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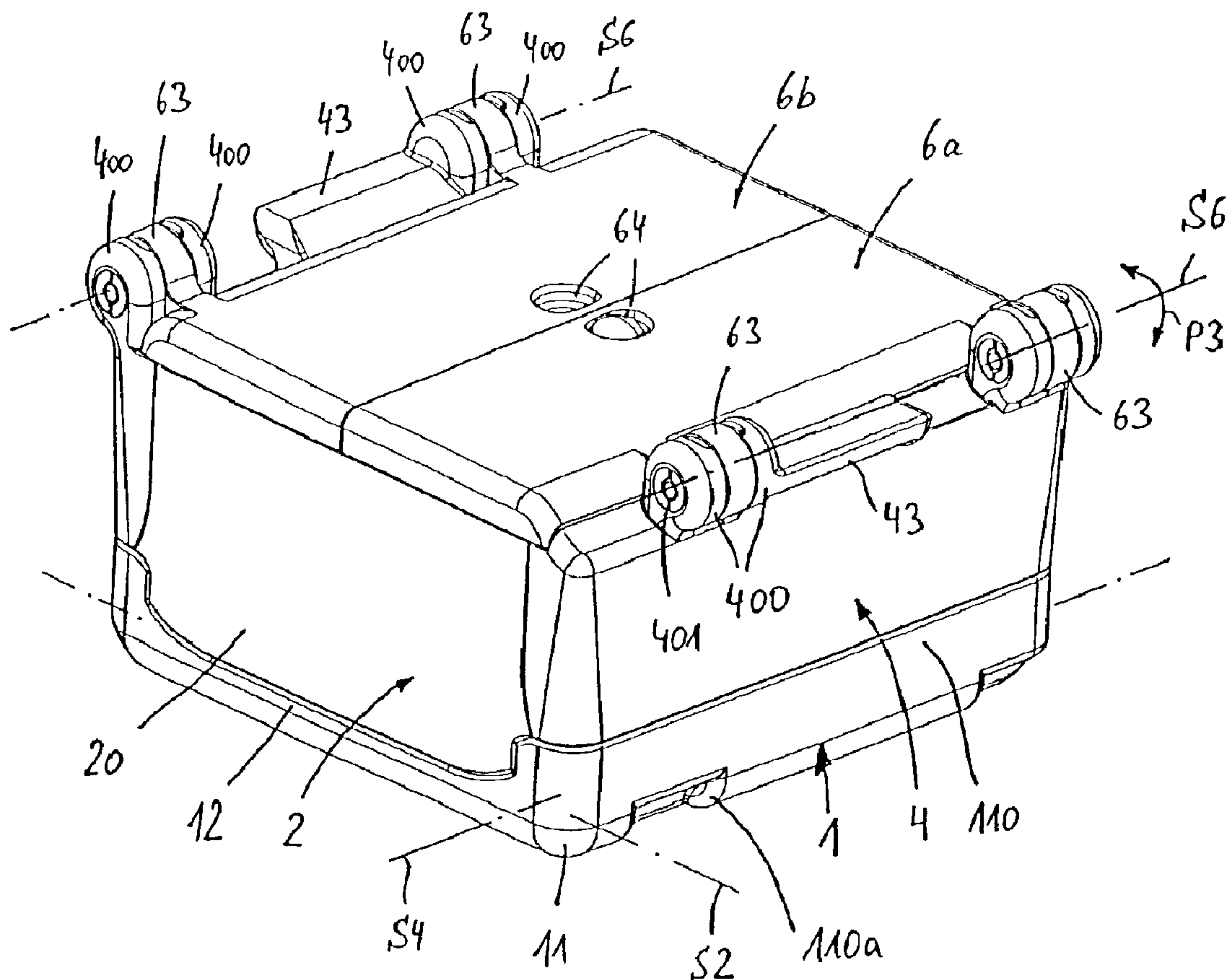
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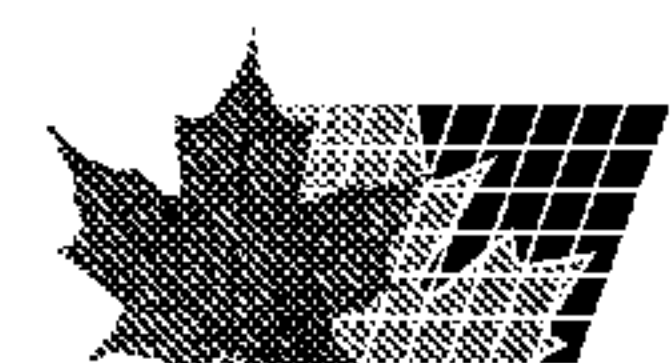
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(54) Title: THERMALLY INSULATING TRANSPORTATION BOX



(57) Abrégé/Abstract:

The invention relates to a thermally insulating transportation box, comprising a base part (1), two longitudinal side parts (2), two transverse side parts (4) and at least one top part (6a, 6b), which parts bound a transportation space and are produced from a



(57) **Abrégé(suite)/Abstract(continued):**

thermally insulating material, with the longitudinal side parts (2) and the transverse side parts (4) being pivotably mounted on the base part about pivot axes which each run parallel to the base part, so that they can be folded open from a folded-together arrangement, which extends parallel to the base part, into an arrangement which is perpendicular to this and in which they bound the transportation space, and the transportation space can subsequently be closed by means of the at least one cover part (6a, 6b).

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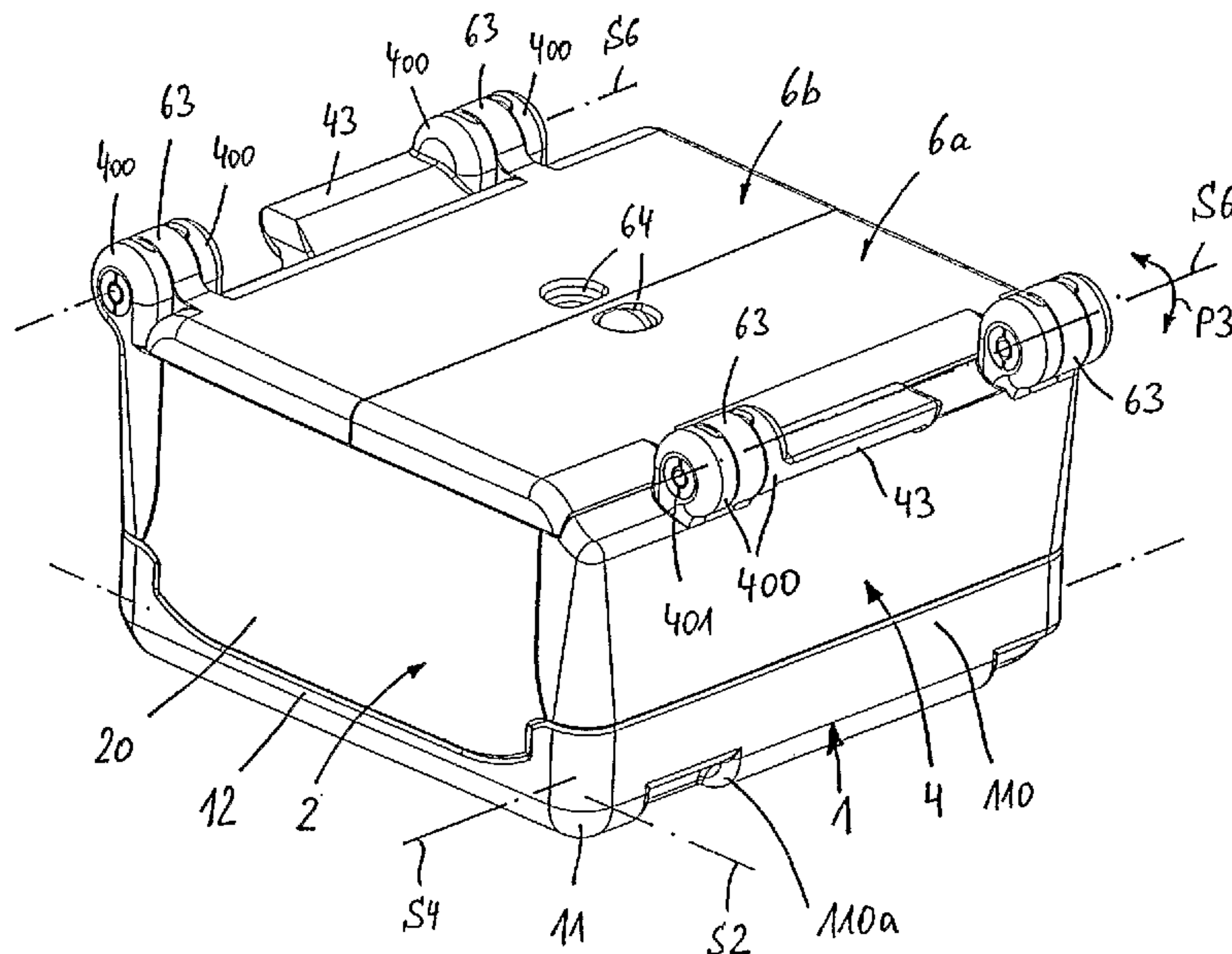
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[Fortsetzung auf der nächsten Seite]

(54) Title: THERMALLY INSULATING TRANSPORTATION BOX

(54) Bezeichnung: THERMISCH ISOLIERENDE TRANSPORTBOX



(57) Abstract: The invention relates to a thermally insulating transportation box, comprising a base part (1), two longitudinal side parts (2), two transverse side parts (4) and at least one top part (6a, 6b), which parts bound a transportation space and are produced from a thermally insulating material, with the longitudinal side parts (2) and the transverse side parts (4) being pivotably mounted on the base part about pivot axes which each run parallel to the base part, so that they can be folded open from a folded-together arrangement, which extends parallel to the base part, into an arrangement which is perpendicular to this and in which they bound the transportation space, and the transportation space can subsequently be closed by means of the at least one cover part (6a, 6b).

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WO 2006/105962 A1

WO 2006/105962 A1

**Erklärungen gemäß Regel 4.17:**

- hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)
- hinsichtlich der Berechtigung des Anmelders, die Priorität einer früheren Anmeldung zu beanspruchen (Regel 4.17 Ziffer iii)
- Erfindererklärung (Regel 4.17 Ziffer iv)

Veröffentlicht:

- mit internationalem Recherchenbericht

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(57) Zusammenfassung: Die Erfindung betrifft eine thermisch, isolierende Transportbox, bestehend aus einem Bodenteil (1), zwei Längsseitenteilen (2), zwei Querseitenteilen (4) und- mindestens einem Deckteil (6a, 6b), die einen Transportraum umgrenzen und aus einem thermisch isolierenden Material hergestellt sind, wobei die Längsseitenteile (2) und die Querseitenteile (4) um jeweils parallel zum Bodenteil verlaufende Schwenkachsen schwenkbar am Bodenteil gehalten sind, so dass sie aus einer zusammengeklappten, sich parallel zum Bodenteil erstreckenden Ausrichtung in eine hierzu senkrechte Ausrichtung aufklappbar sind, in welcher sie den Transportraum umgrenzen und nachfolgend der Transportraum mittels des mindestens einen Deckteiles (6a, 6b) verschließbar ist.

WO 2006/105962

PCT/EP2006/003123

Thermally Insulating Transportation Box

The invention relates to a thermally insulating shipping container consisting of a bottom piece, two longitudinal side pieces, two transverse side pieces and at least one cover piece, which enclose a shipping chamber and are made of an insulating material.

Such thermally insulating shipping containers are known and are extensively used, for example, for shipping temperature-sensitive foods, such as frozen food, or also for shipping warm food. For the purpose of efficient and cost-effective production, along with good thermal insulation properties, such shipping containers are often integrally produced from a molded particle foam on the basis of a polyolefin, such as polypropylene, so-called EPP, or also on the basis of polystyrene, so-called EPS.

However, in connection with shipping containers so far known it has been found to be disadvantageous that, because of their integrally one-piece manufacture, they are very bulky when not in use and because of this require a large shipping volume.

On the other hand, shipping containers are known which do not have a thermally insulating function and which, when not in use, can be folded in a space-saving manner. However, the folding mechanisms employed here cannot be transferred to the previously discussed thermally insulating shipping containers, since in this case the hinged connections, which customarily are comprised of hinged shafts and hinged bearings for the foldable connection of the individual parts, cannot be applied to or embodied as foamed EPP or EPS parts.

Therefore the object of the invention is to propose a

thermally insulating shipping container of the type mentioned at the outset, which has good insulation properties, but takes up only a small volume when not in use, is easy to manufacture and moreover has a large carrying capacity and stability in the unfolded state.

To attain the stated object, the invention proposes the embodiment of a thermally insulating shipping container, comprising:

a bottom piece, two longitudinal side pieces, two transverse side pieces and at least one cover piece, which enclose a shipping chamber and are made of an insulating material, the longitudinal side pieces and the transverse side pieces being pivotably maintained on the bottom piece around respective pivot axes, which extend parallel in respect to the bottom piece, so that they can be unfolded from a folded orientation, which extends parallel in respect to the bottom piece, into an orientation which is perpendicular to it, in which they enclose the shipping chamber and in which the shipping chamber can be subsequently closed by means of the at least one cover piece, wherein the shipping container is made of molded foam particles and the longitudinal and transverse side pieces are maintained, pivotable around the pivot axes, on the bottom piece by means of hinge elements in the form of linkage heads held in hinge recesses, wherein the hinge elements are each integrally molded in the bottom piece and the transverse side pieces.

In accordance with the invention it is proposed that the longitudinal side pieces and the transverse side pieces are pivotably maintained on the bottom piece around respective pivot axes, which extend parallel in respect to the bottom piece, so that they can be unfolded from a folded orientation, which extends parallel in respect to the bottom piece, into an orientation which is perpendicular to it, in which they enclose the shipping chamber and in which the shipping chamber can be subsequently closed by means of the at least one cover piece. Thus, in accordance with the invention a bottom piece is proposed as a central element, on which the longitudinal and transverse

side elements are pivotably fastened or maintained, i.e. all connecting elements required for this can be integrated into the bottom piece and correspondingly in the longitudinal and transverse side pieces, which leads to a particularly sturdy shipping container in the unfolded state.

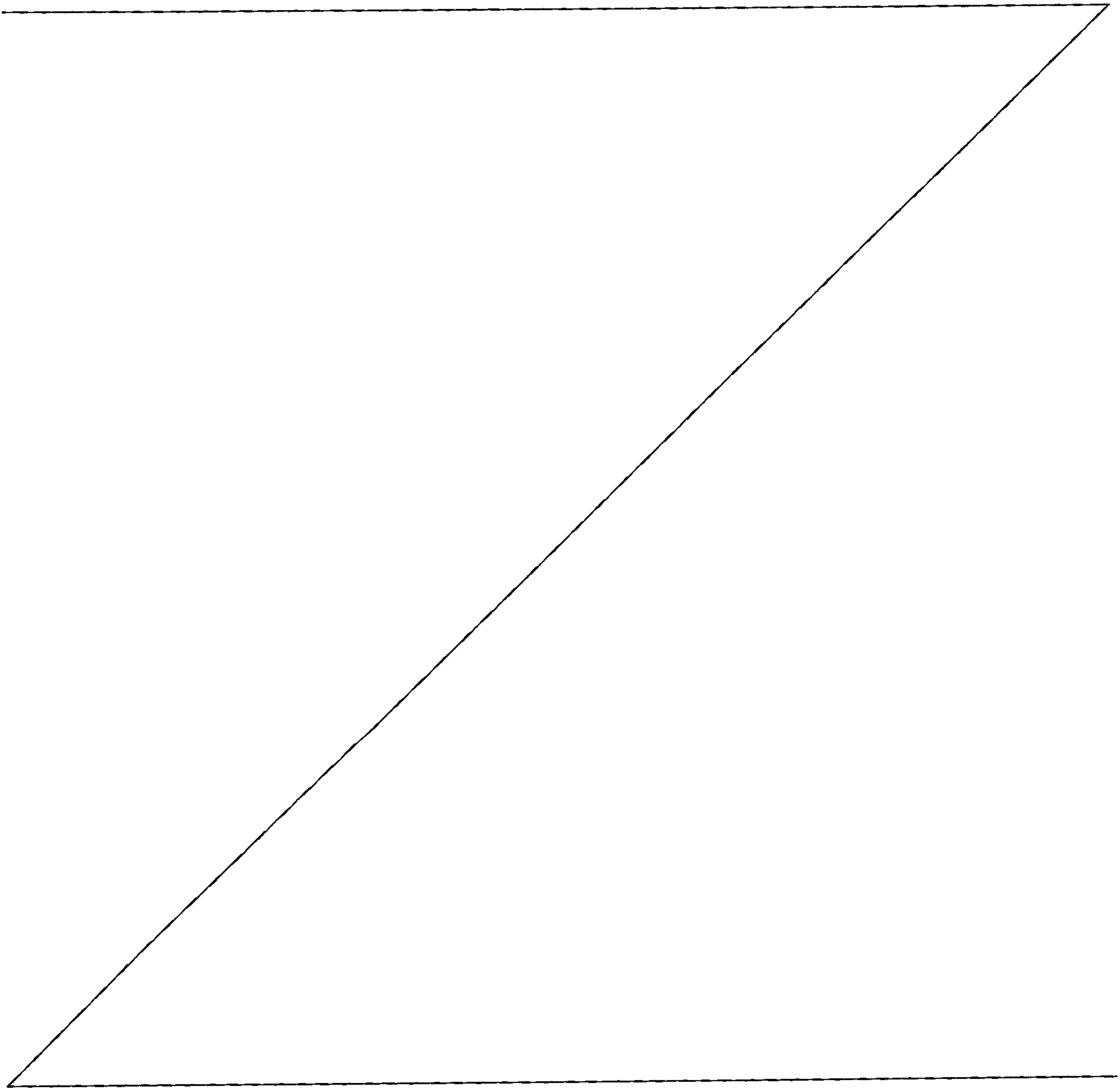
In an advantageous embodiment of the shipping container in accordance with the invention the bottom piece has a right-angled bottom area, wherein a corner protrusion, whose top projects upward, is formed in each corner area of the bottom piece. On its sides facing the longitudinal and transverse side pieces, each one of these corner protrusions has integrally molded hinge elements, which can be brought into an operational connection with correspondingly formed hinge elements of the longitudinal and transverse side walls. Accordingly, the corner protrusions of the bottom piece provide holding and pivotable linkage of the longitudinal and transverse side pieces at the bottom piece. Moreover, the corner protrusions can also be used as stops for the longitudinal and transverse side pieces brought into an unfolded position, i.e. placed perpendicularly in respect to the bottom piece, so that further unfolding is prevented by a stop against the corner protrusions, and a dimensionally stable shipping container is created.

In order to continue to be able to produce the thermally insulating shipping container in accordance with the invention by means of the efficient mode of production from a molded particle foam, the hinge elements are integrally molded in the bottom piece and the longitudinal or transverse side pieces.

A suggestion of the invention provides for the longitudinal and transverse side pieces to be embodied in the form of spherical heads or universal ball joint-shaped heads, which are maintained, pivotable around the hinge axes, in correspondingly embodied ball sockets provided, for example, in the area of the corner protrusions. However, the opposite arrangement is also possible, i.e. the ball sockets are integrally molded in the longitudinal and transverse side pieces,

while the corresponding spherical heads seated therein are molded in the bottom piece, preferably in the area of the corner protrusions. It is possible in this way to omit additional parts, such as hinge shafts, which possibly require different materials.

It is also possible to provide heads in the shape of a truncated cone and corresponding linkage recesses in place of heads in the shape of a universal ball joint.



Not employing other materials does not only make sense from the viewpoint of economy of manufacture, because in this case additional assembly steps are saved. Further than that, the omission of additional materials makes possible recycling of only one type, or the easy disposal of a no longer required shipping container in accordance with the invention.

In an embodiment of the invention, the at least one cover piece can be placed on top of the unfolded longitudinal and transverse side pieces for closing the shipping chamber at the top. The shipping container in accordance with the invention is provided with additional stiffening by means of the cover piece which, in the unfolded orientation of the longitudinal and transverse side pieces, can be placed on top of it, so that its sturdiness in the unfolded state approaches that of a shipping container formed in one piece.

Two cover pieces are provided in another possible embodiment of the invention, which together provide the closure at the top of the shipping chamber. Particularly advantageously it is possible to provide here the pivotable fixation of each cover piece on one of the transverse side pieces, so that the cover pieces are not only connected with the further parts of the shipping container in accordance with the invention in a way in which they cannot be lost, but that, in the folded state of the transverse side pieces, they can also be folded in a space-saving manner above or below the transverse side pieces in a parallel orientation in respect to the latter.

Here, too, it can be preferably provided that the cover pieces are maintained, pivotable around hinge axes, on the transverse side pieces by means of linkage heads held in hinge elements in the form of hinge recesses, wherein the hinge elements are respectively integrally molded in the cover pieces and the transverse side pieces. For example, the linkage heads can have the shape of universal ball joints or truncated cones.

In this way the shipping container in accordance with the invention also makes do without additional hinge pieces, such as shafts, bushings, etc. and can be produced true-to-type, for example by means of the known molded foam methods, in a single work step.

It is provided within the framework of the invention to provide exterior carrying handles on the longitudinal and/or **transverse side pieces of the shipping container in accordance with the invention in order to cause the user to carry and handle the shipping container in accordance with the invention, along with its possibly considerable filling weight, at defined locations which are particularly suitable for the transfer of force.**

In accordance with a suggestion of the invention it is possible to provide attachment strips, which respectively protrude at the top from the bottom piece, between two adjoining corner protrusions used for the hinged holding of longitudinal or **transverse side pieces, which strips are provided on their sides facing the respective corner protrusions with corresponding hinge elements, such as is also the case with the corner protrusions.** Accordingly, these hinge elements are used to come into operational connection with correspondingly formed hinge elements of the longitudinal or transverse side pieces, so that a particularly large degree of stability is achieved by means of this dual joint connection, and the longitudinal and transverse side pieces are prevented from being released in an undesired manner from the hinge connection, even if a large load is absorbed inside the shipping container.

In accordance with a further proposal of the invention it can be provided that the longitudinal side pieces are equipped with means for the snap-in reception of the transverse side pieces in the unfolded orientation. Accordingly, if the shipping container in accordance with the invention is raised into its position of use by means of successively occurring unfolding of the longitudinal side pieces and the

transverse side pieces, further increased stability is achieved by the snapped-in reception of the unfolded transverse side pieces between the longitudinal side pieces, wherein this snapped-in orientation of the longitudinal and transverse side pieces can only be cancelled by a definite use of force, but is safe from accidental folding.

It can furthermore be provided that the longitudinal and/or transverse side pieces are embodied with insertion strips which, in the unfolded orientation, are arranged at the top and can be inserted into corresponding insertion grooves formed at the bottom of at least one cover piece, so that the at least one cover piece can be positively attached to the top of the longitudinal and transverse side pieces arranged in the unfolded orientation, so that therefore the cover piece is not only maintained secure against loss, but furthermore a positive connection, which increases the stability of the shipping container, is also achieved.

Other snap-in and locking options of the at least one cover piece on the longitudinal and transverse side pieces arranged in an unfolded orientation are of course also possible within the framework of the invention. Within the framework of the invention it is also possible to maintain the cover piece pivotably on the longitudinal and transverse side pieces, wherein in such embodiments the cover piece is preferably designed to consist of several pieces.

For arranging the shipping container in accordance with the invention and its individual parts as a compact unit also in the folded state, and moreover to protect it from damage, the height of the corner protrusions extending in height above the bottom surface of the bottom piece is preferably of such a size, that at least the transverse side pieces and the longitudinal side pieces can be received in a parallel orientation in regard to the bottom piece between these corner protrusions, wherein in this orientation the upper edge of the corner protrusions terminates flush with the cover piece placed on the longitudinal and transverse side pieces.

The shipping container proposed by the invention can preferably be produced from a molded particle foam, known per se, which has a particularly good thermal insulating effect and has a predominantly closed-cell foam structure, on the basis of a polyolefin, such as polyethylene or polypropylene, or on the basis of polystyrene. However, other material selections are of course also possible within the framework of the invention.

However, it is considered to be preferable if the shipping container is made of molded foam particles of an apparent density of at least 30 kg/m^3 , wherein the wall thickness of the bottom piece, the longitudinal and transverse side pieces and the cover piece should be in the range between 15 to 35 mm, preferably 25 to 30 mm.

In an alternative embodiment of the shipping container it can also be provided to make it from molded parts, containing hollow chambers, on the basis of thermoplastic materials, which can be produced in a cost-effective manner, have a great insulating effect because of their hollow chambers and are furthermore extremely sturdy. In the case of such an embodiment of the shipping container of molded parts, wall thicknesses of approximately 0.5 to 2 mm are preferably provided, if the molded parts are made of polypropylene. Such molded parts can be produced, for example, by means of a blow-molding method, wherein the hinge elements can also be integrally molded.

Moreover, it can also be provided to provide the surfaces of the shipping container in accordance with the invention with a liquid-proof coating, for example a foil, which is placed into the tool during the molded foam process and is integrally

connected with the molded foam particles and later on constitutes the surface of the produced molded parts. A shipping container in accordance with the invention, produced from such surface-coated parts, can be easily washed off in case of becoming dirty and, by means of an appropriate shaping of the bottom piece, can also form a leak-proof catch basin for liquid possibly exiting the materials shipped in the shipping chamber.

Further embodiments and details of the invention will be explained in greater detail in what follows by means of an exemplary embodiment shown in the drawings. Shown are in:

Fig. 1a, a first embodiment of the shipping container in accordance with the invention in the unfolded state,

Fig. 1b, the shipping container in accordance with Fig. 1 in the folded state,

Fig. 2, the bottom piece of the shipping container in accordance with Figs. 1a and 1b,

Fig. 3a, the transverse side piece of the shipping container in accordance with Figs. 1a and 1b,

Fig. 3b, the transverse side piece in accordance with Fig. 3a in a further perspective representation.

Fig. 4, a longitudinal side piece of the shipping container in accordance with Figs. 1a and 1b in a perspective representation,

Fig. 5, a cover piece of the shipping container in accordance with Figs. 1a and 1b in a perspective representation,

Fig. 6, the view from above on the shipping container with the cover pieces removed,

Fig. 7, two shipping containers stacked on top of each other, each in the unfolded state in accordance with Fig. 1a,

Fig. 8, two shipping containers stacked on top of each other, each in the folded state in accordance with Fig. 1b,

Fig. 9, a further embodiment of the bottom piece of a shipping container in accordance with the invention,

Fig. 10, a further embodiment of a transverse side piece of a shipping container in accordance with the invention,

Fig. 11, a further embodiment of the shipping container in accordance with the invention with pieces in accordance with Figs. 9 and 10 in a perspective representation.

A thermally insulating shipping container is represented in Figs. 1 to 6, which consists of a bottom piece 1, two longitudinal side pieces 2, two transverse side pieces 4 and a two-piece cover piece 6a, 6b, which can be placed, parallel with the bottom piece 1, on the longitudinal and transverse side pieces 2, 4, so that in the position of use a shipping chamber is enclosed.

The thermally insulating effect of the shipping container is caused by the above mentioned pieces being produced from a thermally insulating material, for example EPP of an apparent density of at least 30 kg/m^3 and a wall thickness of preferably 25 to 30 mm and with a predominantly closed-cell foam structure.

It is a peculiarity of the shipping container represented in the drawing figures that during non-use it can be folded together in a space-saving manner, as can be seen in Fig. 1b, and can be unfolded for use, as will be explained in greater detail in what follows and can be seen in Fig. 1a.

The basis, or the basic element of the shipping container is the bottom piece 1, whose details can be seen in Fig. 2.

The bottom piece 1 has a rectangular bottom area 10, wherein an upwardly projection corner protrusion 11 has been molded in each corner area of the bottom piece 10.

Two attachment strips, shaped in the manner of stair steps and projecting from the top and identified by the reference numeral 12, can be furthermore seen between adjoining corner protrusions 11 along oppositely located edge areas of the bottom piece 10. The edge areas of the bottom piece 10 containing these attachment strips 12 face the longitudinal side pieces 2, the

closer details of one of which can also be seen in Fig. 4.

Now, in order to assure a foldable or unfoldable orientation of the longitudinal and transverse side pieces 2 and 4 on the bottom piece 1, such as can be seen in Figs. 1a or 1b, each corner protrusion 11 of the bottom piece 1 has hinge elements in the form of spherical or half-shell-shaped linkage recesses, which can also be called ball sockets 14, 15, on its sides facing the longitudinal or transverse side pieces 2, 4. Here, the ball sockets identified by the reference numeral 14 face the longitudinal side pieces 2, i.e. they are molded in the corner protrusions 11 in the direction of the attachment strips 12 of the bottom piece 1, while the ball sockets identified by the reference numeral 15 face the transverse side pieces 4 and are molded at right angles in regard to the ball sockets 14 in the corner protrusions 11.

An essential characteristic of these hinge elements in the form of ball sockets 14, 15 is that they are integrally molded in the corner protrusions 11, so that the one-piece manufacture of the bottom piece 1, visible in Fig. 2, of the shipping container by means of a molded foam process of expanded polypropylene particle foam or expanded polystyrene (EPP or EPS) is made possible without requiring additional materials or individual parts.

For being pivotably held on the bottom piece 1 embodied in this way, the longitudinal side pieces 2, as can also be seen in Fig. 4, are embodied with a hinge strip 24 which, in the unfolded orientation, is arranged on the underside and extends past the lateral face 20. Corresponding to the ball sockets 14 provided for this, half-shell-shaped or universal ball joint-shaped spherical heads 240, which project from the corner protrusions 11 and can be inserted into oppositely located ball sockets 14 of adjoining corner protrusions 11 parallel with an attachment strip 12, have been integrally molded on the hinge

strip 24 at the two front ends of the hinge strip 24 on the underside. Therefore the longitudinal side pieces 2, together with their hinge elements in the form of spherical heads 240, can also be produced in one piece, for example by means of a molded foam process.

In the same way, the transverse side pieces 4 to be seen in Figs. 3a and 3b are embodied with a hinge strip 44 which, in the unfolded orientation, projects on the underside past the lateral face 40 and has a lesser width, which again has half-shell-shaped spherical heads 440 as hinge elements on its two front ends, which can be inserted into correspondingly provided ball sockets 15 between two adjoining corner protrusions 11 of the bottom piece 1.

Since furthermore and as can be seen in particular in Fig. 2, the ball sockets 15 used for receiving the spherical heads 440 of the transverse side pieces 4 are arranged in respect to the bottom area 10 of the bottom piece at a greater height than the ball sockets 14 used for receiving the spherical heads 240 of the longitudinal side pieces 2, it is therefore possible, as can be seen in Fig. 1b, to arrange the two longitudinal side pieces 2 on the bottom area 10 in a folded orientation, i.e. extending parallel in respect to the bottom piece 1 and its bottom area 10, and to also arrange thereon the two transverse side pieces 4, also in a parallel orientation in respect to the bottom area 10 of the bottom piece 1. Then it is finally possible to place the cover pieces 6a or 6b, visible in Fig. 5, on this arrangement of transverse side pieces 4 and longitudinal side pieces 2, wherein the height of the corner protrusions 11 has preferably been selected to be such that they then terminate flush with the top of the folded-up transverse side pieces 4, and the transverse side pieces 4 and the longitudinal side pieces 2 are received between the corner protrusions 11. In this folded orientation the shipping container in accordance with Fig. 1b needs only

little storage space.

If, however, it is to be used in accordance with its purpose, i.e. enclose a shipping chamber in which temperature-sensitive material can be shipped, the longitudinal and transverse side pieces 2, 4 are placed into a folded-open position, which can be seen in Fig. 1a. First, starting with the folded state in accordance with Fig. 1b, the transverse side pieces 4 with the cover pieces 6a, 6b, which are fastened on them in a manner yet to be described in what follows, are raised into a vertical position. In the process, unfolding takes place around a pivot axis S4, which is defined by the hinge elements in the form of the ball sockets 15 and the spherical heads 440 and extends at right angles in relation to the pivot axis S2 of the longitudinal side pieces 2.

Now the longitudinal side pieces 2 can be reached, which are accessible above the bottom piece 1 and are in the folded-up orientation, i.e. extending parallel with the bottom area 10. Because of their pivotable seating between the ball sockets 14 of the corner protrusions 11 and the spherical heads 240, they are now raised on the hinge strips 24 of the side pieces 2 around a pivot axis identified by S2 into an orientation extending vertically in respect to the bottom area 10 of the bottom piece 1, in which, with a contact protrusion 2a on their underside, they come into contact with the respective attachment strip 12, so that they assume an exactly right-angled orientation in respect to the bottom piece 1.

It is understood that the respective heights of the longitudinal and transverse side pieces 2, 4 in the unfolded state should be matched, i.e. should be identical, and the heights should moreover be selected in such a way that the oppositely located longitudinal side pieces 2 or transverse side pieces 4 can be folded completely over the bottom piece 1.

After the longitudinal and transverse side pieces 2, 4 designed in this way have been brought into their unfolded orientation, i.e. extending vertically in respect to the bottom area 10 of the bottom piece 1, the shipping container in accordance with Fig. 6 can be filled and, following this, the cover pieces 6a, 6b can be placed on the top edge areas of the side pieces 2, 4, in order to close the shipping chamber inside the shipping container. For this purpose, the longitudinal side pieces 2 are provided with top insertion strips 21 along their edge areas which are on top in the unfolded orientation, which strips positively engage correspondingly designed grooves 61 on the underside of the cover piece 6, in the cover pieces 6a, 6b visible in Fig. 1b. A shipping container unfolded in this way and plugged together by means of positive connections has extremely high sturdiness and stability and can be used for shipping even heavy sensitive materials.

Moreover, all performed positive locking processes and also the pivot movements are reversible, i.e. following its use the shipping container can again be folded into its folded, space- saving orientation visible in Fig. 1b, and is therefore suitable for repeated or returnable use.

Although it would be also conceivable to only provide a single cover piece which can be applied and removed, the shipping container preferably has a multi-section cover piece, namely consisting of two cover pieces 6a, 6b, wherein the two cover pieces 6a, 6b each cover approximately one-half of the shipping chamber in the interior of the shipping container and together cover it on the top in the orientation to be seen in Fig. 1a.

Moreover, the two cover pieces 6a, 6 are pivotably held on the horizontal edge of the transverse side pieces 4 which lie on top in the folded-open state of the transverse side pieces 4.

For this purpose each pair of transverse side pieces 4, whose greater details can also be seen in Figs. 3a and 3b and which, in their folded-open state, lie on top, has hinge

receptacles 400, which are each spaced apart by an interspace 400a.

Linkage recesses 401 have been integrally formed out of the facing inner surfaces of the respective pairs of hinge receptacles 400 which, for defining an insertion channel, are upwardly widened in the shape of a step or in the shape of a ramp, which is indicated by the reference numeral 401a.

Correspondingly, the two cover pieces, see for example the **cover piece 6b represented in Fig. 5**, are provided with a hinge element 63, which has been integrally molded on the cover piece 6b and fits into the interspace 400a and on whose two sides facing the linkage recesses 401 protruding linkage heads 630 of a truncated-cone shape are molded, so that, without the addition of separate hinge elements, a pivotable seating of the two cover pieces 6a, 6b on the transverse side pieces 4 can be provided by the integral shaping of the hinge elements constituted in this way. A ramp-shaped flattening 630a is provided for easy introduction of the linkage heads 630 into the linkage recesses which, together with the insertion channels 401a, makes possible the easy attachment and, if required, also the removal, of the cover pieces 6a, 6b.

The hinge connection realized in this process between the transverse side pieces 4 and the respective cover pieces 6a, 6b defines pivot axes S6 parallel in respect to the pivot axes S4 of the transverse side pieces 4, which assure the pivotability of the cover pieces 6a, 6b by at least 270°.

Because of this great pivot angle it is not only possible, as can be seen in Fig. 1a, to place the cover pieces 6a, 6b on the upper edge area of the longitudinal and transverse side pieces 2, 4 for closing the shipping chamber, but also to fold them open for access to the shipping chamber which, incidentally, is made easier by forming out grip recesses 64 on the top of the cover pieces 6a, 6b.

If, for the purpose of returning or because of non-use, the shipping container designed in this way is folded, as can be seen in Fig. 1b, first, following the folding open of the cover pieces 6a, 6b, folding of the longitudinal side pieces 2 into an orientation extending parallel in respect to the bottom piece 1 is provided in the already explained way by means of the pivotable seating of the transverse side pieces 4 around the pivot axis S2 on the bottom piece 1. Thereafter, the two cover pieces 6a, 6b are brought out of their position represented in

Fig. 1a into a parallel position in respect to the transverse

side pieces 4, which are still in the unfolded state, on the two facing outsides of the same and, as a result of their already mentioned pivotable seating around the pivot axis S4, subsequently the transverse side pieces 4 are brought into their position which can be seen in Fig. 1b, in which they come to rest in a space-saving manner parallel with the previously folded-in longitudinal side pieces 2 and the bottom piece 1. The cover pieces 6a, 6b rest above and parallel with the transverse side pieces 4.

It can be further seen in the representation in Figs. 1a and 2 that, in an edge area between the corner protrusions 11 facing the transverse side pieces 4, the bottom piece 1 has a raised attachment edge 110, which assures an exact right-angled placement of the transverse side pieces 4 in the folded-open state.

In order to urge the user to grasp the shipping container at the transverse side pieces 4 connected in this way in a positive manner with the bottom piece 1, the carrying handles identified by the reference numeral 43 have been integrally molded on the outside of the transverse side pieces 4 between the respective hinge receptacles 400. Finally, the representation of the longitudinal side piece 2 in accordance with Fig. 4 shows the forming of snap-in pins 26 which, in the folded-open state of the

longitudinal side pieces 2, engage corresponding recesses 420 in the transverse side pieces 4 and assure a great sturdiness of the shipping container, see also Figs. 3a and 6.

Because the bottom piece 1 of the above explained embodiment in accordance with Fig. 2 has an edge running around the top, formed by the attachment strips 12, 110, it is furthermore used as a catch basin for liquid possibly exiting the shipped material in the shipping chamber. By means of an appropriate dimensioning of the encircling edge it is possible, for example, to assure a capacity of 1 l of liquid or more inside the bottom piece 1.

It is a substantial characteristic of the shipping container that all individual pieces, including their functional elements, in particular the hinge elements, can be molded integrally from a particle foam without the use of separate individual parts, which makes possible a shipping container which is true-to-type and cost effective, but is extremely sturdy. Here, all linkage heads used have the shape of a truncated cone or universal ball joint, and all linkage recesses a shape matching this.

Finally, the bottom piece 1 also has outside recesses 110a which are designed corresponding to the hinge connections between the transverse side pieces 4 and the cover pieces 6a, 6b, so that several shipping containers can be stacked on top of each other, secure against slipping, in the unfolded state, see Fig. 7, as well as in the folded state, see Fig. 8.

A further possible embodiment of the shipping container is represented in Figs. 9 to 11, wherein like elements have been provided with the same reference numerals as in the previously represented and described embodiments and will not be separately explained in what follows, provided this is not necessary for understanding the invention.

The shipping container represented in its position of use

in Fig. 11 has a bottom piece 1 represented in greater detail in Fig. 9 and is equipped, as in the previously described embodiments, with an upwardly projecting corner protrusion 11 in each corner area.

In the area used for the pivotable fastening of a transverse side piece 4, a fastening strip 110, which upwardly projects past the bottom piece 1, is formed between the facing corner protrusions 11 and the hinge elements, identified by the reference numeral 15, in the corner protrusions, which strip, at the two ends located opposite the two corner protrusions 11, is itself provided with corresponding hinge elements 15a, which have been integrally molded and which correspond in their configuration to those of the recesses 15 in the corner protrusions 11. The respective insertion opening 15b for a hinge element of the transverse side piece 16 to be received in it, and which can be seen in Fig. 10 by means of reference numerals 440, here extends parallel in respect to the bottom area 10 of the bottom piece 1 and is identified by the reference numeral 15b.

As can be seen in the overview in accordance with Fig. 11, each transverse side piece 4, which also has the carrying handles 43 for carrying the shipping container, is doubly held on both sides of each formed-on hinge strip 44 by means of appropriately projecting hinge elements 440 in the corresponding hinge receptacle 15 or 15a of a corner projection 11 or fastening projection 110 and, in the folded-open position visible in Fig. 11, cannot be removed out of the receiving position, even in case of large loads arranged inside the shipping container. Thus it is possible also with this embodiment to ship large loads inside the shipping container without the danger of the hinge connection between the bottom piece 1 and the transverse side piece 4 being overwhelmed.

It can be furthermore seen in the embodiment in accordance with Fig. 11 that recesses 22a have been cut into the

longitudinal side pieces 2, which are used as opening aids for the two cover pieces 6a, 6b.

A further functionality of the represented shipping container corresponds to the exemplary embodiment previously described in detail by means of Figs. 1a to 8, so that it is possible to omit further functionality explanations to prevent repetitions.

It is understood that, in place of producing them from particle foam, each one of the previously explained embodiments of the shipping container in accordance with the invention can also be produced, for example, from molded parts made of a thermoplastic material, such as polypropylene or polyethylene, which have hollow chambers, are therefore especially light and at the same time thermally insulating. Such hollow-chambered molded parts can for example be produced in accordance with a blow-molding method, such as has already been known up to now for producing panel parts for the automobile industry and the like.

WHAT IS CLAIMED IS:

1. A thermally insulating shipping container comprising:

10 a bottom piece (1), two longitudinal side pieces (2), two transverse side pieces (4) and at least one cover piece (6a, 6b), which enclose a shipping chamber and are made of an insulating material, the longitudinal side pieces (2) and the transverse side pieces (4) being pivotably maintained on the bottom piece (1) around respective pivot axes (S2, S4), which extend parallel in respect to the bottom piece (1), so that they can be unfolded from a folded orientation, which extends parallel in respect to the bottom piece (1), into an orientation which is perpendicular to it, in which they enclose the shipping chamber and in which the shipping chamber can be subsequently closed by means of the at least one cover piece (6a, 6b), wherein the shipping container is made of molded foam particles and the longitudinal and transverse side pieces (2, 4) are maintained, pivotable around the pivot axes (S2, S4), on the bottom piece (1) by means of hinge elements in the form of linkage heads (240, 440) held in hinge recesses (14, 15), wherein the hinge elements (14, 15, 240, 440) are each integrally molded in the bottom piece (1) and the transverse side pieces (2, 4).

20 2. The shipping container in accordance with claim 1, wherein the bottom piece (1) has a right-angled bottom area (10), and a corner protrusion (11), whose top projects upward, is molded in each corner area of the bottom area (10) and, on its sides facing the longitudinal and transverse side pieces (2, 4), each corner protrusion (11) is provided with integrally molded hinge elements, which can be brought into an operational connection with correspondingly formed hinge elements of the longitudinal and transverse side walls (2, 4).

3. The shipping container in accordance with claim 2, wherein the linkage heads (240, 440) are embodied to be in the shape of a universal ball joint or the shape of a truncated cone.

4. The shipping container according to any one of claims 1 to 3, wherein the bottom piece is embodied with upwardly protruding fastening strips (12, 110) for attaching the folded-open longitudinal side pieces (2) and/or transverse side pieces (4).
5. The shipping container according to claim 4, wherein the fastening strips (12, 11) are formed on the bottom piece (1) between adjoining corner protrusions (11) and are provided with integrally molded hinge elements, which can be brought into operational connection with correspondingly formed hinge elements of the longitudinal or transverse side pieces (2, 4).
- 10 6. The shipping container according to any one of claims 1 to 5, wherein the longitudinal side pieces (2) are provided with means for a snap-in engagement with the transverse side pieces (4) in the unfolded orientation.
7. The shipping container according to any one of claims 1 to 6; wherein the longitudinal, the transverse pieces, or both (2, 4) are equipped with exterior carrying handle elements (43).
8. The shipping container according to any one of claims 1 to 7, wherein the longitudinal, the transverse side pieces, or both (2, 4) are embodied with insertion strips (21) which are arranged on top in the unfolded orientation and can be inserted into corresponding insertion grooves (61) formed on the underside of the at
20 least one cover piece (6a, 6b).
9. The shipping container according to any one of claims 2 to 8, wherein the height of the corner protrusions (11) extending past the bottom area (10) of the bottom piece (1) is dimensioned such that the transverse side pieces (4) and the longitudinal side pieces (2) can be received between the corner protrusions (11) in parallel orientation in regard to the bottom piece (1).

10. The shipping container according to any one of claims 1 to 9, wherein the at least one cover piece (6a, 6b) can be plugged on the unfolded longitudinal and transverse side pieces (2, 4).

11. The shipping container according to any one of claims 1 to 10, wherein two cover pieces (6a, 6b) are provided, each of which is pivotably fastened to a one of the transverse side pieces (4).

12. The shipping container according to claim 11, wherein the cover pieces (6a, 6b) are maintained on the transverse side pieces (4), pivotable around hinge axes (S6), by means of hinge elements in the form of linkage heads (630) held in linkage
10 recesses (401), wherein the hinge elements (401, 630) are each integrally molded on the cover pieces (6a, 6b) and the transverse side pieces (4).

13. The shipping container according to any one of claims 1 to 12, wherein the bottom piece (1) constitutes a catch basin for liquid collecting in the shipping chamber.

14. The shipping container according to any one of claims 1 to 13, wherein the molded foam particles are of a predominantly closed foam structure on the basis of a polyolefin, or of polyester.

15. The shipping container according to claim 14, wherein the polyolefin is polyethylene or a polypropylene.

20 16. The shipping container according to claim 14, wherein the molded foam particles are of an apparent density of at least 30 kg/m³.

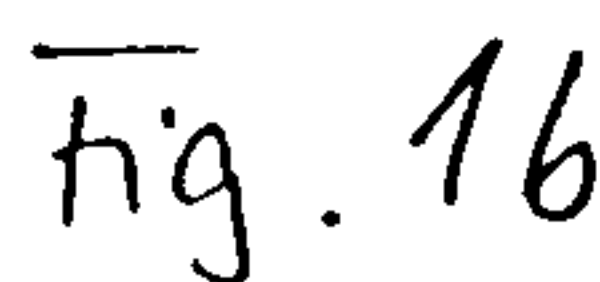
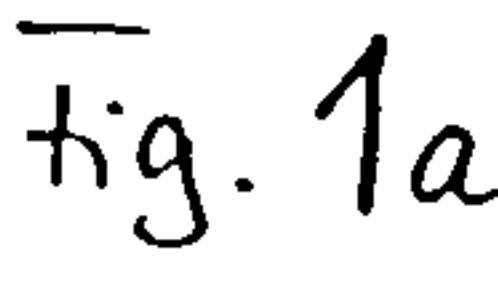
17. The shipping container according to claim 14 or 16, wherein the wall thickness of the bottom piece (1), the longitudinal and transverse side pieces (2, 4)

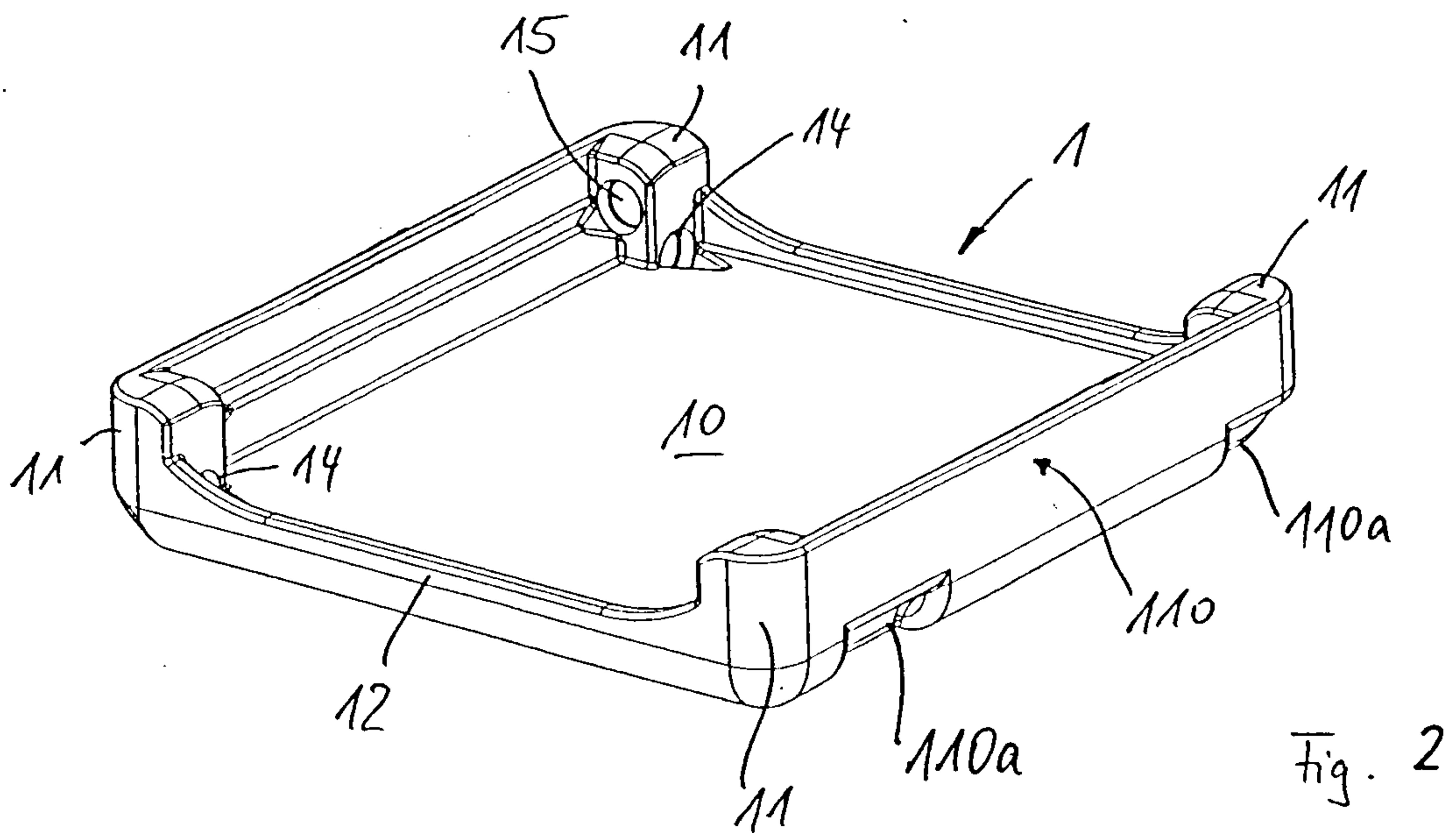
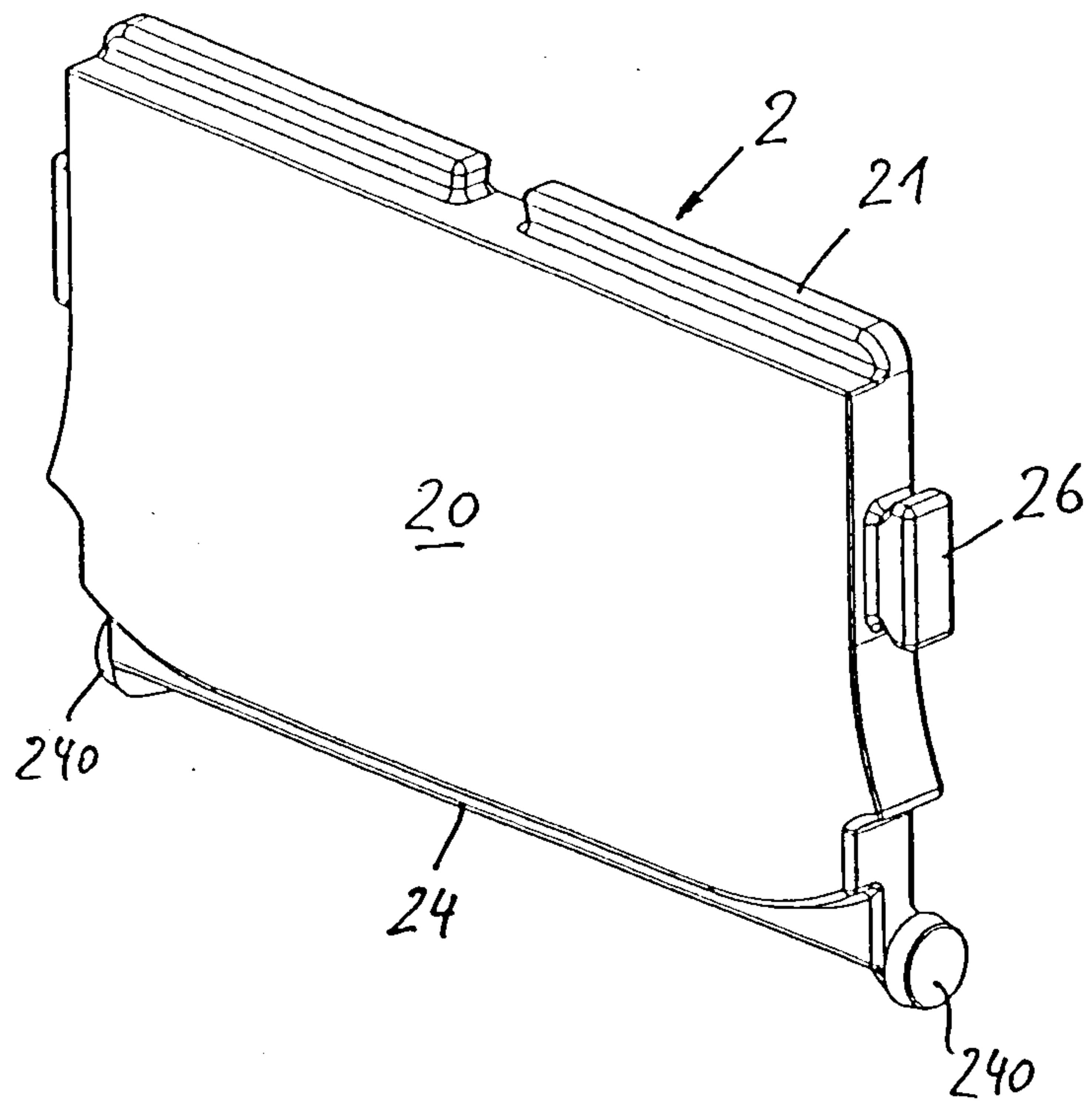
and the cover pieces (6a, 6b) is embodied to lie in the range between 15 and 35 mm.

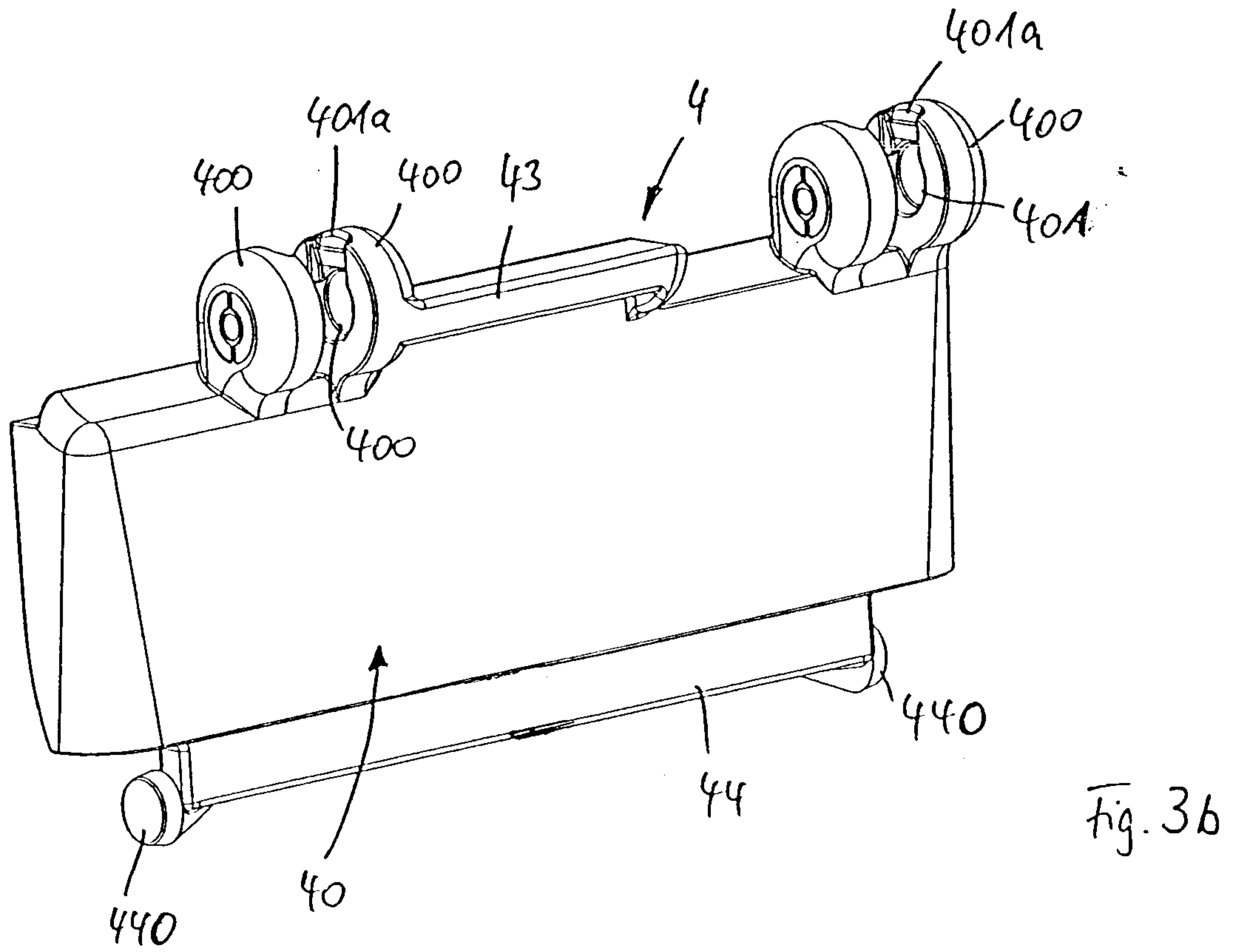
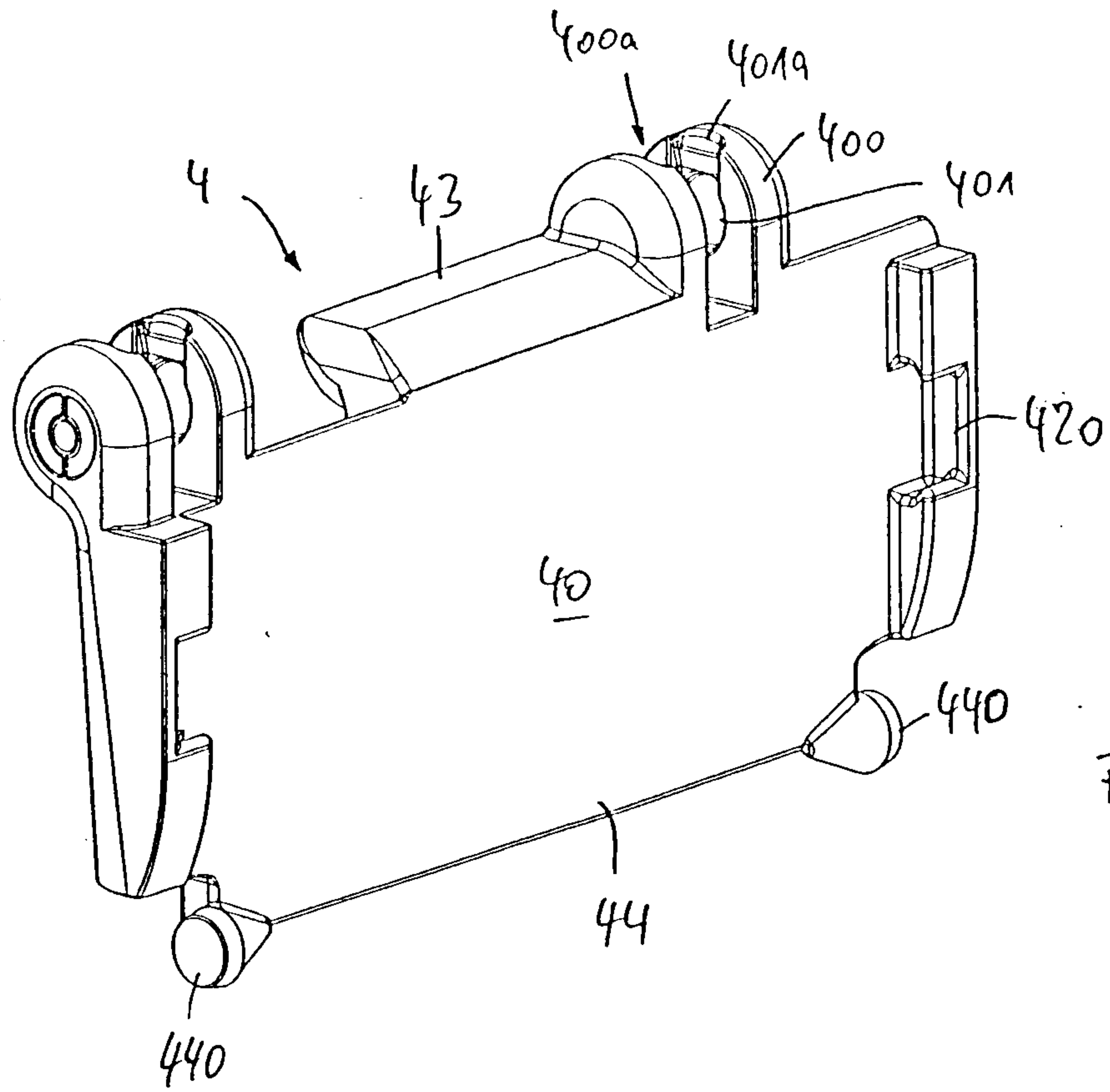
18. The shipping container according to claim 17, wherein said thickness is preferably between 25 to 30 mm.

19. The shipping container according to any one of claims 1 to 18, wherein its surfaces are provided with a liquid-proof coating.

20. The shipping container according to any one of claims 1 to 19, designed to be stackable in the folded or unfolded state.







4/8

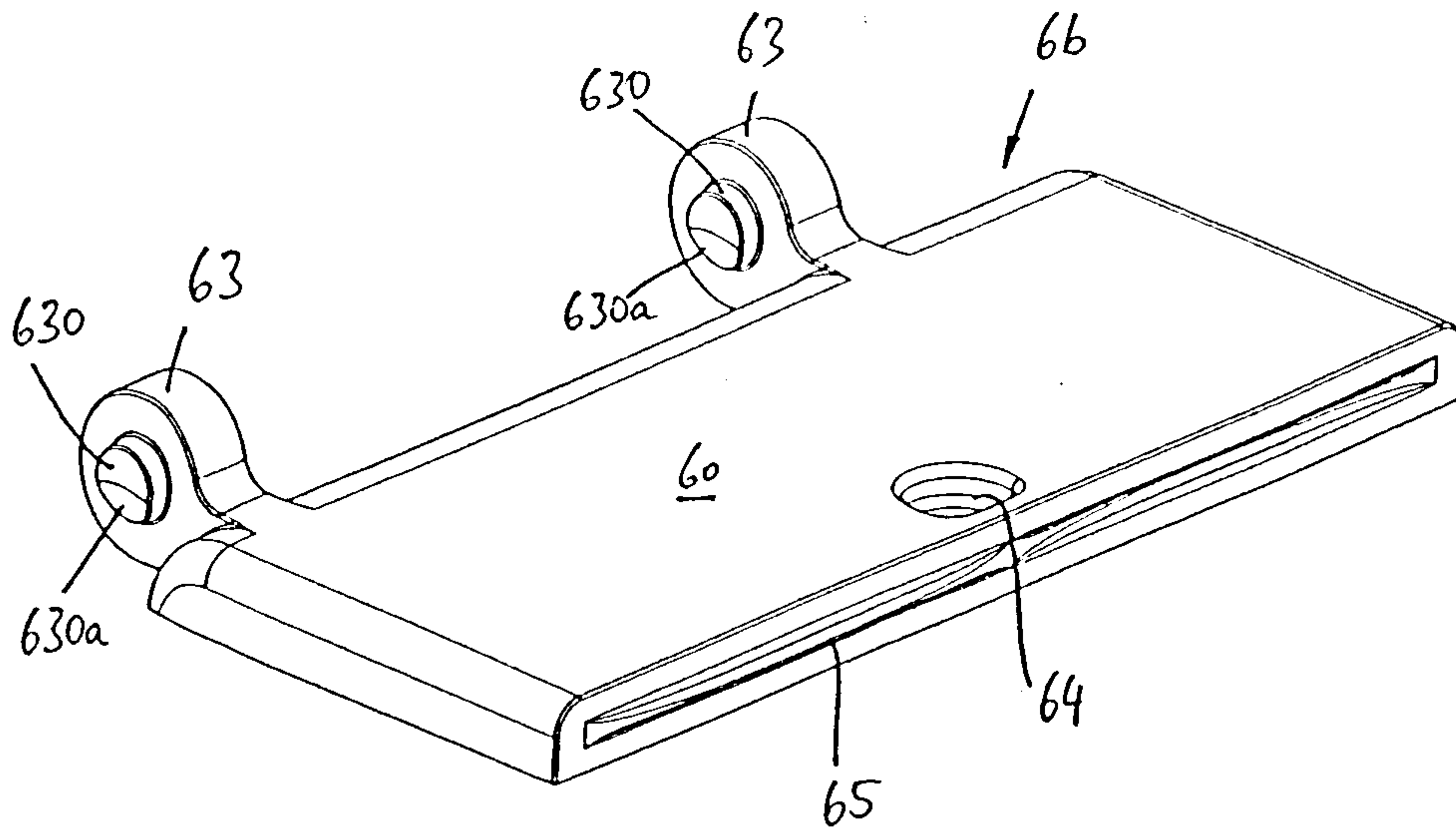


Fig. 5

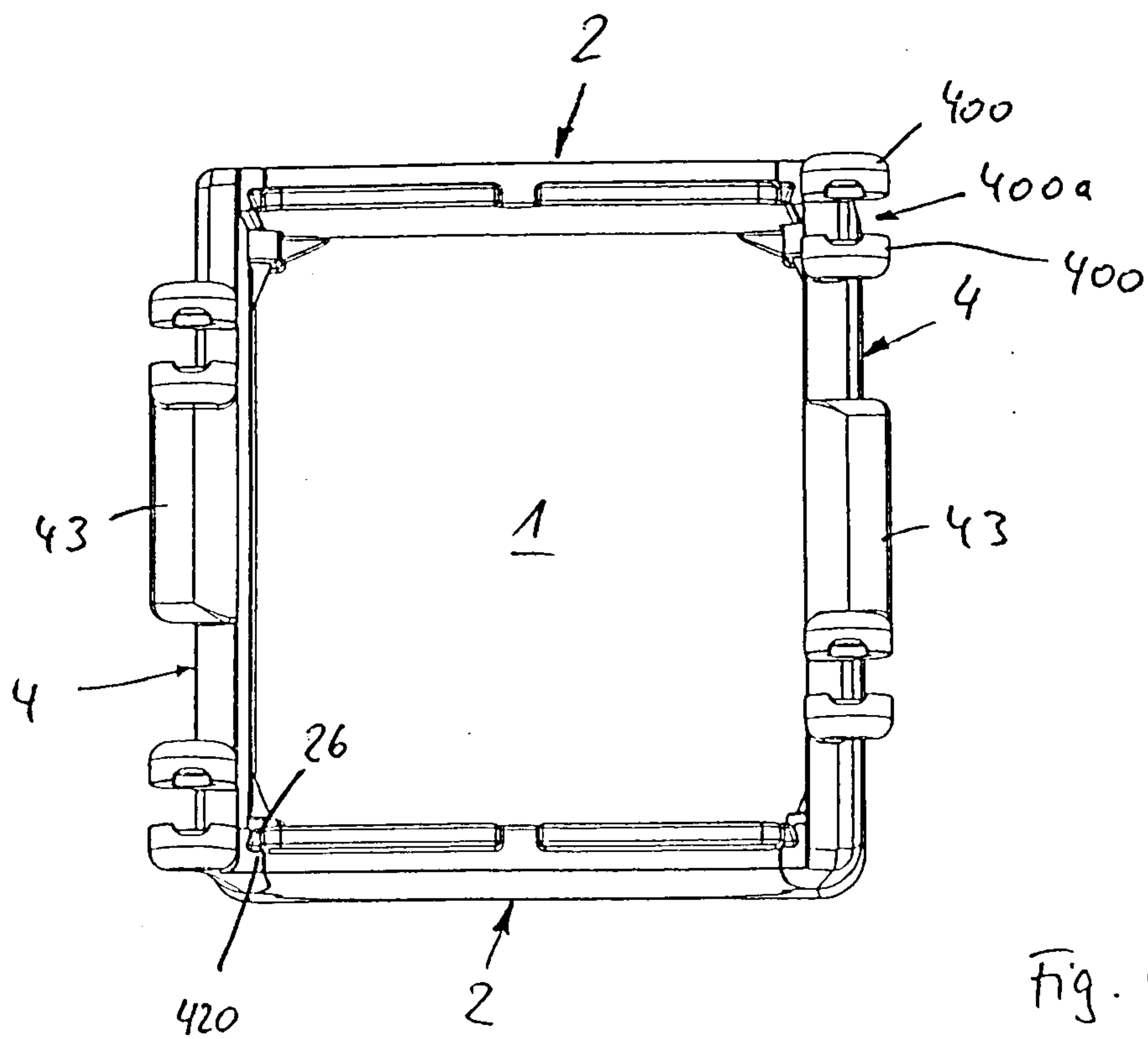


Fig. 6

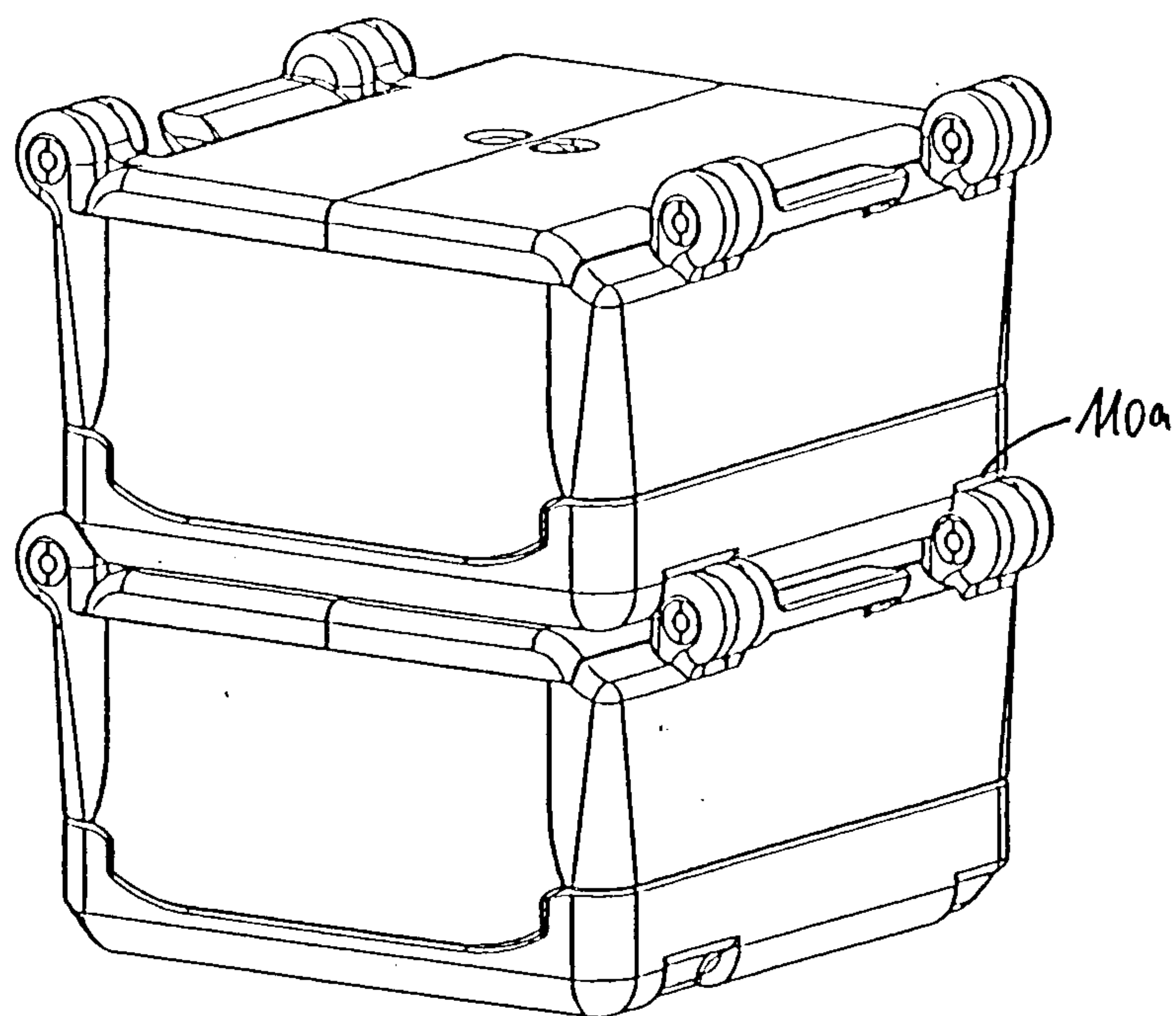


Fig. 7

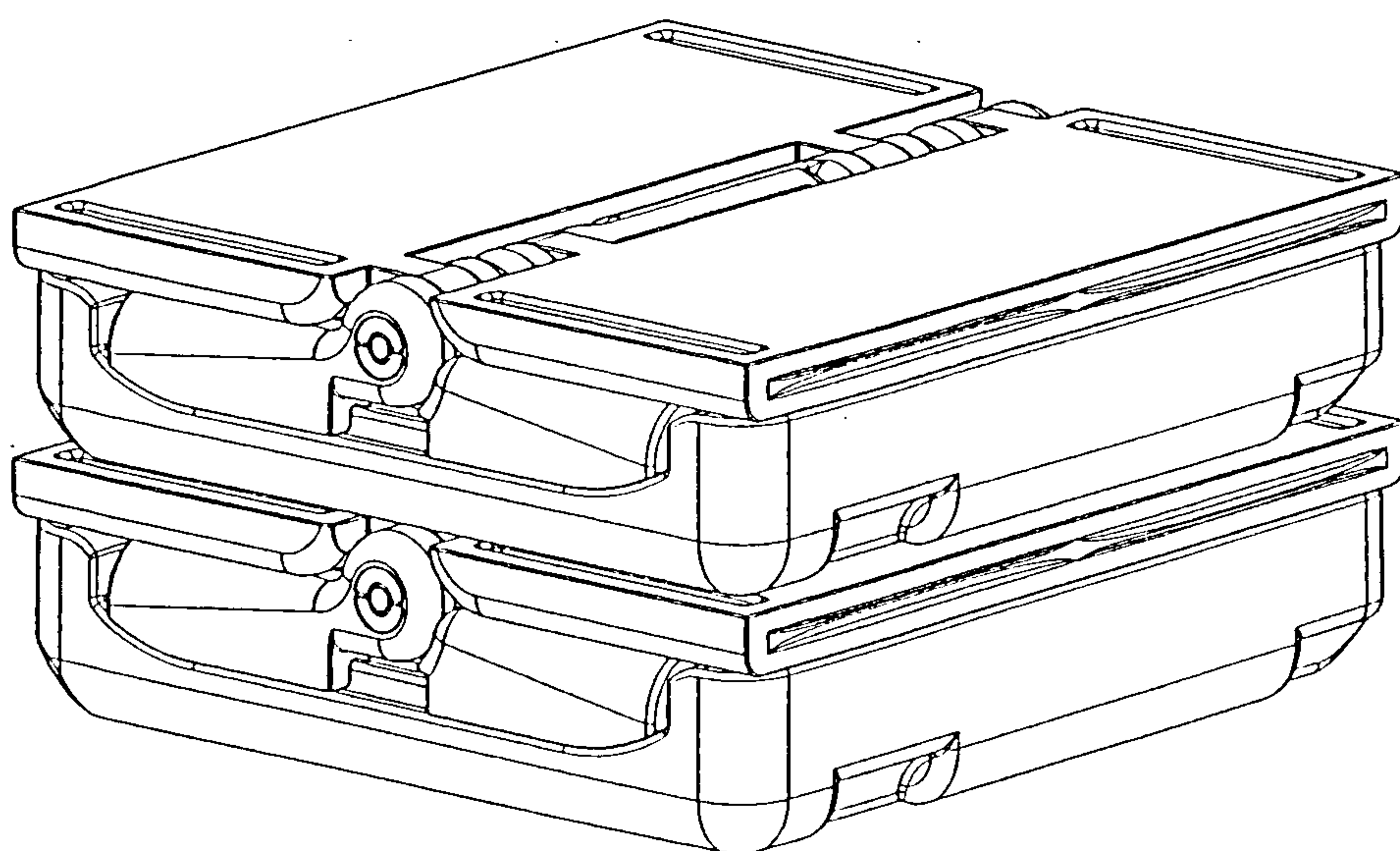


Fig. 8

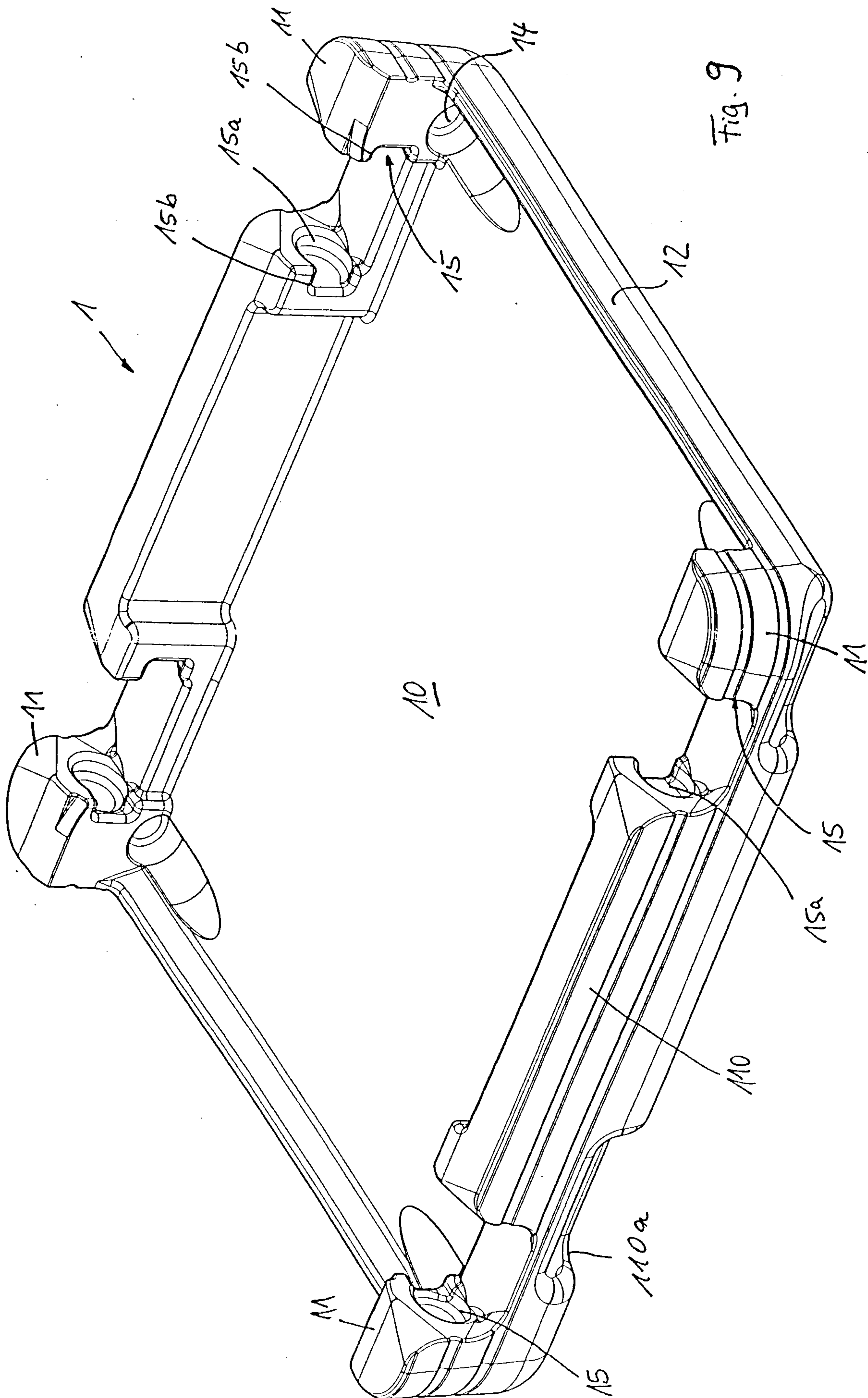


Fig. 9



