(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 202 168 A1**

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**30.06.2010 Bulletin 2010/26**

(51) Int Cl.:
***B65D 19/16*** *(2006.01)*

(21) Application number: **08022488.4**

(22) Date of filing: **29.12.2008**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR**
Designated Extension States:
**AL BA MK RS**

(71) Applicant: **Deutsche Post AG**
**53113 Bonn (DE)**

(72) Inventor: **Lemola, Jussi**
**02100 Espoo (FI)**

(74) Representative: **Jostarndt, Hans-Dieter**
**Jostarndt Patentanwalts-AG**
**Brüsseler Ring 51**
**52074 Aachen (DE)**

## (54) Container with variable height

(57) A container (1) loadable with at least one object comprising a pallet (2) with a loadable upper side (23) and a closable sidewall (31, 32, 33, 34, 350) to be placed on top of the pallet (2), wherein the sidewall comprises at least a first side (31), a second side (32), a third side (33) and a fourth side (34) suitable to be collapsed, wherein at least two sides each comprise a non-moving side (311, 321, 331, 341) and an extendable wall element (51, 52, 53, 54), preferably mounted to the non-moving side, suitable to be telescoped. The invention further relates to the pallet and the side.

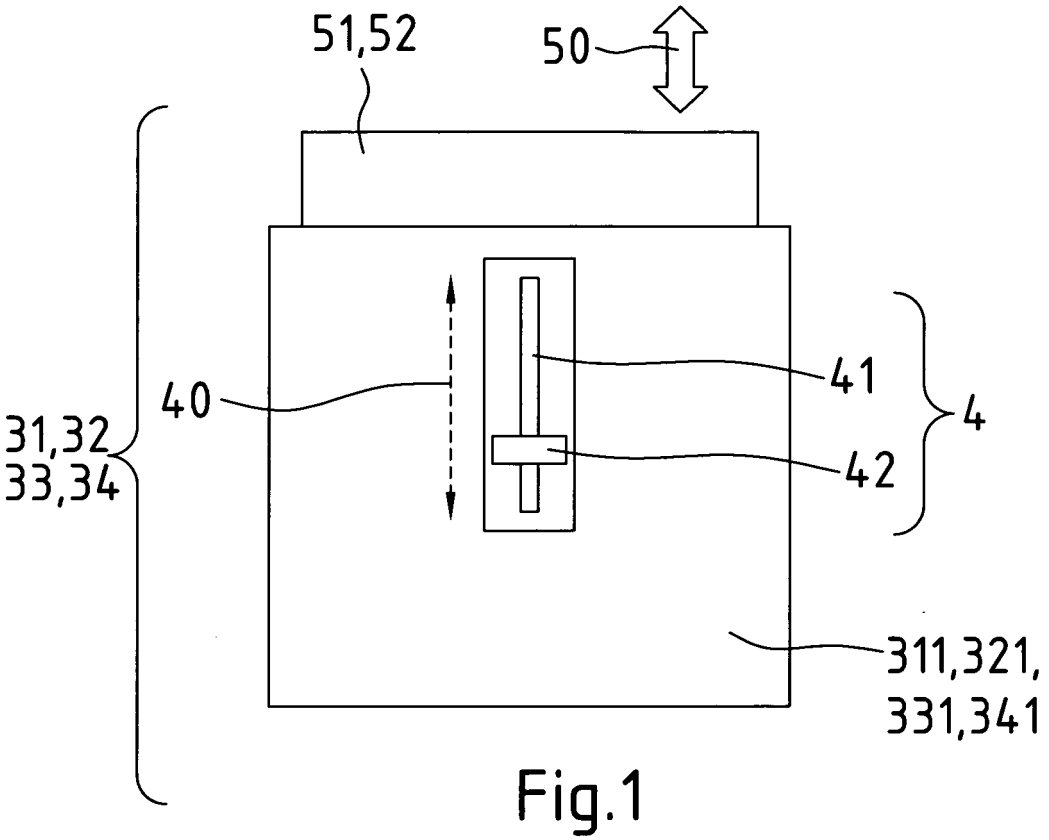



Fig.1

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## Description

### Field of the invention

**[0001]** This invention relates to a container with variable height comprising a pallet and a sidewall with at least two sides comprising extendable wall elements to adapt the loading volume. The invention further relates to the pallet and this sides.

### Background of the invention

**[0002]** Objects to be transported were traditionally arranged on loose load pallets. The loading height is in principle not limited but such loaded pallets have to be moved slowly to avoid objects from falling off the pallet. Furthermore there is no protection against side impacts. Wrapping the objects in order to lower the risk of losing objects during transport, would require additional time consuming effort. Containers with closed sidewalls are used to avoid the loss of objects during transport. However, such containers are defined to a constant loading volume which is not adaptable to an available loading space in transport vehicles.

**[0003]** Document DE 102006022196 discloses a skeleton transport box where the loadable volume can be increased by four vertical aligned telescope elements at the edges of the box mounted to the bottom of the box. The tops of the four telescope elements are permanently connected with a circumferential frame element. The skeleton transport box is closed to the four sides by multipart side elements. This skeleton box is not able to be collapsed or folded to minimize its volume in case of transport of empty boxes The minimum volume is the volume defined by the lower vertical frame elements permanently connected to the bottom of the box and the attached lower sidewalls. Furthermore the complicated structure of the box requires a cost and time consuming mounting process. The permanent connection of frames and sidewalls to the bottom of the box prevents fast and easy exchange of damaged parts.

### Summary of the invention

**[0004]** It is an object of the present invention to provide a loadable container able to be easily collapsed in case of no load, where the loadable volume can easily be varied depending on the amount and size of transported objects.

**[0005]** The object is solved by a container loadable with at least one object comprising a pallet with a loadable upper side and a closable sidewall to be placed on top of the pallet, wherein the sidewall comprises at least a first side, a second side, a third side and a fourth side suitable to be collapsed, wherein at least two sides comprise a non-moving side and an extendable wall element, preferably mounted to the non-moving side, suitable to be telescoped. Here the loadable volume can be easily varied depending on the amount of loaded objects. The minimum loadable volume is defined by the pallet as the base and the closed non-moving sides forming the sidewall. The loadable volume can be increased by telescoping the extendable wall elements of the sides. The term "extendable" refers to the total sidewall area, which is extended, if the extendable wall element is telescoped upwards increasing the height of the sidewall. The term "telescoped (or telescoping)" denotes the movement of the extendable wall element to adapt the height of the resulting sidewall, which total height is the sum of the constant height of the non-moving sides and the additional height provided by the extended (= telescoped) extendable wall elements, to a desired and/or required total height of the container. The increased loadable volume is defined by the resulting sidewall with increased height formed by the non-moving sides and the telescoped extendable wall elements and the pallet as the base of the loadable volume. To define an increased loadable volume, at least two sides with extendable wall elements are required. In case of a container with four sides, for instance two opposite sides can be extendable and loaded objects within the increased loadable volume might be further secured via nets and/or wrapping or other means chosen by people skilled in the art. In a preferred embodiment more than two sides are equipped with extendable wall elements, for example three sides, four sides, five sides etc. Furthermore the at least two sides improve the stiffness (resilience) of the sidewall against side impacts due to the present of an extendable wall element additional to the non-moving side. In a preferred embodiment, the extendable wall element is mounted to the non-moving side. However, the mounting must be suitable not to hamper any desired telescoping of the extendable wall element. The mounting enables for instance a fast collapsing of the sidewall without additional collapsing steps for non-mounted extendable wall elements, a fast replacement of damaged sides of the sidewall in one step replacing both, non-moving side and extendable wall element. A mounted extendable wall element reduces the risk of hampered telescoping due to accidentally blocked extendable wall elements. As an example suitable means to telescope the extendable wall element might by a holder mounted at the upper side of the extendable wall element, ropes mounted to the extendable wall element, rails, grooves or telescope elements to move the extendable wall element. People skilled in the art will choose suitable means in order to telescope the extendable wall element within the scope of this invention.

**[0006]** The term "closable" denotes the possibility to connect the sides of the closable sidewall together, either directly with neighbored sides in contact or indirectly via suitable means, where the neighbored sides are not in direct contact to each other. The term neighbored sites denotes sides with no other side in between. The term "closable" also includes the possibility to apply the reverse process of detaching the sides from each other in

order to collapse the container. Another advantage of a closable sidewall is the possibility to exchange sides of the sidewall in case of damage without wasting the complete sidewall comprising also non-damaged sites. The same holds for the pallet, where only the pallet has to be exchanged, not the whole container.

**[0007]** The term "loadable" denotes all possibilities to load the container, e.g. in case of a sidewall with an open top through this open top or in case of a sidewall comprising at least one side which is able to be opened through this side via detaching one side from the other sides or to open this side keeping the connection means to at least one neighbored side still closed.

**[0008]** The sides of the sidewall, the non-moving sides of sidewall and the extendable wall element of the container may comprise any material within the scope of this invention. In a preferred embodiment the sidewall with extendable wall elements is essentially made of at least one material selected from the group of materials comprising cardboard, treated cardboard and plastic or combinations thereof, preferably water resistant and/or recyclable. The use of the above listed materials provide an environmental sustainable solution and will decrease the production costs of sidewalls and/or extendable wall elements compared to expensive materials such as metal sidewalls or the like. Wrecked material can be recycled and turned back to functional sidewalls or part of the sidewall (first side, third side etc.). These materials still provide a secure locking structure. It is known to skilled people, that the listed materials are water resistant (plastic) or can be made water-resistant in case of cardboard or treated cardboard. One or more sides of the sidewall or one or more extendable wall elements may comprise one or more openings of any shape in order to reduce the weight of the sidewall and/or the extendable wall element. The remaining sidewall area and/or extendable wall element area should be sufficient to secure the loaded objects from slippage and/or side impacts.

**[0009]** In an embodiment at least two of the sides of the sidewall, preferably all sides of the sidewall, comprise first connection means suitable to close the sidewall or suitable to detach the sides from each other to collapse the sidewall onto the upper side of the pallet. The first connection means comprise clips, flaps, pins, bolts anchors, clamps, clips, mounting links and hooks to provide a closed sidewall. Depending on the process how to open the container, for example the fourth side is connected to the first side and the third side via the connection means. To load the container, the fourth side is detached from of the remaining sides of the sidewall (first side, second side, third side). After loading, the fourth side is connected again to the first and third side in order to provide a closed sidewall for the following transportation. The possibility to detach sides of the sidewall and/or the extendable wall elements from each other allows a replacement of parts of the sidewall and/or extendable wall elements without wasting the non-damaged parts.

**[0010]** As a preferred embodiment at least two sides each comprise at least one telescope element comprising a telescoping part to telescope the extendable wall element relative to the non-moving side and a guiding part to guide the telescoping part. Here the extendable wall element is fixed to a telescoping part to guarantee a defined and reproducible movement of the extendable wall element along the guiding part. The risk of the extendable wall element getting stuck is reduced by a guided movement.

**[0011]** The telescope elements could be arranged as separate parts of the container or as integral part of one or more sides of the sidewall. Alternatively the telescope elements could be attached to one or more sides of the sidewall or to the pallet. To collapse the container, the telescope elements are transferred into the non-telescoped status. Depending on the arrangement as integral or separate parts of the sidewall, the telescope elements are moved towards the pallet together with the sidewall if attached or separately before collapsing the sidewall or after collapsing the sidewall onto the pallet. Preferably, the telescope elements are moved towards the pallet together with the side of the sidewall, where the telescope element is located or even attached to.

**[0012]** In another embodiment the guiding part is a groove within the non-moving side and the telescoping part is a slider mounted to the extendable wall element in order to telescope the extendable wall element along the groove. Here the telescoping element is integrated into the sides of the sidewall in order to reduce the numbers of required components to provide a sidewall with extendable wall elements. The integration enables fast closing and detaching of the sidewall in case of loading, de-loading and/or collapsing of the container. Furthermore the required time for replacement of sides in case of damage is reduced. A slider guided by a groove is an easily operable telescope element to telescope the extendable wall element. The term "groove" denotes any suitable opening in the non-moving side to move a slider along one direction, preferably along a vertical direction. The term "slider" denotes any suitable means to manually telescope the extendable sidewall along the groove. Skilled people might choose other telescope elements to enable any alternative easy operable telescope elements within the scope of this invention.

**[0013]** In a further embodiment the non-moving side is a double-sided side with a cavity in between, where the extendable wall element is arranged in the cavity in order to be telescoped. The cavity prevents the extendable wall element of getting stuck during telescoping movements (up and down), because the movement is shielded to the inside and the outside of the sidewall by the non-moving double sided side. This arrangement can be applied in combination with a previously disclosed telescoping element, preferably with a grove and a slide building the telescoping element, or with alternative arrangements to telescope the extendable wall element.

**[0014]** In another embodiment the telescope element is a post, preferably with a flat top, arranged on top of

the upper side of the pallet with the telescoping part fitting into or onto the guiding part. The telescoping part of posts (or poles etc.) is commonly inside the guiding part to enable the guiding part to guide the telescoping part. The telescoping part may also be arranged around the guiding part as the inner sub-post of the post as the telescope element. Skilled people may choose other arrangements between telescoping and guiding parts of posts within the scope of this invention. The extendable wall element is mounted to the telescoping part of the post in order to be telescoped by the post as the telescope element. The extendable wall element is not necessarily mounted to the non-moving side. To define an increased loadable volume the extendable wall elements only have to be present at at least two sides of the sidewall, preferably at the inner side of the sidewall facing towards the loaded objects. As an example this is achieved with posts as telescoping elements having mounted extendable wall elements placed at the inner side of at least two sides. In a preferred embodiment the posts comprise a flat top (either the guiding part or the telescoping part or both also depending of the length of the posts) in order to further support the stacking of the container. The term "post" denotes any post-like element, such as poles, bars, longitudinal supports, piles, pillars suitable to build a telescope element according to the present invention.

**[0015]** In another embodiment the sidewall comprises corners with one post arranged in each corner of the sidewall. Here, the term "corner" denotes the area, where two sides of the sidewall are directly or indirectly connected to each other to form a closed sidewall. Neighbored sides at a corner may be located under a certain angle between the sides forming a common corner or may define a round shaped, elliptically shaped corner or define corners with other shapes. The preferred shape of the corner is a corner having neighbored sides at an angle of essentially 90° angel between the sides. The term "arranged in the corner of the sidewall" denotes an alignment of the posts in any angle to the upper side of the pallet. Several alignments deviating from such vertical alignments could also provide a container with adaptable loading volume. However, a vertical alignment of the posts relative to the upper side of the pallet is preferred, because it provides the largest loadable volume with a pallet defining the bottom of the volume with the most stable capability of stacking the containers. The posts in a non-telescoped status (minimum length of the posts as the telescope elements) may have any length within the scope of this invention, for example smaller or larger than the height of the sidewall. The preferred length of the non-telescoped status is essentially identical to the height of the sidewall. Here, containers are stackable directly on top of the posts without any further handling. In case of posts smaller than the height of the sidewall, the telescope part has to be move upwards to adapt the height of the telescope element identical to the height of the sidewall in order to provide a stackable container. If the non-telescoped status has a length larger than the height of the sidewall, a further container is stackable on top of the posts with a gap between sidewall and pallet of the container stacked on top.

**[0016]** In another embodiment at least two of the posts on top of the pallet are sufficiently resilient in order to enable the container to be stackable, even in a loaded status.

**[0017]** In order to support stacking of the container, the posts have to be placed either directly on top of the pallet or indirectly via suitable means between post and pallet. In order to be sufficiently resilient, the posts may be made of a resilient material such as fiberglass, metal hard plastics. Skilled people may choose other suitable materials within the scope of this invention. The resilience of the posts may further be improved by a suitable cross section and/or thickness and/or diameter. The highest resilience is achieved by a post made of a suitable material with optimized cross section (preferred rectangular, more preferred triangular, even more preferred pentagonal or hexagonal cross sections) and an adapted wall thickness and/or diameter of the telescope element. The harder the material, the less could the preferred cross section, thickness and/or diameter of the post be. Skilled people are able to choose suitable properties of the posts within the scope of this invention to provide a stackable container.

**[0018]** In another embodiment at least one guiding part comprises at least one second connection means to connect at least one side of the sidewall directly to the guiding part. In a preferred embodiment, all sides of the sidewall can be connected via the second connection of the guiding parts of the posts. This enables to exchange each side of the sidewall even in a loaded status of the container, because the other sides of the sidewall are still stable connected via the posts.

**[0019]** The second connection means comprise clips, flaps, pins, bolts anchors, clamps, clips, mounting links and hooks to provide a secure connection to the sidewall to enable a closed sidewall. In alternative embodiments first and second connection means could be identical or corresponding means fitting into each other.

**[0020]** In another embodiment the guiding parts further comprise guiding means to guide the extendable wall element. Guiding means lower the risk of damaging the extendable wall element when moved in a loaded status of the container, where non-guided extendable wall elements may get stuck with loaded objects when moved down. Guided extendable wall elements further improve the stability of the container against side impacts, because of the extendable wall elements as an additional sidewall in case of a not fully telescoped status of the container. As an example, the guiding means could be a simple guide rail or a slit or a groove, in which the extendable wall element extends and is moved up and down. Skilled people may choose other guiding means within the scope of this invention.

**[0021]** In another embodiment at least two of the sides each comprising two posts with a first and a second ex-

tendable wall element arranged between the two posts on each side. Preferably the posts are arranged in the corners of the sidewall, more preferably in the four corners, where the four corners are in coincidence with the four corners of the pallet. Preferred the first extendable wall element is arranged between a first post in the first corner and a second post in the second corner and a second extendable wall element is arranged opposite to the first extendable wall element between the third post in the third corner and the fourth post in the fourth corner. In another embodiment the pallet comprises carrier means to carry the posts, preferably to fasten the posts to the pallet. The carrier means define a secure position of the posts on the pallet further improving the resilience of the posts for stacking the container. Additionally, it improves the stability of the sidewall against side impacts, because the posts are fixed to a certain position by the carrier elements and will absorb at least a part of the impact shock.

**[0022]** In an embodiment at least one of the extendable wall elements further comprises at least one fixation means in order to fix the extendable wall element in a telescoped position. A fixed position guarantees that the extendable wall element keeps the desired position even when transported. In case of no fixation means, one has to rely on friction forces to keep the extendable wall element staying in an initial telescoped position. This could be successful in case of extendable wall elements moved in direct contact to the sidewall. However, this direct contact would lead to a faster degradation of the sidewall and the extendable wall element. It is preferred to move the extendable wall element not in direct contact to the sidewall. In a preferred embodiment fixation means are mounted to the telescope element to keep the telescoping part in a telescoped position. Here the movement of the extendable wall element to a telescoped position could be easily finished with the fixation of this position in a one-step process. Suitable fixation means comprises pins, bolts, screws, windings, clamps, clips, lugs, splints or combinations thereof. A person skilled in the art may chose other fixation means within the scope of this invention. There may be one or more fixations means at one or several or each of the extendable wall elements and/or the telescope elements of the container. The more fixation means the more secure is the fixed telescoped position of the extendable wall element.

**[0023]** In another embodiment, each of the extendable wall elements are able to be telescoped independently from each other. This enables a non-symmetric adaptation of the height of the container, e.g. if objects are not equally loaded at different sides of the container and/or if the available transportation space is non-symmetric as the case in airplanes near the walls.

**[0024]** In another embodiment the sidewall and the pallet comprise first and second fastening means in order to fasten the sidewall to the pallet, which improves the stability of the sidewall against side impacts. Furthermore, the first and second fastening means may support the collapse process of the container when moving the sides of the sidewall towards the pallet in order to achieve a stable collapsed container with a lowered risk of damaging the collapsed container during transport.

**[0025]** In another embodiment one of the sides of the sidewall is arranged as a door, preferably as a double wing door. The presence of a door enables a fast an easy loading process of the container. If an extendable wall element is arranged at the side arranged as a double wing door, the extendable wall element has to be arranged as a double wing door also. In case of a side arranged as a simple door (single wing door with the complete side as the single wing), the side with the extendable wall element mounted to the non-moving part could be applied without any modification compared to sides not arranged as a door. As an example the side of the sidewall arranged as a door may be the fourth side connected to the vertical edge of the first side and/or third side facing towards the fourth side via at least one opening means. When the container should be loaded the door will be opened along the vertical edge of one side, first side or third side, in case of a single wing door. In case of a double wing door, both wings will be opened along the vertical edges of the first and third side to provide easy access to the whole loadable volume of the container. A fixation of objects loaded above the sidewall, where no extendable well element might be present, can be obtained by appropriate means such as nets, wrapping etc.

**[0026]** The opening angle provided by the opening means allows different handling procedures. In another embodiment the opening means are suitable to provide an opening angle of the door (or double wing door) of at least 90°, preferably 180°, more preferred 270°. At least 90° are required to enable direct loading of the whole loadable volume of the container. Several container placed beside each other can be loaded simultaneously. An opening angle of the door of 180° enables to load objects into the container also from loading directions not parallel to the first and third sides of the sidewall. The loading can be executed more variable, but containers cannot be placed side by side for simultaneous loading. An opening angle of 270° prevents damaging of the door (or both door wings in case of a double wing door) during loading. Here, several containers placed beside each other with previously opened doors can be loaded simultaneously but the doors cannot be closed directly after loading. Hinge, flexible joint, angle, clip, or flap or combinations thereof are suitable examples of opening means. People skilled in the art may also consider other opening means.

**[0027]** The invention further relates to a pallet to be used in a container as claimed in our present invention comprising a sidewall, where the pallet comprises first fastening means suitable to fasten the sidewall to the pallet according to the present invention because the pallet can be commercialized independently from the container.

**[0028]** This invention further relates to a side to be used

in a container as claimed in our present invention comprising a non-moving side and an extendable wall element suitable to be telescoped because this side can be commercialized independently from the container. In an embodiment the side further comprises a guiding part, preferably a groove, within the non-moving side and a telescoping part, preferably a slider, mounted to the extendable wall element in order to telescope the extendable wall element along the guiding part. In a preferred embodiment the non-moving side is a double-sided side with a cavity in between, where the extendable wall element is arranged in the cavity in order to be telescoped.

**[0029]** More details of the invention are shown in the following figures and the detailed description of embodiments.

**Brief description of the drawings**

**[0030]**

Fig.1: front view of a side according to the present invention comprising a non-moving side and an extendable wall element.

Fig.2: perspective view of the side as a double-sided side

Fig.3: container according to the present invention with two of the sides as shown in fig.1.

Fig.4: container according to the present invention with two telescope elements to telescope the extendable wall elements.

Fig.5: container according to the present invention with four posts as the telescope elements arranged at the four corners of the sidewall with two separate extendable wall elements attached thereto.

Fig.6: side views of second side (a), first side (b) and third side (c) with a double wing door as the fourth side, and a top view of the pallet (d).

Fig.7: forklift stacking two containers according to the present invention

Fig.8: container according to the present invention with cover on top of the sidewall.

Fig.9: partly collapsed container and stacked fully collapsed containers.

**Detailed description of the embodiments**

**[0031]** Fig.1 shows an example of a side 31, 32, 33, 34 according to the present invention comprising an extendable wall element 51, 52 and a non-moving side 311, 321, 331, 341 defining the height of the side in a non-telescoped position of the extendable wall element 51, 52 (and subsequently the height of the closed sidewall after attaching the sides together). As an example, a telescope element 4 is present at the side 31, 32, 33, 34 to telescope the extendable wall element 51, 52 in the moving direction 50 (upwards / downwards). In this example, the telescope element 4 comprises a guiding part 41 arranged as a groove and a telescoping part 42 arranged as a slider. People skilled in the art may choose other telescoping and guiding parts within the scope of this invention to be used in the side as shown in figure 1. The slider 42 is mounted to the extendable wall element 51, 52. Moving the slider 42 along the guiding part 41 in the moving direction 40, the mounted extendable wall element 51, 52 is telescoped along the moving direction 50. Preferably, the slider is mounted removable to the extendable wall element in order to be able to replace the extendable wall element 51, 52 separate from the non-moving side 311, 321, 331, 341. It is also preferred to use a groove assembly, which comprises a part building the groove made out of a rigid material, e.g. metal or hard plastics, in order to show less abrasion during slider movement compared to softer materials, e.g cardboard, and groove assembly means to attach the groove assembly to the non-moving side as shown in figure 1.

**[0032]** Fig.2 shows the side corresponding to figure 1 as a double-sided side 31, 32, 33, 34 with the extendable wall element 51, 52 arranged in a double sided non-moving side 311, 321, 331, 341. The double sided side protects the extendable wall element 51, 52 arranged in a cavity 43 inside the double-sided side from outer effects such as loaded objects placed on top of the pallet in contact to the inner side of the side 31, 32, 33, 34 or slippage of objects during transport of the container in a telescoped position, where the movement of the extendable wall element downwards may be blocked by these objects. A telescope element according to figure 1 may be additionally present in a side according to figure 2.

**[0033]** Fig.3 shows a container 1 according to the present invention in a perspective view with two opposite located sides 31, 33 according to the side as shown in figure 1. The pallet 2 is shown as a black bottom. The sidewall 31, 32, 33, 34 is placed onto the pallet 2 forming a closed sidewall with a sidewall height defined by the heights of the non-moving sides 311, 321, 331, 341 in a non-telescoped position. For a better view, the details of the fourth side 34 are shown separately below the container. The arrow indicates, that the fourth side 34 is located on the pallet between first side 31 and third side 33 as part of the sidewall. The sidewall 31, 32, 33, 34 of fig.1 may comprise openings to lower the weight of the sidewall (not shown here). The first and second connection means of the sidewall are not shown is this figure. The first sides 31 comprises a first extendable wall elements 51 and the third side 33 comprises a second extendable wall element 52 in order to provide an increasable loadable volume of the container. Alternatively also the second and/or fourth sides 32, 34 may comprise extendable wall elements. The telescope elements 4 each comprise a guiding part 41 and a telescoping part 42 (only shown on third side 33). In fig.3, the extendable wall elements 51, 52 are partly telescoped along the slider moving direction 40 to increase the height of the sidewall along the moving direction 50 to a total height 36 as the sum of the height of the non-moving sides 311, 331

and the telescoped height of the extendable wall elements 51, 52.

**[0034]** The fourth side 34 in fig.3 can be attached and detached from the first side 31 and second side 33 in order to open the container 1 to load the container with objects. If detached, the fourth side 34 may be taken away from the pallet 2 using the fourth side holders 342. The position and shape of the holders 342 is only an example. People skilled in the art may consider other means, arrangements and shapes to remove the fourth side 34 from the remaining sidewall 31, 32, 33 and pallet 2.

**[0035]** The size of pallet 2 and sidewall 31, 32, 33, 34 can be customized and may have any desired length, depth and height. However, containers (pallet + sidewall) adapted to available storage spaces in trucks, trailers, trains, ships and air planes are advantageous, because the effective use of the available space to transport objects decreases the transportation costs and time.

**[0036]** Fig.4 shows another container 1 according to the present invention in a perspective view with posts as the telescope elements 4. The pallet 2 is shown as a black bottom. The sidewall 31, 32, 33, 34 is placed onto the pallet 2 forming a closed sidewall with a sidewall height defined by the heights of the non-moving sides 311, 321, 331 in a non-telescoped position. For a better view, the details of the fourth side 34 are shown separately below the container. The arrow indicates, that the fourth side 34 is located on the pallet between first side 31 and third side 33 as part of the sidewall. The sidewall 31, 32, 33, 34 of fig.1 may comprise openings to lower the weight of the sidewall (not shown here). The first and second connection means of the sidewall and the posts are not shown is this figure. The shown container comprises two posts 4, where three extendable wall elements 53, 54, 55 (one on each side) form an u-shaped extendable sidewall 5 mounted with a minimum distance between sidewall 31, 32, 33 and extendable sidewall 5 in order to provide an as large as possible loadable volume of the container. The extendable sidewall 5 has no side at the fourth side 34 of the sidewall 31, 32, 33, 34 in order to keep the container loadable in a non-telescoped position. The posts 4 each comprise a guiding part 41 and a telescoping part 42 with an extendable sidewall 5 mounted to the telescoping part 42. In this figure the telescope parts 42 are partly lifted outside the guiding parts 41. In fig.4, the extendable sidewall 5 is partly telescoped to increase the height of the sidewall to a total height 36 of the sum of the height of the non-moving sides 311, 321, 331 and the telescoped height of the extendable sidewall 5

**[0037]** The fourth side 34 in fig.4 can be attached and detached from the first side 31 and second side 33 in order to open the container 1 to load the container with objects. If detached, the fourth side 34 may be taken away from the pallet 2 using the fourth side holders 342. The position and shape of the holders 342 is only an example. People skilled in the art may consider other means, arrangements and shapes to remove the fourth side 34 from the remaining sidewall 31, 32, 33 and pallet 2. The fourth side 34 may be arranged as the side shown in figure 1.

**[0038]** The size of pallet 2 and sidewall 31, 32, 33, 34 can be customized and may have any desired length, depth and height. However, containers (pallet + sidewall) adapted to available storage spaces in trucks, trailers, trains, ships and air planes are advantageous, because the effective use of the available space to transport objects decreases the transportation costs and time.

**[0039]** Alternatively the container according to the present invention may comprise three telescope elements 4 with a third additional telescope element 4 is arranged at the middle of the second side 32 of the sidewall compared to figure 1. The third telescope element 4 can either guide the same extendable sidewall 5 as shown in figure 4 or may guide the extendable wall element of the second side 32 connected to the extendable wall elements of first and third side 31, 33 to form an closed extendable sidewall 5 between the first and the second telescope elements 4 as posts arranged according to fig. 4. The resulting extendable sidewall corresponds to the extendable sidewall 5 as shown in figure 4.

**[0040]** Fig. 5 shows another embodiment of the container according to the present invention, where the container comprises four posts as the telescope elements 4. One extendable wall element 53 is mounted to the telescoping parts 42 of two posts 4 arranged at the both corners of the first side 31 of the sidewall. The second extendable wall element telescope sidewall 54 is mounted to the telescoping parts 42 of two posts 4 arranged at the both corners of the third side 33 of the sidewall. Preferably both extendable wall elements are movable (to be lifted) separate from each other in order to provide a container with the best variability to adapt the container volume to the loaded objects and/or available transportation space.

**[0041]** In all embodiments of the container there may be additional packaging means to secure loaded objects within the container, e.g a net or a wrapping around the objects, preferably around the objects exceeding the height of the non-moving sides of the sidewall. The sidewall 31, 32, 33, 34 has an open base to minimize the required parts to build a closed sidewall. Additionally a base is not required because the pallet 2 form the base of the container 1. The figures 1 - 5 do not show the fixation means to fix either the extendable wall element or the telescoping part in a certain telescoped position. In an embodiment the fixation means fix the extendable wall element in a telescoped position directly to the non-moving side. In an alternative embodiment the fixation means fix the telescoping part 42 to the guiding part 41.There may be one or more fixation means on a extendable wall element and/or telescope element. People skilled in the art are able to select appropriate fixation means within the scope of this invention. For example, a simple fixation meansis a vertical sequence of holes

present in the non-moving side and/or guiding part of the telescope element and one or more holes vertically aligned in the extendable wall element and/or telescoping part of the telescope element, preferably with a different distance to the distance between the holes in the extendable wall element and/or telescoping part sequences. The extendable wall element and/or the telescoping part can be fixed to the non-moving side and/or the guiding part by putting a splint, bolt, pin etc through the holes brought in coincidence with the lifted extendable wall element and/or telescoping part. Skilled people may modify this example to achieve other fixation means within the scope of this invention.

**[0042]** The container 1 comprises a pallet 2, a sidewall with a first side 31, a second side 32, a third side 33 and a fourth side 34, which can be a door or a double wing door with two door wings 350 as shown in Fig. 6. Here the parts of the container 1 are shown separate from each as side views for (a) the second side 32, (b) the first side 31, (c) the third side 33 and (d) a top view of the pallet 2. Here, the fourth side 34 is a double wing door, where a first wing 350 of the door is attached to the first side 31 via opening means 6 to hold and open the first wing 350. Correspondingly, a second wing 350 of the double wing door is attached to the third side 33 via opening means 6 to hold and open the door. The opening means can be identical for both first and second wings 350 or may be different depending on the desired opening characteristics. People skilled in the art will select the appropriate opening means for the desired opening characteristics. As an example, the wings 350 are shown in figure 6 in two different positions, with an opening angle of 90° and another opening angle of 270°. The minimum opening angle required to be able to load the complete loadable volume directly is 90°. The maximum opening angle is 270°, when the door wing(s) contact the outside surface of the first and/or the third side. The opening means may provide any maximum opening angle between 90° and 270°. In an alternative embodiment with a single wing door as the fourth side 34, the previously discussed features and limitations are valid also. The opening means 6 may enable the door wings turned to the inside surface of the first and/or third side. The opening angle of 90° to the inside of the container should not be used for loading the container, because the door wings cannot be closed after loading, but this opening angle might be important to collapsed the sidewall of the container, where the door wings are still fixed to the first and/or third side via the opening means 6. Both wings 350 of the double wing door as the fourth side 34 comprise door locking means 360. The door locking means 360 will further secure the loaded objects within the container from getting lost during transport, because a locked door cannot be opened accidentally. People skilled in the art will chose appropriate closing means in order to lock the door safety. In alternative embodiments there are 2, 3 4 or more door locking means on each door or door wing.

**[0043]** The first connection means to connect the parts of the sidewall, the first side 31, the second side 32, the third side 33, the fourth side 34 or the door 350, together in order to build a closed sidewall enclosing the loaded objects of the container are not shown in details in fig.6. People skilled in the art will chose any appropriate first connection means to connect said parts. The sides of the sidewall may be alternatively connected to the at least two telescope elements via second connection means. Having telescope elements present in each corner of the sidewall, the sidewall may be solely closed by connecting the sides of the sidewall via the second connecting means to the telescope elements. The sides of the sidewall are therefore connected to each other via the second connections means and the corresponding telescope elements. In alternative embodiments there may be combinations of first and second connection means to close the sidewall. Examples of appropriate first and second connection means are clips, flaps, pins, bolts anchors, clamps, clips, mounting links and hooks. The number and position of the connecting means on the parts of the sidewall may be chosen by skilled people depending on size, maximum load, material etc. of sidewalls and pallets. In a further alternative embodiment there may be combinations of first and second connection means fitting to each other in order to close the sidewall.

**[0044]** The square shape of the pallet 2 is only one example of any possible shapes. However, a square shape with adapted sizes may be advantageous for certain available storage spaces in transporting vehicles such as trucks, trailers, trains, ships, air planes etc. The pallet 2 comprises first fastening means 21 arranged at three sides of the pallet in order to fit into the corresponding second fastening means 35 of the sides 31, 32 ,33 in order to fasten the sidewall on the pallet 2.

**[0045]** The pallet shown in figure 6 has no first fastening means at the fourth side, because the fourth side is arranged as a double wing door in this example. Fastening means at the fourth side would hamper opening of the door. Additional, fastening means at the fourth side in case of the fourth side as a door are not required, because the door 350 is fastened to the pallet 2 via the opening means 4 fastening the door 350 to the first and third side 31, 33 and via the fastening means 35 of first and third side 31 and 33 to the pallet 2. In this example the first fastening means 21 are rectangular protrusions such as ledges, edges, lugs etc.

**[0046]** The sidewall has corresponding recesses or notches as second fastening means 35 fitting onto the first fastening means. During collapsing the container, the first side 31 and the third side 33 can be turned towards the upper side 23 of the pallet 2 by turning these sides around the first fastening means 21 onto the pallet 2. After collapsing the first and third sides 31 and 33, the fastening means 21, 35 are still in fitting contact, if protrusion and recess are of appropriate height.

**[0047]** The collapsing procedure may be further supported by additional bolts, pins etc. improving the fasten-

ing of first and second fastening means while simultaneously maintain the rotatability of the first and third side along the first fastening means. Examples of appropriate first and second fastening means are hinges, clips, flaps, pins, bolts, clamps, clips, mounting links, angle, hooks, local ledges, local edges or combinations thereof. People skilled in the art might chose alternative fastening means within the scope of this invention.

**[0048]** In some embodiments the pallet further comprises carrier means 22, preferably at any position, where a telescope element is placed in order to carry, preferably to fasten, said telescope element to the pallet. In the shown embodiment, there are four carrier means for four telescope elements, e.g. posts.

**[0049]** The openings 9 shown in fig.6 are only one possible example to design the sidewall. Sidewalls according to the present invention may have different numbers of openings, openings with different shape or no openings.

**[0050]** The second side 32 further comprises a foldable line 322 in order to move the second side 32 towards the upper side of the pallet 23 as the last step of the collapsing procedure for the container. A second side with such foldable line 322 can be kept fastened to the pallet also in the collapsed status of the container. Therefore second sides 32 with foldable lines 322 may have different second fastening means 35 to fit into the first fastening means 21 of the pallet at the side corresponding to the second site of the sidewall. In alternative embodiments the first fastening means 21 of the pallet at this side could be different to the first fastening means at the sides of the pallet corresponding to the first and third sides of the sidewall.

**[0051]** Fig.7 shows two stacked containers 1, where the second container is stacked on top of the first container with a forklift 7. The pallet 2 as part of the container 1 enables handling of the containers by forklifts 7, which saves time and therefore costs in case of large and/or heavy weight containers.

**[0052]** The resilience of the sidewall is established by the extendable wall elements and/or the telescope elements. Pallet and loadable volume define a maximum load weight. The material of the sidewall, the extendable wall element and/or the telescope elements as well as their cross section, their thickness and their diameter has to be adapted to this maximum load weight in order to be stackable.

**[0053]** One further example to improve the resilience of the container is shown in fig.8. Here the container 1 comprises an additional cover 10 placed on top of the sidewall 31, 32, 33, 34. In this example, the container comprises no openings 9. The cover is shaped to conform with the loadable volume defined by the sidewall and in case of a telescoped position defined by the extendable wall elements. The cover may comprise a cover top and covers sides, the cover being adapted to be removable and to locate on an outer surface of the sidewall and/or the extendable wall elements in the manner of a snug fit. The removability of the cover is required in order to maintain the possibility to collapse the container in case of no loaded object in order to save back-transportation space. If the cover is not removed during the loading process, the lay-out of the cover must not affect the opening mechanism of the fourth side, especially in case of doors or double wing doors. For example, suitable covers might have no cover side at the fourth side of the container, or a smaller cover side not blocking the opening of the door.

**[0054]** To collapse the container, the first and/or second connection means of the sidewall have to be opened. In one embodiment, all first and second connection means are opened first before starting to collapse the container. In an alternative embodiment, only the connection means of the part of the sidewall to be collapsed are opened. In another embodiment, only the connection means required to detach the sides of the sidewall are opened while eventually attached telescope elements are still connected to the side in order to be collapsed with the corresponding side. In case of an extendable sidewall comprising more than one extendable wall elements covering more than one side of a sidewall, the extendable sidewall may be folded or its extendable wall elements are detached to order to be collapsed. The detached sides of the sidewall will be collapsed and the next first and/or second connection means of the next part of the sidewall are opened in order to be able to collapse the next part of the sidewall and so on.

**[0055]** Fig.9 shows a partly collapsed container 1 (left side) and a stack of 4 fully collapsed containers 1 (right side). As one possible example of collapsing procedures, the first side 31 connected to a wing 350 of the double wing door is placed on top of the upper side of the pallet 2 with the wing 350 turned to 270° to the outer side of the first side 31 (first side and door are into contact). To fit to the first side with door, the third side 33 and the other wing 350 of the double wing door are detached from the pallet and are turned around and the other wing is turned to 90° to the inner side of the third side 31 (third side and door are into contact). Here the term "inner side" denotes the surface of the sidewall, which is the inner side of the container. Correspondingly, the term "outer side" denotes the surface of the sidewall, which is the outer side of the container.

**[0056]** The sequence may be altered and the above described procedure can be executed in an inverted manner resulting in an equivalent status of the partly collapsed container. As the last step of collapsing the container, the second side may be folded along the foldable line 322 towards the previously collapsed first and third sides 31, 33 with attached door 350. The foldable line 322 has to be a minimum distance from the lower edge of the second side 32 of the cumulative thickness of the three other sides of the sidewall and the diameter of at least one telescope element, in some embodiments the diameter of two telescope elements. In this embodiment, the second fastening means 35 of the second side 32 are kept fastened to the first fastening means 21 of the pallet 2 of its side corresponding to the second side of

the sidewall.

**[0057]** Alternatively, a second side 32 without a foldable line 322 might be detached from the pallet 2 and placed on top of the previously collapsed first and second sides with attached door.

**[0058]** In case of a fourth side 34 not arranged as a door 350, the fourth side 34 may replace the layer of both door wings 350 as shown in fig.7. Alternatively, the fourth side 34 may be placed on top of the collapsed first and third sides. However, all previously disclosed collapsing methods lead to a dense package of the collapsed sidewall. This is advantageous in case of stacked transport of collapsed containers, because the weight of collapsed containers will not damage the collapsed containers below, if the collapsed sidewalls are in a dense package at least similar to the package shown in fig.9.

**[0059]** The shown embodiments must not be considered as limitation of the invention. The discussed embodiments are only examples of the present invention. People skilled in the art may consider alternative embodiments of the previously disclosed invention still falling into the scope of this invention.

**List of reference signs**

**[0060]**

| | |
|---|---|
| 1 | container according to the present invention |
| 2 | pallet |
| 21 | first fastening means |
| 22 | carrier means |
| 23 | upper side of the pallet |
| 31 | first side of the sidewall |
| 32 | second side of the sidewall |
| 322 | foldable line of the second side |
| 33 | third side of the sidewall |
| 34 | fourth side of the sidewall |
| 35 | second fastening means of the sides of the sidewall |
| 36 | total height of the sidewall in a telescoped position |
| 311 | non-moving side of the first side |
| 321 | non-moving side of the second side |
| 331 | non-moving side of the third side |
| 341 | non-moving side of the fourth side |
| 342 | front side holders |
| 350 | wings of a double wing door as part of the front side |
| 360 | clocking means |
| 4 | telescope element |
| 40 | moving direction of the telescope element |
| 41 | guiding part of the telescope element |
| 42 | telescoping part of the telescope element |
| 5 | extendable sidewall comprising at least two extendable wall elements |
| 50 | moving direction of the extendable wall element |
| 51,53 | first extendable wall element |
| 52,54 | second extendable wall element |
| 55 | third extendable wall element |
| 6 | opening means |
| 7 | forklift |
| 9 | opening (within the sidewall) |
| 10 | cover (for the sidewall) |

**Claims**

1. A container (1) loadable with at least one object comprising a pallet (2) with on top of the pallet (2), wherein the sidewall comprises at least a first side (31), a second side (32), a third side (33) and a fourth side (34) suitable to be collapsed, wherein at least two sides each comprise a non-moving side (311, 321, 331, 341) and an extendable wall element (51, 52, 53, 54), preferably mounted to the non-moving side, suitable to be telescoped.

2. The container (1) according to claim 1, **characterized in that** at least two of the sides of the sidewall (31, 32, 33, 34), preferably all sides of the sidewall, comprise first connection means suitable to close the sidewall (31, 32, 33, 34, 350) or suitable to detach the sides (31, 32, 33, 34) from each other to collapse the sidewall (31, 32, 33, 34, 350) onto the upper side of the pallet

3. The container according to claim 1 or 2, **characterized in that** the at least two sides each comprise at least one telescope element (4) comprising a telescoping part (42) to telescope the extendable wall element (51, 52, 53, 54) relative to the non-moving side (311, 321, 331, 341) and a guiding part (41) to guide the telescoping part (42).

4. The container according to claim 3, **characterized in that** the guiding part (41) is a groove within the non-moving side (311, 321, 331, 341) and the telescoping part (42) is a slider mounted to the extendable wall element (51, 52) in order to telescope the extendable wall element (51, 52) along the groove (41).

5. The container according to any preceding claim, **characterized in that** the non-moving side (331, 321, 331, 341) is a double-sided side with a cavity (43) in between, where the extendable wall element (51, 52) is arranged in the cavity (43) in order to be telescoped.

6. The container according to claim 3, **characterized in that** the telescope element (4) is a post, preferably with a flat top, arranged on top of the upper side of the pallet (23) with the telescoping part (42) fitting into or onto the guiding part (41).

7. The container (1) according to claim 6, **character-**

**ized in that** the sidewall (31, 32, 33, 34, 350) comprises corners with one post (4) arranged in each corner of the sidewall (31, 32, 33, 34, 350).

**8.** The container (1) according to claim 6 or 7, **characterized in that** at least two of the sides (31, 32, 33, 34, 350) each comprise two posts (4) with a first and a second extendable wall element (53, 54) arranged between the two posts (4) on each side.

**9.** The container (1) according to any of the preceding claims, **characterized in that** at least one of the extendable wall elements (51, 52, 53, 54) further comprises at least one fixation means in order to fix the extendable wall element (51, 52, 53, 54) in a telescoped position.

**10.** The container (1) according to claim 9, **characterized in that** the fixation means comprises pins, bolts, screws, windings, clamps, clips, lugs, splints or combinations thereof.

**11.** The container (1) according to any preceding claim, **characterized in that** each of the extendable walls elements (51, 52, 53, 54) are able to be telescoped independently from each other.

**12.** The container (1) according to any of the preceding claims, **characterized in that** the sidewall (31, 32, 33, 34, 350) and the pallet (2) comprise first and second fastening means in order to fasten the sidewall (31, 32, 33, 34, 350) to the pallet (2).

**13.** The container (1) according to any of the preceding claims, **characterized in that** one of the sides of the sidewall (31, 32, 33, 34) is arranged as a door (350), preferably as a double wing door (350).

**14.** A pallet (2) to be used in a container (1) as claimed in claim 1 comprising a sidewall, where the pallet (2) comprises first fastening means (22) suitable to fasten the sidewall to the pallet (2).

**15.** A side to be used in a container as claimed in claim 1 comprising a non-moving side (311, 321, 331, 341) and an extendable wall element (51, 52, 53, 54) suitable to be telescoped.

**16.** The side according to claim 15, **characterized** the side further comprises a guiding part (41), preferably a groove, within the non-moving side (311, 321, 331, 341) and a telescoping part (42), preferably a slider, mounted to the extendable wall element (51, 52) in order to telescope the extendable wall element (51, 52) along the guiding part (41).

**17.** The side according to claim 15 or 16, **characterized in that** the non-moving side (331, 321, 331, 341) is a double-sided side with a cavity (43) in between, where the extendable wall element (51, 52) is arranged in the cavity (43) in order to be telescoped.

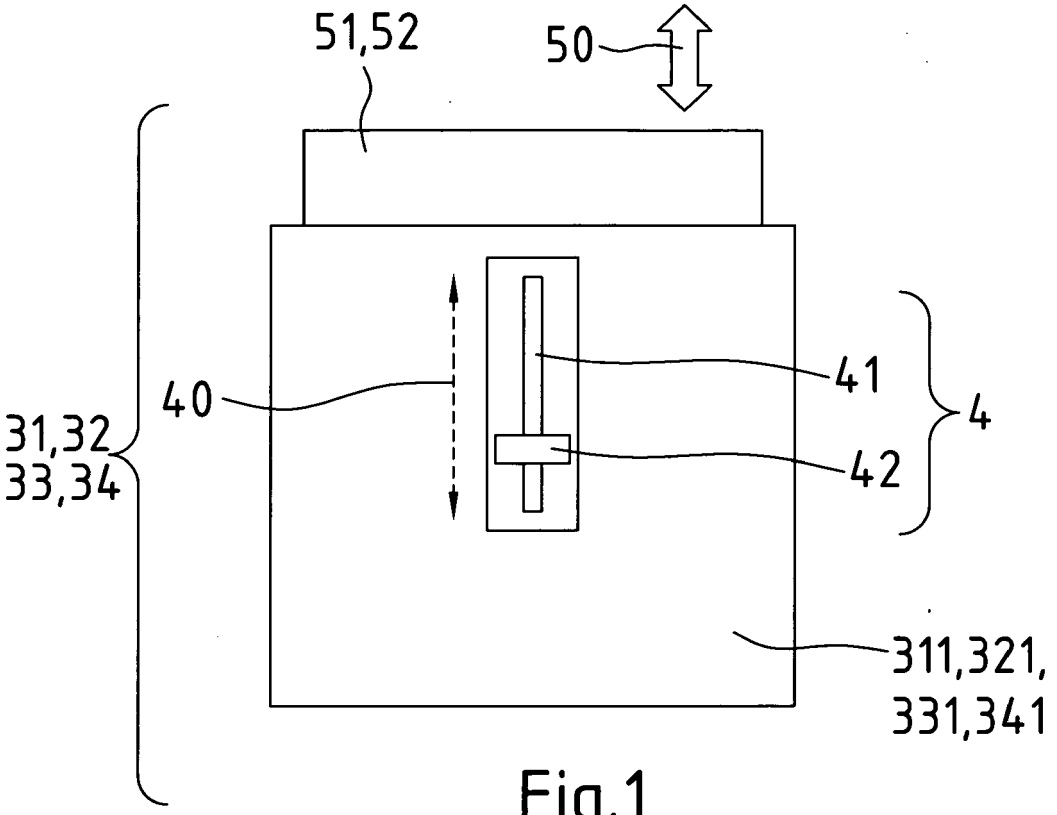

51,52
50
31,32
33,34
40
41
42
4
311,321,
331,341

Fig.1

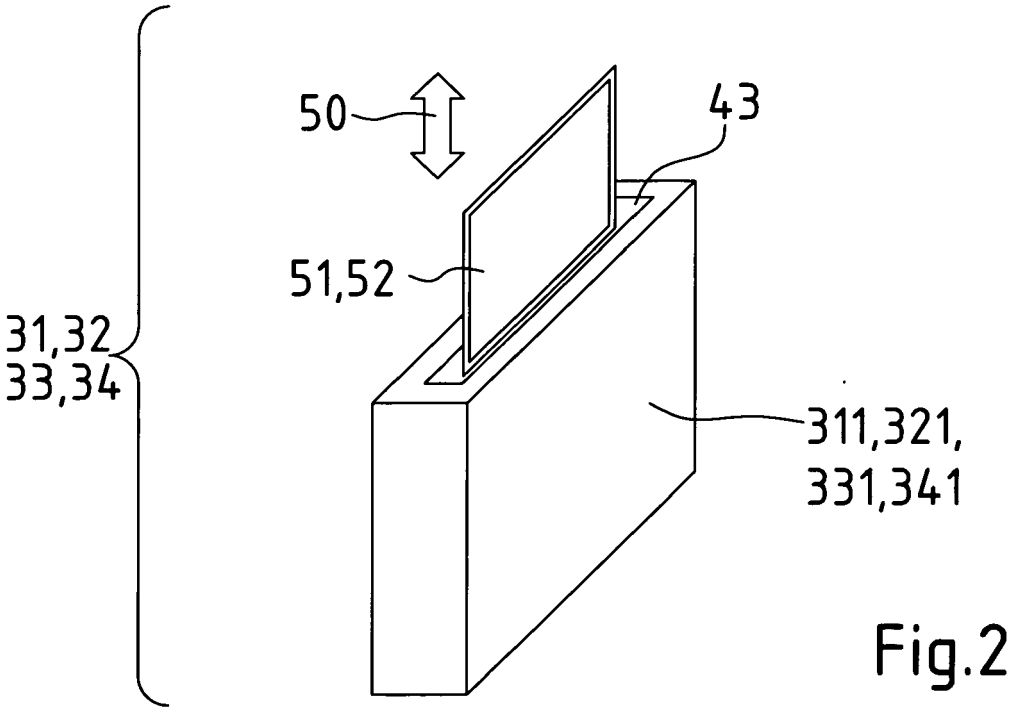
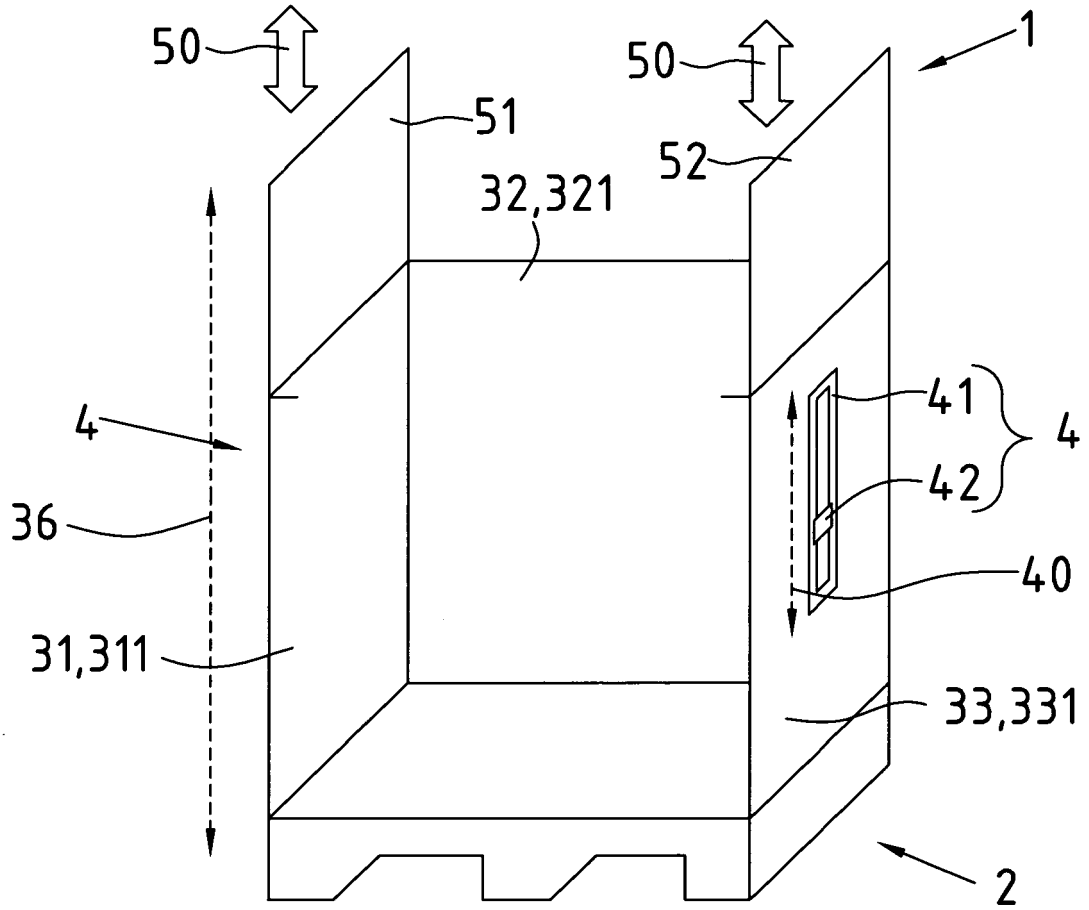

50
43
51,52
31,32
33,34
311,321,
331,341

Fig.2



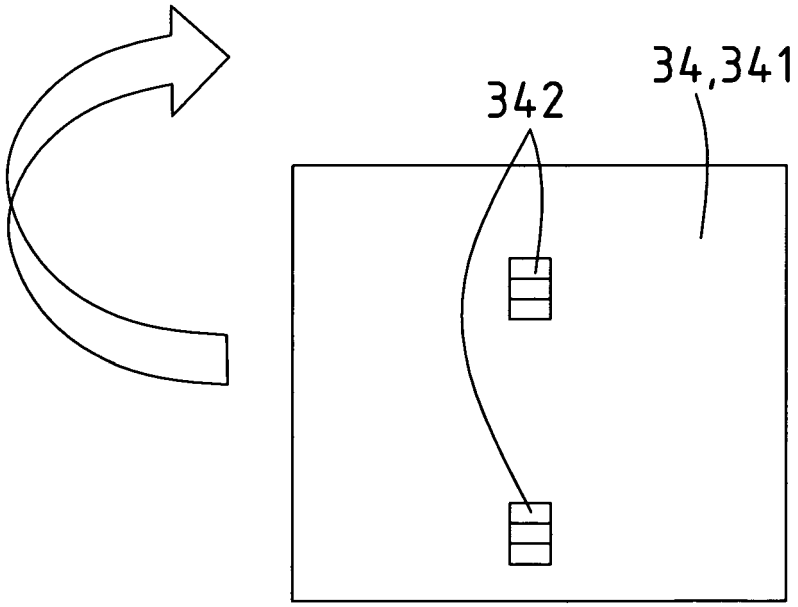




Fig.3

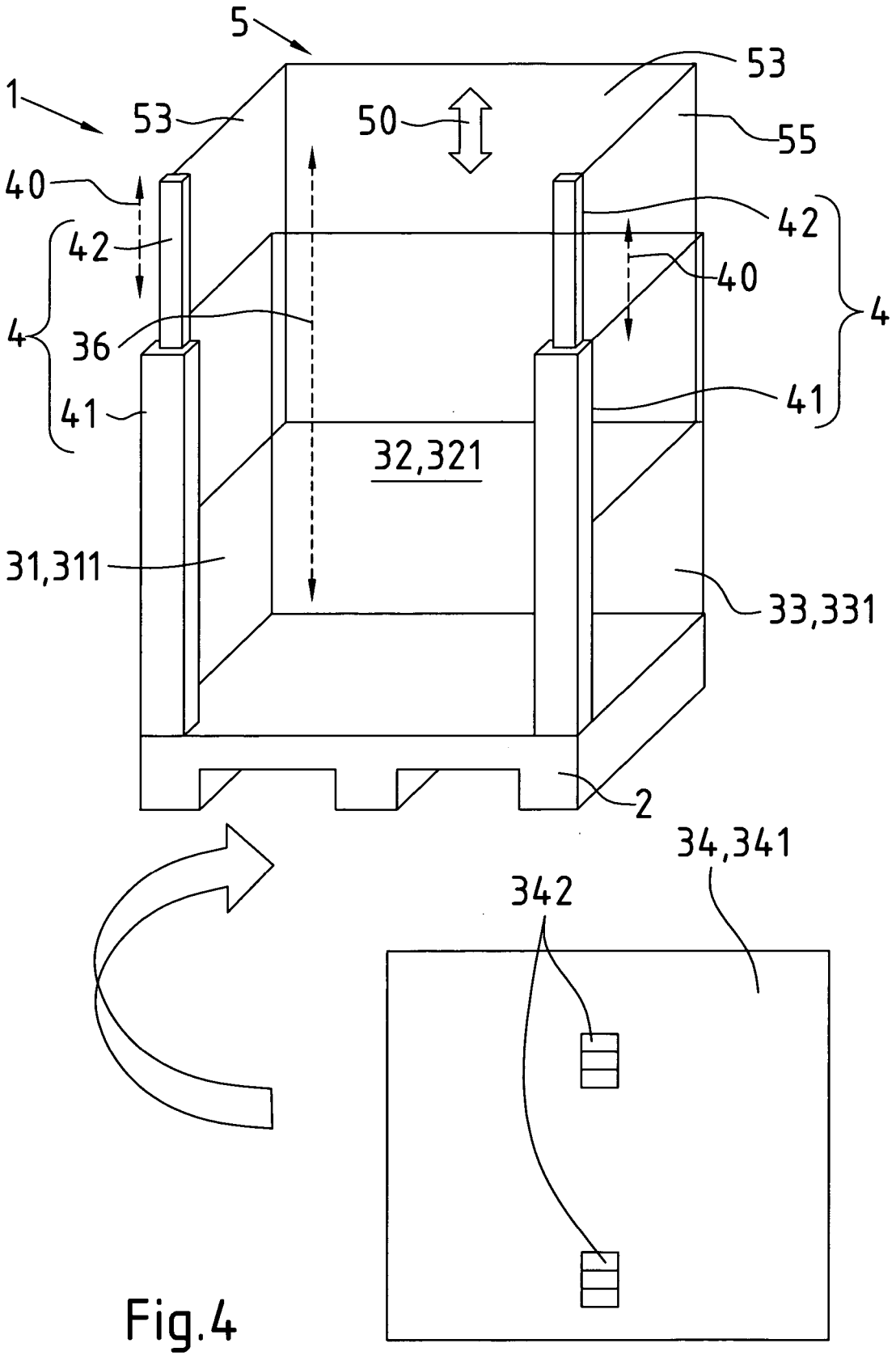
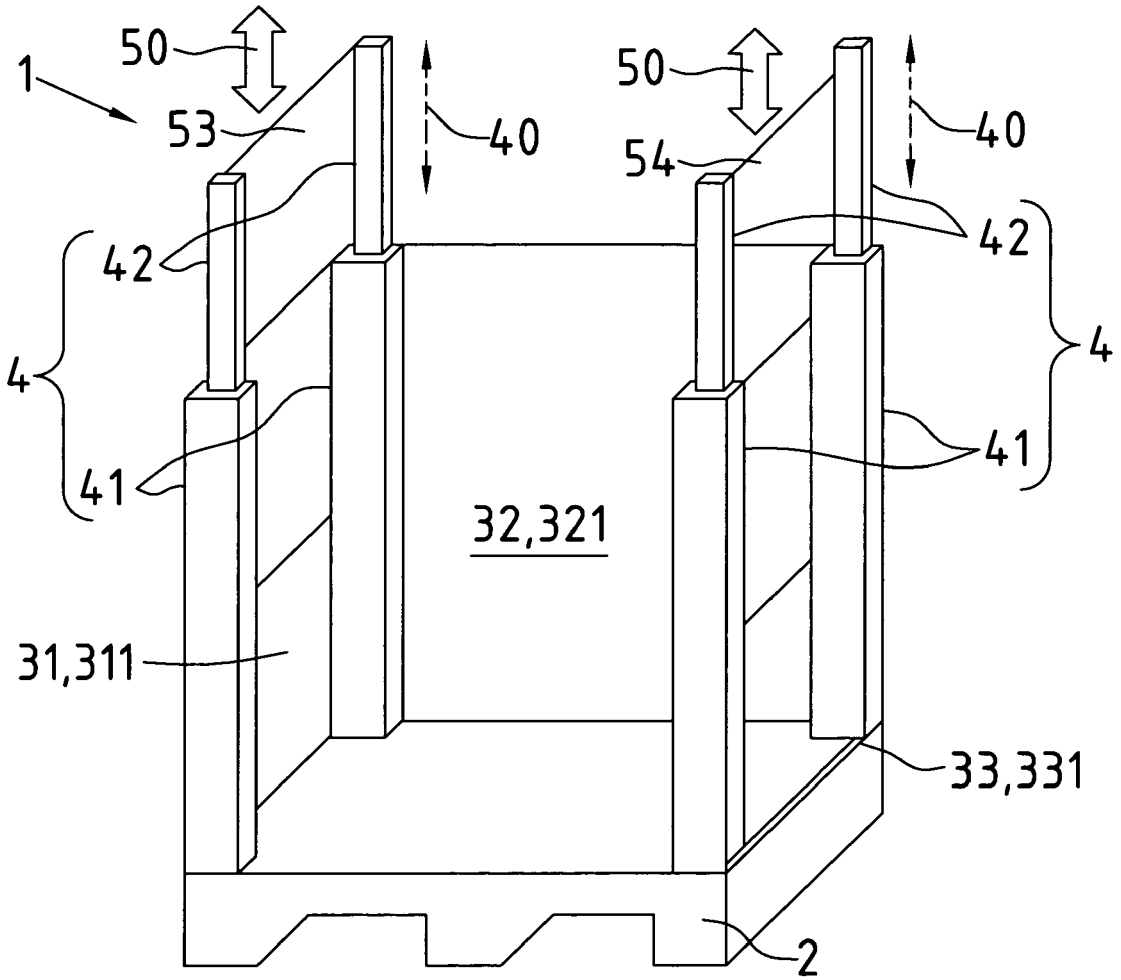

5
1
53
50
53
55
40
42
42
40
4
36
4
41
41
32,321
31,311
33,331
2
34,341
342

Fig.4



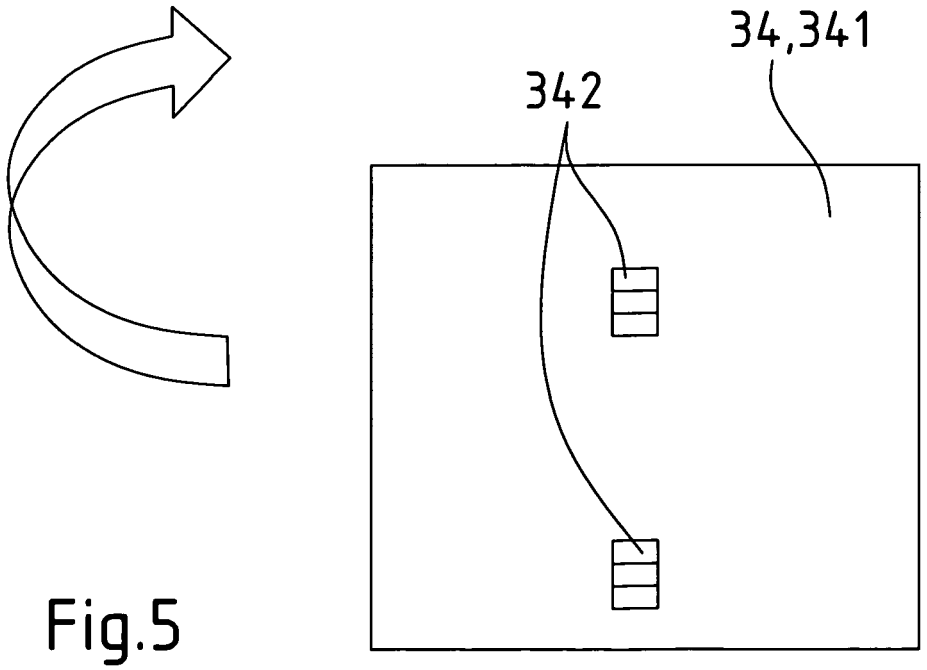




Fig.5

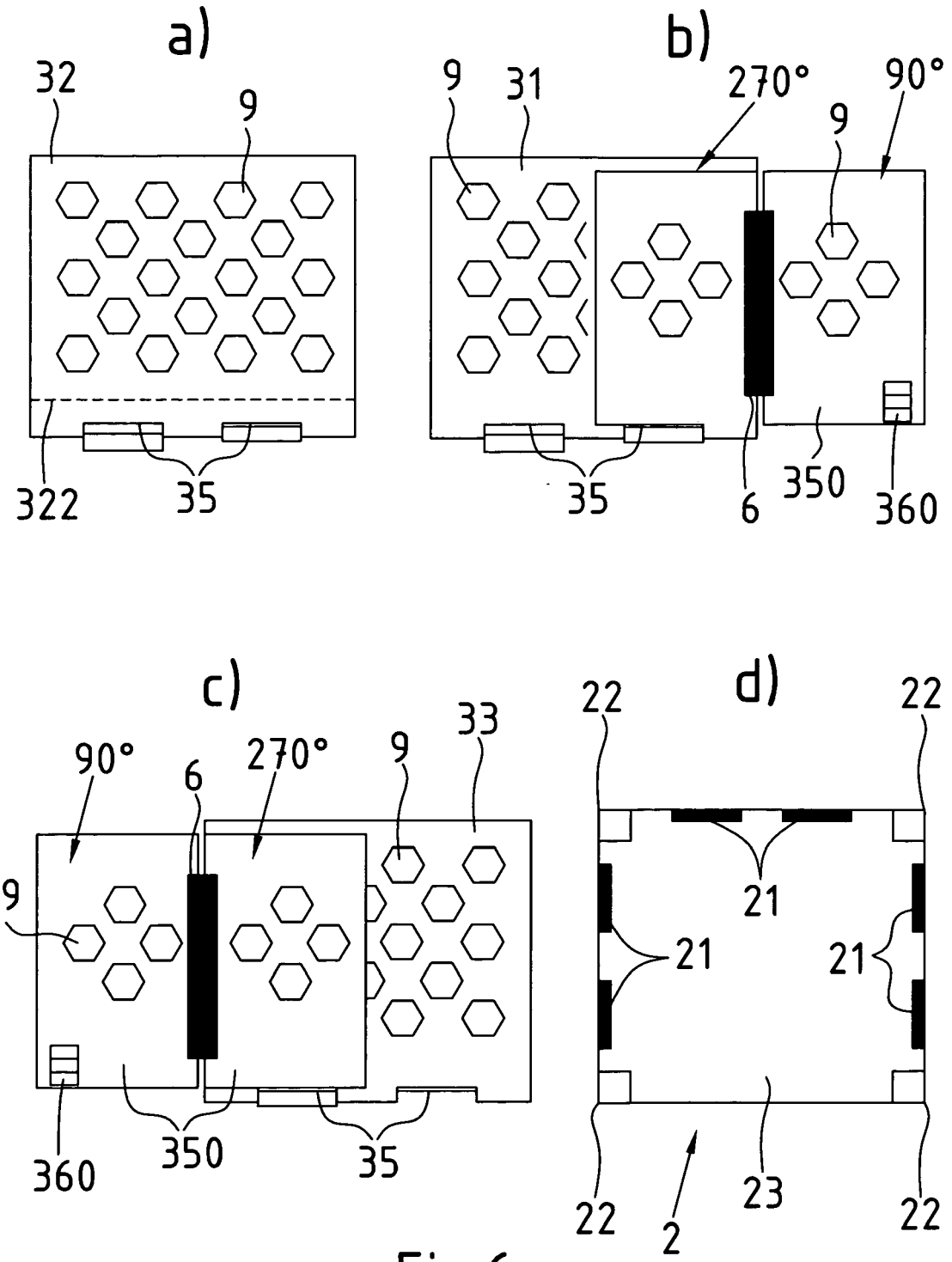

a)
32
9
322
35
b)
9
31
270°
90°
9
35
6
350
360
c)
90°
6
270°
9
33
9
360
350
35
d)
22
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22
22
23
2

Fig.6

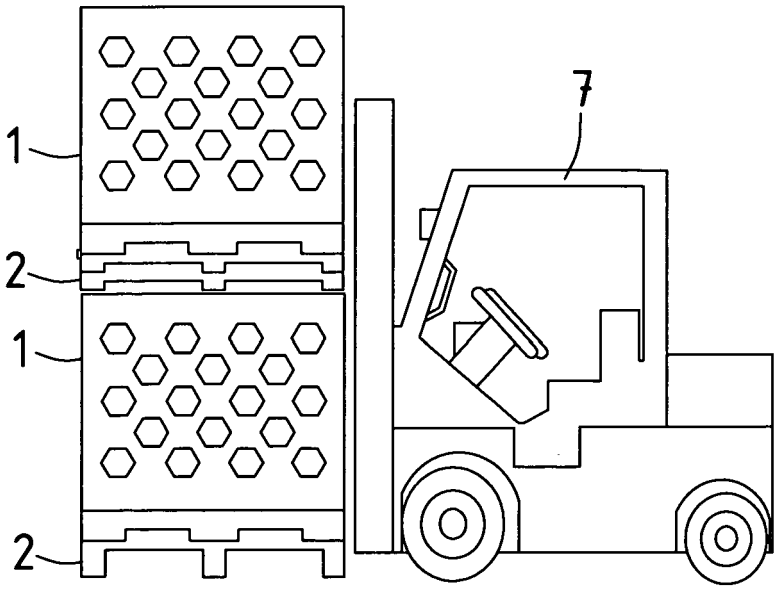



Fig.7

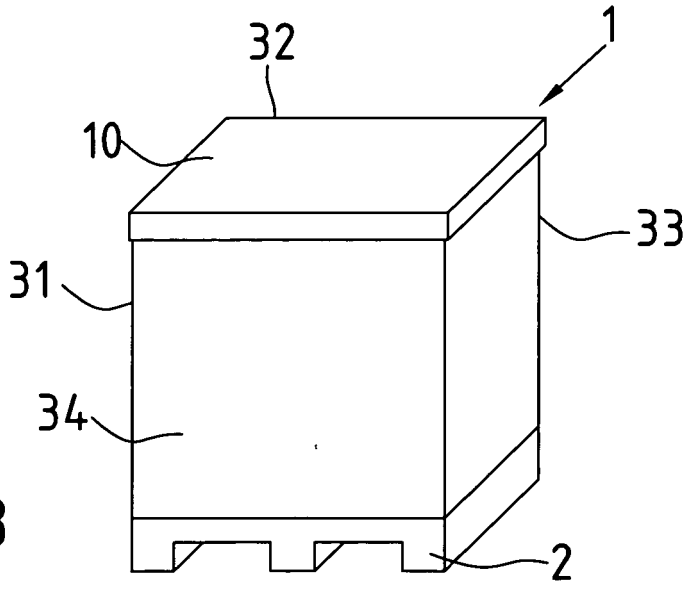



Fig.8

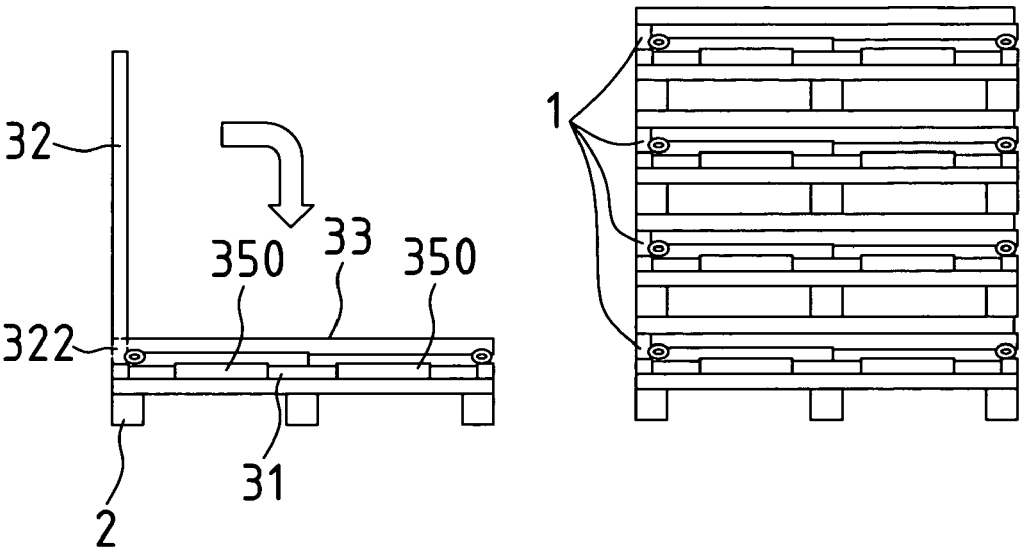



Fig.9

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# EUROPEAN SEARCH REPORT

Application Number
EP 08 02 2488

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
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| A | WO 2006/058946 A (ALAMAR GALAN ANTONIO [ES]; FORTEA ESPERT SERGIO [ES])<br>8 June 2006 (2006-06-08)<br>* the whole document * | 1 | |

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B65D

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 14 May 2009 | Vigilante, Marco |

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 02 2488

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14-05-2009

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