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(54) Support element and system using the same for handling palletless large-size packages containing low density mineral wool slabs, as well as large-size package and manufacturing method for the same

(57) An object of the invention is a support element (5) and a system for handling palletless large-size packages (9) containing low density mineral wool slabs, each large-size package comprising at least one package module (1) which contains at least two packets (2) consisting of low density mineral wool slabs, each package module (1) being wrapped in a cohesive plastic wrapper (3). In the invention, the support element is a support element (5), which is made of a strong material, disposable between the packets (2) inside the wrapper (3) and which, when disposed between the packets (2), establishes a lifting hole (4) for handling elements (12, 15). In the invention, the system comprises at least two support elements (5), which are made of a strong material, establishing a lifting hole (4), and which are disposable between the packets (2) of at least one module (1) inside the wrapper (3), as well as lifting and handling elements (12, 15) extensible through the lifting holes (4). Another object of the invention is a method for manufacturing above-mentioned movable palletless large-size packages (9) containing low density mineral wool slabs, in which method at least two support elements (5), made of a strong material and establishing a lifting hole (4), are disposed in at least one module (2) of the large-size package (9) inside a wrapper (3) by pushing the same between packets (2). A still further object of the invention is a large-size package (9), wherein at least one module (1) of the large-size package (9) has inside a wrapper (3) between packets (2) at least two support elements (5) made of a strong material and establishing a lifting hole (4).

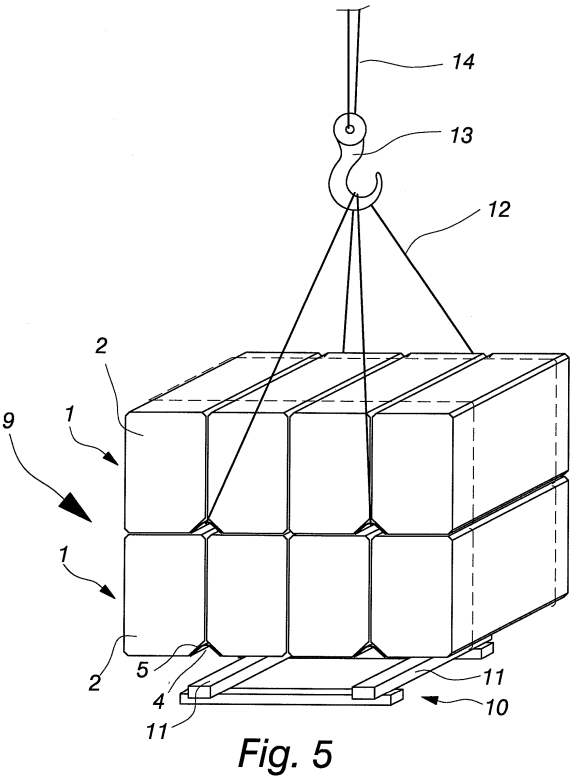

Fig. 5

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Description

[0001] The present invention relates to a support element for use as a handling aid in the process of handling palletless large-size packages containing low density mineral wool slabs, each large-size package comprising at least one package module which contains at least two adjacent packets consisting of low density mineral wool slabs, each package module being wrapped in a cohesive plastic wrapper.

[0002] The present invention relates also to a system for handling palletless large-size packages containing low density mineral wool slabs, each large-size package comprising at least one package module which contains at least two adjacent packets containing low density mineral wool slabs, each package module being wrapped in a cohesive plastic wrapper.

[0003] The present invention relates also to a method for manufacturing movable palletless large-size packages containing low density mineral wool slabs, each large-size package comprising at least one package module which contains at least two adjacent packets containing low density mineral wool slabs, each package module being wrapped in a cohesive plastic wrapper.

[0004] This invention concerns also a movable large-size package, comprising at least one package module which contains at least two adjacent packets containing low density mineral wool slabs, each package module being wrapped in a cohesive plastic wrapper.

[0005] It is prior knowledge that slab-shaped low density products (density $\leq$ 40 kg/m^3, compression $\geq$ 15%) have been packed in packages of 3-8 slabs, depending on compression and product thickness. Packets constructed of low density products are compiled in a single module to include 3-5 packages, and the modules are secured together by a plastic wrapper which is joined by welding.

[0006] Modules are in turn packed in 3-5 tiers thereof on top of each other and a wooden pallet is set underneath to enable handling of the large-size package. Finally, the module and the pallet are protected by a stretch film which holds the entire pallet-package together.

[0007] Palletless package solutions regarding insulation slabs are available from before, but those are primarily intended for moving the packages by means of a forklift to a maximum height allowed by the forklift. In addition, these concern mainly high-density (density > approx. 50 kg/m^3) mineral wool or rolls. The use of palletless packages is desirable for eliminating the use of a wooden pallet, which occupies unnecessary space in transportation and which at the site becomes waste wood that must be disposed of. In addition, large-size packages with wooden pallets may damage other materials at the workplace and hamper material logistics at the construction site. However, in order to be functional, the palletless package must be strong enough to withstand handling performed by carrying (e.g. a forklift) or suspension (e.g. a crane).

[0008] Accordingly, it is an object of this invention to provide a support element, a system, a method, and a large-size package for handling one or more palletless large-size packages consisting of soft, i.e. low density mineral wool slabs, effected by way of carrying and/or suspending, such that the foregoing drawbacks are obviated. An object of this invention is particularly to provide a large-size package not including a wooden pallet and even more particularly a large-size package, the modules of which can be manipulated individually as smaller units.

[0009] The support element of the invention is characterized by that it is a support element, which is made of a strong material, and which due to the flexibility of the low density mineral wool slabs contained in the packets is disposable between the packets inside the wrapper whereby a lifting hole for handling elements is established between the packets.

[0010] The support element according to the invention is preferably made of mineral wool or cardboard. It is preferred that the support element according to the invention has a length which is substantially equal to that of the packets. The support element according to the invention may lie between the packets at the intermediate level, at the top edge or bottom edge of a module. Most preferably, the support element lies at the bottom edge of a module. In principle, the support element may be of any shape, but one preferred form is a trough-like shape. Regardless of the shape, the most important aspect is that the shape enables the support element to be pushed in between packets without damaging them.

[0011] In the event that extra support is desired for the packets of a module, the trough-shaped support element may preferably consist of a plate and two trough-shaped members mounted on its two opposite edges, each of which is coupled with the plate from the external side of the trough-shaped member's bottom. As a result, the packets of a module retain their positions in a particularly good and solid manner.

[0012] On the other hand, the system according to the invention is characterized by that that it comprises at least two support elements, which are made of a strong material, and which due to the flexibility of the low density mineral wool slabs contained in the packets are disposable between the packets of at least one module inside the wrapper, whereby the support element disposed between the packets in question establishes a lifting hole, as well as lifting and handling elements extensible through the lifting holes.

[0013] The method according to the invention is in turn characterized in that at least two support elements made of a strong material are disposed between the packets in at least one module of the large-size package inside the wrapper, which support elements enabled by the flexibility of the low density mineral wool slabs contained in the packets are pushed into place between the packets, the support elements thereby establishing lifting holes between the packets for handling elements.

[0014] In this method, the support elements can be set

between the packets of a module at the top edge, mid-level or bottom edge of the module. It is especially preferred that the support elements be placed at the bottom edge of the module. It is preferred that at least the lowermost module be provided with support elements. If it is desirable that each tier or module can be lifted or handled separately, each module must be provided with support elements.

[0015] The movable large-size package according to the invention is characterized in that at least one module of the large-size package has inside the wrapper between the packets at least two support elements made of a strong material, which support elements due to the flexibility of the low density mineral wool slabs contained in the packets have been displaceable between the packets, thus establishing lifting holes for handling elements.

[0016] The support elements are preferably set between the packets of the module at the top edge, mid-level or bottom edge of the module. Preferably, the support elements are located at the bottom edge of a module. It is favourable that the support elements be provided at least in the lowermost module. If it is desirable to make each tier i.e. module of a large-size package capable of being individually lifted or handled, each module must have support elements included therein.

[0017] By virtue of the present invention, a wooden pallet is no longer needed in a large-size package, the handling being effected e.g. by extending the prongs of a forklift into the lifting holes of the lowermost module or by passing the lifting straps of a crane through the lifting holes of the lowermost module. The batch to be handled can be decided by the operator, provided that each module includes lifting holes needed for handling. Hence, this makes it possible to handle both individual modules and piles of several modules as desired.

[0018] The modules enable the construction of large-size multiproduct packages, implying that a single large-size package may include a number of products, for example slabs of unequal thickness but otherwise of equal size. This is necessary for example at major construction sites, wherein a single structural section, for example, requires insulation with a thickness of 150 mm and 50 mm. Now these can be obtained from one large-size package, thus increasing the speed of insulation work. This is not possible with the currently available system, because the modules cannot be handled individually.

[0019] In addition to the above, one and the same large-size package may also include products unequal in other than thickness dimensions, such that the modules of a particular large-size package can be of various heights.

[0020] By virtue of the invention, it is also possible that the number of modules needed at major working sites be distributed by a crane to relevant spots, which also speeds up insulation work.

[0021] Still another advantage gained by the invention is that, at the site, the final displacement of modules can be performed by carrying with the aid of pipes or boards or other such means. This type of means can be pushed through the lifting holes, which makes it possible to carry an entire module. This has not been possible before, as the prior art only provides a capability of carrying unattached packets. Carrying a module without lifting holes is an extremely difficult, if not nearly impossible undertaking.

[0022] Thus, the applicant has discovered that the flexibility feature of low density insulation products can be utilized. In other words, the very feature that used to constitute a problem has been unexpectedly overturned in the solution of the invention into an advantage, because the solutions according to the invention would not be possible without the flexibility feature. Still, although large-size packages constructed from low density products have been available a long time, about 15-20 years, nobody has until now thought of exploiting this way the flexibility of low density insulation products even though the problem has been there the whole time. Neither has anyone invented a system that enables mechanical handling of a module.

[0023] The present invention will now be described in more detail by way of examples, with reference to the accompanying drawings, in which:

fig. 1a shows a prior art module engaged in a plastic wrapper included in a large-size package,

fig. 1b shows a large-size package module engaged in a plastic wrapper and provided with lifting holes according to the invention,

fig. 2 shows one embodiment for a support element according to the invention,

fig. 3 shows a second embodiment for a support element according to the invention,

fig. 4 shows a large-size package according to the invention in its entirety, and

fig. 5 shows one way of lifting a large-size package consisting of two modules, and

fig. 6 shows how a single module can be handled by the effort of just two persons.

[0024] Referring to fig. 1a, there is shown a prior art module 1, included in a large-size package 9 and engaged in a plastic wrapper 3 and comprising four soft packets 2 side by side. Due to its softness, such a module 1 is extremely difficult, if not indeed impossible to handle. In addition, the packets 2 become soiled and the plastic broken when rolling the modules 1 on the ground.

[0025] In fig. 1b, there is shown a module 1 according to the invention, which consists of four packets 2 of soft slabs engaged together with a plastic wrapper 3, and which module 1, at its bottom edge between the packets

2, is provided with two support elements 5 establishing a lifting hole 4 between two adjacent packets 2 and the plastic wrapper 3. In this solution, one support element 5 is accommodated between the ultimate and penultimate packets 2 as seen from the right and the other support element 5 respectively as seen from the left. In principle, the support elements 5 and the lifting holes 4 created thereby can be in any shape or form, but in this solution the support elements 5 take the shape of a furrow-like trough (the trough has a cross-section in the shape of a rather wide-open V, possibly with a slightly rounded bottom tip), whereby the lifting holes 4 resulting between the same and the plastic wrapper are substantially triangular in cross-section.

[0026] Fig. 2 presents a perspective view of the support element 5 shown in fig. 1b. The support element 5 can be manufactured from any durable material, such as for example cardboard or hard mineral wool, preferably hard stone wool. In this solution, the support element 5 in the shape of a furrow-like trough, which has a rounded corner, is made of hard cardboard. The presently discussed support element 5 is placed in an ordinary module 1, consisting of nothing else but packets 2 engaged in a plastic wrapper 3, by pushing the support element 5 in between the packets 2. The support element 5 can be placed between the packets 2 at the top edge or bottom edge of the module 1 or at half-way between the top or bottom edges. In a solution as shown in fig. 1b, the support elements 5 have been inserted between the packets 2 and the plastic wrapper 3 at the bottom edge of the module 1.

[0027] Fig. 3 presents a second embodiment for a support element 5 according to the invention, in which the support element 5 consists of a furrow-like trough 5 as shown in fig. 2, having an extension member 15 coupled therewith. This extension member consists of two plates 6, each having deflected wings 7 and 8 at two opposite ends. One of the plates 6 is secured to the outside of one of the trough's 5 wings and the other to the outside of the trough's 5 other wing in such a way that both plates converge and abut each other at the corner of the trough's furrow and extend at a right angle relative to the tangent of the corner of the trough's furrow across a certain distance until diverging from each other again at the point of deflection at a moderately obtuse angle after a certain distance from the trough 5. Both lines of deflection are parallel. When coupled together, the support element 5 of fig. 3 and the extension member 15 included therein establish an entity, which is sized in its dimensions so that it has a height substantially equal to that of the packets 2 between which it is destined to be placed. Placed between the packets 2, it supports and keeps the packets very effectively in place.

[0028] Fig. 4 illustrates a large-size package 9, which consists of four modules 1 on top of each other, each of said modules comprising four packets 2. Each module 1 is provided with two support elements 5. The figure endeavours to reveal that the support elements 5 can be designed in ways other than a furrow-like trough, i.e. can be designed in ways other than those forming substantially triangular lifting holes. Those could as well be, for example, circular 5c or square 5b in cross-section.

[0029] Fig. 5 presents one way of lifting a palletless large-size package 9 according to the invention. In this case, the palletless large-size package 9 consists of two modules 1, each of said modules comprising four packets 2. Each module 1, both on the left and the right side, between the outermost and second outermost packets, at the bottom edge of the module 1 between a plastic wrapper 3 and two adjacent packets 2, has installed therein a support element 5 in the shape of a furrow-like trough. Lifting straps 12 can be threaded either into the lifting holes 4 of the bottom module 1 or through the lifting holes 4 of the top module 1, depending on whether it is desirable to lift the entire large-size package 9 at one time or only its top module 1, and then the straps can be secured to a crane hook 13. In the warehouse, the large-size package 9 can be stored on top of a wooden pallet 10, such that the large-size package 9 is supported on the wooden pallet's 10 boards 11 by the support elements 5 of the large-size package's bottom module 1 with enough space left between the boards 11 and the support elements 5 for threading the lifting straps 12 therethrough.

[0030] Fig. 6 illustrates how a single module 1 can be lifted by the effort of just two people and carried at the site for example by means of pipes or boards 15. This can only be managed with soft packets by having a module 1 provided with hard support elements 5, which establish lifting holes 4 for these lifting boards or pipes 15.

Claims

1. A support element (5) for use as a handling aid in the process of handling palletless large-size packages (9) containing low density mineral wool slabs, each large-size package comprising at least one package module (1) which contains at least two adjacent packets (2) consisting of low density mineral wool slabs, each package module (1) being wrapped in a cohesive plastic wrapper (3), **characterized in that** it is a support element (5), which is made of a strong material, and which due to the flexibility of the low density mineral wool slabs contained in the packets (2) is disposable between the packets (2) inside the wrapper (3) whereby a lifting hole (4) for handling elements (12, 15) is established between the packets (2).

2. A support element (5) as set forth in claim 1, **characterized in that** it is made of mineral wool or cardboard.

3. A support element (5) as set forth in claim 1 or 2, **characterized in that** it has a length which is sub-

stantially equal to that of the packets (2).

4. A support element (5) as set forth in claim 1, 2 or 3, **characterized in that** it lies between the packets (2) at the top edge or bottom edge of the module (1) or substantially at half-way between the top edge and the bottom edge, preferably at the bottom edge of the module (1).

5. A support element (5) as set forth in any of claims 1-4, **characterized in that** it has a configuration which is substantially trough-shaped.

6. A support element (5) as set forth in claim 5, **characterized in that** it consists of a plate (6) and two trough-shaped members (5) mounted on its two opposite edges, each of which is coupled with the plate (6) by the external side of the bottom, respectively.

7. A system for handling palletless large-size packages (9) containing low density mineral wool slabs, each large-size package comprising at least one package module (1) which contains at least two adjacent packets (2) containing low density mineral wool slabs, each package module (1) being wrapped in a cohesive plastic wrapper (3), **characterized in that** it comprises at least two support elements (5), which are made of a strong material, and which due to the flexibility of the low density mineral wool slabs contained in the packets (2) are disposable between the packets (2) of at least one module (1) inside the wrapper (3), whereby the support element (5) disposed between the packets in question establishes a lifting hole (4), as well as lifting and handling elements (12, 15) extensible through the lifting holes (4).

8. A system as set forth in claim 7, **characterized in that** the handling and lifting elements (12, 15) comprise lifting straps (12), forklift prongs and/or handheld carrying means (15).

9. A method for manufacturing movable palletless large-size packages (9) containing low density mineral wool slabs, each large-size package comprising at least one package module (1) which contains at least two adjacent packets (2) containing low density mineral wool slabs, each package module (1) being wrapped in a cohesive plastic wrapper (3), **characterized in that** at least two support elements (5) made of a strong material are disposed between the packets (2) in at least one module (2) of the large-size package (9) inside the wrapper (3), which support elements enabled by the flexibility of the low density mineral wool slabs contained in the packets (2) are pushed into place between the packets (2), the support elements (5) thereby establishing lifting holes (4) between the packets (2) for handling elements (12, 15).

10. A method as set forth in claim 9, **characterized in that** the support elements (5) are disposed in the module (1) between the packets (2) at the top edge or bottom edge of the module or substantially at half-way between the top edge and the bottom edge, preferably at the bottom edge of the module (1).

11. A method as set forth in claim 9 or 10, **characterized in that** support elements (5) are disposed at least in the lowermost module (1).

12. A method as set forth in claim 9 or 10, **characterized in that** support elements (5) are disposed in every module (1) of the large-size package (9).

13. A movable large-size package (9), comprising at least one package module (1) which contains at least two adjacent packets (2) containing low density mineral wool slabs, each package module (1) being wrapped in a cohesive plastic wrapper (3), **characterized in that** at least one module (1) of the large-size package (9) has inside the wrapper (3) between the packets (2) at least two support elements (5) made of a strong material, which support elements (5) due to the flexibility of the low density mineral wool slabs contained in the packets (2) have been displaceable between the packets (2), thus establishing lifting holes (4) for handling elements (12, 15).

14. A large-size package (9) as set forth in claim 13, **characterized in that** the support elements (5) are disposed in the module (1) between the packets (2) at its top edge or bottom edge or substantially at half-way between the top edge and the bottom edge, preferably at the bottom edge of the module (1).

15. A large-size package (1) as set forth in claim 13 or 14, **characterized in that** support elements (5) are disposed at least in the lowermost module (1).

16. A method as set forth in any of claims 13-15, **characterized in that** every module (1) has support elements (5) disposed therein.

17. A large-size package (9) as set forth in any of claims 13-16, **characterized in that** it is movable both by suspending and carrying.

18. A large-size package as set forth in any of claims 13-17, **characterized in that** it is a large-size multiproduct package (9), which contains packets (2) containing products of various dimensions.

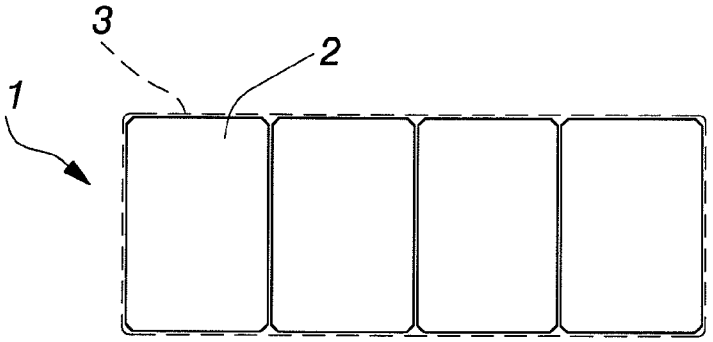

Fig. 1a

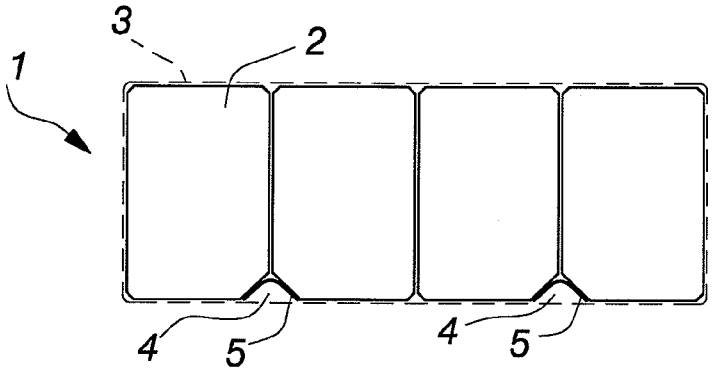

Fig. 1b

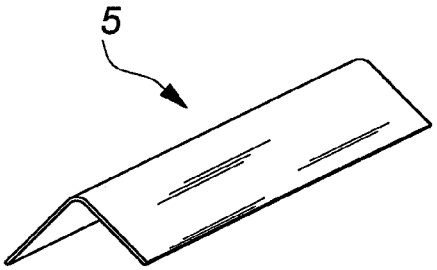

Fig. 2

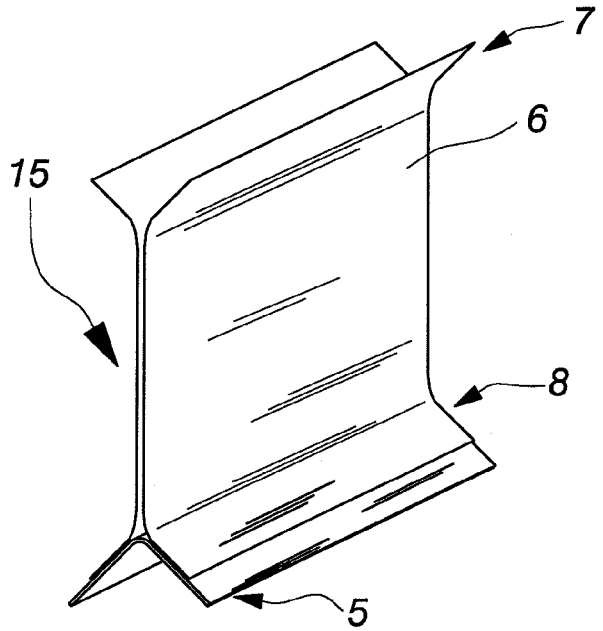

Fig. 3

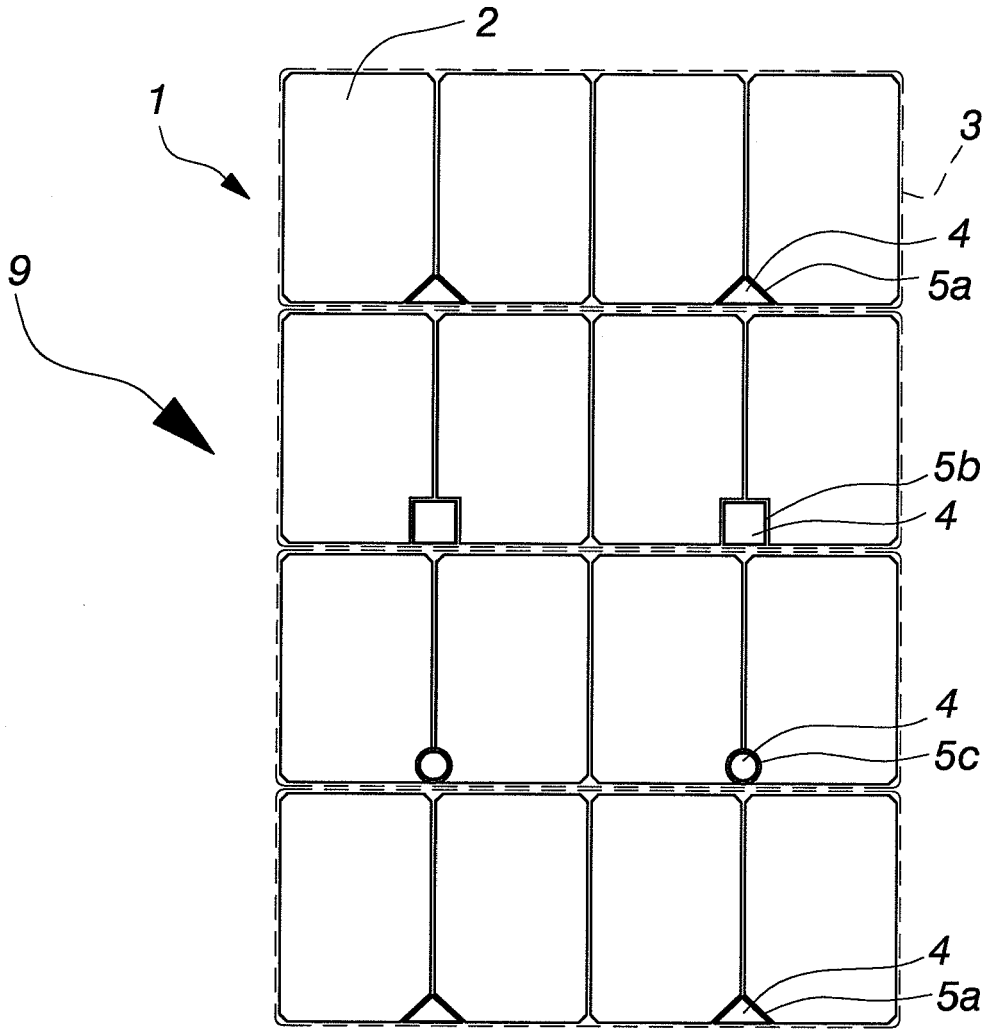

Fig. 4

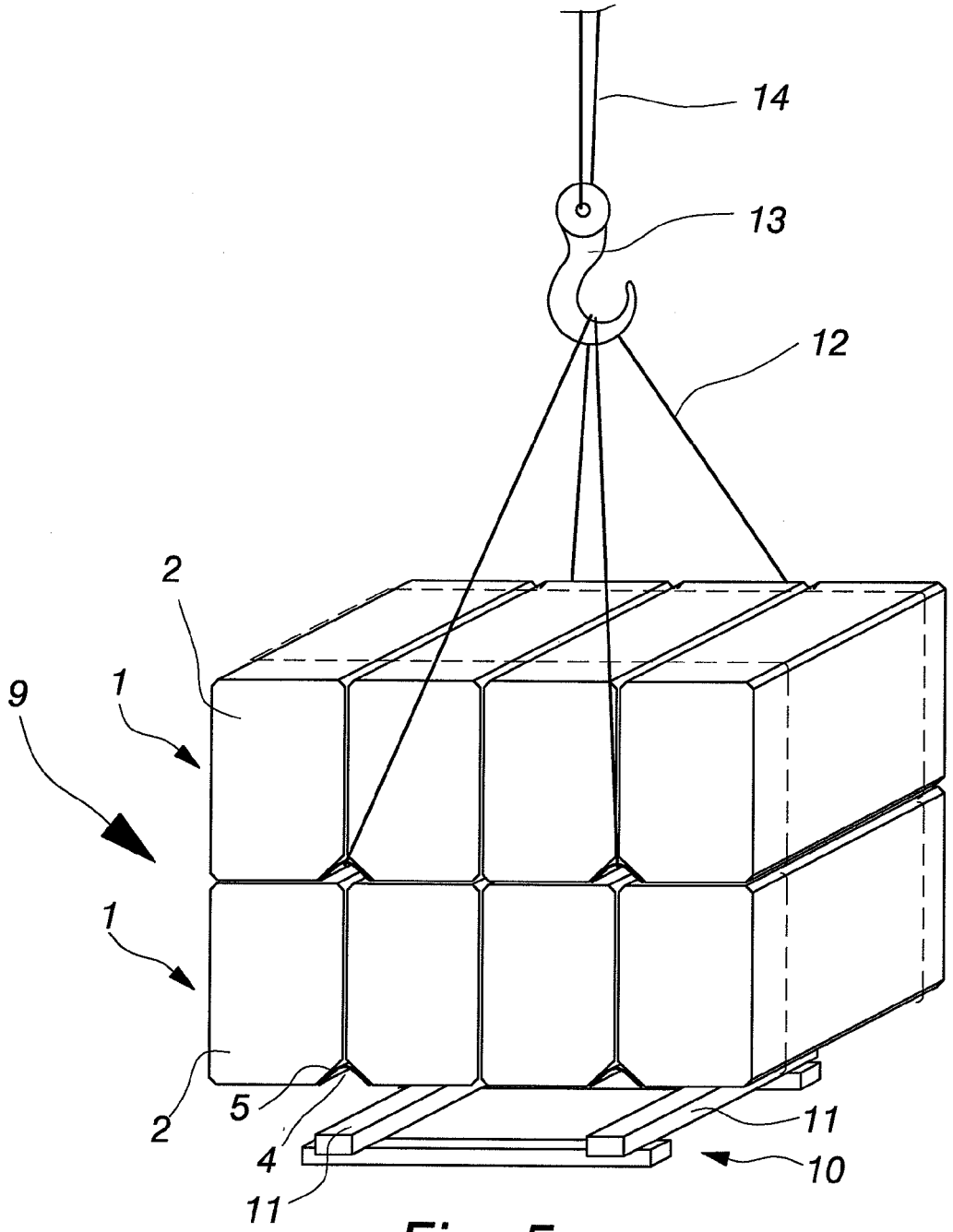

Fig. 5

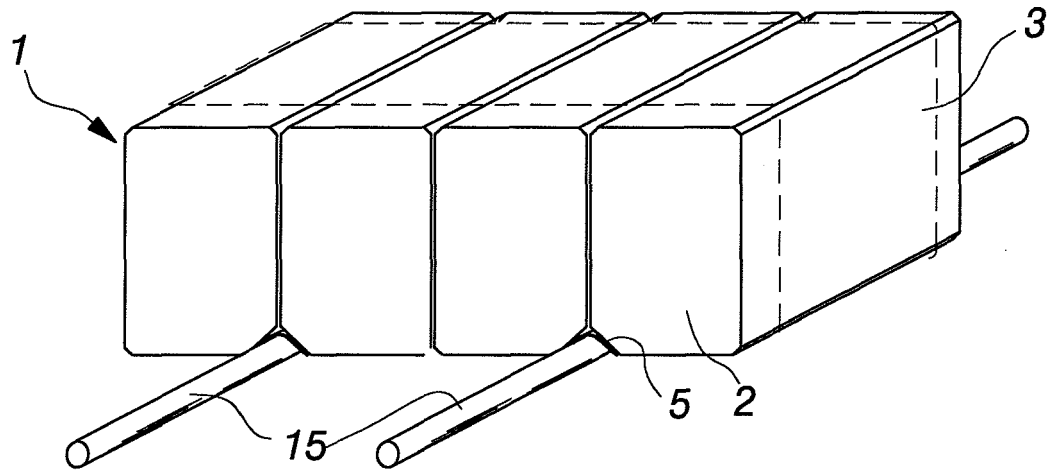

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 March 2007	Jervelund, Niels

CATEGORY OF CITED DOCUMENTS

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