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(71) Applicant: **ANCAN S.r.l.**
I-00195 Roma (IT)

(72) Inventor: **Di Pilla, Luciano**
00015 Monterotondo, (Prov. of Rome) (IT)

(74) Representative: **Gervasi, Gemma, Dr. et al**
NOTARBARTOLO & GERVASI Srl,
Corso di Porta Vittoria, 9
20122 Milano (IT)

(54) Foldable container

(57) Parallelepiped container (A) having a rectangular base (1) and lateral walls (2) and (3), characterized, on base (1), by: two cut lines (4) and four folding lines (8), at 45°, originating from the apexes of the base (1), and ending on cut lines (4); folding lines (11) parallel to each other and to the larger sides of base (1), originating on folding lines (8) and cut lines (4); folding lines (11'), parallel to lines (11), originating on open zone (15) and ending on the cut line (4) and such as they produce a folding direction opposite to the one of corresponding folding lines (11).

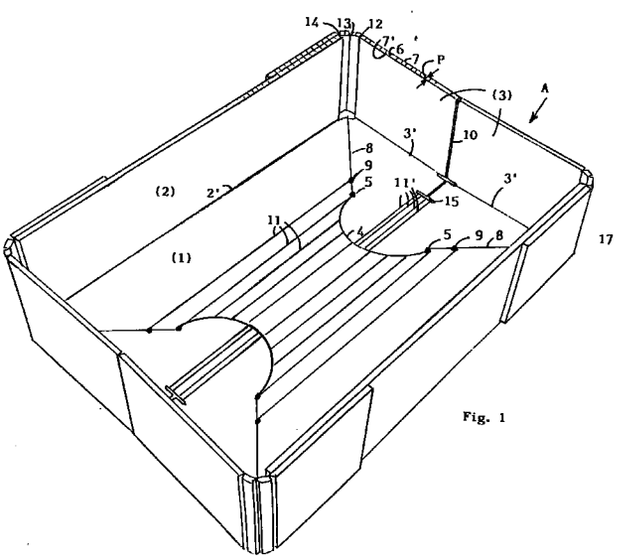

Fig. 1

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Description

FIELD OF THE INVENTION

The present invention relates to a foldable container. In particular, the invention refers to a container having a rectangular base, obtained starting from rigid or semirigid materials, said materials being characterized by a certain elasticity and described in more detail in the following description of the invention. Said container is characterized by a specific combination of foldings and cuts, realized on some of said flat surfaces so that, when empty and folded, said container takes a very reduced dimension.

BACKGROUND ART

It is known the need of containers which, when full, have a fixed volume and, when empty, can be folded thus taking up a minimum volume.

The applicant filed the European Patent No. 0 711 709 wherein a series of folding containers is described, which are made by rigid or semirigid materials. Some of those materials, such as double-face corrugated board, or polypropylene, also double-faced with corrugated or honeycomb core, do not accept the folding system described in such application, therefore a particular combination of cuts has now been developed, to be used with square or rectangular based parallelepiped containers, permitting to utilize and enhance the elasticity of the material employed. In particular, it has been found that in the case of the above materials and with reference to the containers described in the above application, the cutting on the base of the parallelepiped containers has to be necessarely replaced by at least a folding.

SUMMARY OF THE INVENTION

It is an object of present invention to provide a rectangular based, preferably opened parallelepiped container provided with a combination of foldings associated with cuts, obtained by punching, on lateral walls as well as on the base of said container, so that it can be folded to assume, after folding, the dimension of one of its lateral walls and a thickness which is function of the thickness of the material utilized for the container.

The container according to the invention is obtained from materials having a given thickness and characterized a first a second face spaced by a gap containing a stiffening structure, as for instance a lamellar or a honeycomb structure. Such structures can be similar to those abovementioned for the corrugated board or polypropylene.

Moreover, in order to explain such combination of foldings and cuts used in the present disclosure, the following words will be used: "punched folding line" or simply "folding line and "cut line". In order to make clear the folding according to the invention, in the following Fig. 5 the cut lines, as well as the edges of the container, will be indicated as continuous lines, that is, lines along which a cut is made to obtain the container in its final shape starting from a substantially larger portion of starting material. Obviously the material used for making the container has to be puncheable and shall be preferably processed by shearing. Such containers are preferably produced not by forming, but from a starting flat surface duly punched and cut according to the invention. With "punched folding line" a folding line is meant, obtained preferably by punching, traced on the surface of the container. A folding of said surface is made along this line, the folding being such to produce a rising of the surface or, alternatively, a lowering thereof, with respect to the plane containing the same surface. In order to make clear the folding according to the invention, in the following Fig. 5 the punched folding lines will be indicated with broken lines: those producing a rising of the surface will be indicated with dash lines, those producing a lowering will be indicated with dot-dash lines.

With punching a techique is meant, known to the expert, through which an incision is obtained on the material along which a folding is made.

BRIEF DESCRIPTION OF FIGURES

Fig. 1 schematically shows a perspective view of a first embodiment of a substantially parallelepiped container with a rectangular base according to the invention.

Fig. 2 is a top view of the container of Fig. 1.

Fig. 3 is a bottom view of the container of Fig. 1.

Fig. 4 is a schematic perspective view of a detail of the container of Fig. 1.

Fig. 5 is a view of the planar development of the container of Fig. 1.

Fig. 6 is a top perspective view of the container of Fig. 1, partially folded according to the invention.

Fig. 7 is a bottom perspective view of the container of Fig. 1, partially folded according to the invention.

Fig. 8 is a top perspective view of the container of Fig. 1, almost partially folded.

Fig. 9 is a schematic perspective view of a second embodiment of a rectangular base, substantially parallelepiped, open container according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

Features and advantages of the invention will be illustrated with reference to the enclosed drawings, in which some embodiments of the present invention are shown as exemplificatory not limiting examples. As can be seen in Fig.s 1 and 2, container (A) has an open parallelepiped shape with base (1) and lateral walls (2) and (3). Both punched folding lines and cut lines are present on container (A). In this case two cut lines (4) are on the base (1) and have a semicircular shape and such a lenght to facilitate opening and closing of the container.

Any of such cut lines could be substituted by two converging substantially rectilinear lines having origin in (5). The thickness of the container material is indicated with P. As can be seen, the material is characterized by a first (7) and second (7') wall with an inteposed stiffening fin structure (6), in this case consisting in a sort of ribbing transversal to the punching lines.

The punched folding lines are indicated, as aboventioned, with broken line. As can be seen, the punched folding lines essential for the present invention are the following. Four lines (8), at 45°, originating from the apexes of the base plane (1), and each terminating at (5) on cut lines (4). To said lines (8) other (10) are associated, placed corresponding to the midline of lateral walls (3), corresponding lateral walls (2) being not provided with folding lines. Other folding lines (11) are placed on base (1), parallel to each other and to the larger sides of base (1). Said folding lines (11) originate on lines (8) and (4), and preferably, as in the embodiment of the figures, when folding lines (11) originate on folding lines (8), or at the intersection of line (8) with cut line (4), at the originating point an opening (5) or (9) is made, preferably as circular hole. Such openings (5) and (9) facilitate opening and closing the container (A). The number of folding lines (11) is not defined, preferably it is three or more, more preferably it is odd. The so placed folding lines (11) facilitate the folding of the container (A) according to the invention, in that they in somewhat enhance the elasticity of the material.

Other folding lines (11'), parallel to each other, and also parallel to (11), and placed on base (1), cooperate to folding the container (A). They originate on the open zone (15) and end on cut line (4). As can be seen, they produce a folding direction opposite to the one of corresponding folding lines (11). Also the number of lines (11') does not limit present invention and it is function of the type of material used and of the necessity of folding. However such lines (11') are preferably even in number, and more preferably four.

There are other folding lines, associated to punched folding lines (8, 10 11, 11') and to cut lines (4), which help folding of container (A) according to the invention. Such folding lines coincide with larger and lesser sides of base (1), they are indicated as (2') and (3') respectively and have the function of generating the parallelepiped container (A). Still other folding lines, better seen in Fig. 4, are indicated with (12, 13, 14), they are parallel to each other and placed to join lateral walls (2) and (3) at the four corners of the lateral surface of the container (A). In this case they are three in that, due to the thickness P of container (A), with a lesser number it would not be easy to fold the container; anyhow such lines could also be present in a lesser or higher number. It must be noted that lines (12) (13) and (14) do not necessarely have to be equally spaced.

As already mentioned, container (A) has zones or openings (5, 9, 15, 16) which can have any form, as it simply means that some material was eliminated to facilitate folding of container, which has a thickness P.

Zones (16) are advantageously placed at the joining apexes between base (1) and lateral walls (2) and (3). Zones (15) are advantageously placed between lines (10) and (11') and preferably have a substantially double T shape. Zones (5) and (9), preferably in form of circular hole, are advantageously placed along lines (8), zones (5) being at the intersection between line (8) and line (4).

The specific embodiment shown in Figs. 1-4 has the planar development shown in Fig. 5. As already said, the containers according to present invention are preferably obtained by shearing starting from a planar surface which, after this tis step, will have, for example, the planar development of Fig. 5. As can be seen in this figure, lateral walls (3) of container (A) end with extensions (17) which can have any form, in that their sole function, in the assembling step, is to be folded and glued or otherwise strongly connected to the lateral wall (2) in order to obtain the container (A) in its final form. Obviously the extensions (17) can be alternatively fixed on lateral walls (3).

As can be seen in Fig. 5, zones (16) are shaped, and lines (12, 13, 14) are spaced among them, considering the presence of said extensions (17).

It is to be noted that the punching steps to obtain folding lines and cuts are preferably performed before the assembling of container (A) in form of a box.

A second embodiment of the container according to the present invention is shown in Fig. 9, in which container (A) has a particular shaping of lip (18) and has holes (19) acting essentially as handles for the container itelf.

Obviously, dimensions and shape of the container (A), as well as dimensions and shaping of its lateral walls, can vary within the scope of present invention.

Figs. 6-8 show container (A) through different folding steps in sequence, with top and bottom views. As can be seen, the combination of cutting and folding lines, obtained by punching, is able to give a folding so that the central zone of base (1) of container (A) lifts and its lateral walls (2) approach to each other, while lateral walls (3) bend along relevant centreline. In effect, the punching operation brings to a sort of quasi-elastic folding of the container, which can be collapsed and then easily brought back to it original box shape with a simple operation.

Materials advantageously utilizable to obtain the containers according to present invention are all those materials which have spaced first and second walls connected by stiffening structures and which can be punched, such as e.g. board and plastic sheets of different kinds.

Claims

1. Container (A) having an open parallelepiped shape with a rectangular base (1) and lateral walls (2) and (3), said container (A) being characterized in that the material with which it is made is a puncheable

material provided with spaced first (7) and second (7') walls connected by a stiffening fin structure (6), on said container (A) being produced a cooperating combination of punched folding lines and cut lines according to the following indications:

- two cut lines (4) are on the base (1) and have a semicircular shape and such a lenght to facilitate opening and closing of the container (A);
- first four folding lines (8), at 45°, originating from the apexes of the base plane (1), and each terminating at (5) on cut lines (4);
- second folding lines (10), placed corresponding to the midline of lateral walls (3), while corresponding lateral walls (2) are not provided with folding lines;
- third folding lines (11), placed on base (1), parallel to each other and to the larger sides of base (1), said folding lines (11) originating on folding lines (8) and cut lines (4);
- fourth folding lines (11'), parallel to each other, and also parallel to (11), and placed on base (1), originating on an open zone (15) and ending on cut line (4) and such as they produce a folding direction opposite to the one of corresponding folding lines (11);
- fifth folding lines (2') and (3') placed to join the base (1) with lateral walls (2) and (3) respectively;
- sixth folding lines (12) (13) and (14), parallel to each other and placed to join lateral walls (2) and (3) at the four corners of the lateral surface of the container (A).

2. Container according to claim 1 characterized in that it is further provided with four zones or holes or openings (5), (9), (15) and (16), said zones (16) being placed at the apexes of the base (1) with the lateral walls (2) and (3), said zones (15) being placed among the lines (10) and (11'), said zones (5) and (9) being placed along the line (8) and the zones (5) being at the intersection between line (8) and line (4).

3. Container according to claims 1 and 2 characterized in that the structure between walls (7) and (7') is a honeycomb structure.

4. Container according to claims 1 and 2 characterized in that the structure between walls (7) and (7') is a sort of ribbing transversal to the punching lines.

5. Container according to claims 1 and 2 characterized in that each cut line (4) is constituted by two substantially straight lines originating in (5) and converging between them.

6. Container according to claims 1 and 2 characterized in that, when the folding lines (11) originate on the folding lines (8) or at the intersection of line (8) with the cut line (4), in correspondence with such origin a hole (5) or (9) is produced.

7. Container according to claims 1 and 2 characterized in that the folding lines (11) are three or higher.

8. Container according to claims 1 and 2 characterized in that the folding lines (11) are odd.

9. Container according to claims 1 and 2 characterized in that the folding lines (11') are even.

10. Container according to claims 1 and 2 characterized in that the folding lines (12), (13) and (14) are not equally spaced among them.

11. Container according to claims 1 and 2 characterized in that the openings (15) are shaped substantially as a double T.

12. Container according to claims 1 and 2 characterized in that the openings (5) or (9) are circular holes.

13. Container according to claims 1-12 characterized in that it is further provided with extensions (17) which, in the assembling step, are fixed to the lateral walls (2) or (3).

14. Container according to claim 13 characterized in that the extensions (17) are fixed with glue.

15. Container according to claims 1-14 characterized in that it has a particular shaping of lip (18) and has holes (19) acting essentially as handles for the container itelf.

16. Use of materials characterized by spaced first and second walls connected by stiffening structures for obtaining the container according to claims 1-15.

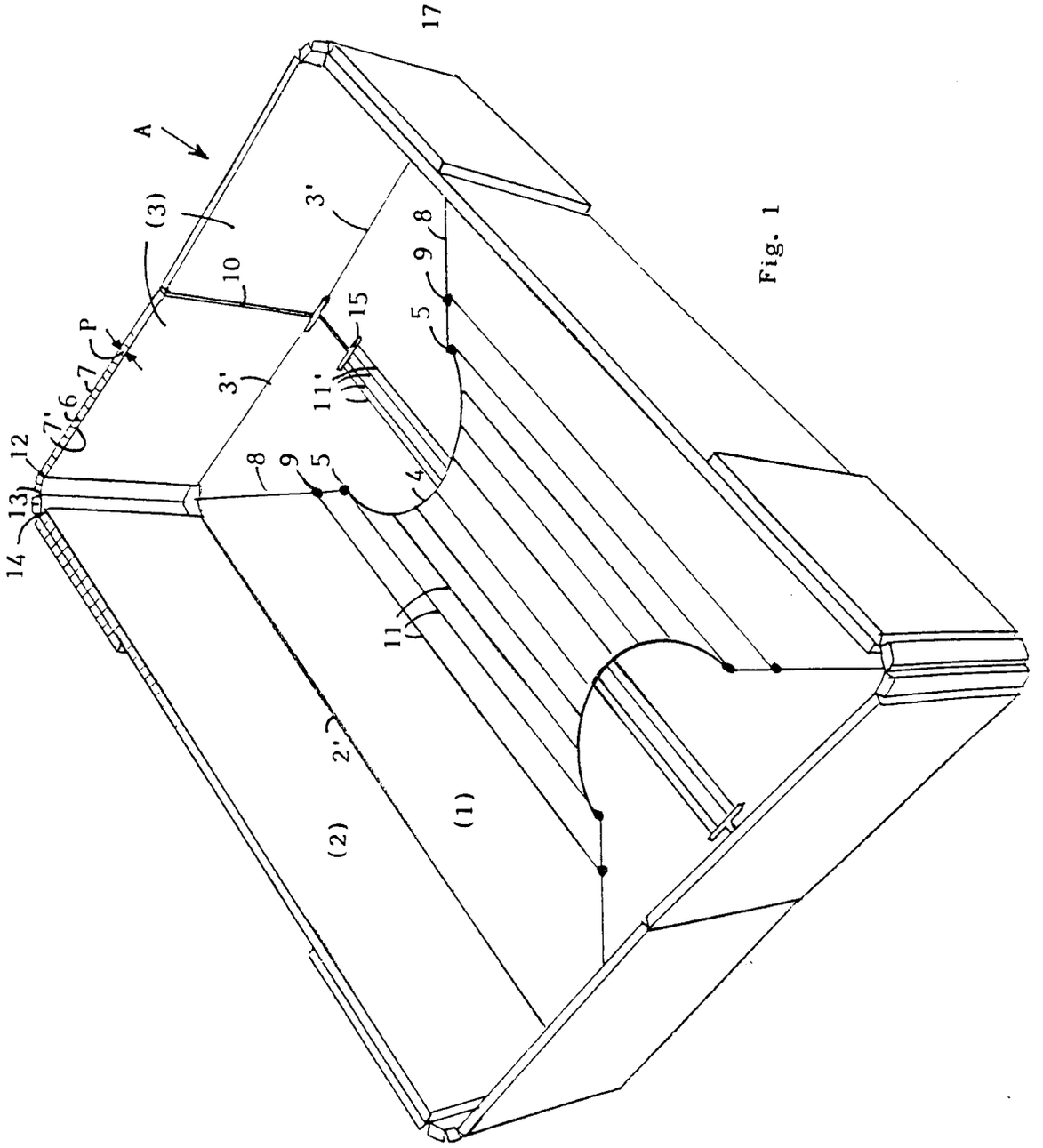

Fig. 1

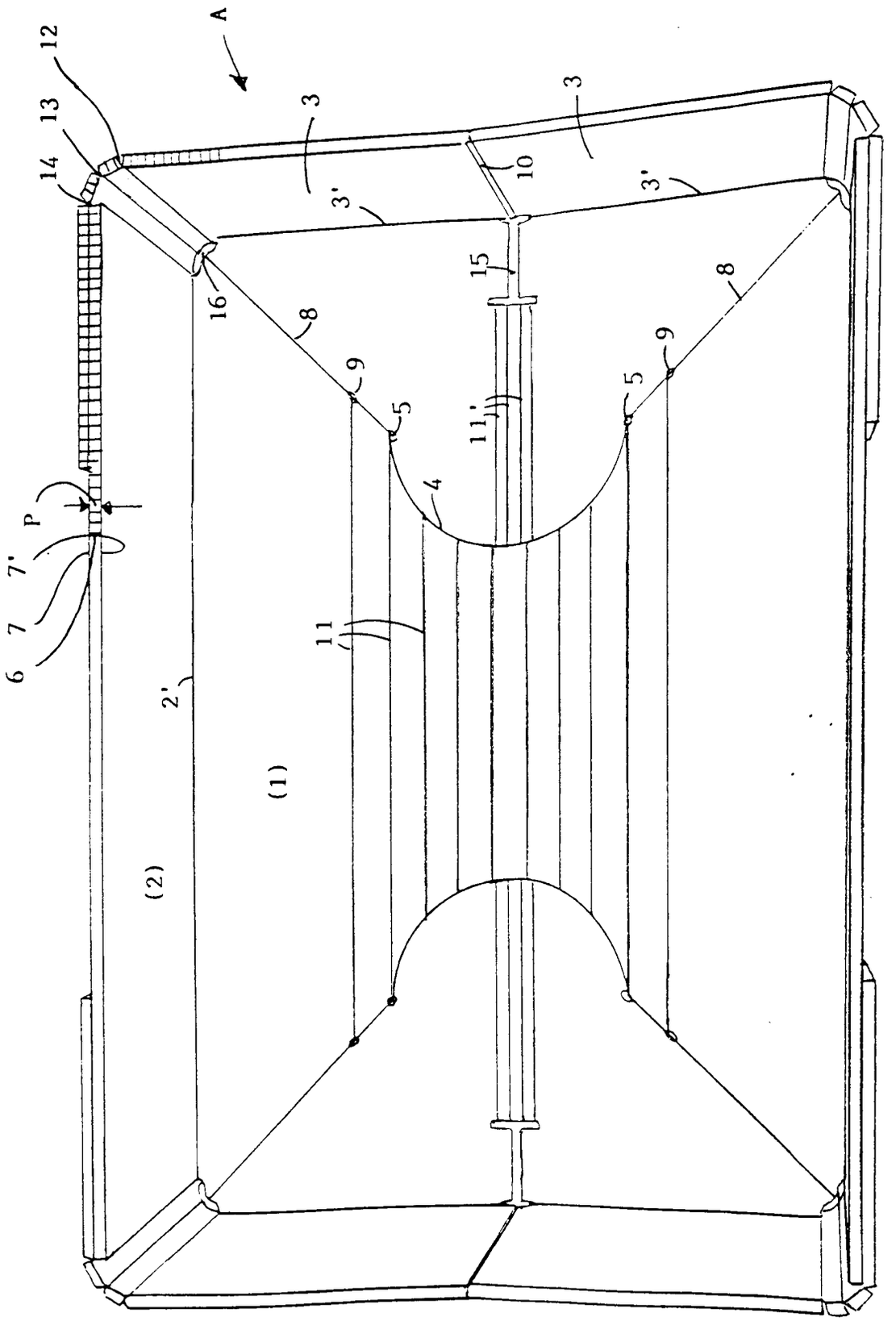

Fig. 2

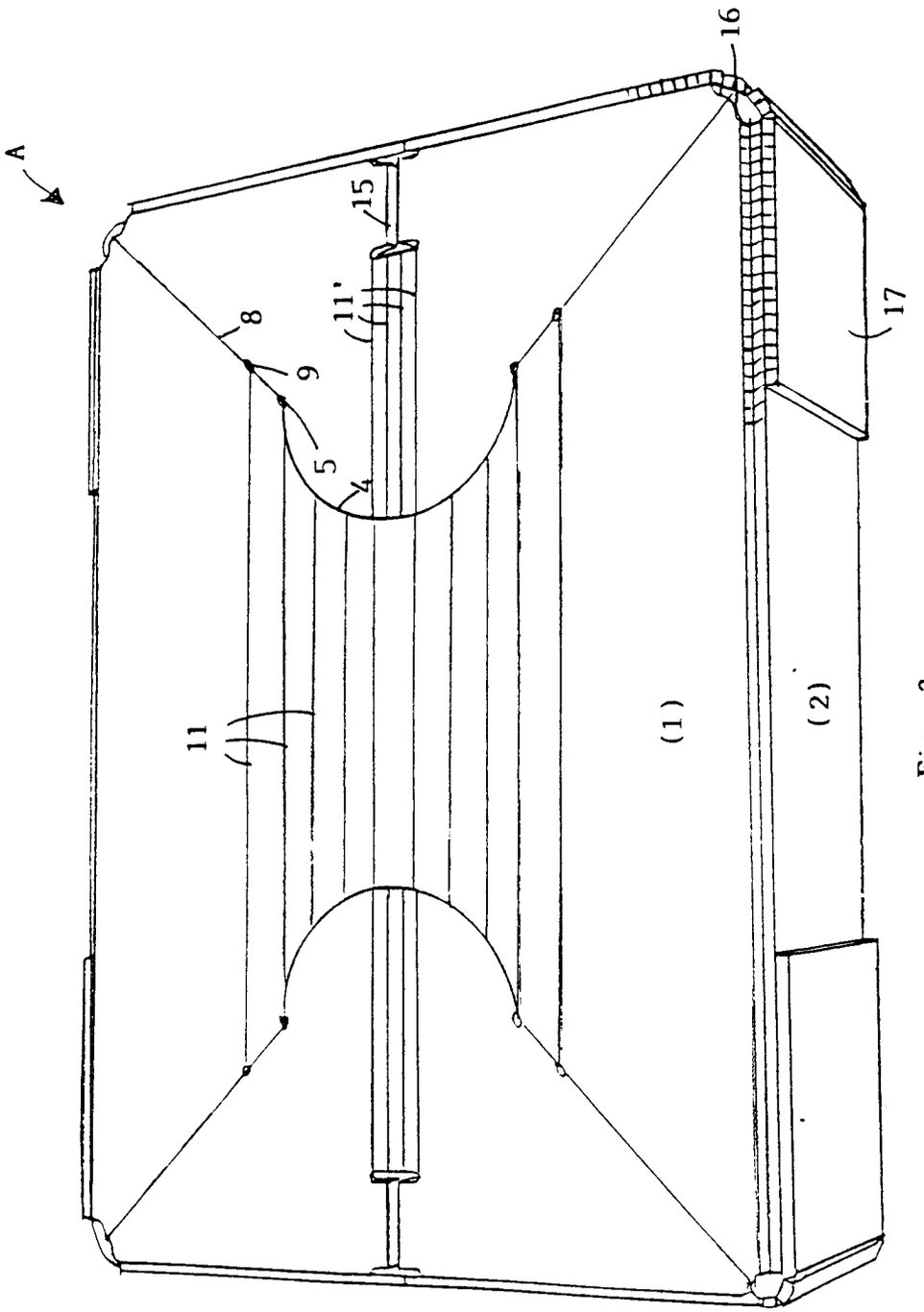

Fig. 3

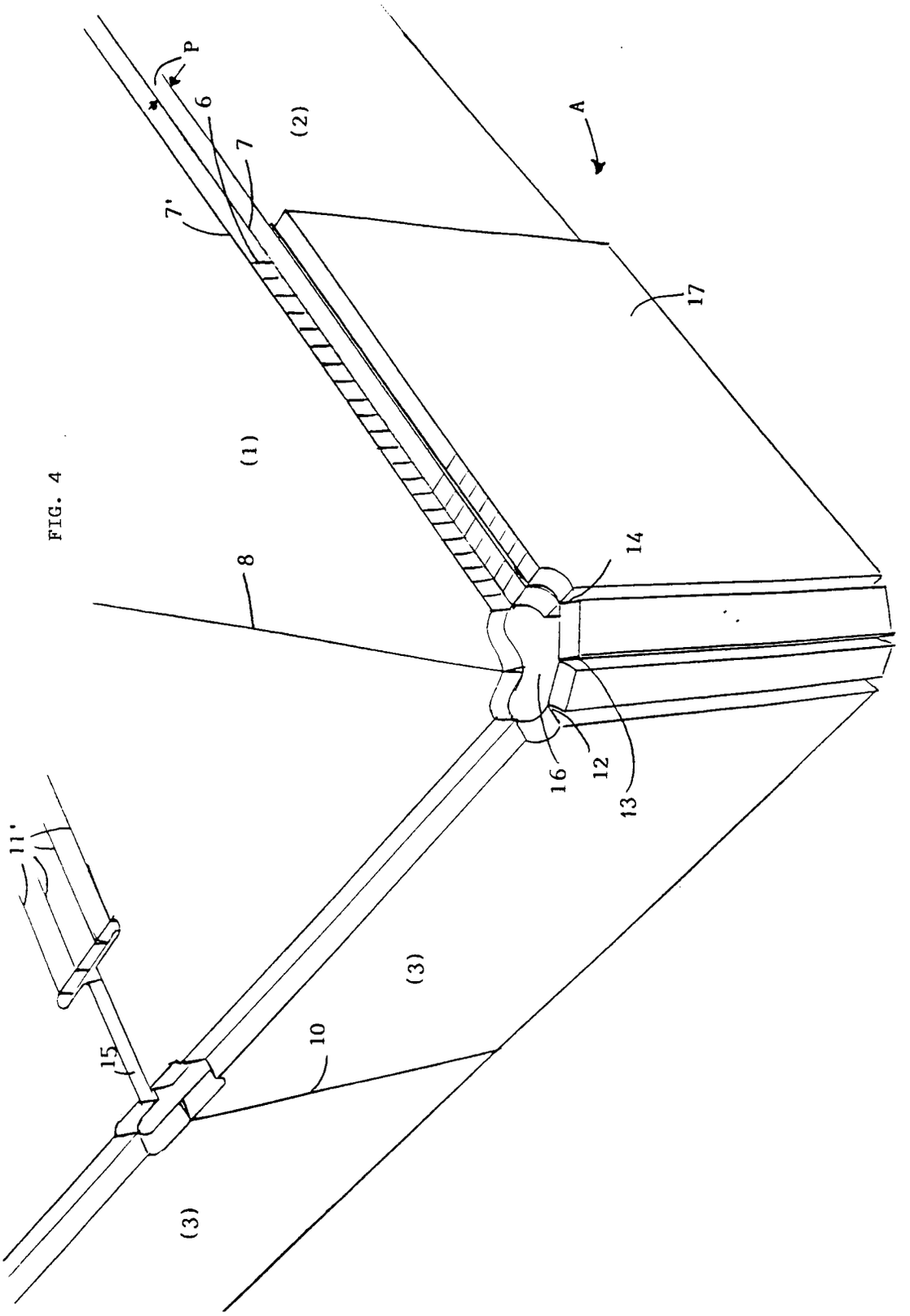

FIG. 4

Fig. 4

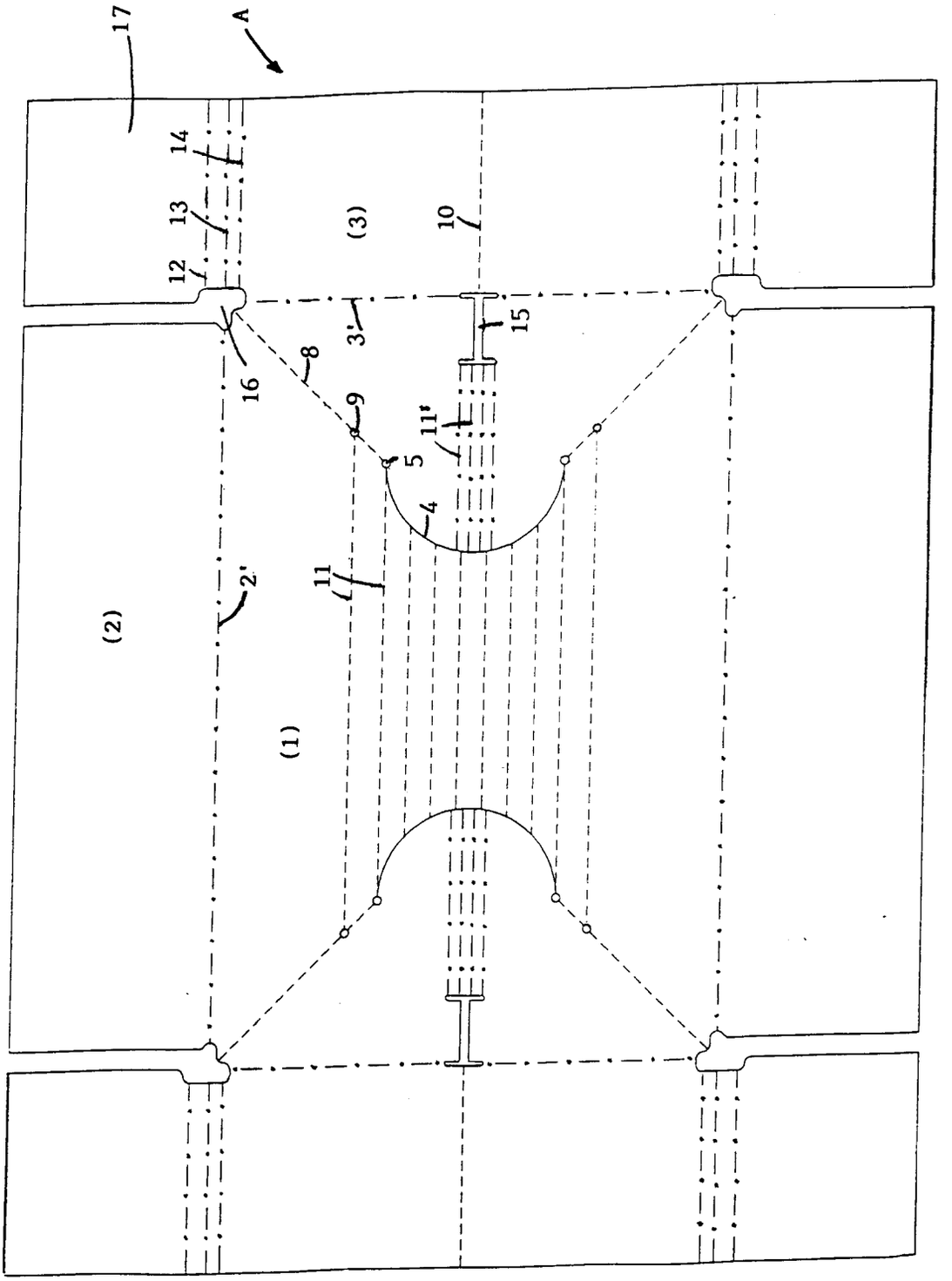

Fig. 5

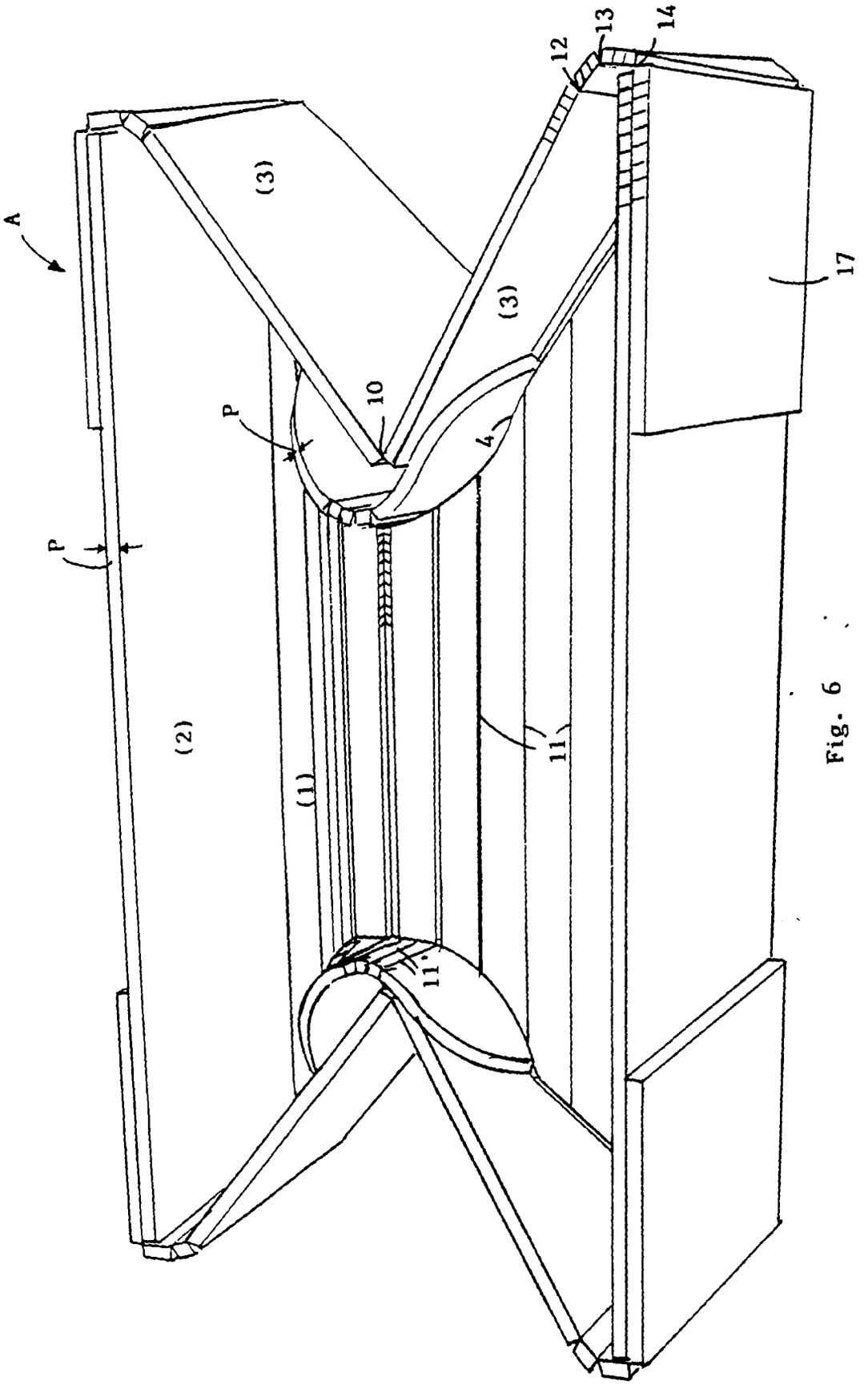

Fig. 6

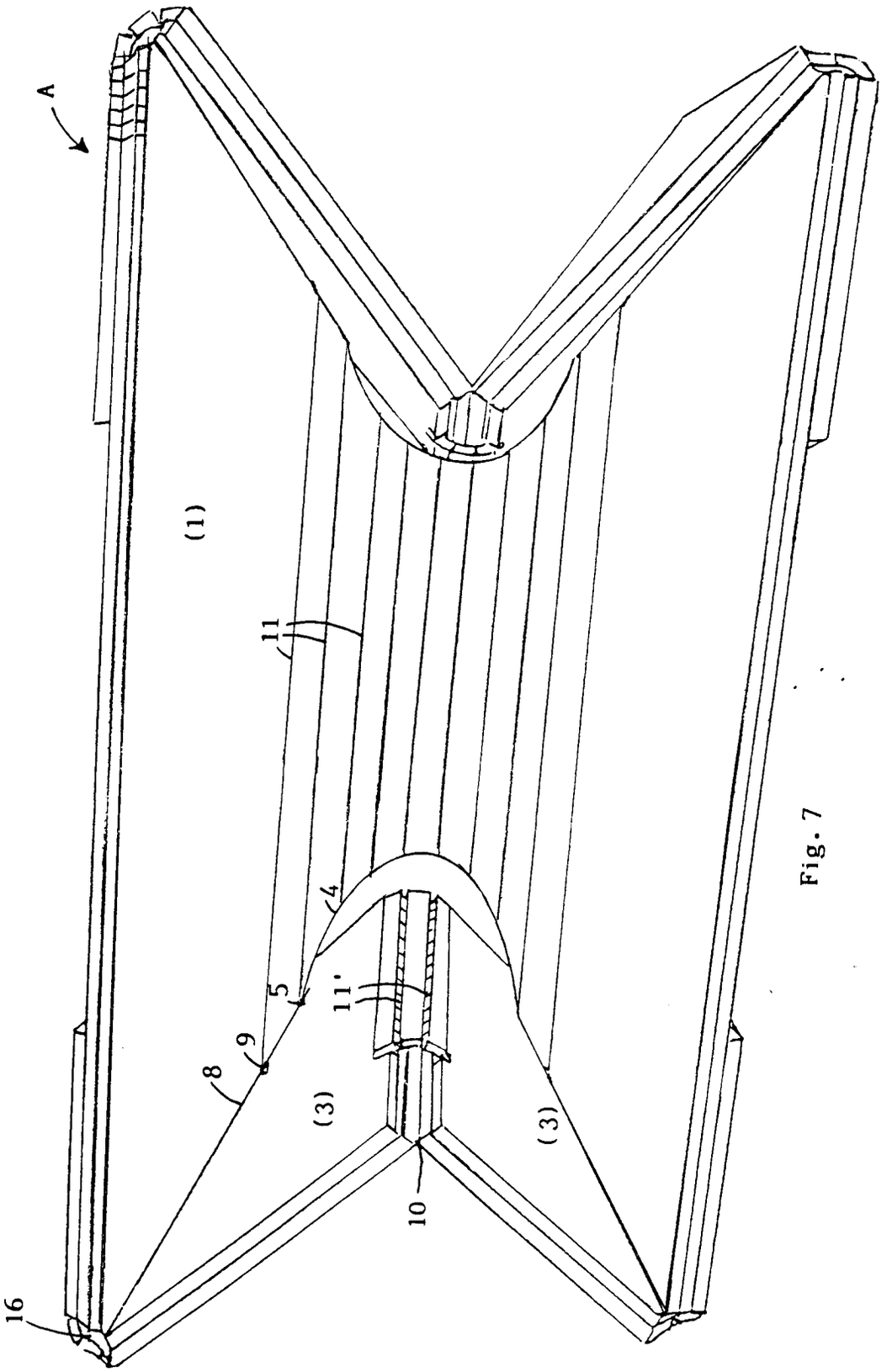

Fig. 7

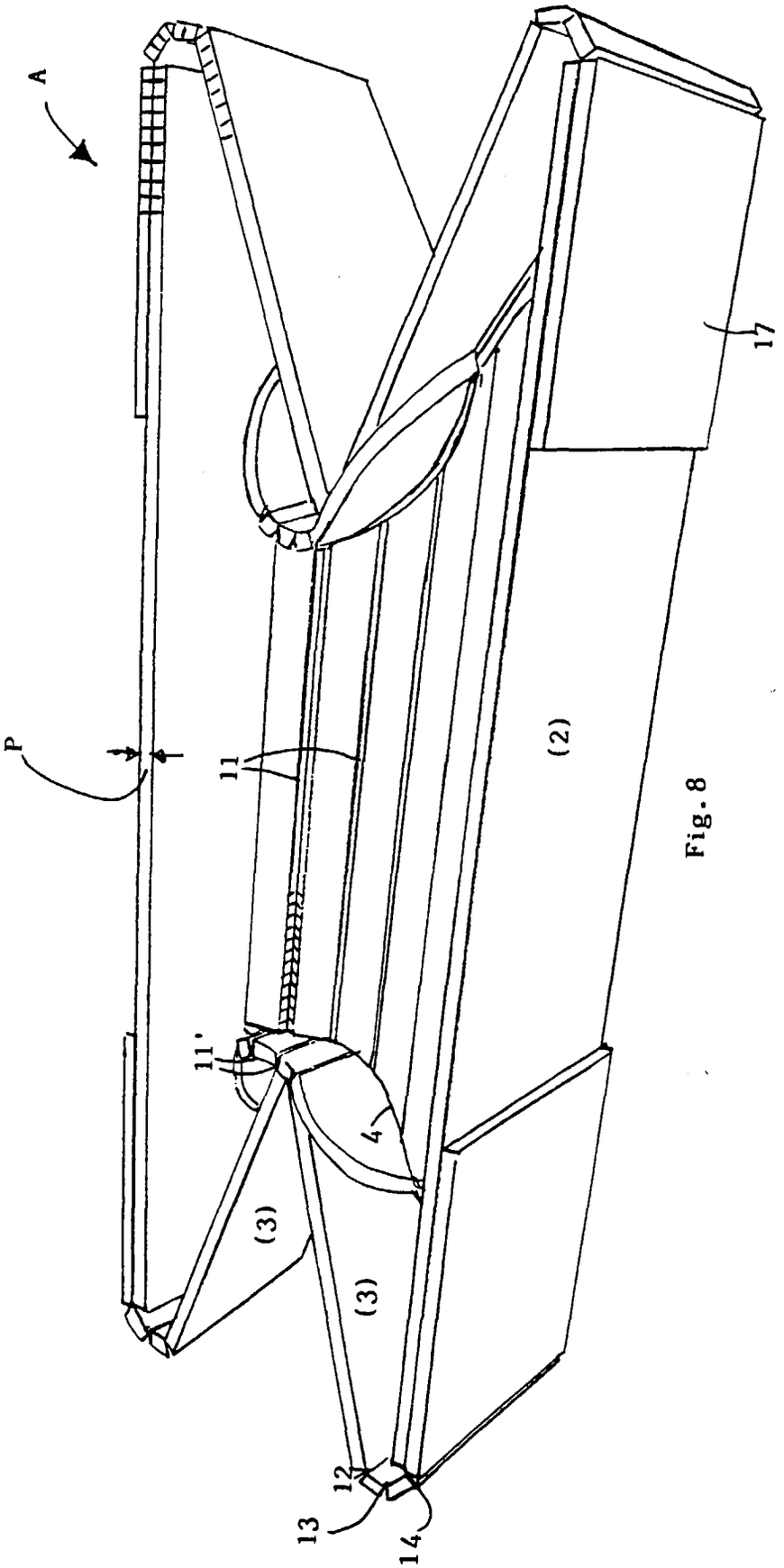

Fig. 8

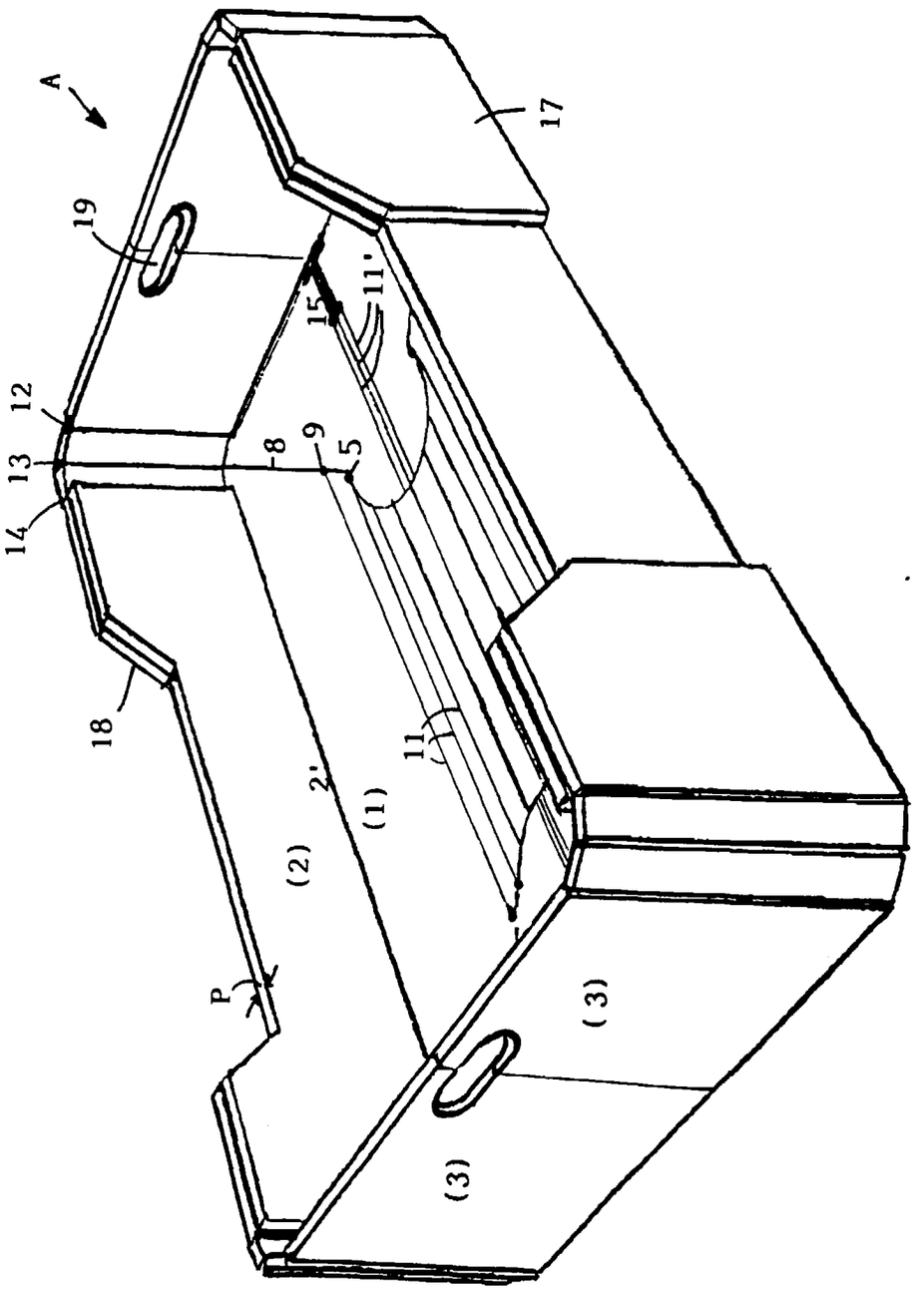

Fig. 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 5738

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 1 374 473 A (SCOTCHER) * the whole document *	1,5,13, 14	B65D5/36
A	FR 2 241 459 A (UNILEVER) * page 6, line 3 - page 7, line 28; figures 1-3 *	1,5,13, 14	
A	BE 671 082 A (VANDEWEGHE) * page 5, paragraph 2; figures 3,4,6 *	1	
A	US 4 762 270 A (STOLL ET AL) * abstract *	15	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 July 1997	Leong, C

CATEGORY OF CITED DOCUMENTS

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