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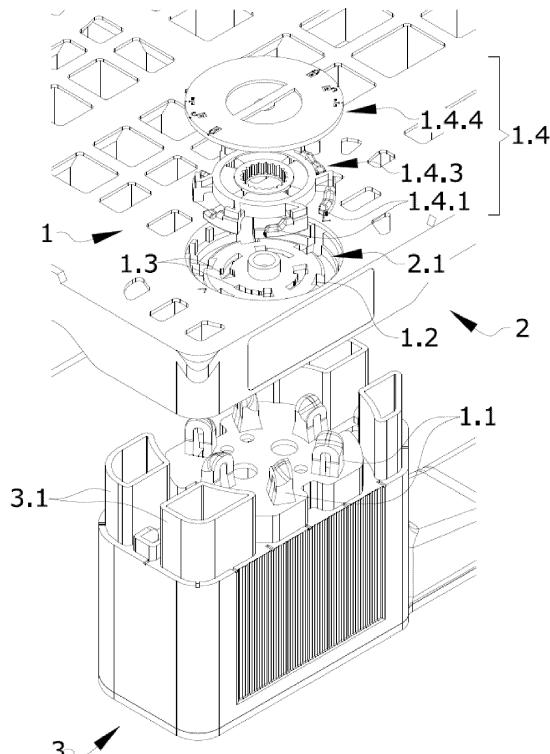
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### (54) CONNECTION SYSTEM FOR A REMOVABLE PLATFORM

(57) The present invention relates to a connection system (1) adapted for removably attaching a deck (2) to a support device (3) of a platform (4) for the storage and transport of goods. The connection system (1) facilitates the assembly and removal of the different elements

of the platform by means of mounts (1.1), pins (1.4.1), studs (1.4.2) and apertures (1.2, 1.3) arranged both in the deck itself and in the support device and operated by means of turning an actuation mechanism (1.4).



**FIG.1**

**Description****Object of the Invention**

**[0001]** The present invention relates to a connection system which facilitates the assembly and removal of the different elements of a platform for the storage and transport of goods, once said removable elements have been arranged to be attached to one another.

**[0002]** More specifically, the connection system is based on the joint cooperation of linkages, pins, and apertures arranged both in the deck itself and in the support device and operated by means of turning a mechanism.

**[0003]** Therefore, according to the direction of rotation whereby the mechanism is actuated, the connection system allows either assembling or removing at least one support device of the deck.

**Background of the Invention**

**[0004]** Returnable logistic circuits today use conventional platforms such as a pallet with skids, which are strong, robust, and durable as they are manufactured either as one-piece or in the form of attached deck and skids. Throughout the description, terms like "deck", "board" or "top deck" will be understood as equivalents.

**[0005]** In particular, in pallets formed by several elements said elements are susceptible to being substituted or replaced separately in order to repair only the damaged part of the product. As a result, pallets of this type are more sustainable and entail a considerable cost savings as it prevents having to replace the entire pallet in the event of damage, even when said damage is located exclusively in one of the elements.

**[0006]** However, the way of connecting the elements of these platforms is usually neither simple nor practical, as there are enormous difficulties in assembling the different elements of the platform and, particularly, in removing them.

**[0007]** Generally, both the assembly and the removal of the elements of the platform involve specific and complex tooling that tend to apply a large force on said elements; for example, lever systems, pneumatic or hydraulic presses, hand tools, or customized tools.

**[0008]** For this reason, during the process of repairing and substituting elements for example, particularly during the process of removing same, the elements are usually damaged and rendered useless. That is, a great deal of force is required for the removal, which causes them to be very brusque processes which in many cases cause considerable damage in the parts involved.

**[0009]** Likewise, besides the possible damage in the parts to be removed, another drawback associated with the assembly and removal of the elements of the platforms is the enormous physical effort required by the operator in charge of performing the task, so certain brusqueness is generally required.

**[0010]** The present invention solves the problems

mentioned above by means of a connection system which facilitates the assembly and removal of a platform for the storage and transport of goods, said platform being formed by a deck attached to several skids.

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**Description of the Invention**

**[0011]** The present invention proposes a solution to the aforementioned problems by means of a connection system adapted for removably attaching a deck to a support device according to claim 1, a support device according to claim 12, a deck according to claim 14, a platform for the storage and transport of goods according to claim 15, and a method for attaching a support device and a deck according to claim 16.

**[0012]** A first inventive aspect provides a *connection system adapted for removably attaching a deck to a support device of a deck, the connection system comprising:*

- 20 - *a plurality of mounts arranged in a radial manner on the face of the support device configured for contacting with the deck;*
- *a first set of apertures spaced in a circular manner and configured for receiving the plurality of mounts of the support device, and a second set of elongate apertures spaced in a circular manner and arranged such that each one covers a sector of the circle that is formed, the first set of apertures and the second set of elongate apertures being separated in a concentric manner in a cavity of the deck; and*
- *a substantially circular actuation mechanism, comprising:*

*a plurality of retaining pins arranged in a radial manner and configured for being introduced in the plurality of mounts of the support device, and a plurality of headed studs which project perpendicular to the plurality of retaining pins through one of the surfaces of the actuation mechanism, the plurality of headed studs being configured for being introduced in the second set of elongate apertures of the deck;*

*such that the deck is attached to or removed from the support device by means of turning the actuation mechanism.*

**[0013]** Throughout this document, "platform for the storage and transport of goods," pallet, or simply platform will be understood to be equivalent terms. In the context of the invention, the platform comprises a deck on which the goods will be supported, understanding that said deck is a part that is substantially flat on the face devised for supporting said goods regardless of the fact that it may further comprise small openings or slits deliberately introduced for lightening the weight thereof without penalizing its mechanical performance. In a particular embodiment, the inner body of said deck further comprises a shape with a rectangular type or "honeycomb" pattern

which helps to reduce weight. Furthermore, said deck is vertically limited by the upper face conceived for supporting goods and a lower surface, said surfaces being arranged substantially parallel to one another.

**[0014]** "Support device" must be understood to mean a support, "block," or leg of the platform attached to the deck at the lower face thereof, or an assembly of several of same. Said support device may thereby comprise either a single block or a plurality of blocks arranged in line and connected to one another.

**[0015]** If the support device comprises several blocks, the resulting element is referred to in the industry as a "skid". Therefore, the at least one skid on which the deck of the platform rests comprises a plurality of blocks attached by their lower face to a substantially flat and elongate surface which serves on its opposite surface as a support for the assembly on the ground (or on any other surface). One and the same platform is known to comprise at least two skids to provide stability to the assembly.

**[0016]** Support devices (either loose blocks or several of them forming a skid) are generally conceived for being fitted in the deck of the platform providing stability to same. Therefore, the arrangement of each skid with respect to the deck must be such that the stability function of the deck is carried out when the skids are assembled.

**[0017]** For example, in the event that a rectangular deck (that is, with a larger side and a smaller side) and two skids are provided, the skids must be arranged along any of the two parallel edges (preferably on respective larger sides of the deck). The bending load when it supports goods will thereby be reduced.

**[0018]** In another particular example in which an additional support device is provided (besides the two skids already provided in the preceding example), said device will be fitted along the deck in the central position of its smallest dimension.

**[0019]** For the purpose of attaching or assembling a support device to or on the deck of the platform, the present invention uses the connection system. The connection system must be understood as an element capable of fixing the attachment between the deck and the support devices.

**[0020]** Therefore, separately, the support device comprises projecting elements whereas the deck comprises a first set of complementary apertures which receive the projecting elements, which completely go through said apertures. Specifically, the projecting elements of the device are in the form of "mounts", i.e., elements the shape of which allows another element to be bound or chained therein. For example, if the mounts have the shape of an upside down "U" they can be connected to the surface with both legs or with just one, said legs having a separation suitable for allowing the passage of retaining pins of the actuation mechanism.

**[0021]** Therefore, in use, the actuation mechanism which has said retaining pins is arranged on the deck on the face opposite the support device, and the attachment

between the deck and the support device is fixed by means of turning same.

**[0022]** For the purpose of retaining the actuation mechanism and preventing it from coming out of the deck, the invention provides a second set of elongate apertures spaced in a circular manner with each one covering a sector of a circle in the cavity of the deck.

**[0023]** Since the actuation mechanism is positioned on the cavity of the deck, each of the headed studs it incorporates is introduced in an elongate aperture, and it is after the complete rotation or turning of the actuation mechanism (i.e., once the retaining pins are inserted into the respective mounts) when the whole support device and deck assembly is advantageously locked. Thus, once the actuation mechanism is inserted into the cavity and turned, the headed studs are retained in these elongate apertures.

**[0024]** Therefore, with a simple movement, the operator can lock or release (according to the direction of rotation imparted to the actuation mechanism) the deck of the support device for subsequent use (if it is locked) or removal (if it is released), respectively.

**[0025]** In particular, the plurality of mounts are arranged in a radial manner on a face of the support device; i.e., each mount is positioned at the same distance with respect to a fictitious center forming a circle between them; furthermore, the mounts are preferably equidistantly spaced in an angular manner with respect to one another.

**[0026]** Moreover, a first set of apertures and a second set of apertures separated in a concentric manner are located in a cavity of the deck, understood as a preferably cylindrical depression or void. As discussed, the apertures of said first set are configured for receiving the mounts of the support device, and therefore the arrangement thereof is complementary to that of the mounts, i.e., they are also arranged in a radial manner and, furthermore, equidistantly spaced in an angular manner with respect to one another.

**[0027]** Moreover, the second set of apertures is also arranged in a radial manner and is concentric to the first set such that the circle that is formed by the second set of apertures has a smaller radius than the circle that is formed by the first set of apertures. The apertures of the second set, which are equidistantly spaced in an angular manner, have an elongated structure, each one covering a sector of the circle they form, without overlapping one another.

**[0028]** In relation to the actuation mechanism, which is understood as the element of the connection system which allows actuating a locking of the assembly by rotation or turning, said mechanism comprises both the plurality of retaining pins and the plurality of studs.

**[0029]** Since the legs of the mounts (with an upside down "U" shape) are in the radial direction, that is, one leg is situated closer to the center than its homologue, the plurality of retaining pins are "horizontal" such that they are introduced in the mounts tangentially by means

of the turning movement. The number of retaining pins corresponds with the number of mounts, and the arrangement thereof allows such a mutual relationship.

**[0030]** In turn, the plurality of studs are understood to mean projections formed by a body and a head that is wider than the body. By placing one of the surfaces of the actuation mechanism opposite the cavity of the deck, said studs which are located perpendicular to this surface are introduced in the second set of apertures of the cavity of the deck. Therefore, they are arranged in a manner that is complementary to the second set of apertures of the cavity, i.e., they are also arranged in a radial manner, preferably equidistantly spaced in an angular manner with respect to one another, wherein the circle they form is concentric to the circle formed by the plurality of retaining pins, preferably with a smaller radius (that is, they are situated on the inside).

**[0031]** Once both the support devices and the actuation mechanism have been arranged in the deck, upon turning the mechanism, locking is actuated and fixing of the attachment between all the elements of the platform is allowed. The mechanism is turned manually, which allows a smooth, simple, and intuitive actuation.

**[0032]** Advantageously, the actuation mechanism provided in the present invention allows there to be no force requirements in the conventional processes for assembling elements on or removing them from platforms. The use of complex tooling which may damage the different elements of the platforms upon the application of forces thereon is therefore prevented, and the enormous physical effort that the operators in charge of the assembly and removal of the platforms must exert is prevented as well.

**[0033]** In a more advantageous manner, the connection system allows the platform to be a sustainable product since it is possible to quickly, comfortably, and simply substitute the parts comprised therein with other similar parts, whether they are the support devices or the deck, thereby preventing disposing of the whole platform in the event that one of its elements has deteriorated.

**[0034]** In a particular example, each platform comprises between six and nine locking systems and at least two support devices when said support devices are skids. In a preferred embodiment, the platform has three support devices comprising three blocks, each of which is fixed to the deck by means of a connection system (whereby the embodiment requires, in total, nine locking systems according to the invention).

**[0035]** In a preferred embodiment, the deck is preferably made of thermoplastic polymeric material such as reinforced or non-reinforced polypropylene or polyethylene. In a more particular embodiment, the deck is made with other polymers such as ABS (acrylonitrile butadiene styrene) or PET (polyethylene terephthalate).

**[0036]** In a preferred embodiment, the support devices are preferably made of thermoplastic polymeric material such as reinforced or non-reinforced polypropylene or polyethylene. In an alternative embodiment, said support

devices are made with other polymers such as ABS or PET.

**[0037]** In a particular embodiment, *at least one of the elongate apertures of the second set of apertures arranged in the cavity of the deck comprises three portions:*

- *a first portion at one end of the covered sector, the width of which is substantially greater than the width of the other two second and third portions, enabling one of the headed studs of the actuation mechanism to pass therethrough, and*
- *a second portion and a third portion the widths of which are smaller than the width of the head of the stud such that the latter is retained, said second and third portions being separated by a local width constriction.*

**[0038]** Structurally, the apertures of the second set of apertures have three portions in which the headed studs of the actuation mechanism are introduced or retained, according to their relative position. Said three portions define three different consecutive positions of the connection system during the turning of the actuation mechanism, facilitating the assembly and the removal of the platform:

- The first portion is identified with the first position.

**[0039]** This position allows each of the heads of the studs of the actuation mechanism to pass through the end of the elongate aperture in the cavity of the deck. Therefore, the actuation mechanism goes through the deck of the platform. Preferably, this task is performed in the first assembly of the platform such that, during the remaining service life of the deck, the actuation mechanism always remains inserted therein.

- The second portion is identified with the second position.

**[0040]** Upon turning the actuation mechanism, the stud is retained in this second position given its narrowness (i.e., smaller width) compared with the first portion. It must be stated that its narrowness is defined in terms of length in the transverse dimension, which must be similar to the section of the body of the stud (to achieve either grip or play between both). In this position, the support device is then assembled in (or, similarly, removed from) the deck.

- The third portion is identified with the third position.

**[0041]** When the support device is already assembled in the deck, the actuation mechanism continues to be turned from the second position to force the stud to pass through the constriction separating the second and third portions, accordingly being retained in this third position. The connection system thereby fixes the attachment be-

tween the support device and the deck.

**[0042]** As explained above, with the actuation mechanism being completely turned (that is, reaching the third position) the retaining pins pass through the mounts of the support device, the assembly accordingly being locked (in other words, the attachment between the support device and the deck is fixed).

**[0043]** What has been described herein is repeated until all the support devices are fixed to the deck by means of respective connection systems, whereby the platform is assembled or mounted and can operate as intended (e.g., for storing and transporting goods).

**[0044]** The structure of the apertures of the second set of apertures advantageously allows the studs of the actuation mechanism to only be introduced in the first portion of said apertures. That is, once the actuation mechanism is turned further, it remains permanently fixed to the deck with the studs being retained in the second or third position.

**[0045]** In particular, all the studs of the actuation mechanism transition from one position to another along the respective apertures in unison.

**[0046]** Advantageously, the presence of specific positions during the turning of the actuation mechanism allows the operator in charge of the assembly and removal to easily know when the skids can be fitted to and disengaged from the deck by simply turning the actuation mechanism between the second (assembly-removal) position and third ("usage") position. This simple turning does not require the operators in charge of the task to exert an enormous physical effort or to use complex tooling like in the conventional assembly-removal methods. Furthermore, the support devices can be locked in a sequential manner, and not all at once as occurred in conventional platforms.

**[0047]** In a particular embodiment, the *substantially circular actuation mechanism is divided into two parts*:

- *an annulus on the outer edge of which the plurality of retaining pins are arranged in a radial manner,*
- *a substantially circular and flat cover from the surface of which the plurality of headed studs project perpendicular to the plurality of retaining pins,*

*wherein the annulus further comprises through holes distributed in a homogeneous manner and configured for allowing the passage of the plurality of headed studs of the cover.*

**[0048]** Although said parts are described and shown throughout this document as separate parts, they can also be integrally attached, or attached by some fixing means.

**[0049]** In the case of being loose parts, the manufacturing process thereof is advantageously easier.

**[0050]** The actuation mechanism comprises two structures designed to cooperate with one another. On one hand, the annulus comprises the retaining pins, whereas the cover comprises the headed studs which go through

through holes in the annulus. Therefore, once inserted, these studs are positioned perpendicular to the pins of the annulus.

**[0051]** This configuration allows introducing the studs in the second set of apertures of the cavity of the deck in the first position of the connection system, whereas the retaining pins of the annulus are introduced in the mounts of the support device during the turning of the actuation mechanism from the second position to the third position.

**[0052]** In a preferred embodiment, *the cover is sized so as to close the cavity of the deck, being flush with the surface of the deck, and the cover further comprises three distinguishable positioning marks for seeing the position adopted by the headed studs as they are situated in one of the three portions of the elongate apertures of the second set of apertures.*

**[0053]** Advantageously, the surface of the cover opposite the outlet of the studs is substantially flat, and once the platform is assembled, it is positioned flush with the upper surface of the deck, i.e., there is no unevenness between the deck and the cover of the actuation mechanism. Therefore, the mechanical capabilities of the platform are not compromised as the goods are perfectly and stably supported on the deck once the platform has been mounted.

**[0054]** Additionally, information about the internal operation of the actuation mechanism itself is provided on the cover of the actuation mechanism. This information allows the operator in charge of the assembly and removal of the platform to know which of the three positions the actuation mechanism is in at a glance and without having to take the cover off for such purpose.

**[0055]** In a particular example, these positioning marks or illustrations are:

- Illustration of the assembly of the actuation mechanism: it indicates the first position, i.e., the position in which the actuation mechanism can be introduced in the cavity of the deck, in particular where the studs are situated in the first region of the elongate apertures and can freely exit or enter same.
- Illustration of an "open lock": it indicates the second position, i.e., the position in which it is possible to fit the skid in the deck in which it is no longer possible to take the studs out of the aperture given that they are situated in the second (narrower) region of the elongate apertures.
- Illustration of a closed lock: it indicates the third position, i.e., the position in which the attachment of the elements of the platform is locked, the free turning movement of the studs in the aperture being restricted by the constriction separating the second position and third position.

**[0056]** It must be stated that transitioning from one positioning mark or illustration to another is achieved by following the turning movement of the actuation mecha-

nism, the transition from one to another therefore being done in a sequential manner directed by the path of each of the elongate apertures of the second set of apertures.

**[0057]** In a preferred embodiment, said positioning marks are raised, painted, or xerographed.

**[0058]** One skilled in the art is capable of understanding that said three distinguishable positioning marks can likewise be situated on the periphery of the cavity of the deck, whereas it is the cover which comprises a single mark, such as an arrow or a pointer, which allows seeing the position adopted by the headed studs according to said mark (e.g., arrow or pointer) on the cover being situated close to one of the three marks on the periphery of the cavity.

**[0059]** In a particular embodiment, *the plurality of retaining pins extend in a radial manner on the same circular plane of the actuation mechanism, and wherein each retaining pin has a shape in the form of a "7" and/or comprises a beveling and/or a change in section.*

**[0060]** As already mentioned, the structure of the retaining pins of the actuation mechanism allows such pins to be introduced in the mounts of the support device during the turning of the actuation mechanism from the second position to the third position.

**[0061]** In particular, the shape in the form of a "7" is optimum so that the retaining pins are supported on the base or lower surface of the cavity of the deck when moved tangentially, and in turn, the mounts of the support devices encompass them in their central part by means of the turning movement. Advantageously, the retaining pins are perfectly anchored or retained in the mounts while at the same time the actuation mechanism rests on the cavity of the deck.

**[0062]** In a particular example, the retaining pins further comprise a beveling in their front-most area, preferably at 45 degrees, to facilitate the introduction thereof in the corresponding mount.

**[0063]** In a particular embodiment, *the plurality of retaining pins of the actuation mechanism and the mounts of the support device comprise a change in section.*

**[0064]** The retaining pins may comprise a change in section in the portion that will contact with the mount, preferably generating a 45 degree plane. Similarly, the mounts configured for receiving the retaining pins also comprise a change in section, complementary to the aforementioned one.

**[0065]** This structure has the advantage of facilitating insertion of the retaining pins into the mounts during the turning of the actuation mechanism, for example when transitioning the connection system from the second to the third position.

**[0066]** In a particular embodiment, *each of the headed studs has the shape of a "T", and/or wherein each of the mounts of the support device has the shape of an upside down "U".*

**[0067]** The T-shaped structures of the studs allow the latter to be retained in the second and third positions of the connection system since the head of the T-shaped

stud has dimensions that are larger than the dimensions of the second and third portions of the apertures of the second set of apertures of the cavity of the deck. For optimization of the assembly, structures having "1", "r", or similar type shape can also be used.

**[0068]** The structures having an upside down "U" shape of the mounts allow the retaining pins to be introduced therethrough, between their legs.

**[0069]** In a particular embodiment, *the connection system further comprises a tool configured for operating the actuation mechanism.*

**[0070]** For the purpose of facilitating the turning of the actuation mechanism, the system may further comprise a tool configured for fitting in the cover of the actuation mechanism. Said tool acts as an operating control which allows the operator to turn the mechanism in a quick and easy manner, without the need to apply force.

**[0071]** Preferably, said tool comprises an ergonomic grip for the operator.

**[0072]** It is understood that unlike the other elements of the connection system according to the present invention which become a part of the deck during use, the purpose of the tool is simply to facilitate the turning of the actuation mechanism, so once the actuation mechanism is in the suitable (i.e. first, second, or third) position, the tool is taken out and put away for subsequent use.

**[0073]** In a particular embodiment, *the plurality of mounts are 6 in number, the plurality of retaining pins are 6 in number, and the plurality of headed studs are 4 in number, two of which are thicker than the other two.*

**[0074]** The preferred number of mounts, retaining pins, and studs is that of this embodiment. By having studs with different thickness, the actuation mechanism is limited to having to be introduced in the deck in a certain way ("poka-yoke" design). In a related manner, the elongate apertures of the second set of apertures must each be configured for receiving one of these studs with different thickness.

**[0075]** In an alternative embodiment, the body of all the studs is identical, whereas they differ only in the head, either in thickness or by having a given shape.

**[0076]** This has the advantage of the positioning marks or illustrations on the cover being positioned to correctly show the internal information of the mechanism.

**[0077]** In a particular embodiment, *the cover comprises on the same surface from where the plurality of headed studs project a central ring the outer surface of which is toothed. In turn, the annulus comprises on its inner edge a toothed face configured for engaging the toothed outer surface of the central ring of the cover.*

**[0078]** This configuration allows the movement of the cover (which is exposed by enclosing the cavity of the deck in some embodiments and which is therefore where the operator will operate the actuation mechanism) to drive the annulus in the turning thereof. Therefore, cooperation between both parts without slipping during the turning of the actuation mechanism between the different positions of the connection system is advantageously fa-

vored.

**[0079]** In a particular embodiment, the connection system also comprises in the central area of the cavity of the deck a protuberance adapted for being inserted into the inner surface of the central ring of the cover.

**[0080]** This configuration helps to position the actuation mechanism inside the cavity of the deck in the suitable position.

**[0081]** A second inventive aspect provides a support device comprising a plurality of mounts arranged in a radial manner on the face configured for contacting with a deck, wherein said plurality of mounts are part of any of the embodiments of the connection system according to the first inventive aspect.

**[0082]** The features, advantages, or functionalities of the support device mentioned in the first inventive aspect can be extrapolated to any of the embodiments of the second inventive aspect described below, where appropriate.

**[0083]** In a particular embodiment, the support device further comprises a plurality of turrets arranged around the plurality of mounts which can be inserted into respective openings of a deck.

**[0084]** The presence of turrets in the support devices favors the fitting thereof in the deck. To that end, the lower surface of the deck itself comprises openings adapted for receiving said turrets without the need to exert an enormous physical effort but preventing the existence of clearance between them.

**[0085]** Therefore, where there is a need to provide additional rigidity to the assembly, the turrets constitute a more stable support for minimizing possible movements between the deck and the support device. Particularly when the deck itself incorporates the openings, making them both fit together.

**[0086]** A third inventive aspect provides a deck serving as a support for goods on at least one of its surfaces, wherein said deck comprises at least one cavity on said surface, wherein there are arranged:

- a first set of apertures spaced in a circular manner and configured for receiving the plurality of mounts of a support device according to the second inventive aspect, and
- a second set of elongate apertures spaced in a circular manner and arranged such that each one covers a sector of the circle that is formed, the first set of apertures and the second set of elongate apertures being separated in a concentric manner in the cavity of the deck.

**[0087]** The features, advantages, or functionalities of the deck mentioned in the first inventive aspect can be extrapolated to any of the embodiments of the third inventive aspect described below, where appropriate.

**[0088]** A fourth inventive aspect provides a platform for the storage and transport of goods, wherein the platform comprises:

- at least one support device according to any of the embodiments of the second inventive aspect;
- a deck configured for serving as a support for the goods on at least one of its surfaces according to any of the embodiments of the third inventive aspect; and
- a connection system according to any of the embodiments of the first inventive aspect for removably attaching said deck to said at least one support device.

**[0089]** The features, advantages, or functionalities of the platform for the storage and transport of goods mentioned in the first inventive aspect can be extrapolated to any of the embodiments of the fourth inventive aspect described below, where appropriate.

**[0090]** A fifth inventive aspect provides a method for attaching a support device according to the second inventive aspect to a deck of a platform according to any of the embodiments of the third inventive aspect by means of a connection system according to any of the embodiments of the first inventive aspect, wherein the method comprises the steps of:

- a) providing said support device, deck, and connection system;
- b) inserting the plurality of headed studs of the actuation mechanism of the connection system into respective elongate apertures of the second set of elongate apertures arranged in the cavity of the deck;
- c) positioning the support device on the deck such that the plurality of mounts are inserted into the apertures of the first set of apertures; and
- d) turning the actuation mechanism until the plurality of retaining pins are introduced in respective mounts of the support device.

**[0091]** The method of the fifth inventive aspect describes a method for attaching a platform and a support device, wherein the attachment of the elements thereof is fixed by the connection system of the first inventive aspect. A platform will be mounted or assembled when all the support devices are attached to the deck by means of a plurality of connection systems according to the method of the fifth inventive aspect.

**[0092]** Similarly, the method for detaching the elements from a platform would be the reverse of the method of the fifth inventive aspect and said platform will be disassembled or removed when all the support devices are detached from the deck.

**[0093]** Throughout the present document, the positioning of the support device on the deck, or the deck on the support device, will be understood to be equivalent provided that the plurality of mounts are inserted into the apertures of the first set of apertures.

**[0094]** In a particular embodiment, the method additionally comprises, between steps b) and c), a step of turning the actuation mechanism until the plurality of headed studs are retained in the second portion of the

*second set of apertures arranged in the cavity of the deck.*

**[0095]** In a particular embodiment in which the three defined positions of the connection system are identified, the method for attaching the elements of a platform furthermore requires the actuation mechanism to be positioned in the second position for the deck to be fitted in the support device, or vice versa.

**[0096]** Similarly, to disengage the elements of the platform, the actuation mechanism must be positioned in the second position.

#### Description of the Drawings

**[0097]** These and other features and advantages of the invention will become apparent from the following detailed description of a preferred embodiment given solely by way of non-limiting illustrative example in reference to the attached drawings.

Figure 1 shows an exploded view of a connection system adapted for removably attaching a deck to a support device of a deck according to the present invention.

Figure 2 shows a plurality of mounts arranged in a radial manner on the face of the support device.

Figure 3 shows a deck with a cavity where a first set and a second set of apertures are located.

Figures 4a and 4b show an actuation mechanism with its parts shown in an exploded view and in an assembled view, respectively.

Figures 5a and 5b show a detailed view of the retaining pin and mount assembly, as well as a section of the assembly.

Figures 6a to 6c each shows an actuation mechanism arranged in the cavity of the deck both in a top view and in a bottom view of the assembly, (a) in a first position, (b) in a second position, and (c) in a third position; together with the corresponding positioning mark on the cover.

Figure 7 shows a tool configured for operating the actuation mechanism of the connection system of the present invention.

Figure 8 shows an exploded view of a platform for the storage and transport of goods incorporating connection systems according to the present invention.

#### Detailed Description of the Invention

**[0098]** According to the first inventive aspect, the present invention relates to a connection system (1) adapted for removably attaching a deck (2) to a support device (3) of a deck (2).

**[0099]** Figure 1 illustrates a portion of a platform (4) for the storage and transport of goods in the area in which the deck (2) is attached to a support device (3). It can likewise be seen that the deck (2) is attached to the support device (3) as a result of the connection system (1)

of the present invention, which comprises a plurality of parts or elements arranged in a fixed manner in each of the elements to be attached, and of other moving parts or elements which allow the attachment of the assembly in a compact manner.

**[0100]** Nevertheless, said deck (2)-support device (3) attachment is likewise removable (also understood as releasable) by means of the correct operation of the connection system (1), specifically by means of a simple turning movement which disables the locking.

**[0101]** Said connection system (1) comprises:

- a plurality of mounts (1.1) arranged in a radial manner on the face of the support device (3) configured for contacting with the deck (2);
- a first set of apertures (1.2) spaced in a circular manner and configured for receiving the plurality of mounts (1.1) of the support device (3), and a second set of elongate apertures (1.3) spaced in a circular manner and arranged such that each one covers a sector of the circle that is formed, the first set of apertures (1.2) and the second set of elongate apertures (1.3) being separated in a concentric manner in a cavity (2.1) of the deck (2); and
- a substantially circular actuation mechanism (1.4), comprising:

o a plurality of retaining pins (1.4.1) arranged in a radial manner and configured for being introduced in the plurality of mounts (1.1) of the support device (3), and

o a plurality of headed studs (1.4.2) which project perpendicular to the plurality of retaining pins (1.4.1) through one of the surfaces of the actuation mechanism (1.4), the plurality of headed studs (1.4.2) being configured for being introduced in the second set of elongate apertures (1.3) of the deck (2) ;

such that the deck (2) is attached to or removed from the support device (3) by means of turning the actuation mechanism (1.4) .

**[0102]** A portion of the support device (3) can be seen in the lower part of the figure, where a block (3.2) can be seen. A substantially flat and elongate surface (3.3) serving as a support for the assembly on the ground extends from this block (3.2) along its lower face, whereby making it a skid.

**[0103]** On its opposite face, the plurality of mounts (1.1) arranged on an elevation (1.1.1) can be seen.

**[0104]** Bearing in mind that Figure 1 shows an exploded view, the deck (2) to which the support device (3) is to be attached is arranged above said support device (3). Said deck (2) comprises a cavity (2.1) with at least two sets of apertures (1.2, 1.3), both spaced in a circular manner and separated in a concentric manner with respect to one another. Of these apertures, those of the first set (1.2) preferably have a square or rectangular section,

whereas those of the second set (1.3) are substantially elongate such that each one covers a sector of the circle that is formed.

**[0105]** There is arranged above the cavity (2.1) of the deck (2) an actuation mechanism (1.4) having two parts: a cover (1.4.4) and an annulus (1.4.3). Nevertheless, said parts of the actuation mechanism (1.4) are also shown in an exploded view since it is envisaged that they can be separated from one another.

**[0106]** A plurality of retaining pins (1.4.1) which are kept on the plane, that is, they do not project above or below the plane that is formed, protrude in a radial manner from the annulus (1.4.3), specifically from its outer edge. Therefore, said plurality of retaining pins (1.4.1) have a shape substantially in the form of a 7 with two portions attached by a bend.

**[0107]** In particular, each retaining pin (1.4.1) is formed at two heights such that it from a recess which the complete turning of the annulus (1.4.3) inside the cavity (2.1) of the deck is guided by a recess on the periphery of said cavity (2.1). Therefore, each retaining pin has the section which protrudes in a radial manner at a height extending from the annulus (for the purpose of resting on the surface of the cavity having the apertures of the second set (1.3); and an end section (the one arranged tangentially) at a second height, lower than the first height, to run along the recess of the cavity.

**[0108]** In turn, though not seen correctly based on this figure because of the perspective, a plurality of headed studs (1.4.2) project from the lower surface of the cover (1.4.4) (that is, from the surface conceived for contacting with the annulus (1.4.3)).

**[0109]** Said cover (1.4.4) has a substantially circular and flat shape which coincides with the transverse shape of the cavity (2.1) of the deck (2) such that, when not in exploded view, it is positioned flush with the upper surface of the deck (2), and there is no unevenness between the deck (2) and the cover (1.4.4) of the actuation mechanism (1.4).

**[0110]** Figure 2 shows the support device (3) comprising the plurality of mounts (1.1) on the face contacting with the deck (2) separately.

**[0111]** Specifically, said mounts (1.1) are arranged on the block of the support device (3), which in this case is part of an assembly of blocks aligned and attached by means of a substantially flat surface, that is, it is part of a skid. It must be stated that even though a skid is shown, said support device (3) could likewise comprise a single block.

**[0112]** On its upper face, said support device (3) comprises an elevation in the form of a rosette from where the plurality of mounts (1.1) with an upside down "U" shape upwardly project. As already mentioned, the opening between the legs of the mounts (1.1) must be such that it allows the passage (at least in part) of the retaining pins (1.4.1) of the actuation mechanism (1.4).

**[0113]** Given that said deck (2)-support device (3) attachment may be weak for certain commercial uses of

the platform (4) incorporating said connection system (1), the support device (3) further comprises a plurality of turrets (3.1) arranged around the rosette where the plurality of mounts (1.1) is located.

**[0114]** According to the technical specifications or structural requirements of the commercial use of the platform (4), a different number of turrets (3.1) can be considered, although they will preferably be 4 in number. Likewise, to optimize the final design, other shapes, thicknesses, or lengths different from those herein shown can be taken into account.

**[0115]** Likewise, the deck (2) must incorporate respective openings (2.3) on its lower face (the one that will contact with the turrets), wherein the shape of said openings (2.3) must correspond with the shape of the turrets (3.1). Therefore, besides facilitating the fitting of the support device (3) in the deck (2) by means of guiding, it provides additional rigidity to the assembly.

**[0116]** The upper face of said deck (2) can be seen in Figure 3. Specifically, a detail view of the cavity (2.1) that will receive the actuation mechanism (1.4) is shown.

**[0117]** A first set of apertures (1.2) and a second set of apertures (1.3) as defined in Figure 1 are arranged in said cavity (2.1). Additionally, a protuberance (2.2) adapted for helping to position the actuation mechanism (1.4) inside the cavity (2.1) of the deck (2) in the suitable position can be observed in the central area of the cavity (2.1).

**[0118]** For such purpose, the cover (1.4.4) comprises a central ring (1.4.4.1), wherein its inner surface receives said protuberance (2.2) of the cavity (2.1).

**[0119]** As can be observed, on the periphery of the cavity, going through the first set of apertures (1.2), there is a recess serving as a guide for the turning of the annulus (1.4.3).

**[0120]** Specifically, each retaining pin (1.4.1) which protrudes in a radial manner from the annulus is formed at two heights:

- the section which protrudes in a radial manner and is connected to the annulus rests on the surface of the cavity having the apertures (1.3); and
- the end section arranged in a tangential manner is lower such that it runs along the recess of the cavity.

**[0121]** Figures 4a and 4b show the actuation mechanism (1.4) divided into two parts defined in Figure 1, but seen from below, separately.

**[0122]** Based on Figure 4a it can be observed that the substantially circular actuation mechanism (1.4) comprises:

- an annulus (1.4.3) on the outer edge of which the plurality of retaining pins (1.4.1) is arranged in a radial manner, and
- a substantially circular and flat cover (1.4.4) from the surface of which the plurality of headed studs (1.4.2) project perpendicular to the plurality of retaining pins

(1.4.1),.

**[0123]** Furthermore, the annulus (1.4.3) comprises through holes (1.4.3.1) distributed in a homogeneous manner and configured for allowing the passage of the plurality of headed studs (1.4.2) of the cover (1.4.4).

**[0124]** As can be observed, said headed studs (1.4.2) differ from one another in pairs to prevent an incorrect placement. To that end, notwithstanding there being other variants, both the head and the body itself of the stud (1.4.2) are of different thickness. In a complementary manner, the through holes (1.4.3.1) of the annulus differ in pairs and correspond to the distribution and shape of the studs (1.4.2).

**[0125]** Furthermore, the body of said headed studs has a length that is greater than the thickness of the annulus (1.4.3) such that they project from same once they are placed, as can be seen in Figure 4b. In this manner, studs having a suitable length for reaching the apertures (1.3) of the second set of apertures of the cavity (2.1) of the deck (2) are obtained.

**[0126]** Preferably, the headed studs (1.4.2) are T-shaped, as can be seen. The T-shaped structures of the studs (1.4.2) allow them to be retained in the second and third positions of the connection system (1) given that the head has dimensions that are greater than the apertures (1.3) of the second set of apertures of the cavity (2.1) of the deck (2). This will be seen in greater detail throughout Figures 6a to 6c.

**[0127]** Furthermore, there can be observed in Figure 4a a central ring (1.4.4.1) in the cover (1.4.4), the outer surface of which is toothed. In turn, the annulus (1.4.3) comprises on its inner edge a toothed face (1.4.3.2) configured for engaging the toothed outer surface of the central ring (1.4.4.1) of the cover (1.4.4). Both surfaces being in contact can be observed in Figure 4b, which contact allows the movement of the cover (1.4.4) to drive the annulus (1.4.3) in the turning thereof.

**[0128]** Figure 5a shows a detailed view of an embodiment of the retaining pin (1.4.1) and mount (1.1) assembly.

**[0129]** As can be seen, the retaining pins (1.4.1) with a shape in the form of a "7" comprise a 45 degree beveling in their front-most area to facilitate their introduction (tangentially caused by the turning of the actuation mechanism (1.4)) in the corresponding mount (1.1). The beveling is indicated within a circle with a discontinuous line.

**[0130]** For illustrative purposes, the deck (2) is not shown in this Figure 5a. Nevertheless, said deck (2) is shown in the cross section of Figure 5b.

**[0131]** Figure 5b shows the same arrangement of elements as Figure 5a but with a cross section. Therefore, it can be observed that both the plurality of retaining pins (1.4.1) and the mounts (1.1) of the support device (3) comprise respective changes in section complementary to one another. As can be seen, a 45 degree plane is generated. Nevertheless, planes with other degrees can likewise be considered provided that the entry of the re-

taining pin in the mount is facilitated.

**[0132]** In the embodiment shown in Figure 3, it could be observe how the cavity (2.1) of the deck (2) comprised the first set of apertures (1.2) and second set of apertures (1.3). In particular, at least one of the elongate apertures (1.3) of the second set of apertures arranged in the cavity (2.1) of the deck (2) comprises three portions:

- a first portion at one end of the covered sector, the width of which is substantially greater than the width of the other two second and third portions, enabling one of the headed studs (1.4.2) of the actuation mechanism (1.4) to pass therethrough, and
- a second portion and a third portion the widths of which are smaller than the width of the head of the stud (1.4.2) such that the latter is retained, said second and third portions being separated by a local width constriction.

**[0133]** Structurally, the apertures (1.3) of the second set of apertures have three portions in which the headed studs (1.4.2) of the actuation mechanism (1.4) are introduced or retained, according to their relative position along the elongate aperture (1.3).

**[0134]** As can be observed in Figures 6a to 6c, said three portions define three different consecutive positions of the connection system (1) during the turning of the actuation mechanism (1.4). Specifically, each of these figures shows different views of the connection system (1) according to the invention in one of those positions, from top to bottom:

- a top view of the actuation mechanism (1.4) arranged in the cavity (2.1) of the deck (2),
- a bottom view of the cavity (2.1) of the deck (2) with the actuation mechanism (1.4) arranged therein, and
- the corresponding positioning mark on the cover (1.4.4).

**[0135]** It should be borne in mind that the cover (1.4.4) further comprises three distinguishable positioning marks on its outer face (that is, the face that is exposed to the outside once it is placed) for seeing the position adopted by the headed studs (1.4.2) as they are situated in one of the three portions of the elongate apertures of the second set of apertures (1.3).

**[0136]** Furthermore, as can be seen in these figures, in the deck (2) close to the periphery of the cavity (2.1) there is a fixed pointer or arrow showing the operator each of the positioning marks.

#### FIRST PORTION - Figure 6a

**[0137]** Therefore, the first portion is identified with the first position. Said first position is observed in Figure 6a.

**[0138]** In this position, the heads of the studs (1.4.2) of the actuation mechanism (1.4) can pass through this first portion situated at the end of the elongate aperture

(1.3) in the cavity (2.1) of the deck (2). As a result, the actuation mechanism (1.4) is capable of going through the deck (2) of the platform (4) when it is situated in this first position.

**[0139]** Nevertheless, this task is performed in the first assembly of the platform (4) such that, during the remaining service life (1.5) of the deck (2), the actuation mechanism (1.4) always remains inserted therein.

**[0140]** With respect to the positioning mark, it shows the first position and indicates to the operator that the studs (1.4.2) can freely exit or enter the elongate apertures (1.3). Therefore, the operator knows that the actuation system can be inserted into or extracted from the cavity of the deck.

#### SECOND PORTION - Figure 6b

**[0141]** The second portion is identified with the second position. Said second position is observed in Figure 6b.

**[0142]** The passage from the first to the second position is achieved with turning the actuation mechanism (1.4) in a suitable direction. It should be pointed out that turning in the opposite direction would cause the transitioning back from the second to the first position.

**[0143]** In this second position, the aperture (1.3) is reduced in width (in other words, it tapers) to a dimension that is slightly greater than that of the body of the stud, but smaller than that of the head thereof. Accordingly, the headed stud (1.4.2) is vertically retained in this second portion of the aperture (1.3). Obviously, the stud can move along the elongate aperture according to the turning of the actuation mechanism.

**[0144]** With respect to the positioning mark, there is illustrated in this second position an "open lock" which indicates to the operator that the skid can be assembled on or removed from the deck (2) so it is no longer possible to take the studs (1.4.2) out of the elongate aperture (1.3). Therefore, the extraction of the actuation mechanism from the cavity of the deck is prevented.

#### THIRD PORTION - Figure 6c

**[0145]** Finally, the third portion is identified with the third position. Said third position is observed in Figure 6c.

**[0146]** The transition to said third position from the second position of the connection system (1) likewise occurs in a sequential manner by continuing to turn the actuation mechanism (1.4) in the original direction. Turning in the opposite direction would cause going back to the second position.

**[0147]** Therefore, the actuation mechanism (1.4) forces the stud (1.4.2) to pass through the constriction separating the second and third portions, accordingly being retained in this third position. Therefore, the connection system (1) fixes the attachment between the support device (3) and the deck (2) when the retaining pins (1.4.1) of the actuation mechanism (1.4) enter the mounts (1.1) of the support device (3) or skid.

**[0148]** With respect to the positioning mark, there is illustrated in this third position a "closed lock" which indicates to the operator that the platform (4) can be used without the support device (3) being removed from the deck (2) in an accidental or unintentional manner. In other words, the attachment between the elements of the platform (4) is locked, with the free turning movement of the studs (1.4.2) in the aperture (1.3) being restricted by the constriction separating the second position and third position.

**[0149]** Figure 7 shows the tool (1.5) for operating the actuation mechanism (1.4).

**[0150]** The tool (1.5) is configured for fitting in the cover (1.4.4) of the actuation mechanism (1.4), which comprises a slit or bridge between two depressions. It must be stated that in any of the two embodiments (i.e., slit or bridge) of the cover (1.4.4), no protuberance (2.2) is formed which exceeds the height at which it is flush with the deck (2).

**[0151]** Specifically, any other different design of a slit or bridge could be used provided that it achieves a connection between the tool (1.5) and the cover (1.4.4), for example, holes. In summary, the tool acts like a "key" for turning the actuation mechanism.

**[0152]** In particular embodiments, the tool (1.5) is designed such that the actuation mechanism can only be actuated (i.e., turned) by means of same, thereby preventing someone who does not have such tool (that is, unauthorized persons) from being able to externally manipulate the connection.

**[0153]** Parallel to said slit or bridge, the tool (1.5) further comprises at its outermost part (visible for the operator while operating it) a line acting as a reference for placing the tool (1.5) in a suitable manner.

**[0154]** As explained before, said tool (1.5) acts as an operating control which allows the operator to turn the mechanism in a quick and easy manner, without the need to apply force. To that end, said tool (1.5) comprises an ergonomic grip for the operator. Furthermore, the tool (1.5) can incorporate a grooving or corrugation on its side face to improve grip.

**[0155]** Once the tool (1.5) is used to change the positions of the connection systems which are required, it is taken out and put away for subsequent use.

**[0156]** Finally, Figure 8 shows an exploded view of a platform (4) for the storage and transport of goods incorporating connection systems according to the present invention.

**[0157]** Despite showing a platform (4) here with 3 skids, where each skid comprises three blocks, other embodiments can likewise be considered.

**[0158]** Specifically, the platform (4) comprises:

- three support devices in the form of skids, with three blocks each;
- a deck (2) configured for serving as a support for the goods on at least one of its surfaces; and
- connection systems for removably attaching said

deck (2) to each of said block.

### Claims

1. A connection system (1) adapted for removably attaching a deck (2) to a support device (3) of a deck, the connection system (1) comprising:

- a plurality of mounts (1.1) arranged in a radial manner on the face of the support device (3) configured for contacting with the deck (2);

- a first set of apertures (1.2) spaced in a circular manner and configured for receiving the plurality of mounts (1.1) of the support device (3), and a second set of elongate apertures (1.3) spaced in a circular manner and arranged such that each one covers a sector of the circle that is formed, the first set of apertures (1.2) and the second set of elongate apertures (1.3) being separated in a concentric manner in a cavity (2.1) of the deck (2); and

- a substantially circular actuation mechanism (1.4), comprising:

◦ a plurality of retaining pins (1.4.1) arranged in a radial manner and configured for being introduced in the plurality of mounts (1.1) of the support device (3), and

◦ a plurality of headed studs (1.4.2) which project perpendicular to the plurality of retaining pins (1.4.1) through one of the surfaces of the actuation mechanism (1.4), the plurality of headed studs (1.4.2) being configured for being introduced in the second set of elongate apertures (1.3) of the deck (2);

such that the deck (2) is attached to or removed from the support device (3) by means of turning the actuation mechanism (1.4).

2. The connection system (1) according to claim 1, wherein at least one of the elongate apertures of the second set of apertures (1.3) arranged in the cavity (2.1) of the deck comprises three portions:

- a first portion at one end of the covered sector, the width of which is substantially greater than the width of the other two second and third portions, enabling one of the headed studs (1.4.2) of the actuation mechanism (1.4) to pass therethrough, and

- a second portion and a third portion the widths of which are smaller than the width of the head of the stud (1.4.2) such that the latter is retained, said second and third portions being separated by a local width constriction.

3. The connection system (1) according to any of claims 1 or 2, wherein the substantially circular actuation mechanism (1.4) is divided into two parts:

- an annulus (1.4.3) on the outer edge of which the plurality of retaining pins (1.4.1) are arranged in a radial manner,

- a substantially circular and flat cover (1.4.4) from the surface of which the plurality of headed studs (1.4.2) project perpendicular to the plurality of retaining pins (1.4.1),

wherein the annulus (1.4.3) further comprises through holes (1.4.3.1) distributed in a homogeneous manner and configured for allowing the passage of the plurality of headed studs (1.4.2) of the cover (1.4.4).

4. The connection system (1) according to claim 3, wherein

the cover (1.4.4) is sized so as to close the cavity (2.1) of the deck, being flush with the surface of the deck (2), and wherein

the cover (1.4.4) further comprises three distinguishable positioning marks for seeing the position adopted by the headed studs (1.4.2) as they are situated in one of the three portions of the elongate apertures of the second set of apertures (1.3).

5. The connection system (1) according to any of claims 1 to 4, wherein the plurality of retaining pins (1.4.1) extend in a radial manner on the same circular plane of the actuation mechanism (1.4), and wherein each retaining pin (1.4.1):

- has a shape in the form of a "7", and/or  
- comprises a beveling.

6. The connection system (1) according to any of claims 1 to 5, wherein the plurality of retaining pins (1.4.1) of the actuation mechanism (1.4) and the mounts (1.1) of the support device (3) comprise a change in section.

7. The connection system (1) according to any of claims 1 to 6, wherein each of the headed studs (1.4.2) has the shape of a "T", and/or wherein each of the mounts (1.1) of the support device (3) has the shape of an upside down "U".

8. The connection system (1) according to any of claims 1 to 7, wherein the connection system (1) further comprises an tool (1.5) configured for operating the actuation mechanism (1.4).

9. The connection system (1) according to any of claims 1 to 8, wherein:

- the plurality of mounts (1.1) are 6 in number,  
 - the plurality of retaining pins (1.4.1) are 6 in  
 number, and  
 - the plurality of headed studs (1.4.2) are 4 in  
 number, two of which are thicker than the other  
 two. 5

10. The connection system (1) according to any of claims 3 to 9, wherein  
 the cover (1.4.4) comprises on the same surface 10  
 from where the plurality of headed studs (1.4.2)  
 project a central ring (1.4.4.1) the outer surface of  
 which is toothed, and  
 the annulus (1.4.3) comprises on its inner edge, a  
 toothed face (1.4.3.2) configured for engaging the  
 toothed outer surface of the central ring (1.4.4.1) of  
 the cover (1.4.4). 15

11. The connection system (1) according to claim 10, wherein the connection system (1) also comprises 20  
 in the central area of the cavity (2.1) of the deck a  
 protuberance (2.2) adapted for being inserted into  
 the inner surface of the central ring (1.4.4.1) of the  
 cover (1.4.4). 25

12. A support device (3) comprising a plurality of mounts (1.1) arranged in a radial manner on the face configured for contacting with a deck (2), wherein said plurality of mounts (1.1) are part of the connection system (1) according to any of claims 1 to 11. 30

13. The support device (3) according to claim 12, wherein in the support device (3) further comprises a plurality of turrets (3.1) arranged around the plurality of mounts (1.1) which can be inserted into respective 35  
 openings (2.3) of a deck (2).

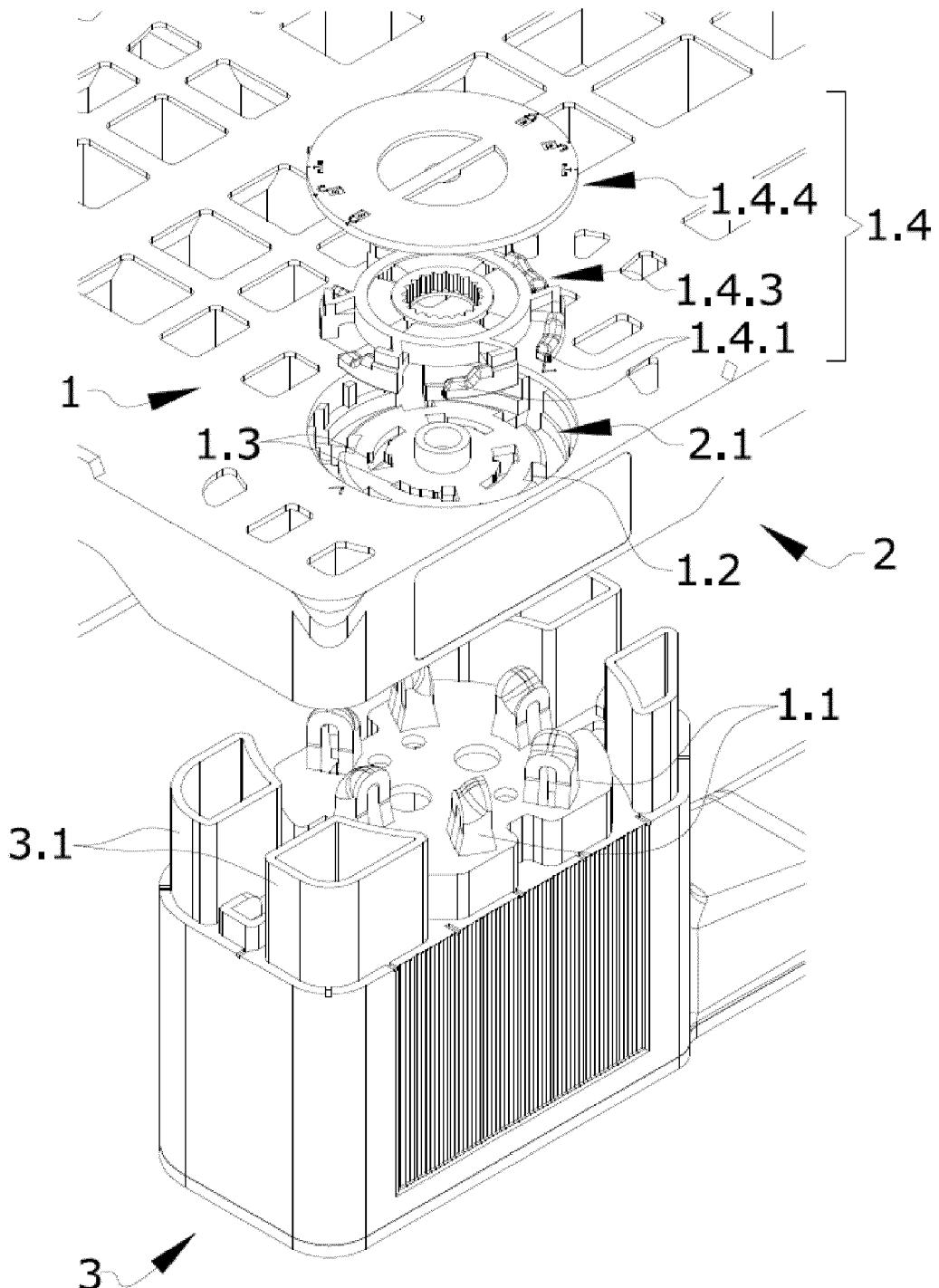
14. A deck (2) serving as a support for goods on at least one of its surfaces, wherein said deck (2) comprises at least one cavity (2.1) on said surface, wherein 40  
 there are arranged:  
 - a first set of apertures (1.2) spaced in a circular manner and configured for receiving the plurality of mounts (1.1) of a support device (3) according to any of claims 12 or 13, and 45  
 - a second set of elongate apertures (1.3) spaced in a circular manner and arranged such that each one covers a sector of the circle that is formed, the first set of apertures (1.2) and the second set of elongate apertures (1.3) being separated in a concentric manner in the cavity (2.1) of the deck. 50

15. A platform (4) for the storage and transport of goods, 55  
 wherein the platform (4) comprises:  
 - at least one support device (3) according to

any of claims 12 or 13;  
 - a deck (2) configured for serving as a support for the goods on at least one of its surfaces according to claim 14; and  
 - a connection system (1) according to any of claims 1 to 11 for removably attaching said deck (2) to said at least one support device (3). 5

16. A method for attaching a support device (3) according to any of claims 12 or 13 to a deck (2) of a platform (4) according to claim 14 by means of a connection system (1) according to any of claims 1 to 11, wherein the method comprises the steps (1.4.4) of:  
 a) providing said support device (3), deck (2), and connection system (1);  
 b) inserting the plurality of headed studs (1.4.2) of the actuation mechanism (1.4) of the connection system (1) into respective elongate apertures (1.3) arranged in the cavity (2.1) of the deck;  
 c) positioning the support device (3) on the deck (2) such that the plurality of mounts (1.1) are inserted into the apertures of the first set of apertures (1.2); and  
 d) turning the actuation mechanism (1.4) until the plurality of retaining pins (1.4.1) are introduced in respective mounts (1.3) of the support device (3). 30

17. The method according to claim 16, wherein when the connection system (1) is according to any one of claims 2 to 11, the method comprises an additional step (1.4.4) between steps (1.4.4) (b) and (c) of turning the actuation mechanism (1.4) until the plurality of headed studs (1.4.2) are retained in the second portion of the second set of apertures (1.3) arranged in the cavity (2.1) of the deck. 40



**FIG.1**

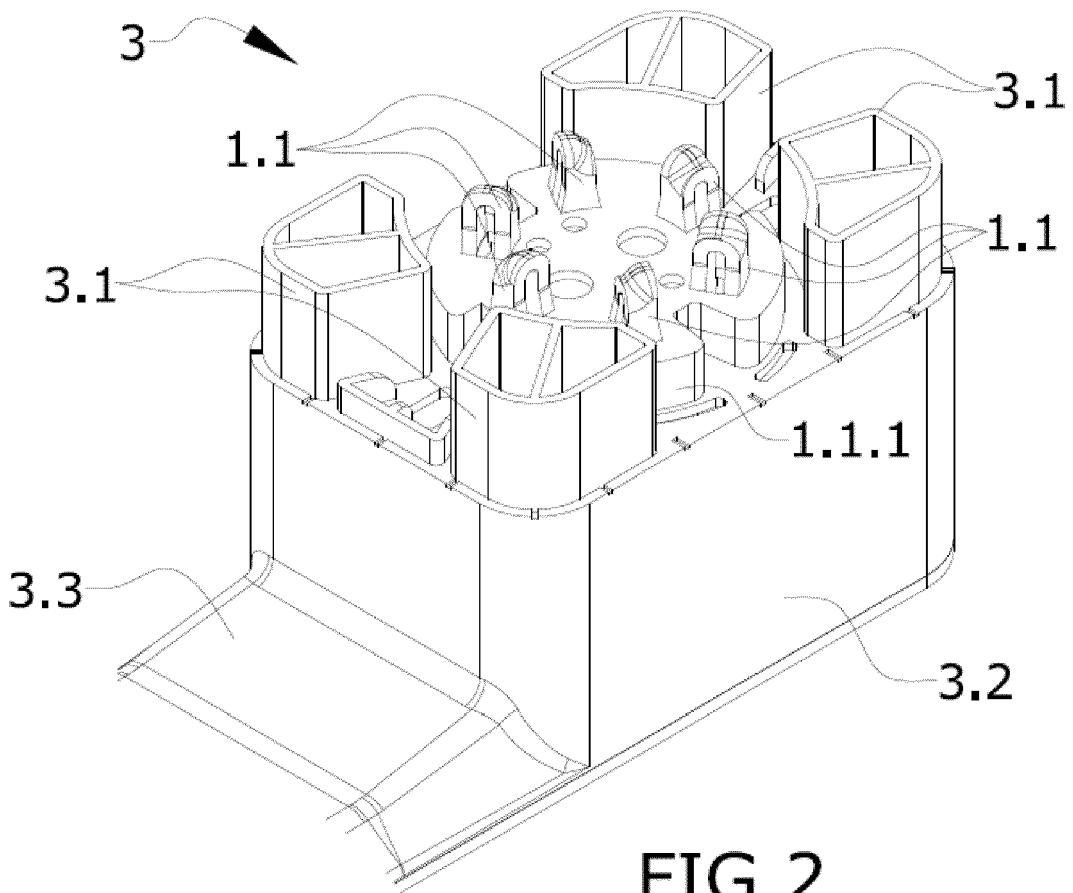


FIG.2

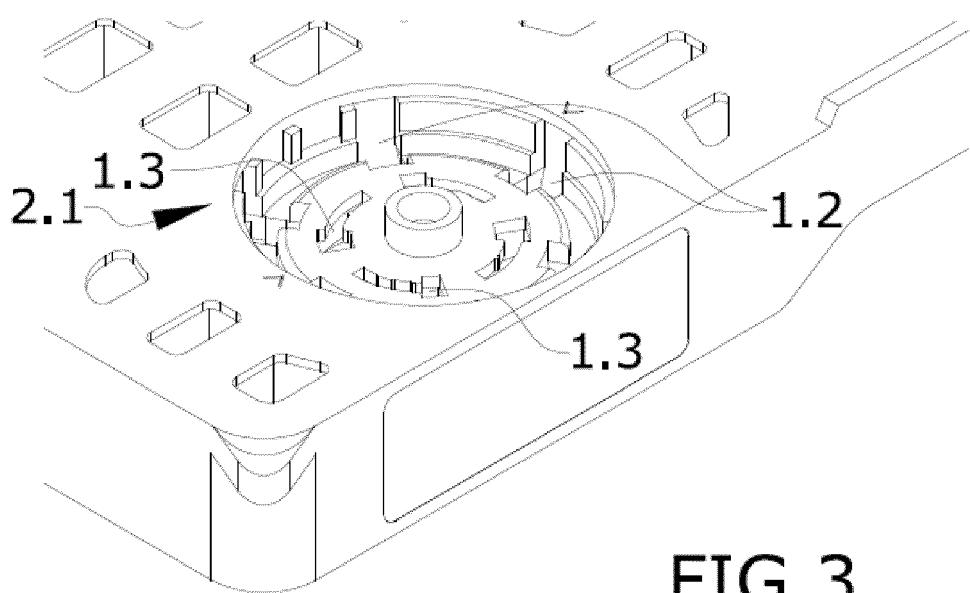


FIG.3

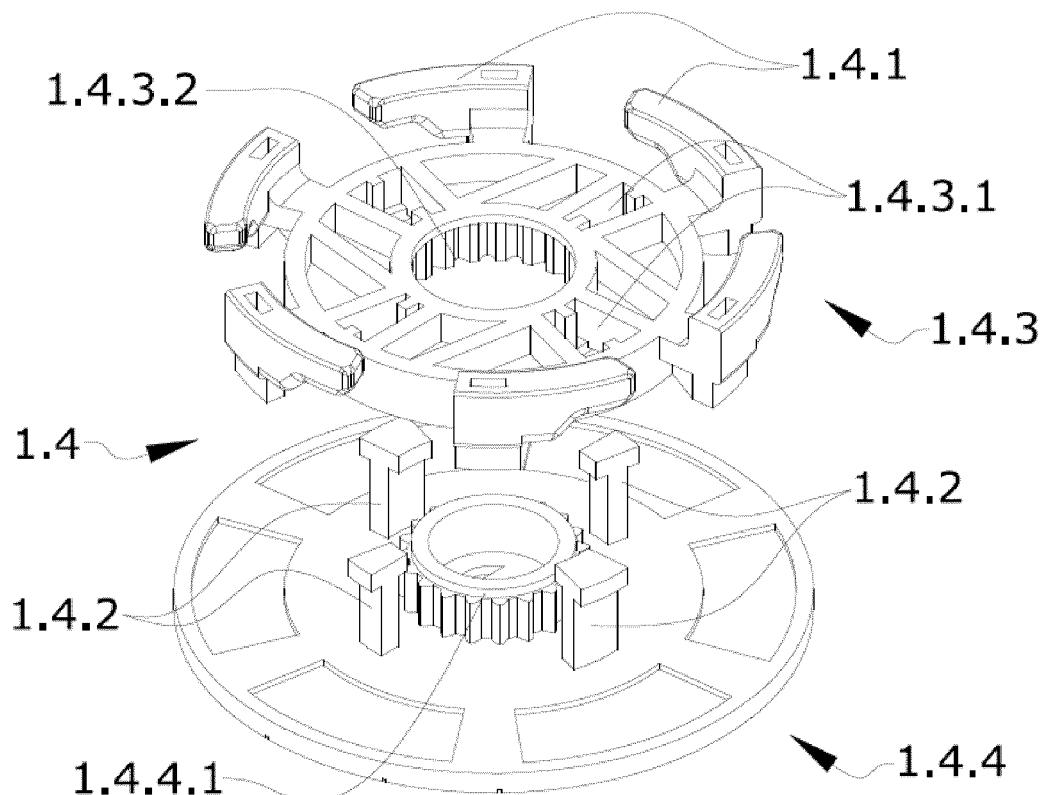


FIG.4a

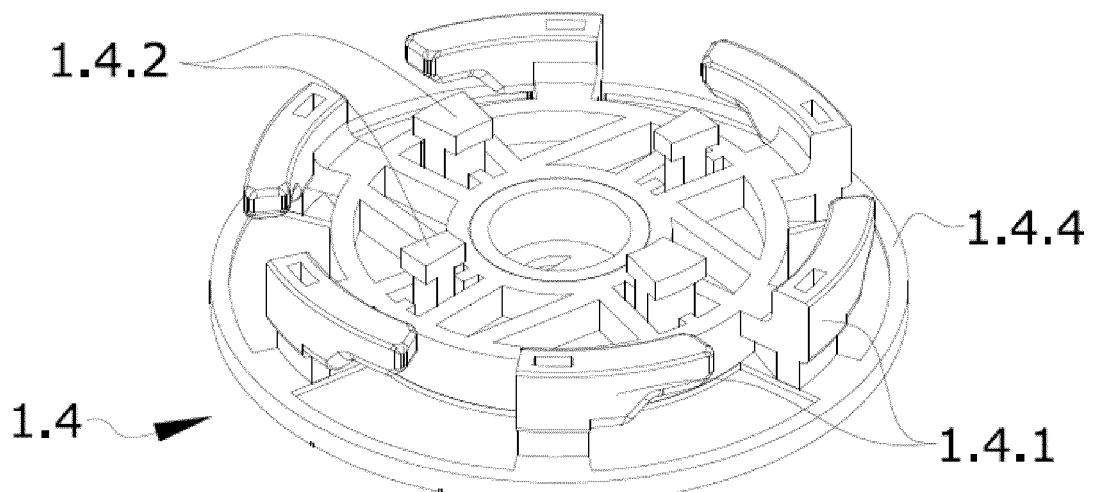


FIG.4b

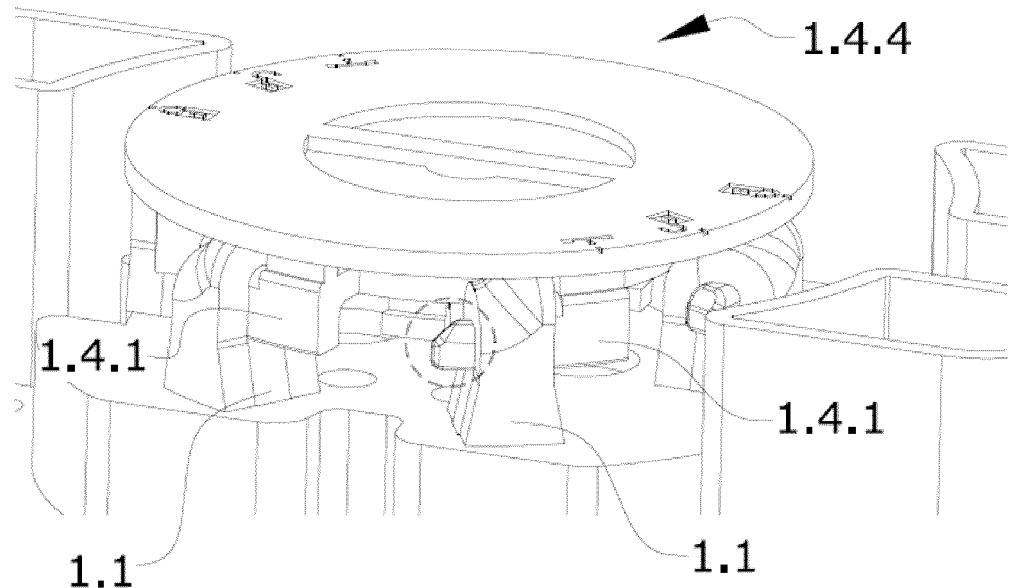


FIG.5a

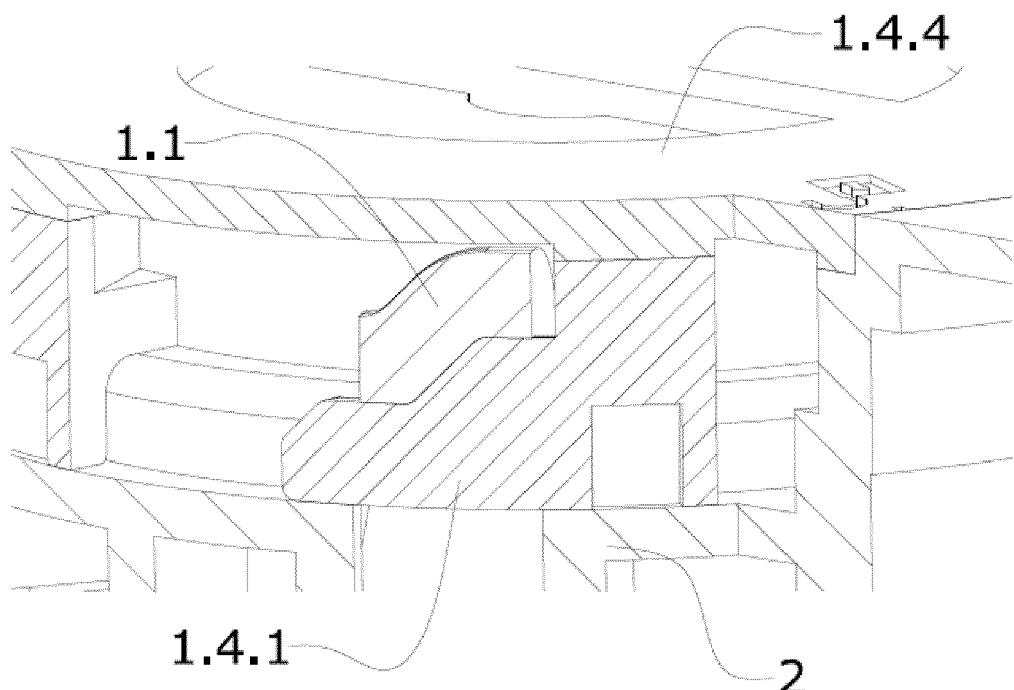
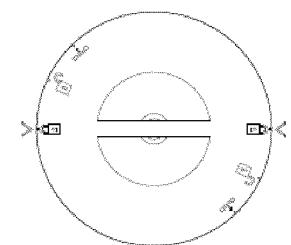
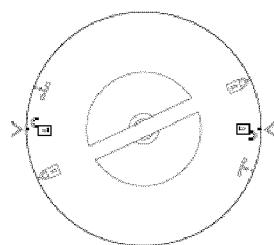
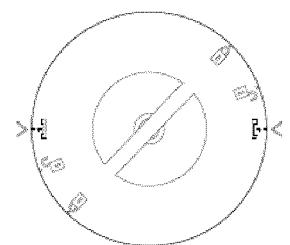
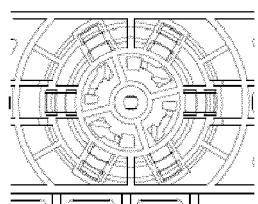
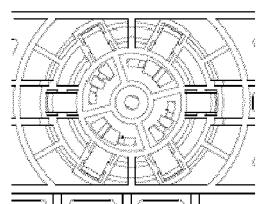
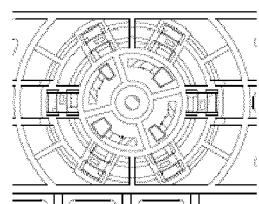
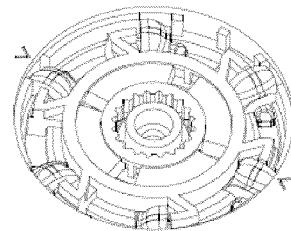
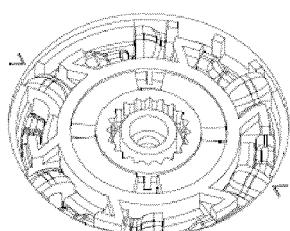
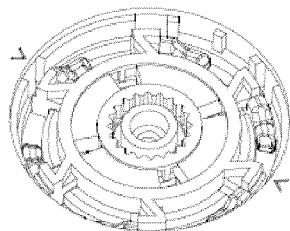


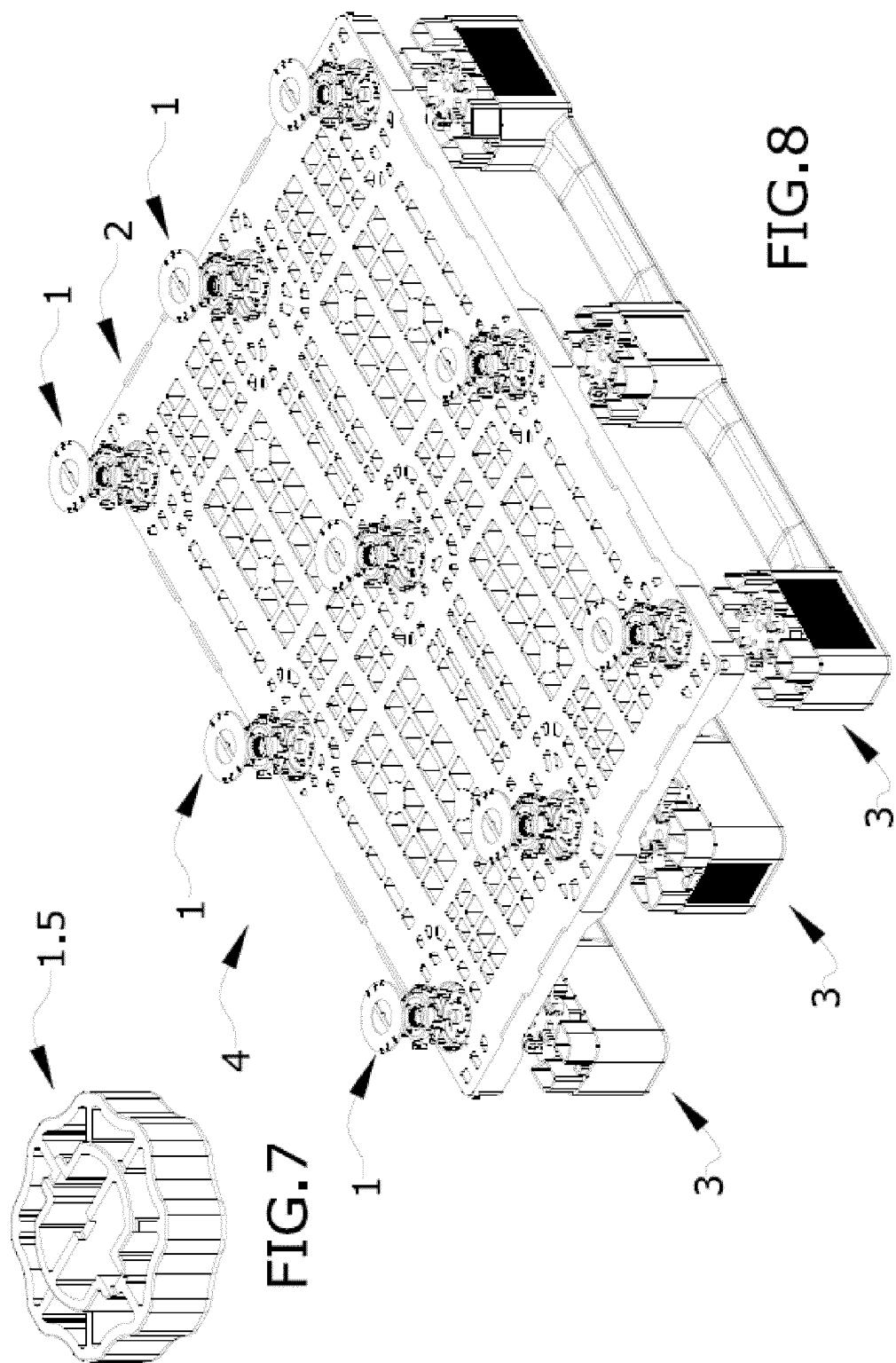
FIG.5b



**FIG.6a**

**FIG.6b**

**FIG.6c**





## EUROPEAN SEARCH REPORT

Application Number

EP 19 38 2236

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55	Place of search Munich	Date of completion of the search 27 August 2019	Examiner Fitterer, Johann
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