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(54) **Tool box with high resistance to load deformations, in particular for motor vehicles for commercial transportation**

(57) A tool box (1), comprising a container body (2) and a closing cover (3), characterized in that said container (1) has a loading or access area equipped with a stiffening structure (5) which locally increases the stiffness thereof. In this way an undeformable structure is obtained, apt to keep unchanged the shape of the box (1) itself, even under extreme load conditions and with

high environmental temperatures.

The container is parallelepiped and it is equipped with a closing cover (3) hinged to the body of the container by means of a hinge arranged along the lower horizontal side of the box (1) itself. Said container and said cover (3) are preferably made of plastic material by injection.

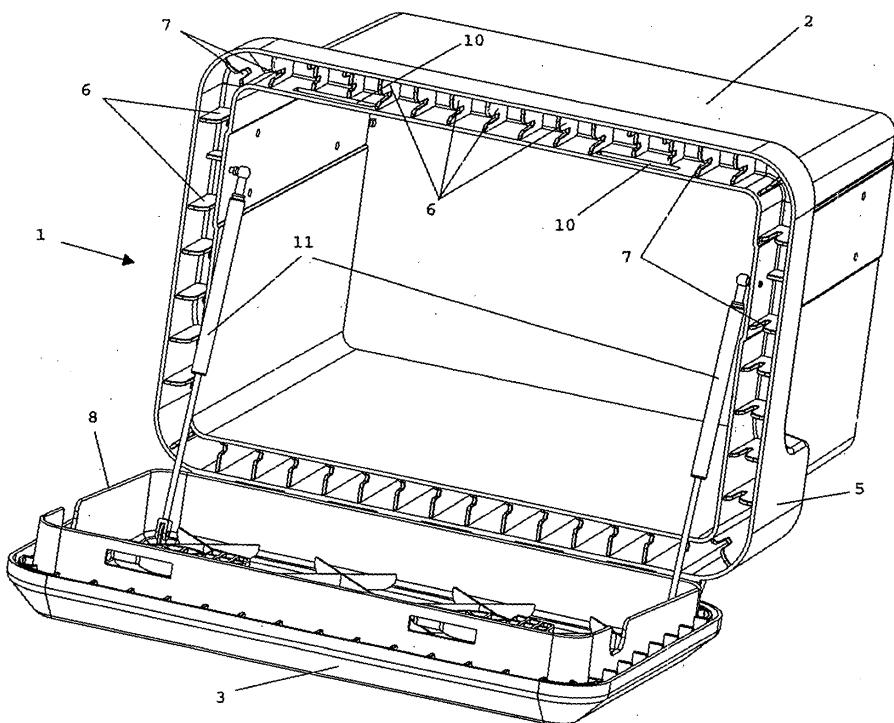


FIG. 1

## Description

**[0001]** The present invention relates to a tool box, in particular for lorries.

**[0002]** Currently, different types of tool boxes are known which usually, but not exclusively, are fastened to the frame of the motor vehicle, beneath the deck, preferably between the front and the rear wheels of the tractor or articulated vehicles.

**[0003]** Such known boxes generally are parallelepiped shaped and usually are made of weather resistant metal, such as for example stainless steel, or plastic material which, however, even if it is cheap and weather resistant, has limited mechanical features.

**[0004]** As a consequence, said plastic boxes get deformed under the weight of the tools which are kept inside thereof, especially when the environmental temperatures become high during the summer period, for example one can think of the heat conditions which are reached in the motorway, with the asphalt reverberation increasing the heating effect given by the sun.

**[0005]** Such deformations are located in the open side of the box, that is the one which is closed by the cover and which is clearly deprived of the vertical wall which would keep the shape thereof, as it happens for the bottom area of the box itself.

**[0006]** Owing to the deformations mentioned above, the central area of the lower side tends to lower and bend, so that the (rectangular) cover loses its functionality since its shape is no more able to "match" the perimeter edge of the open side of the box itself. Furthermore, the deformation of the lower side of the box also jeopardizes the good operation of the hinge(s) thereabout the cover rotates during its opening/closing motion.

**[0007]** Therefore, the main object of the present invention is to overcome the problems mentioned above by providing a tool box, preferably made of plastic material, equipped with an undefeatable structure apt to keep the shape unchanged, even under extreme load conditions and with high environmental temperatures.

**[0008]** This has been obtained, according to the present invention, by providing a tool box with a loading area equipped with a preferably alveolar stiffening structure which locally increases the stiffness thereof without excessively increasing the weight thereof.

**[0009]** A better comprehension of the invention will take place with the following detailed description and by referring to the enclosed figures, which illustrate by way of example a preferred embodiment thereof.

**[0010]** In the drawings:

figure 1 is an axonometric view of the invention in open configuration;

figure 2, similar to the previous one, shows a top view of the invention;

figure 3 shows, in axonometry, the invention in completely closed configuration;

figure 4 is a front elevational view of the front side

of the box according to the present invention, in open configuration;

figure 5 is a sectional view according to the plane A-A shown in figure 4;

figure 6 is a front elevational view of the front side of the box according to the present invention, in closed configuration; and

figure 7 is a sectional view according to the plane A-A shown in figure 6.

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**[0011]** By referring to the figures described above, the tool box 1 according to the invention comprises a parallelepiped container 2 equipped with a closing cover 3 hinged to the container body by means of a hinge 4 preferably arranged along the lower horizontal side of the box itself.

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**[0012]** According to a first peculiar feature of the present invention, the open side of the container 2 has a stiffened perimeter edge 5, apt to increase the resistance thereof to load deformations even under the conditions wherein the high temperature would increase the deformability thereof.

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**[0013]** A second peculiar feature of the invention lies in that said stiffened perimeter edge 5 is constituted by an area of the wall of the container 2 having an increased thickness.

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**[0014]** Such edge 5 is constituted by two parallel walls, separated by separators 6 orthogonal thereto which keep unchanged the mutual distance thereof and increase the resistance to bending thereof.

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**[0015]** The separators 6 substantially develop in the direction parallel to the box walls.

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**[0016]** According to an additional peculiar feature of the invention, the continuity of each one of the separators 6 is partially interrupted, starting from the side thereof faced towards the cover, by a small opening 7 which is apt to receive a wall or projecting rim 8 provided on the inner side of the cover 3, which wall or projecting rim inserts into said openings when the cover is closed upon the container 2 (figure 7).

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**[0017]** It is interesting to underline that said wall or projecting rim 8, together with the openings 7 of the separators 6, advantageously plays also a useful function of self-centering the cover 3 with respect to the container body 2 of the tool box 1.

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**[0018]** As it is clearly shown by the figures, the lower area of the open side of the container 2, that is the lower horizontal side and a small lower portion of the two vertical sides adjacent thereto, has a stiffened perimeter edge 5 which has an extension towards the vertical bottom wall of the box which is greater than the one of the stiffened edge existing on the upper side and on the remaining portions of the vertical sides. This obviously because the lower side is the one most subject to deform under the weight of the tools which are placed in the box 1 which is described.

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**[0019]** In the present embodiment, the cover closing is performed by means of one or more (preferably two)

revolving handles 9 of known type, preferably made of plastic material, which are installed on the cover 3 and they engage inside slots 10 properly arranged along the edges of the opening of the container 2, preferably on the side opposite to the one with respect thereto the cover 3 is hinged.

**[0020]** At last, according to the present invention, there are provided telescopic shock absorbers 11 of known type, each one thereof has one end hinged to the body of the container (2) and the other end hinged to the body of the cover (3). Advantageously, said shock absorbers have a triple function: they determine the limit stop of the opening motion of the cover 3 with respect to the container 2, they support the cover 3 itself in a fully open position and, at last, they make the opening/closing motions regular by avoiding slammings which could danger the tool box 1 which is described.

**[0021]** For sake of completeness, it is necessary also pointing out the presence of stiffened areas of the walls of the box 1, apt to allow the fastening thereof to the hangers, of known type, existing on the motor vehicle.

**[0022]** The tool boxsofar described is preferably implemented by injection moulding.

**[0023]** The present invention has been described and illustrated in a preferred embodiment thereof, but it is clear that any person skilled in the art could apply modifications and/or replacements equivalent from the technical and/or operating point of view, however comprised within the protective scope of the present industrial invention.

## Claims

1. A tool box (1) of the type comprising a container body (2) and a closing cover (3), **characterized in that** said container (2) has a loading or access area equipped with a stiffening structure which locally increases the stiffness thereof; thus obtaining an undeformable structure apt to keep unchanged the shape of the box itself, even under extreme load conditions with high environmental temperatures.
2. The tool box according to the preceding claim, **characterized in that** it comprises a parallelepiped container (2) equipped with a closing cover (3) hinged to the body of the container by means of a hinge (4) arranged along a lower horizontal side of the box itself; said container and said cover being made of plastic material.
3. The tool box according to claim 1 or 2, **characterized in that** the open side of the container (2) has a stiffened perimeter edge (5), apt to increase the resistance thereof to the load deformations even under conditions wherein the high temperature would increase the deformability thereof.

4. The tool box according to the preceding claim, **characterized in that** said stiffened perimeter edge (5) is constituted by an area of the wall of the container (2) having an increased thickness.
5. The tool box according to the preceding claim, **characterized in that** said stiffened edge (5) is constituted by two parallel walls, separated by separators (6) orthogonal thereto which keep unchanged the mutual distance thereof thereby increasing its resistance to bending.
6. The tool box according to the preceding claim, **characterized in that** the separators (6) substantially develop in the direction parallel to the walls of the box.
7. The tool box according to the preceding claim, **characterized in that** the continuity of each one of the separators (6) is partially interrupted, starting from the side thereof faced towards the cover, by a small opening (7) which is apt to receive a wall or projecting rim (8) provided on the inner side of the cover (3), which wall or projecting rim inserts into said openings (7) when the cover is closed onto the container (2).
8. The tool box according to the preceding claim, **characterized in that** said wall or projecting rim (8) is positioned so that, together with the openings (7) of the separators (6), it plays the function of self-centering the cover (3) with respect to the container body (2) of the box (1).
35. 9. The tool box according to one of the claims from 3 onwards, **characterized in that** the lower area of the open side of the container (2), that is the lower horizontal side and a small lower portion of the two vertical sides adjacent thereto, has a stiffened perimeter edge (5) having an extension toward the vertical bottom wall of the box which is greater than the one of the stiffened edge existing on the upper side and on the remaining portions of the vertical sides.
40. 10. The tool box according to one of the preceding claims, **characterized in that** the closing of the cover (3) is performed by means of one or more revolving handles (9) of known type, which are installed on the cover and engage inside slots (10) properly arranged along the edges of the opening of the container (2).
45. 11. The tool box according to the preceding claim, **characterized in that** said slots (10) are arranged on the side opposite to the one with respect thereto the cover (3) is hinged.

12. The tool box according to one of the preceding claims, **characterized in that** it provides telescopic shock absorbers (11) of known type, each one thereof has one end hinged to the body of the container (2) and the other end hinged to the body of the cover (3); thus obtaining a triple function: determining the limit stop of the opening motion of the cover (3) with respect to the container (2), supporting the cover (3) itself in a wholly open position and, at last, making the opening/closing motions regular by avoiding slammings which could damage the tool box (1) which is described. 5

13. The tool box according to one of the preceding claims, **characterized in that** there are provided stiffened areas of the walls of the box (1), apt to allow the fastening thereof to the hangers of known type existing on the motor vehicle. 15

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FIG. 1

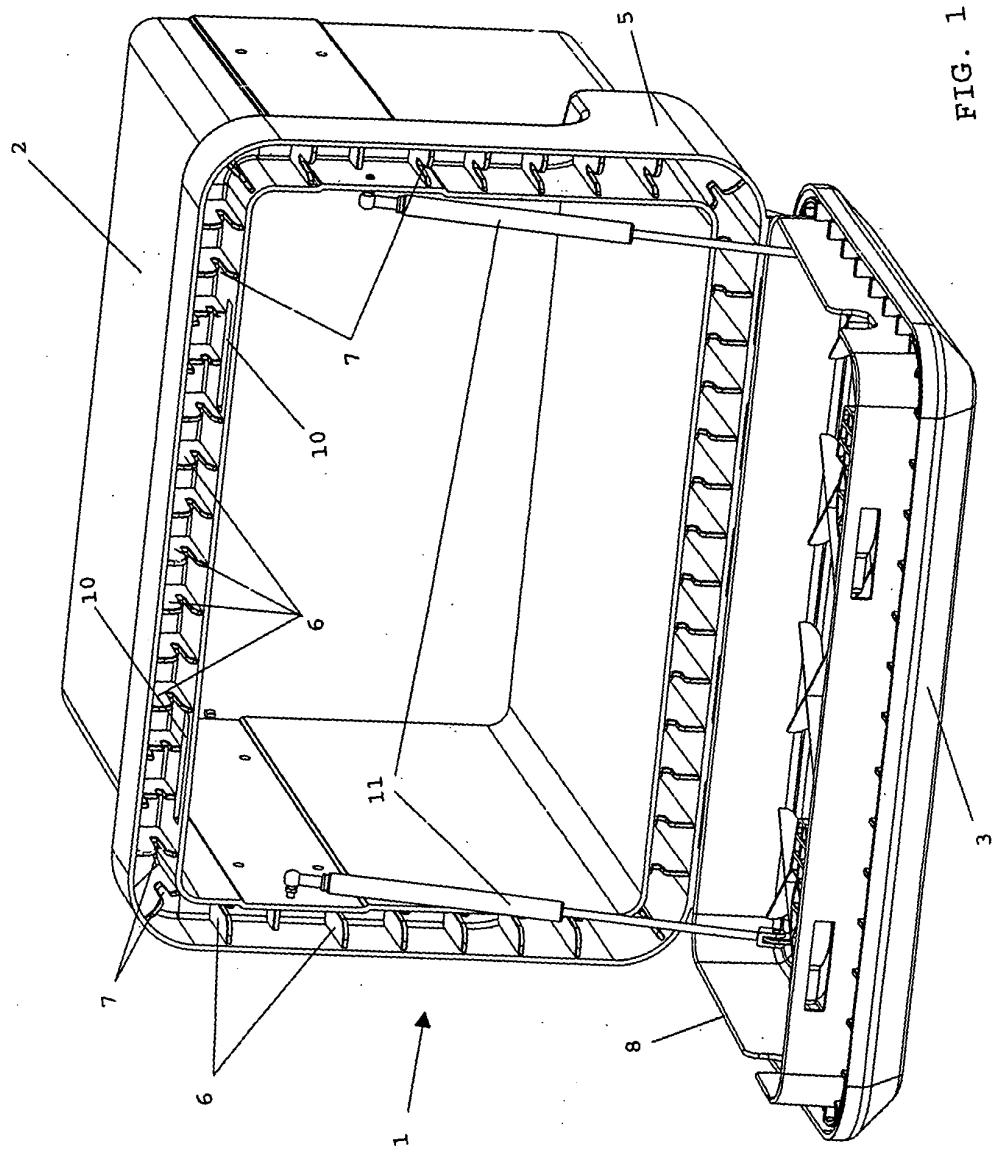


FIG. 2

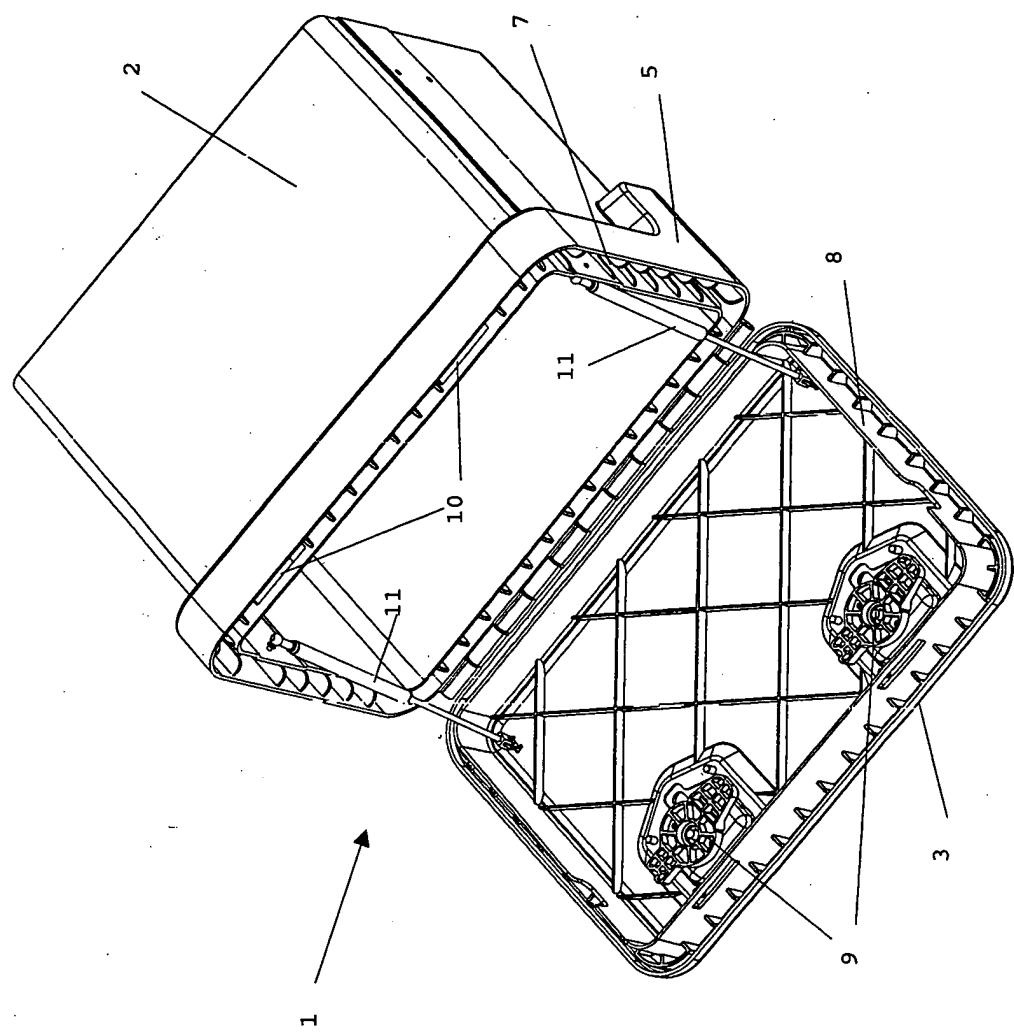
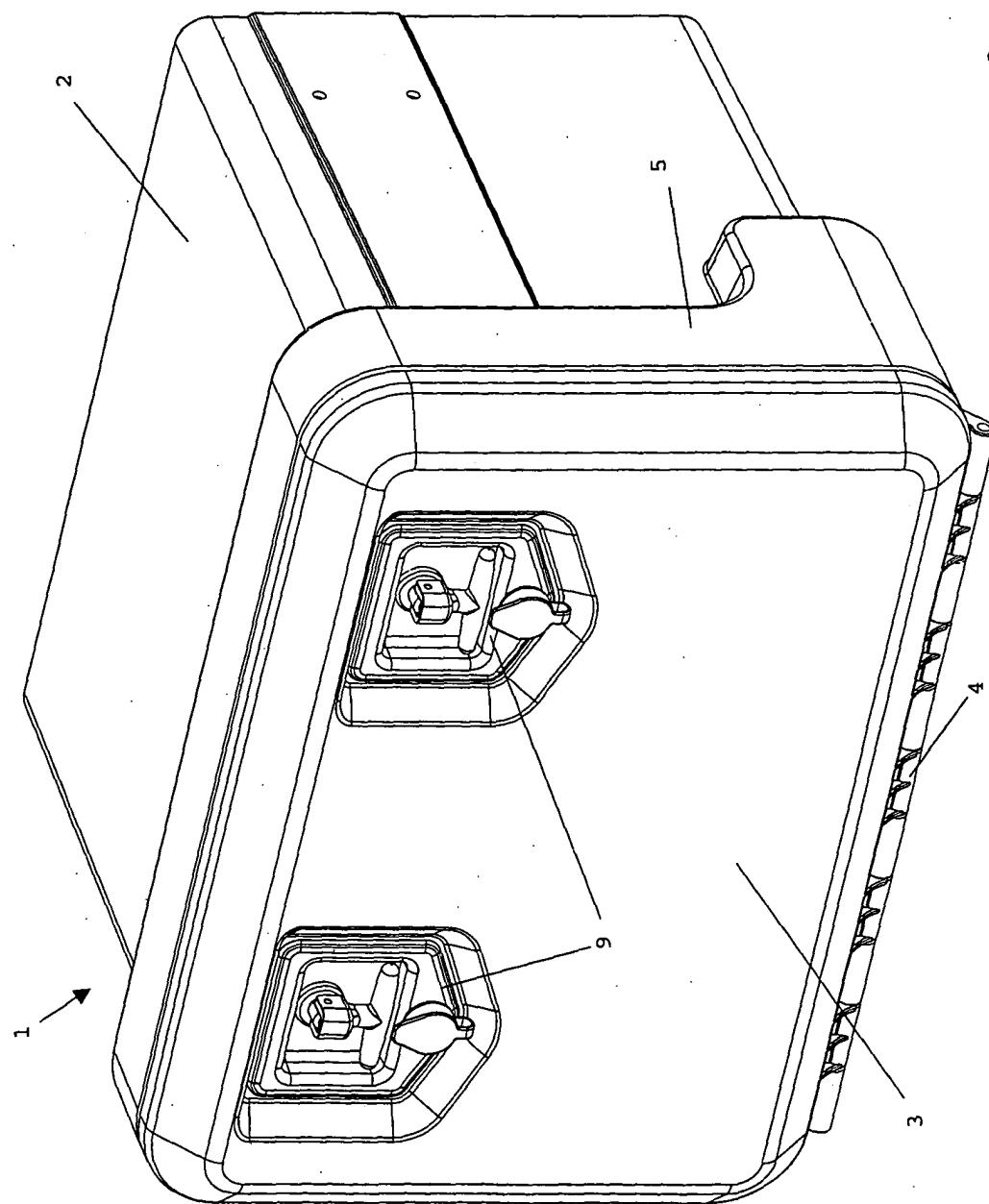


FIG. 3



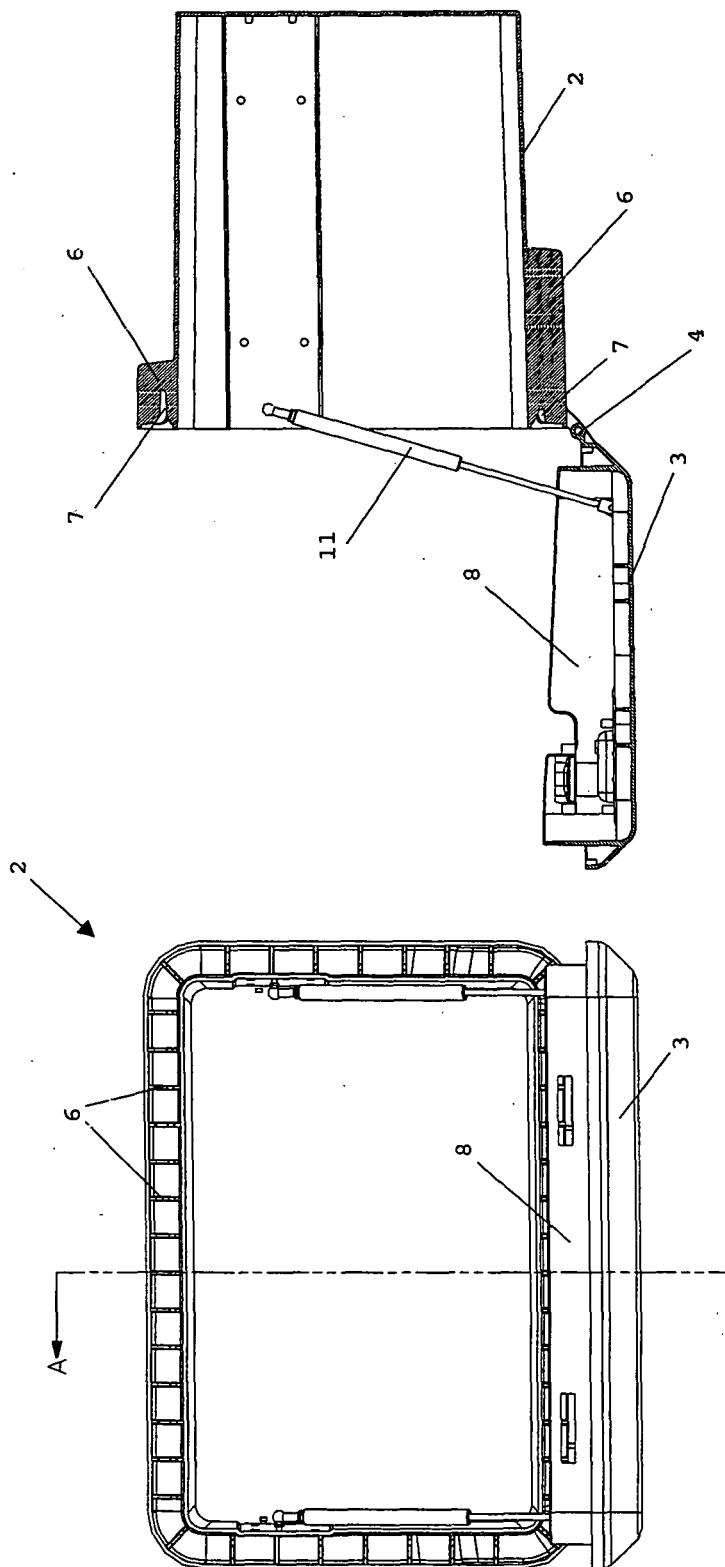


FIG. 5

FIG. 4

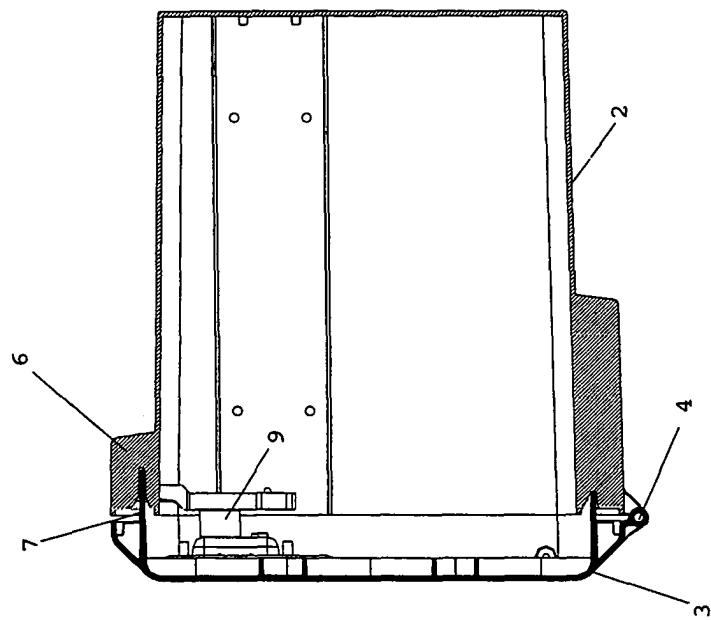


FIG. 7

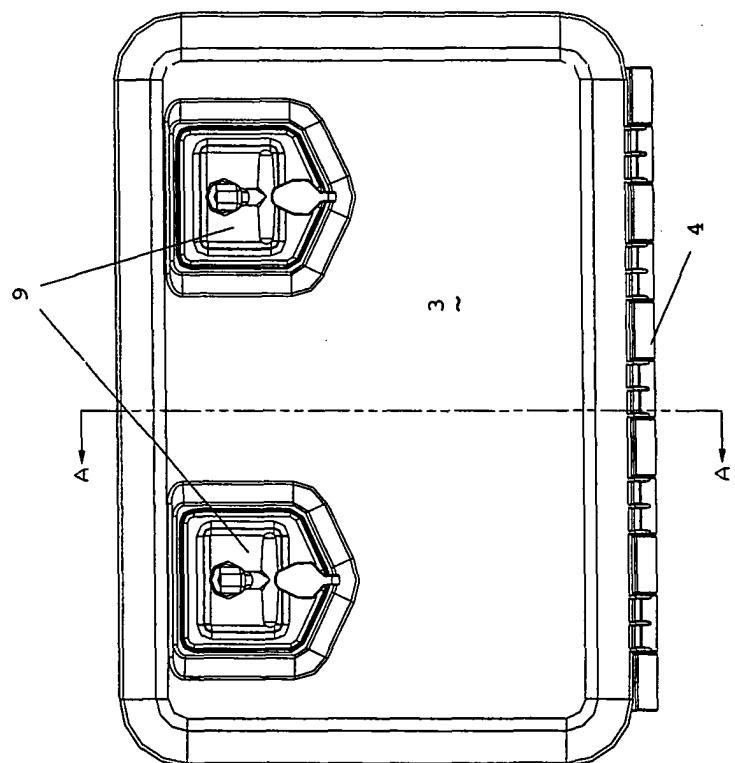


FIG. 6



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US 4 674 665 A (VAN KIRK) 23 June 1987 (1987-06-23) * column 1, line 55-58; figures *	1, 3-6	B25H3/02 B60R11/06
Y	---	2	
A	---	13	
X	EP 1 034 897 A (ZARGES) 13 September 2000 (2000-09-13) * column 6, line 6-10; figures *	1, 3, 4	
A	---	2	
Y	FR 2 748 455 A (ETABLISSEMENTS GEORGES DAVID) 14 November 1997 (1997-11-14) * page 3, line 18,19; figures *	2	
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B25H B60R
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	11 May 2004	Matzdorf, U	
CATEGORY OF CITED DOCUMENTS			
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T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			

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ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-05-2004

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