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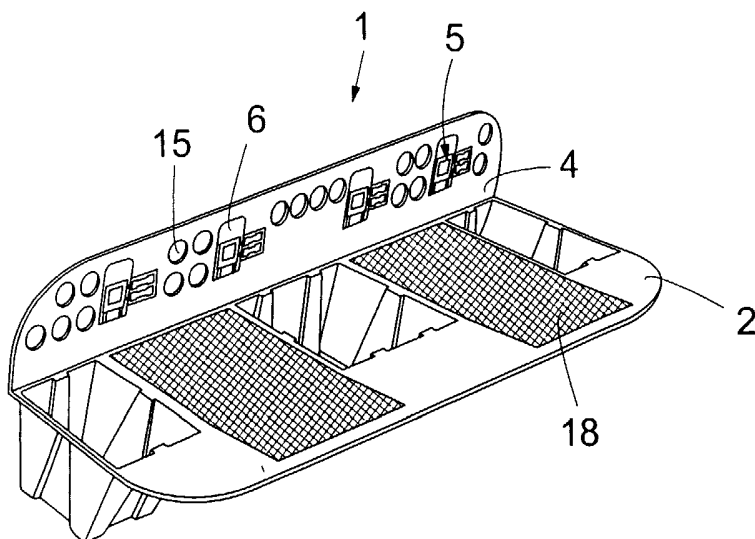
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(54) Title: A LOADING LEDGE



(57) Abstract: The present invention concerns a loading ledge (1) to be used e.g. in transport and storing and a system for creation of load units. The loading ledge (1) has an upper leg (4) and a lower leg (2) forming a substantially L-shaped cross-section. The lower leg (2) is furnished with one or more projections (3), to make it possible to use handling equipment. One or more locking means (5) are integrated in the loading ledge (1) to grip straps or the like. A load unit is created in that two or more loading ledges (1) are used together with straps to fixate the goods (19) on the loading ledges (1).

A LOADING LEDGE

5

Technical Field

The present invention concerns an improved loading ledge to be used e.g. in transport and storing and a system for creation of load units.

10

Prior Art

For transport and storage of different types of goods it is today common to use pallets. Normally wooden pallets of standardized dimensions are used. Often straps and/or stretch or shrink wrapping are wrapped around the pallet including the goods.

Other means for transportation and storage are known, e.g. loading ledges to be placed at the goods. One or more articles are placed on two or more loading ledges to form a unit load. Each loading ledge comprising an L-shaped profile having projections for supporting the unit load at a certain distance over its support. The loading ledges are positioned at a lower edge of the unit load for storage and/or transport of the unit load including its loading ledges to a receiver of the articles. The unit loads are formed, by strapping the loading ledges and the goods. The straps have to be locked with clips or the like to securely hold the goods at the loading ledges.

By the provision of the supporting projections on the loading ledges the formed unit load can be handled by handling equipment, such as forklift trucks or pallet trucks, used for handling unit loads on wooden pallets.

The loading ledges are preferably produced of recyclable plastic, for example uncoloured polypropylene (PP). The production method may be injection moulding. Other materials and production techniques are possible.

The loading ledges may be returned for renewed use on new unit loads, but it may be advantageous to recycle them, for example by grinding them, and to return the material to a producer of loading ledges. Alternatively, the material
5 can be put on the ordinary market as plastic raw material. In the latter case it is of special importance to have the plastic material uncoloured.

With the use of loading ledges as set out above it will be possible to use one size only for all applications.
10 The size of the unit load is not dependent on any pallet size but rather on the size of the articles, provided at their bottom edges with two or more loading ledges with downwardly extending projections allowing handling by traditional handling equipment. If the articles are long, two
15 or even three loading ledges may be provided at each lower edge.

The use of loading ledges means in other words that an optimal unit load may be built according to the goods or articles, not according to the pallet size as today.

20 Further, the tara weight and the price for the loading ledge are very low.

Empty loading ledges may be stacked for transportation, which thus may be very effective.

As stated above straps are normally used to hold the
25 goods. Said straps are to be locked with clips or the like. Even if existing clips function well in many respects, they are loose, discrete elements, which should be at hand when needed. Furthermore, it is a risk that the prior art clips or other locking means for the straps harm goods placed on
30 adjacent pallets, as the locking means normally are placed in varying positions. Depending on the goods such damages may be serious.

Summary of the Invention

When designing new products there are a number of more or less obvious objects. Such objects are e.g. having as low weight as possible, in order to reduce the amount of material used and, thus, to save costs. It is also a general object to be able to produce the products in a simple and reliable way to reduce costs.

One specific object with the present invention is that the loading ledge should be easy to use. A further object is that the loading ledges should be possible to stack, in order to facilitate transport and storing.

Yet an object is that then loading ledge should be environmental friendly.

According to the present invention a loading ledge having an upper leg and a lower leg forming a substantially L-shaped cross section is formed. The lower leg of the loading ledge is furnished with one or more projections. One or more locking means are integrated in the loading ledge.

By using loading ledges according to the present invention for creation of unit loads instead of pallets of a standard dimension the goods it is normally possible to store the goods more compactly. When using standard pallets the total available loading areas are often not used, unless the size of each item of the goods is adapted to the size of the pallets. Furthermore, the loading ledges of the present invention are lower than most standard pallets, increasing the possibility to fully use the available space in containers, trucks, lorries, warehouses etc. Loading ledges according to the present invention are automatically adapted to the dimensions of the unit loads.

The weight of the loading ledges are kept as low as possible by providing it with a number of openings, without jeopardising the function. The low weight is beneficial

both concerning transport and in that less material is needed to produce each loading ledge.

Further objects and advantages of the present invention will become obvious for a person skilled in the art
5 when reading the detailed description below of preferred embodiments.

Brief Description of the Drawings

The invention will be described more closely below by
10 way of an example and with reference to the enclosed drawings. In the drawings:

Fig. 1 is a perspective view of a loading ledge according to the present invention;

Fig. 2 is a front view of the loading ledge of Fig.
15 1;

Fig. 3 is an end view of the loading ledge of previous Figs;

Fig. 4 shows different examples of unit loads formed using the loading ledges of Figs. 1 to 3;

Fig. 5 is a perspective view of a loading ledge according to the invention furnished with an adapter;
20

Fig. 6 is a perspective view of an adapter set used in the embodiment of Fig. 5; and

Fig. 7 is a perspective view of an alternative
25 adapter to be attached to the loading ledge of Figs. 1 to 3.

Detailed Description of Preferred Embodiments

As used in this description the expressions "upper",
30 "lower" etc. are with reference to loading ledges 1 as shown in the Figs.

The present invention concerns loading ledges 1 to be used in transport and storing of goods 19. The loading ledges 1 comprises a lower leg 2 and an upper leg 4, which
35 legs 2, 4 are arranged almost perpendicular to each other.

Thus, the loading ledge 1 will have a substantially L-shaped cross section. The loading ledge 1 is preferably an injection moulded, L-shaped profile of recyclable plastic, preferably polypropylene (PP). Its lower leg 2 is provided with projections 3, in the shown case three projections, for supporting a unit load above the ground or other support. The projections 3 make it possible to handle the unit load with ordinary handling equipment utilised for goods on ordinary wooden pallets presently widely used in distribution systems. The upper leg 4 of the loading ledge 1 is generally plain and is to bear against a vertical side surface of a unit load to be supported by the loading ledges. At least the free or outer end of the lower leg 2, i.e. the part outside the projections, is slightly inclined upwards. By slightly inclined as used here is meant a few degrees or even parts of degree.

The upper leg 4 and lower leg 2 of the loading ledge 1 are slightly inclined towards each other. Thereby, and by the fact that the outer end of the lower leg 2 inclines slightly upwards the loading ledge 1 will be held snugly against the goods in use.

As used in this description the term "unit load" includes the loading ledges 1, the goods 19 received on two or more loading ledges 1 and stretching devices, such as straps 14.

In the upper leg 4 a number of locking means or clips 5 are arranged. The clips 5 are arranged in openings 6 of the upper leg 4. The openings 6 are to receive the straps 14. The clips 5 are integrated parts of the upper leg 4 and are each formed of a frame 16 and two foldable parts 17. The foldable parts 17 are in one embodiment releasably fixed to the frame 16 by means of weakenings, which are easy to break by hand. In other embodiments the ends of the foldable parts 17 remote from the frame 16 are totally free, i.e. not fixed to the loading ledge 1. By means of

the foldable parts 17 the straps 14 may be locked. In use the foldable parts are folded at the transition between each foldable part 17 and the associated frame 16. In the shown embodiment there are four clips 5 and openings 6. A
5 person skilled in the art realises that other number of clips 5 and openings 6 may be used. Furthermore, a person skilled in the art realises that the clips as shown are only one example. The exact design of the clips 5 may vary as long as they fulfil the intended use.

10 A number of further, weight-reducing openings 15 are normally furnished in the loading ledge 1. Said further openings 15 are made mainly to save weight and to reduce the amount of material used. These weight-reducing openings 15 are placed to not impair the strength of the loading
15 ledge 1 at normal use. The openings 15 are normally placed in the upper leg 4 of the loading ledge 1. However, a person skilled in the art realises that the weight-reducing openings 15 may be placed anywhere as long as they do not jeopardise the function of the loading ledge 1. Further-
20 more, the number and size of the weight-reducing openings 15 may vary. In one loading ledge openings of different sizes may be arranged.

The projections 3 have inclined sides to assist in stacking of a number of loading ledges 1 in each other. The
25 side of each projection 3 placed more or less in line with the upper leg 4 of the loading ledge 2 has normally no inclination. The sides of each projection 3 facing the adjacent projections 3 and the short ends of the loading ledges 1 have an inclination of an angle α in relation to the
30 horizontal plane. The angle α is normally between 50° and 70° , preferably between 60° and 70° and is most preferably 66.4° . The side of each projection 3 facing forward, i.e. closest to the outer end of the lower leg 2, has an inclination of an angle β in relation to the horizontal plane.
35 The angle β is normally between 40° and 60° , preferably be-

tween 45° and 55° and most preferably 52°. The dimension of the projection 3 placed in the middle is normally somewhat larger than the dimensions of the other projections 3.

To enhance the friction the bottom of the projections
5 3 may have a number of small irregularities. The areas of small irregularities are referred to as friction patterns in this description. Also on the upper side of the lower leg 2 friction patterns 18 are provided. These friction patterns 18 are to assist in holding the goods more safely
10 on the loading ledges 1. A person skilled in the art realises that the exact form and position of the friction patterns 18 may vary. Also the form of the irregularities of the friction patterns 18 may vary.

In a practical (but non-limiting) case the overall
15 length of the loading ledge 1 is about 759 mm, the widths of the lower leg 2 and the upper leg 4 is about 179 mm and about 100 mm, respectively. The projections 3 have a height of about 45 mm and a width of about 50 mm at the bottom. The central projection has a length of about 120 mm at the
20 bottom, and each of the two outer projections have a length of about 50 mm at the bottom. The size of the contact areas formed by the bottom areas of the projections 3 is important in order to have enough friction against the support. Due to the dimensions and angles of the projections the
25 distance between adjacent loading ledges 1 when stacked is about 3 mm. This means that the loading ledges 1, when not in use, may be stacked in an easy and space-saving manner, which is beneficial for storage and possible transport of the loading ledges 1.

30 The height of the projections 3 and the distance between the projections 3 are adapted to the handling equipment used. Such handling equipment includes forklift trucks, pallet trucks etc. The distance between the projections 3 is chosen to allow for normal adjustment of the

distance between the forks. Thus, the forks will normally not harm the projections 3.

The loading ledges 1 of the present invention are developed for handling equipment having relatively thin
5 forks. The distance from the ground or other support to the bottom of the lower leg 2 is about 45 mm. Much of the handling equipment on the market today has a smallest distance between the support and the upper side of the forks of about 85 mm. Thus, such handling equipment cannot be used
10 with standard loading ledges 1. To make it possible to use this type of handling equipment adapters 7, 12 have been developed for placement on the projections 3. Said adapters 7, 12 give a total distance from the ground or other support to the bottom of the lower leg 2 of about 90 mm. A
15 person skilled in the art realises that by the use of adapters 7, 12 any suitable distance may be formed if needed due to the dimensions of the handling equipment used.

In a first embodiment, indicated in Figs. 5 and 6 an
20 adapter set 7 is formed. The adapter set 7 comprises a board 9 and three adapters 8, 11. Normally the board 9 and adapters 8, 11 are integrally formed. The adapters 8, 11 as shown have different sizes adapted to the sizes of the projections 3. On top of each adapter 8, 11 a peg 10 is
25 formed. The purpose of the peg 10 is that it should be received in an opening in the bottom of corresponding projection 3. The connection between the peg 10 and opening of the projection is preferably of the type having a snapping effect. To reach said snapping effect the peg 10 may be
30 furnished with a groove, receiving the edge of the opening of the projection 3. A person skilled in the art realises that the connection between peg 10 and opening may be accomplished in many different ways. Thus, it is possible to have a press fit between the peg 10 and the opening, in
35 which case no groove is needed on the peg 10.

As indicated in Fig. 6 the adapters 12 may also be discrete elements for placement on each projection 3. Also these discrete adapters 12 have pegs 10 to be received in an opening of the projection 3 in the same way as stated above, regarding the adapter set 7. Normally, the size of each adapter 12 is adapted to the size of the projection 3 on which it is to be placed. However, it is also possible to have adapters 12 of only one size, irrespectively of the size of the projections 3. In this latter case the size of the adapters 12 is adapted to the size of the smallest projection 3.

Normally when not in use the loading ledges 3 and adapters 7, 10 are stored separately, i.e. not with the adapters 7, 10 attached to the loading ledges 1.

In use at least two loading ledges 1 are placed at the bottom of the goods 19. The two loading ledges 1 are placed at opposite sides of the goods 19. Different types of load units formed by means of the loading ledges 1 are indicated in Fig. 4. The straps 14 are drawn through both the openings 6 adjacent the clips 5 and the frames 6 of the clips 5 in the upper leg 4. As is normal for this type of clips 5 the grip will become more firm the more the strap 14 is pulled.

Normally some kind of edge protection 13 is placed under the strap 14 at the edges of the goods 19. This is especially important if the goods 19 are one or more cardboard boxes or the like susceptible to damage by the strap 14, as the strap 14 is tightened. It is also possible to integrate clips 5 or other locking means in each edge protection 13. The form and function of the clips 5 in the edge protection 13 is the same as for the clips 5 integrated in the loading ledges 1. A person skilled in the art realises that also edge protections 13 having no clips or other locking means for the straps may be used.

As indicated above it is quite common with existing clips that the clips harm goods on adjacent pallets during transport or storage. The clips are normally placed randomly, which means that they may adhere directly on goods on adjacent pallets. If the goods are cardboard boxes they are susceptible to damages. However, by using loading ledges 1 with integrated clips 5 according to the present invention, the clips 5 will be positioned aligned with clips 5 on adjacent unit loads. Thus, the contact between adjacent unit loads will be at the clips 5. Thereby the risk of harming the goods during transport or storage is reduced.

CLAIMS

1. A loading ledge (1) having an upper leg (4) and a lower leg (2) forming a substantially L-shaped cross section, where the lower leg (2) is furnished with one or more projections (3), **characterized** in that one or more locking means (5) are integrated in the loading ledge (1).

2. The loading ledge (1) of claim 1, **characterized** in that the locking means have the form of clips (5).

3. The loading ledge (1) of claim 2, **characterized** in that the clips (5) are integrated in the upper leg (4) of the loading ledge (1) and having the form of a frame (16) fixed to the loading ledge (1) and two foldable parts (17) each having one end foldably fixed to the frame (16) and one end releasably fixed to the loading ledge (1).

4. The loading ledge (1) of claim 3, **characterized** in that the ends of the foldable parts (17) remote from the frame (16) are releasably fixed to the loading ledges (1).

5. The loading ledge (1) of any of the previous claims, **characterized** in that the locking means (5) are arranged in openings (6) in the upper leg (4) and/or that four locking means (5) are arranged in each loading ledge (1).

6. The loading ledge (1) of any of the previous claims, **characterized** in that the lower and upper legs (2, 4) are slightly inclined towards each other and/or that at least the outer end of the lower leg (2) incline slightly upwards.

7. The loading ledge (1) of any of the previous claims, **characterized** in that the projections (3) are directed downwards to be placed on a floor or the like and that at least three of the sides of the projections (3) shown an angle (α , β) to the horizontal plane which is smaller than 90° .

8. The loading ledge (1) of claim 7, **characterized** in that the angle (α) of the sides of each projection (3) facing adjacent projections (3) and the short ends of the

loading ledge (1) are between 50° and 70°, preferably between 60° and 70° and is most preferably 66.4°; and that the angle (β) of the side of each projection (3) facing forward, i.e. closest to the other end of the lower leg (2),
5 is between 40° and 60°, preferably between 45° and 55° and most preferably 52°.

9. The loading ledge (1) of any of the previous claims, **characterized** in that adapters (11, 12) are received on each projection (3).

10 10. The loading ledge (1) of claim 9, **characterized** in that the adapter has the form of an adapter set (7) placed on several projections (3), which adapter set (7) comprises a board (9) and two or more adapters (8, 11).

11. The loading ledge (1) of claim 9, **characterized**
15 in that one discrete adapter (12) is placed on each projection (3).

12. The leading ledge (1) of any of the claims 8 to 11, **characterized** in that each adapter (8, 11, 12) is furnished with means for a fixed connection with an opening of
20 each projection (3).

13. The leading ledge (1) of claim 12, **characterized** in that the means for fixed connection of the adapter (8, 11, 12) is a peg (10).

14. The loading ledge (1) of any of the previous
25 claims, **characterized** in that it has a length of about 759 mm, that the upper leg (4) has a height of about 100 mm, that the lower leg (2) has a width of about 150 mm, and that each projection (3) has a height of about 45 mm.

15. The loading ledge (1) of any of the previous
30 claims, **characterized** in that three projections (3) are arranged at the loading ledge (1), of which projections (3) one is placed in between the other two projections and having a larger bottom area than the other two projections.

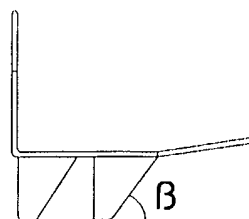
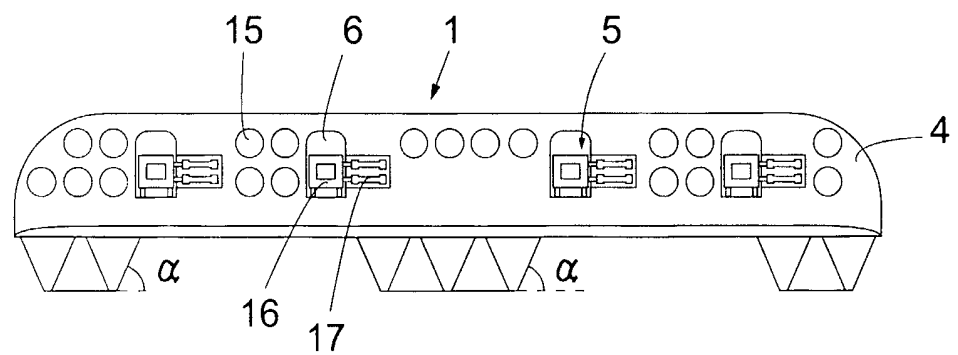
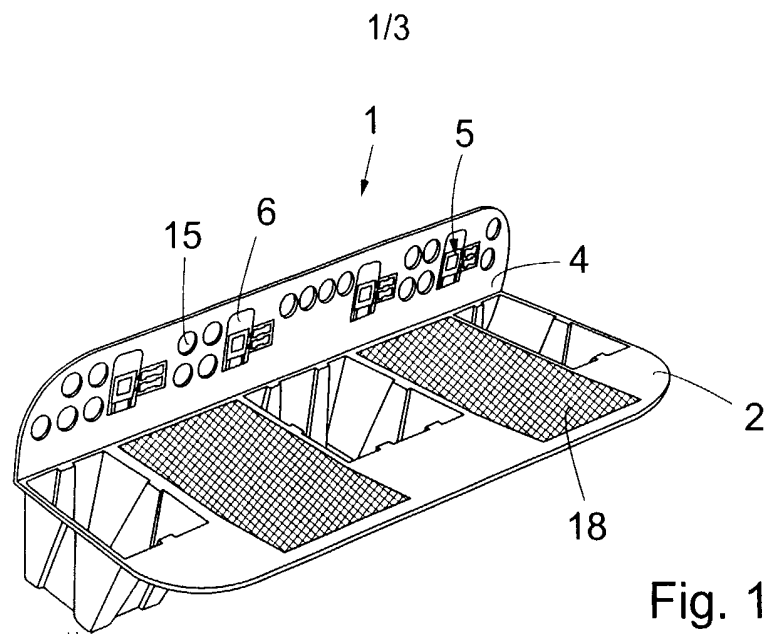
16. The loading ledge (1) of any of the previous claims, **characterized** in that it is furnished with weight-reducing openings (15).

5 17. The loading ledge (1) of claim 16, **characterized** in that the weight-reducing openings are placed in the upper leg (4) of the loading ledge (1).

10 18. A system for creation of load units, **characterized** in that two or more loading ledges (1) of any of the above claims are used together with straps (14) fixating goods (19) on the loading ledges (1).

19. The system of claim 18, **characterized** in that edge protections (13) are used placed between one or more of the straps (14) and edges of the goods (19).

15 20. The system of claim 19, **characterized** in that locking means in the form of clips are integrated in the edge protections (13), which locking means are to lock the straps (14).



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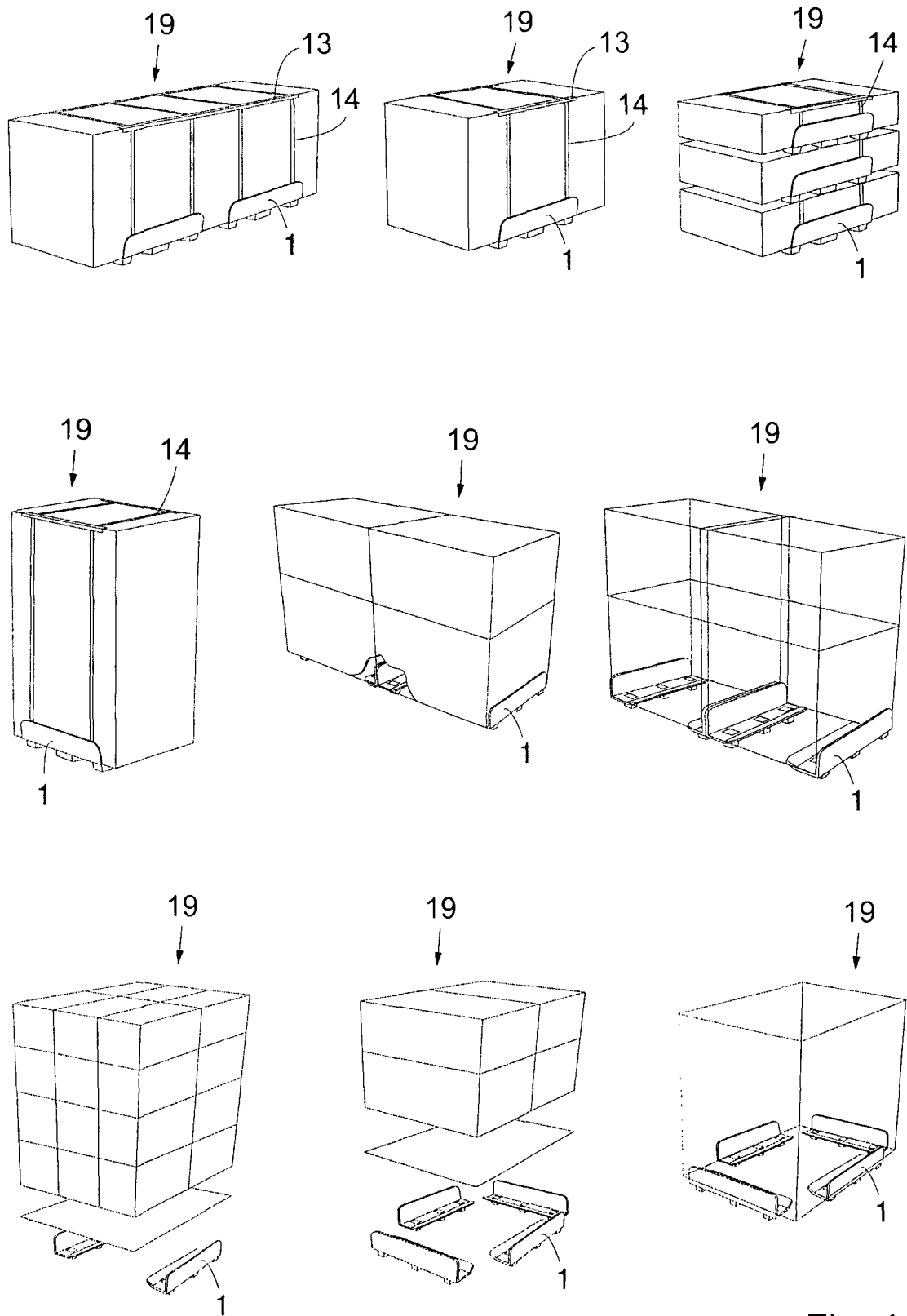
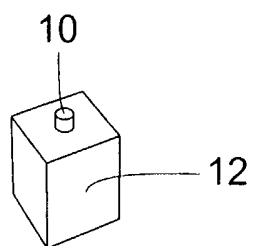
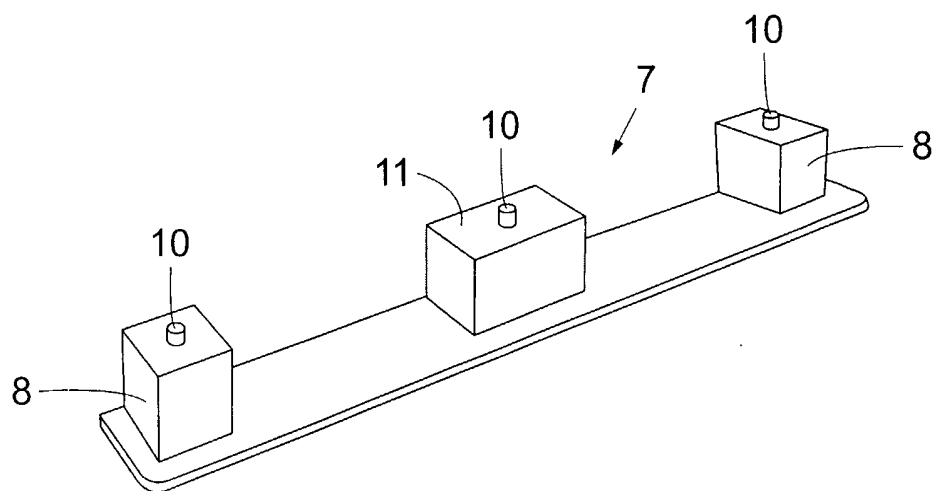
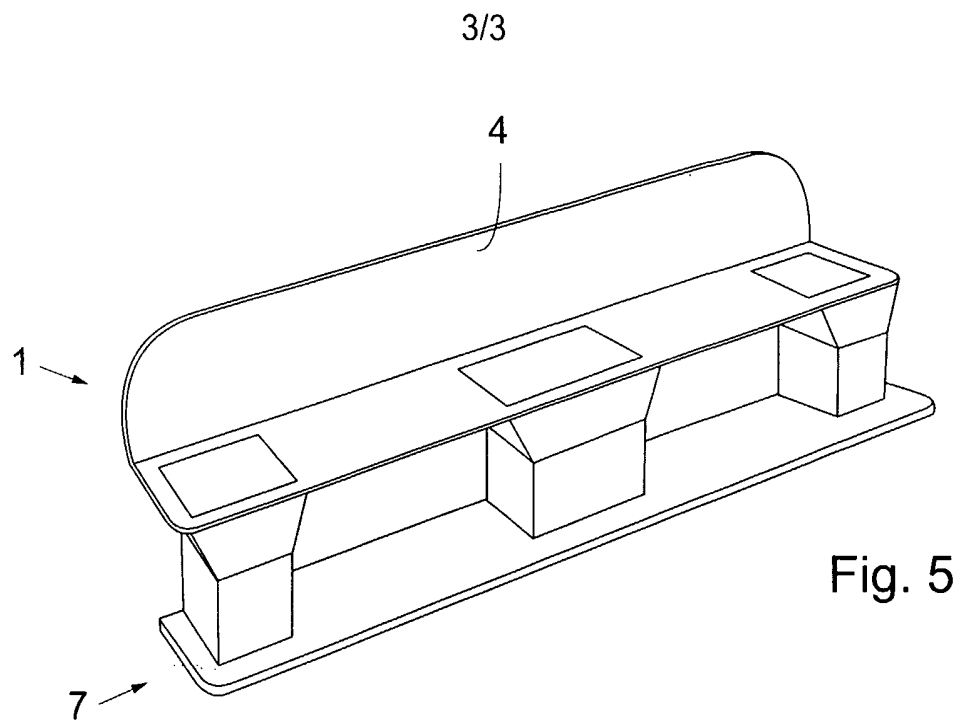


Fig. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/01437

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 19/18, B65D 19/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ, EPOQUE, FULLTEXT, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3880286 A (HANS F. WEGENER), 29 April 1975 (29.04.75), column 2, line 57 - line 65, figures 1-2 --	1-20
Y	DATABASE WPI Week 199941 Derwent Publications Ltd., London, GB; Class Q32, AN 1999-488243 & JP 11208658 A (NEC CORP), 3 August 1999 (1999-08-03) abstract --	1-20

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/01437

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6305566 B1 (MAURICE J. PIGOTT ET AL), 23 October 2001 (23.10.01), column 1, line 59 - column 2, line 26, figures 1-13, abstract --	1-20
Y	US 4065014 A (DARRELL J. SAGMILLER), 27 December 1977 (27.12.77), column 1, line 60 - column 2, line 51, figures 1-4 --	1-20
A	WO 0212076 A1 (RAKNES, STÅLE), 14 February 2002 (14.02.02), column 1, line 2 - column 5, line 23, figures 1-5 --	1-20
A	DE 4236620 A1 (BRIELETТА GMBH DRAHTWERK & GERÄTEBAU), 5 May 1994 (05.05.94), column 1, line 3 - column 2, line 17, figures 1-2, claims 1-9 -- -----	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

06/09/03

International application No.

PCT/SE 03/01437

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
US	3880286	A	29/04/75	NONE			
US	6305566	B1	23/10/01	NONE			
US	4065014	A	27/12/77	NONE			
WO	0212076	A1	14/02/02	AU	8270201	A	18/02/02
				NO	312504	B	21/05/02
				NO	20004004	A	11/02/02
DE	4236620	A1	05/05/94	NONE			