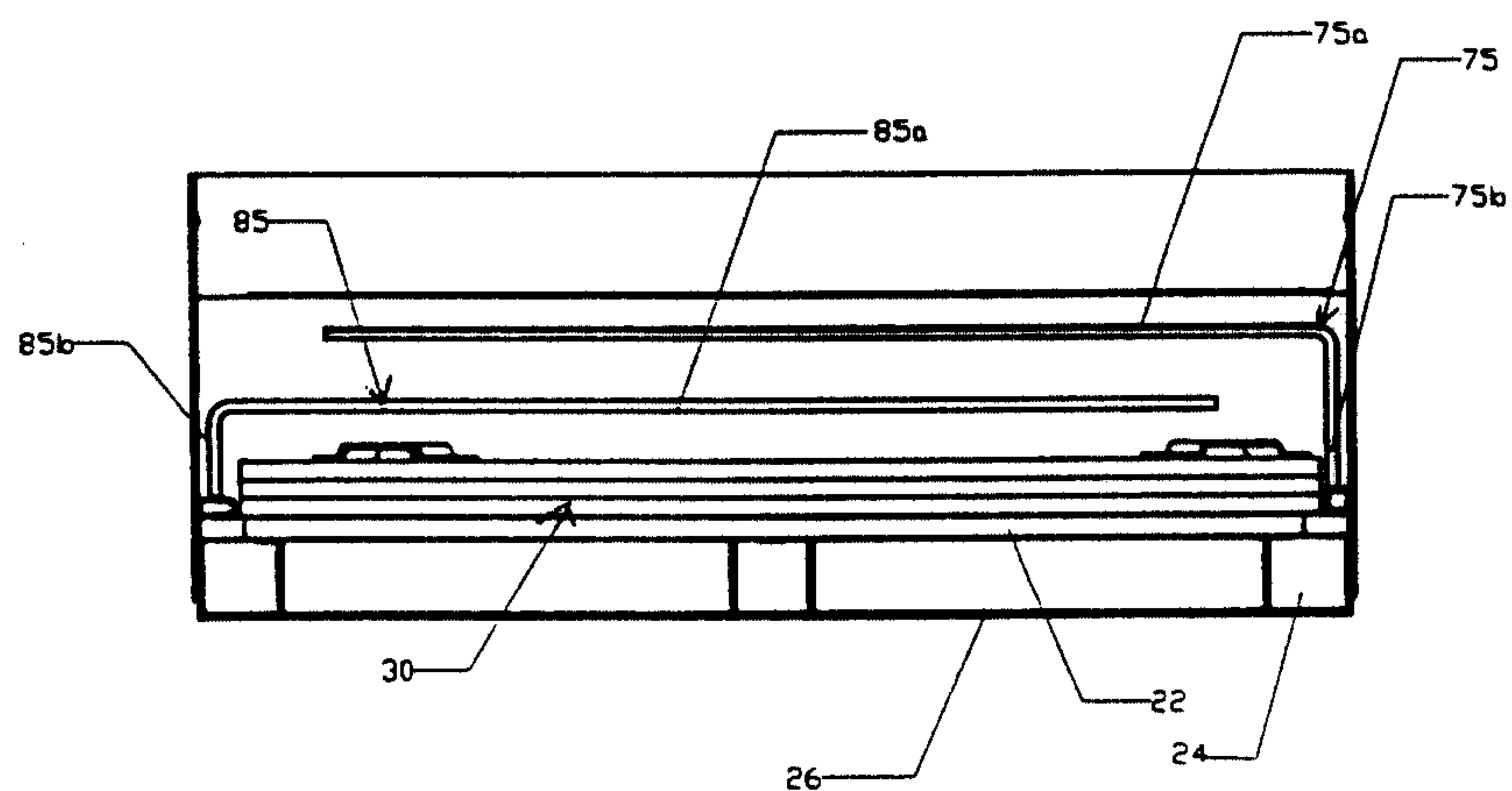
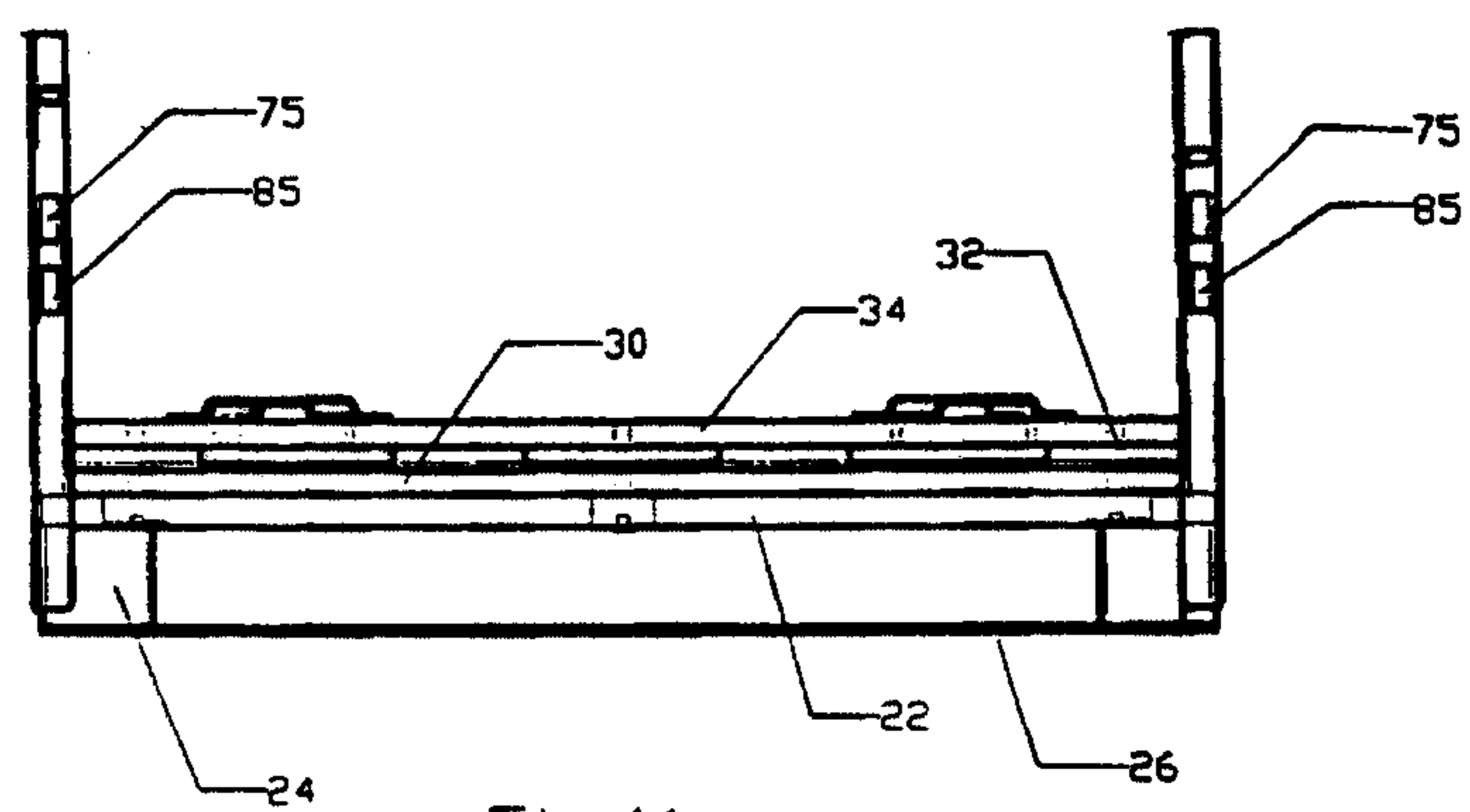
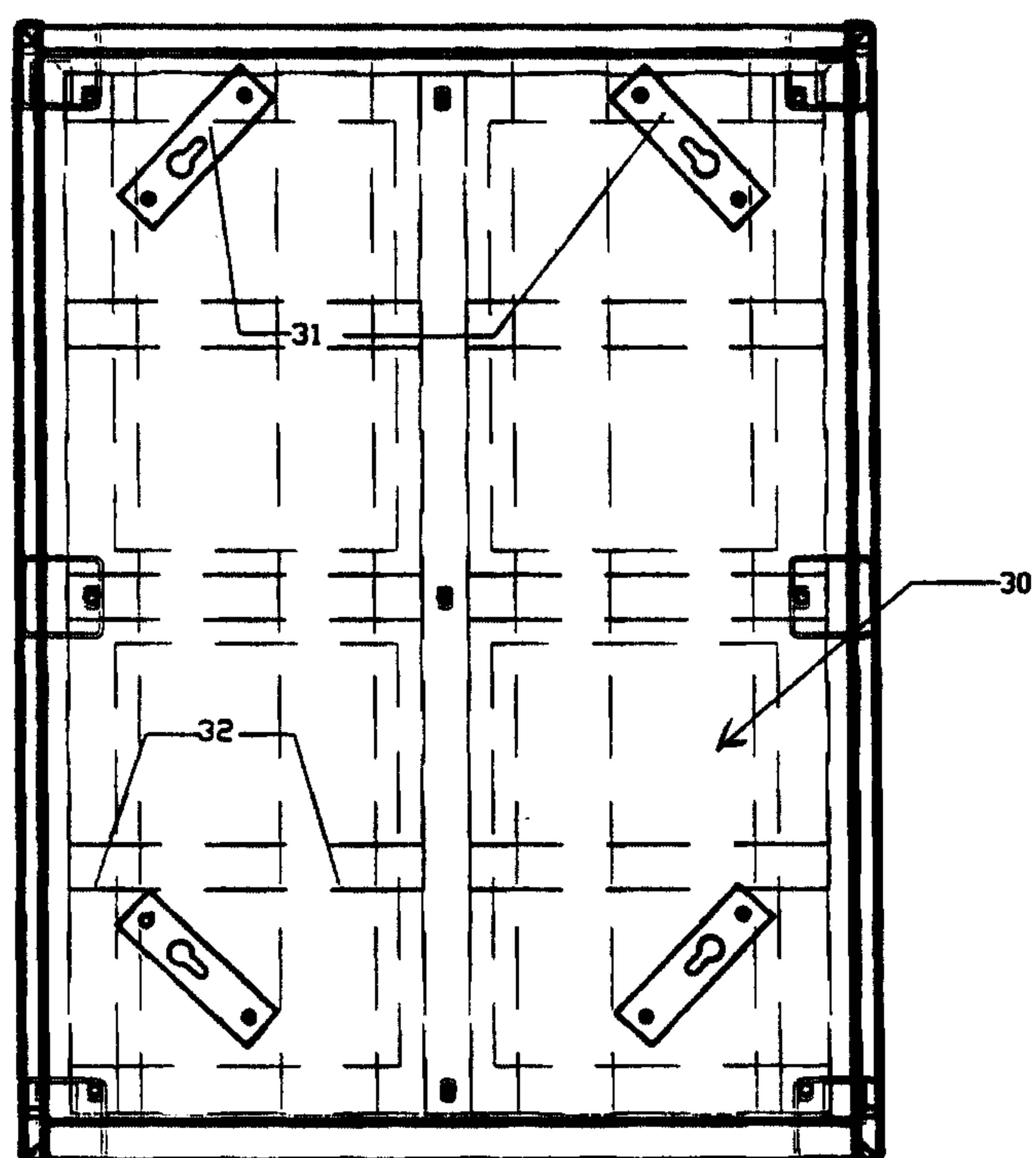


Fig. 10



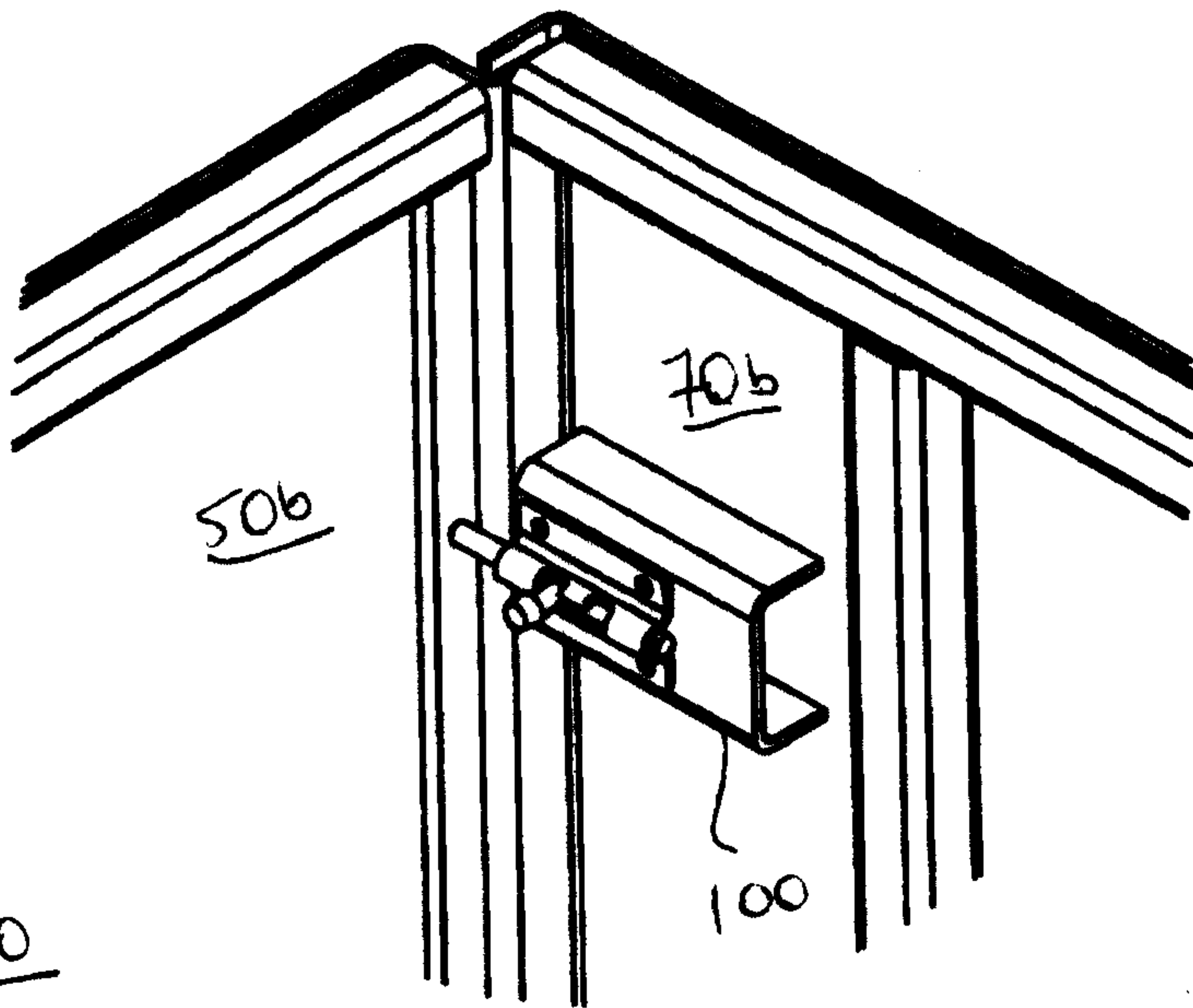


Fig. 13

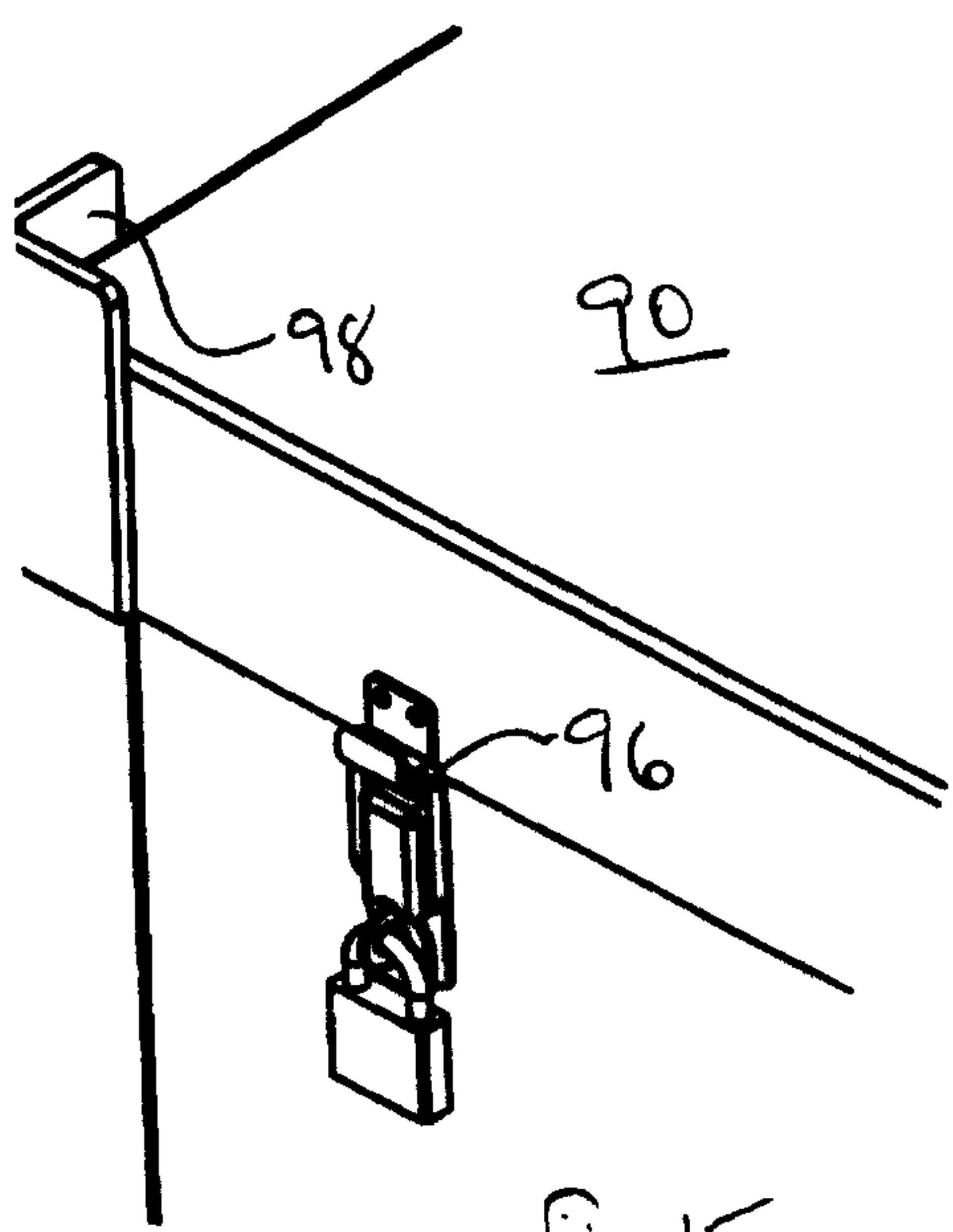


Fig. 15

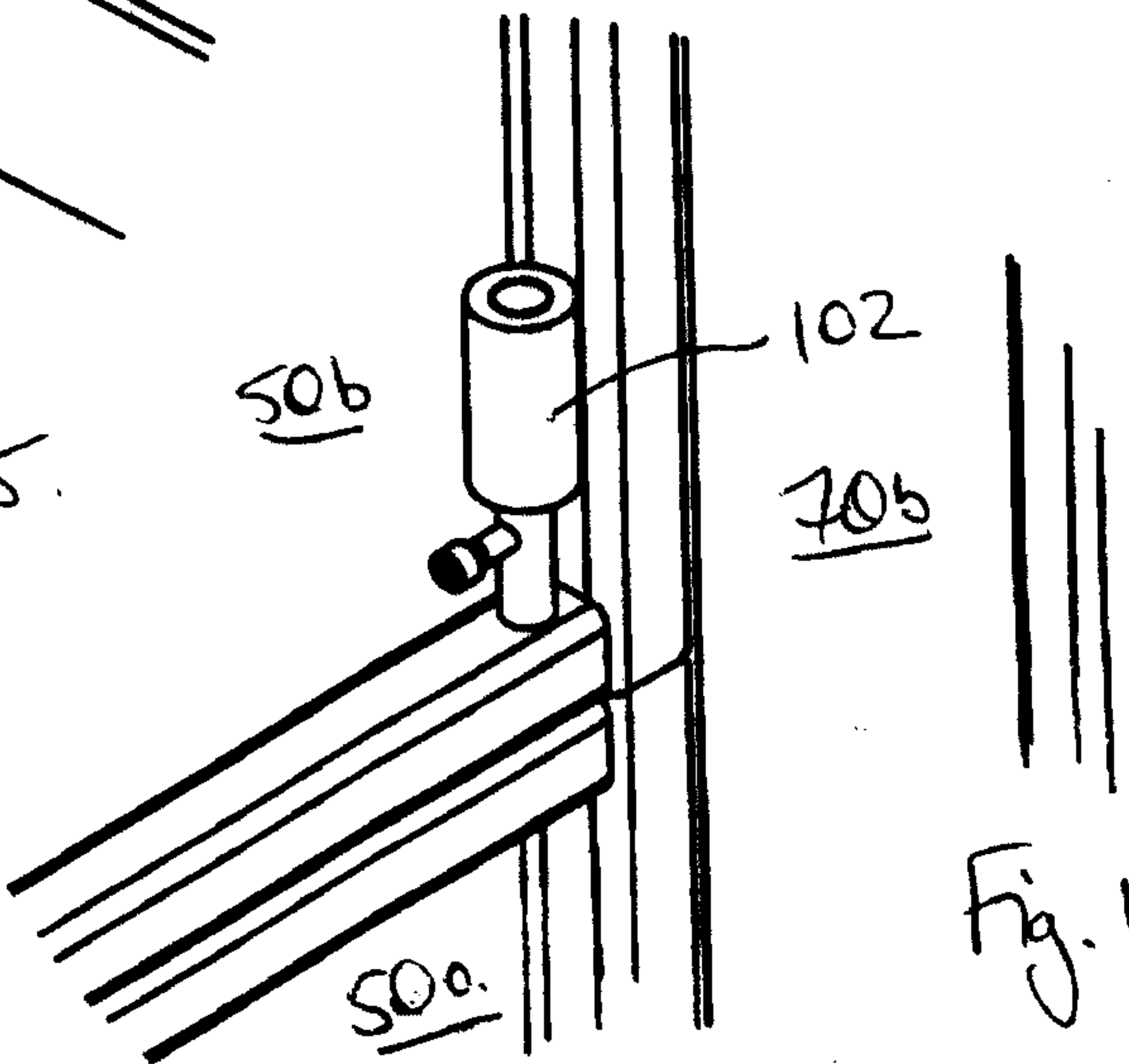


Fig. 14

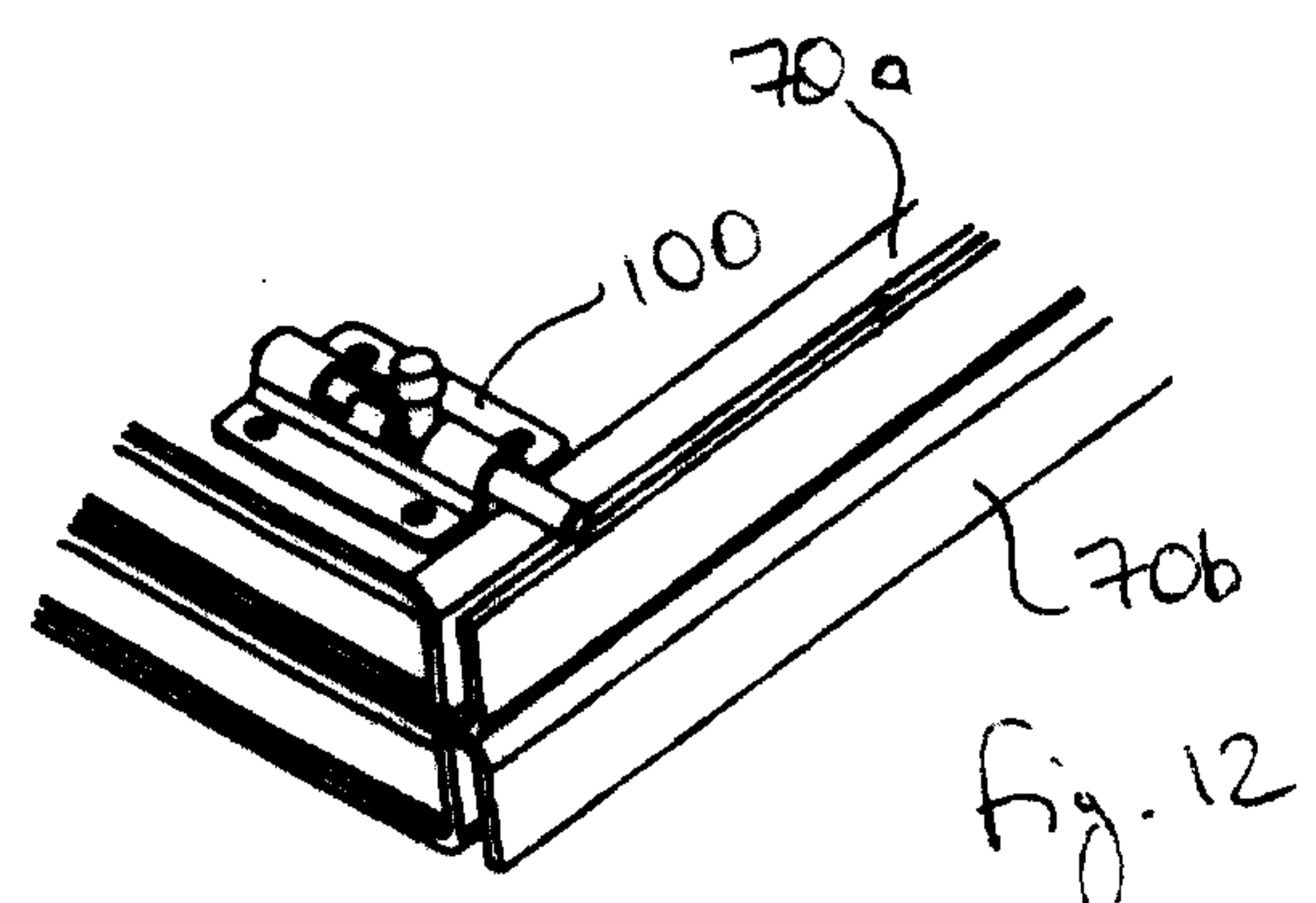


Fig. 12

