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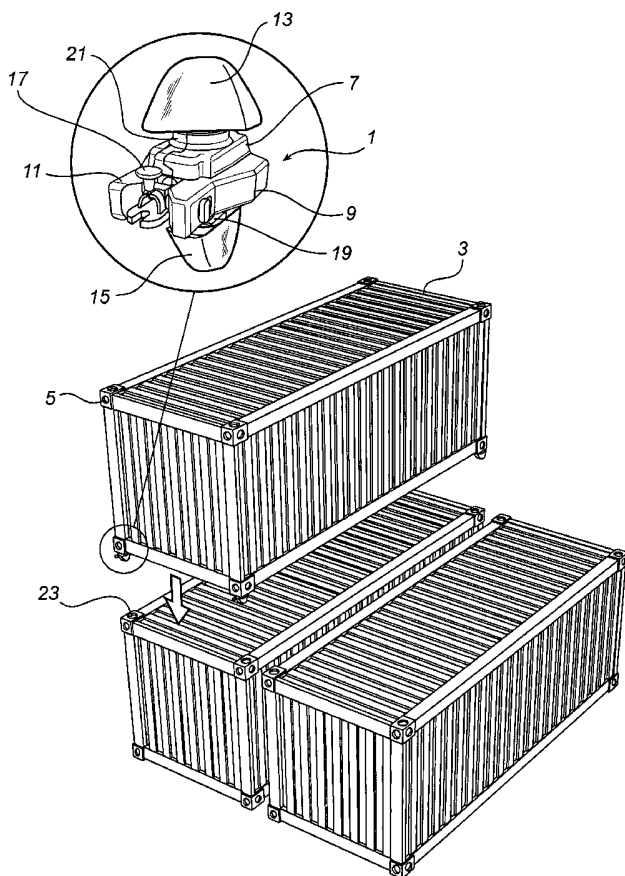
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(54) Title: TWISTLOCK HOUSING



(57) Abstract: The present invention relates to a twist-
lock device (1) to be connected to a corner fitting (5) of
a container (3), comprising at least a first and a second
housing part (9, 11; 109, 111; 209, 211), which housing
parts (9, 11; 109, 111; 209, 211) abut against each other
and form a housing (7; 107), by being interconnected by
at least one locking means (25; 125), said housing (7; 107)
enclosing parts of a rotatable engaging part (13, 15) which
is at least partially insertable into and releasable in said
corner fitting (5), the engaging part (13, 15) being rotat-
ably mounted in said housing (7; 107) by means of a shaft
portion (19) extending into the same, wherein said locking
means (25; 125) is elongate and in its transverse direction
laterally displaced relative to said shaft portion (19), the
locking means (25; 125) being movable towards and away
from the shaft portion (19) and yieldably loaded in one of
these directions.



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TWISTLOCK HOUSINGTechnical Field

The present invention relates to a twist-lock device to be connected to a corner fitting of a container, comprising at least a first and a second housing part, which
5 housing parts abut against each other and form a housing by being interconnected by at least one locking means, said housing enclosing parts of a rotatable engaging part which is at least partially insertable into and releas-
10 rotatably mounted in said housing by means of a shaft portion extending into the same.

Background Art

When transporting goods, for instance, on cargo
15 ships, trains and trucks, part-load, freight and thermo-containers are used to a great extent. Such containers are easy to handle in loading and unloading due to standardised sizes and a robust construction that allows stacking of a plurality of containers on top of each
20 other. Stacking of containers also occurs in storing of goods in containers. This design of containers, which are often referred to as ISO containers, allows the transported goods to be well protected in transport and also in loading and unloading.

25 Containers of the type described above are usually rectangular with floor, roof, two side walls and two end walls. One end wall usually consists of a door portion which is often formed as a pair of doors, each door of the pair of doors being hinged to opposite edges of the
30 end wall in question. Corner fittings are usually arranged at the corners of the container and allow connecting and lashing of containers.

To connect and lash two or more containers, use is made of equipment comprising a lockable coupling which

can be inserted into and locked to a corner fitting of an ISO container.

WO9615052 discloses such a lockable coupling, often referred to as a twist-lock, which is adapted to be fixed to a corner fitting of a container. The described lock-
5 able coupling is provided with two locking portions designed as helical cones which are adapted to be moved into locking engagement with standardised corner fittings of what is referred to as ISO containers. The two helical
10 cones are connected by means of a spring-loaded shaft portion which is rotatably mounted in a housing. The housing, which accommodates parts of, and constitutes support for, the spring-loaded shaft portion, consists of two housing halves which are screwed together by
15 screws extending through one half, said screws being received in threaded holes in the corresponding other half.

In today's transport systems, involving, for example, ships that can take several thousands of containers, the containers are stacked on top of each other in order
20 to maximally use the available space. For this method of loading to be safe in transport, each container is connected to at least one neighbouring container, or to the transport vehicle, by means of, for example, lockable
25 couplings of the above type. Consequently, the stacked containers are locked to each other and to the transport vehicle, thereby providing a stable connected three-dimensional transport stack. It is currently not unusual for about ten thousand lockable couplings to be used on
30 one and the same ship. This means that small reductions of the cost of each lockable coupling may yield great economic profits on a larger scale.

There is also a need for the possibility of repairing these lockable couplings if they break owing to, for
35 example, wear or tough handling. These couplings that are lockable to the corner fittings of a container are often used in outdoor environments that may cause, for example,

corrosion of the lockable coupling. There is thus a risk that the two housing halves are difficult to release from each other if maintenance is required and therefore can make time-consuming and expensive efforts necessary.

5 It is thus desirable to provide lockable couplings of the type described above which are inexpensive to manufacture and easy to maintain and service.

Summary of the Invention

10 An object of the present invention is to provide a twist-lock device that can be manufactured at low cost.

Another object of the present invention is to provide a twist-lock device with low weight.

15 A further object is to provide a twist-lock device which is easy to mount and dismount.

Yet another object is to provide a twist-lock device of compact structure.

20 The above objects and other objects that will be evident from the following description are achieved by a twist-lock device to be connected to a corner fitting of a container according to the appended claims.

According to one aspect of the invention, a twist-lock device is provided to be connected to a corner fitting of a container, comprising at least a first and a
25 second housing part, which housing parts abut against each other and form a housing by being interconnected by at least one locking means, said housing enclosing parts of a rotatable engaging part which is at least partially insertable into and releasable in said corner fitting,
30 the engaging part being rotatably mounted in said housing by means of a shaft portion extending into the same, wherein said locking means is elongate and in its transverse direction laterally displaced relative to said shaft portion, the locking means being movable towards
35 and away from the shaft portion and yieldably loaded in one of these directions.

This results in a twist-lock device having a simple structure and requiring only a few operations to be manufactured. The reduced efforts mean, in turn, that the cost of each twist-lock device can be reduced, which for
5 a complete loading system consisting of, for example, thousands of containers, results in considerable savings.

Furthermore the twist-lock device according to the invention allows a reduced consumption of materials, thereby reducing weight and cost of materials. A reduced weight is desirable in order to simplify manual handling of the twist-lock devices, when, for example, they are inserted and removed from the corner fittings of a container.

In one embodiment, said elongate locking means is
15 formed at its ends with coupling portions widened at least in one direction. Moreover, said locking means is preferably arranged to be engaged with the first housing part and the second housing part from a disengaged position to an engaged position, and vice versa, to allow
20 connection and disconnection of said housing parts. This provides a simple and efficient mounting and dismounting method for the twist-lock device.

It will be appreciated by a person skilled in the art that said widened coupling portions can be formed in
25 various ways. For instance, these widened coupling portions can be integrally formed with the locking means. It is also possible to obtain such a coupling portion as a separate integral part by arranging an element on the locking means to provide the widened coupling portions,
30 which element may consist of, for example, a nut, a cotter pin, a locking ring, a circlip, a split pin etc. It is also possible to obtain said widened coupling portions by deforming the locking means after bringing the housing parts together.

35 Moreover it is preferred that each housing part at least at one side is provided with projecting opposite

engaging portions, which are arranged to engagingly cooperate with the respective ends of said locking means.

In a preferred embodiment, said engaging portions of said housing parts are provided with recesses for form-fitting engaging cooperation with the respective ends of
5 said locking means, said recesses having an extent in at least one direction that allows the locking means to move in said direction towards and away from the shaft portion. A twist-lock device of this type thus reduces the
10 risk that the locking means, after being used for a long time, necessitates extensive efforts in dismounting owing to, for example, corrosion, which can be the case when using conventional fastening elements, such as bolts received in threaded holes in one of the halves of the
15 housing, for connecting the housing parts to each other.

Moreover said recesses are preferably formed through the respective engaging portions. According to one embodiment, said locking means is designed as a quick coupling.

20 Preferably said locking means is so elongate as to grasp said engaging portions, and the locking means in its engaged position extends with its longitudinal axis transversely to the parting plane of the housing and is movable between a disengaged position and an engaged
25 position. The elongate shape of the locking means allows the locking means in its engaged position to extend through the respective housing halves to connect them to each other in a form-fitting manner. The rotation between the disengaged position and the engaged position results,
30 in a preferred embodiment, in the locking means first being placed between the parts of the housing and after that, by a simple operation, being turned in place in order to connect the housing parts to each other.

In one embodiment, the locking means is arranged
35 to be rotatable about its longitudinal axis so as to be moved into locking engagement with the first and the second housing part. Preferably, the projecting engag-

ing portions of each housing part are formed with oval through holes for holding corresponding end portions of the locking means. When interconnecting the two housing parts according to this embodiment, the ends of the locking means are inserted into the respective oval holes of the housing parts, after which the locking means is rotated, preferably through 90°, to allow its ends to form-fittingly engage the engaging portion of the respective housing parts. It will be appreciated that the through holes arranged in the engaging portions and the ends of the locking means can be designed in various ways to allow a form-fitting engagement in rotation of the locking means, and therefore that mentioned above should be considered an exemplary embodiment.

In an alternative embodiment, the locking means is rotatably arranged so that the motion of its longitudinal axis forms a plane substantially transversely to a joint surface between the housing parts to move said locking means into locking engagement with the first and the second housing part. Preferably, the projecting engaging portion of each housing part is formed with an open through slot extended from one lateral edge inwards to the centre of the housing.

In a further alternative embodiment, said locking means is spring-loaded against an engaged position. Moreover said locking means is in said engaged position preferably yieldably retained by said spring load. It is also preferred that said locking means forms a guide for an actuating means which extends to the inner parts of the housing and is arranged to actuate said rotatable engaging part. The applied spring force allows the locking means to be safely held in place in its engaged position. The spring force can preferably also be used to absorb any turning shock loads that are applied to the engaging part of the twist-lock device. In the case that the engaging part is subjected to turning shock loads, the locking means is moved towards the spring force act-

ing on the locking means into the housing, thereby compressing the spring. The spring load applied to the locking means is preferably obtained by means of a helical spring.

5 In one embodiment, the first housing part and the second housing part are hingedly connectable to each other by a grip coupling on the opposite side of said shaft portion in relation to said locking means. The grip coupling is preferably designed as grip hooks that can be
10 inserted into each other. Preferably, said grip coupling is a swing joint. Moreover, a joint surface between the first housing part and the second housing part is preferably formed with at least one opposite complementary difference in level to counteract displacement of the housing parts relative to each other parallel to said joint
15 surface. In a preferred embodiment, said difference in level consists of at least one projecting lug which is form-fittingly held in at least one opposite complementary recess. The preferred grip hooks allow simple inter-
20 connection of the housing parts, in which the number of locking means can be reduced compared with prior-art technique.

Preferably, the first housing part and the second housing part are symmetrical along a parting plane
25 between the housing parts. The symmetric shape means that the two housing halves of the twist-lock device are designed with substantially the same geometry, which makes it possible to avoid that two separate halves with different geometries fitting into each other have to be
30 manufactured.

The above-described twist-lock device to be connected to a corner fitting of a container is preferably manufactured by forging or casting of iron.

Brief Description of the Drawings

Preferred embodiments will in the following be described in more detail with reference to the accompanying exemplary drawings, in which

5 Fig. 1 schematically shows in perspective how an ISO container provided with corner fittings can be connected to a neighbouring container by means of twist-lock devices according to the invention.

10 Fig. 2a schematically shows in perspective a first housing part, a second housing part, a spring element and a coupling means for an embodiment of a twist-lock device according to the invention to be connected to existing corner fittings of an ISO container.

15 Fig. 2b schematically shows in perspective a hook-shaped grip coupling for hinged joining of the first housing part and the second housing part.

20 Figs 3a-3c schematically show in perspective a sequence of how a first housing part and a second housing part according to an embodiment of the twist-lock device according to the invention are interconnected by a locking means.

25 Figs 4a-4b schematically show in perspective a sequence of how a first housing part and a second housing part according to an alternative embodiment of the twist-lock device according to the invention are inter-
30 connected by a locking means.

Fig. 5 shows an alternative hook-shaped grip coupling for hinged joining of the parts of the housing.

Detailed Description of Preferred Embodiments

The invention will now for the purpose of exemplification be described in more detail by means of examples and with reference to the accompanying drawings.

5 An embodiment of a twist-lock device 1 according to the invention to be connected to existing corner fittings 5 of an ISO container 3, said twist-lock device 1 being shown in Fig. 1, usually comprises a housing 7 which consists of two housing parts 9, 11, a first rotatable locking head 13 and an opposite, second rotatable locking head 15. Furthermore the twist-lock device preferably comprises an actuating means 17 to actuate at least one of said first and second locking heads 13, 15. Said first and second locking heads 13, 15 are arranged at the
10 respective ends of a rotatable shaft portion 19 which is partly accommodated in the housing 7, which constitutes a pivot bearing 21 for said rotatable shaft portion 19.

15 Moreover the rotatable shaft portion 19 is preferably spring loaded in relation to the housing 7 in such a manner that the first and second locking heads 13, 15 by the spring load always strive to take a locked position in relation to a corner fitting 5 of a container 3 which they are intended to be inserted into and locked to.

25 In one embodiment, the locking heads 13, 15 are designed as substantially helical rectangular cones, whose length and width are smaller than the length and width of corresponding rectangular coupling holes 23 of a corner fitting 5 of a container 3 which they are adapted to be inserted into. The locking heads 13, 15 can
30 also be designed as oval helical cones which are adapted to be inserted into corresponding, at least slightly larger oval or rectangular coupling holes 23 of a corner fitting 5.

35 The shape of the locking heads 13, 15 and the spring-loaded shaft portion 19 provide a twist-lock device 1 which allows the locking heads 13, 15 to be

automatically made to rotate from their original locked position to a position in which the locking heads 13, 15 can pass through the coupling hole 23 in the corner fitting 5 of a container 3 when, for example, two containers 5 3 are stacked one upon the other. As soon as the locking head 13, 15 has been moved past the inner edge of the coupling hole 23 of the corner fitting 5, the locking head 13, 15 is rotated back to its locked position by the spring force applied inside the housing 7 to the spring-loaded shaft portion 19. In the locked position of the 10 locking head 13, 15, its base is in form-fitting engagement with the inner edge of the coupling hole 23 of the corner fitting 5. The rotation from the locked position to the insertable position of the locking head 13, 15 arises when this is forcefully applied to the edge of a corner fitting of a container 3, whereby the shape of the locking head 13, 15 causes this to rotate in such a manner that a position is reached, which allows further insertion into the corner fitting 5 through the coupling 20 hole 23.

As shown in Fig. 1, an upper container is placed on top of a lower container in the stacking of containers. The upper container is provided with twist-lock devices 1 according to the invention in each corner of the container side which is directed towards the lower container. When the upper container is lowered substantially 25 centrally above the lower container, the end of the locking head 13, 15 of each twist-lock device 1 will be inserted into the coupling hole 23 of the corresponding corner fitting 5 of the lower container. The preferred 30 pointed shape of the locking heads 13, 15 causes the upper container to be directed to a correct loading position in relation to the lower container. In the continued lowering of the upper container, the locking heads 13, 15 will be rotated gradually, as described above, to allow 35 further insertion into the corner fitting 5 of the lower container. As soon as the locking head 13, 15 of each

twist-lock device 1 of the upper container has been inserted inside the inner edge of the coupling hole 23 of the corresponding corner fitting 5 of the lower container, the locking head 13, 15 is rotated to its locked position, whereby the upper container and the lower container are lashed to each other. It will be appreciated that an equivalent method can also be applied to lash two juxtaposed containers.

When unloading an upper container arranged on top of a lower container it is, in the embodiment according to Fig. 1, necessary to unlock each twist-lock device 1 in such a manner that they can be released from the lower container as the upper container is being raised. This is done by each locking head 13, 15 which engages the corner fittings of the lower container being rotated and retained in a position where they can freely pass out through the coupling holes 23 of the respective corner fittings 5 of the lower container. The rotating and retaining of the locking head 13, 15 occur by an actuating means 17 which is rotatably connected to the spring-loaded shaft portion 19 enclosed in the housing 7. When the locking heads 13, 15 which are engaged with the corner fittings 5 of the lower container have been rotated to and retained in their position of removal, each locking head 13, 15 can be removed through the coupling hole 23 of a corresponding corner fitting 5 of the lower container when the upper container is being raised to be unloaded.

Figs 2a and 2b illustrate an embodiment of the first and the second housing part 9, 11 and a locking means 25 which is designed as a quick coupling, to interconnect the two housing parts 9, 11 of a twist-lock device 1 according to the invention. Each housing part 9, 11 consists of a central portion 27 and two shaft bearing portions 29, 31 positioned on either side of the central portion 27. The shaft bearing portions 29, 31 are formed as semi-circular recesses, a throughgoing circular shaft pivot bearing 21 being formed in the joined position of

the first and the second housing part 9, 11. The design of the locking means 25 as a quick coupling according to this embodiment allows the locking means 25 to be actuable in only a few simple operations.

5 In the shown embodiment, the housing parts 9, 11 are articulated to each other at one short side by means of a hook-shaped grip coupling 33. Preferably one housing part is provided with a projecting portion whose end forms a male portion 35 of a hook, which is received in a corresponding female recess 37 formed in the other housing
10 part.

At the short side opposite to the above-mentioned hook-shaped grip coupling 33, the housing parts are provided with engaging portions 39, 41 which project from
15 the respective housing parts 9, 11. In the connected position of the housing parts 9, 11, the two engaging portions 39, 41 are positioned opposite to each other to allow interconnection of the housing parts 9, 11 by a locking means 25. Each engaging portion 39, 41 is accord-
20 ing to the embodiment shown in Figs 2a and 2b provided with oval through holes 43, 45, which are arranged substantially opposite to each other and extend in the direction of extension of the engaging portions 39, 41 from the respective housing parts 9, 11.

25 In the embodiment according to Figs 2a, 2b, the locking means 25 is shaped as an elongate pin whose ends are provided with coupling portions 47, 49 which are widened in at least one direction and preferably have an oval shape substantially corresponding to the shape of
30 the holes 43, 45 in the engaging portions 39, 41 of the housing parts 9, 11. The oval coupling portions 47, 49 of the locking means 25 have a shape that allows them in a first free position to be passed through the oval holes 43, 45 of the engaging portions 39, 41 of the housing
35 parts 9, 11, and in a second locked position, which is rotated relative to the first position, to be prevented

from being passed through said oval holes 43, 45 by form-fitting engagement.

Figs 3a, 3b illustrate how the two housing parts 9, 11 in one embodiment of the twist-lock device 1 according to the invention are connected to each other by the locking means 25. When interconnecting the housing parts 9, 11, the locking means 25 is oriented so that one of the oval coupling portions 47, 49 can be passed through the oval holes 43, 45 of one housing part. Subsequently the two housing parts 9, 11 are joined, as shown in Fig. 3a, by means of the hook-shaped grip coupling 33, whereby the two housing parts 9, 11, by means of the grip coupling 33 arranged at one short side, are articulated to each other and movable between an open position and a closed position.

To connect the housing parts 9, 11 to each other, the first housing part and the second housing part are then brought together, the other oval coupling portion of the locking means 25 being passed through the oval hole of the second housing part. In the joined position of the housing parts according to Fig. 3b, the locking means 25 extends through the two engaging portions 39, 41, the oval coupling portions 47, 49 being positioned on the side of the respective housing parts 9, 11 which is facing away from the housing 7. In this position, the locking means 25 is rotated so that the oval coupling portions 47, 49 are oriented transversely to the oval holes 41, 43 of the respective housing parts, whereby the two housing parts 9, 11 are connected to each other by an action form-fitting to the locking means 25, which is shown in Fig. 3c.

It will be appreciated that the housing parts 9, 11 can also be connected to each other by the hook-shaped grip coupling 33 being brought into engagement before the locking means 25 is inserted into one housing part. In this case, one oval coupling portion of the locking means 25 is inserted, after joining of the housing parts 9, 11,

first into the oval recess of one housing part and then the housing parts 9, 11 are joined so as to grasp also the other oval coupling portion of the locking means 25.

It will also be appreciated that other necessary
5 parts of the twist-lock device 1 according to Fig. 1 are arranged inside the housing 7 when the housing parts 9, 11 are connected to each other.

In one embodiment, a lead-in is arranged substantially in the centre of the longitudinal direction of
10 the locking means 25 for guiding an actuating means 17 extending into the interior of the housing. In the embodiment shown in Figs 1-2b, the guide consists of a lead-in portion 51 with a guiding through hole 53 for holding a wire which extends from the inside of the housing to
15 the outside thereof to allow actuation of the first and second locking heads 13, 15 of the twist-lock device 1, which are shown in Fig. 1, which are adapted to be at least partially inserted into a corner fitting of a container. Said wire is connected to the shaft portion 19
20 which connects the two locking heads, the wire allowing a power-transmitting effect in actuation to rotate the locking heads 13, 15.

To lock the locking heads 13, 15 in predetermined positions, said lead-in portion 51 is provided with a
25 wire lock in the form of a through recess 55 which extends through an edge of the lead-in portion 51 out of the housing 7. The wire lock is arranged to allow locking of the wire of the actuating means 17 in a first position where one locking head of the twist-lock device 1 is in
30 an open position in relation to a corner fitting 5 of a container 3 and a second position where the second locking head of the twist-lock device 1 is in an open position in relation to a corner fitting 5 of a container 3. Preferably the twist-lock device 1 is formed with four
35 recesses which are equidistantly spaced from each other by 90° around the wire lead-in. In the case that one of the locking heads 13, 15 should be rotated to and retain-

ed in an open position, the wire can be pulled out of the housing 7 and be moved to be locked in a suitable recess 55 of the wire lock by means of, for instance, a sleeve (not shown) arranged on the wire and brought into blocking engagement with one of the recess 55 of the wire lock. Said sleeve on the wire is preferably connected to the wire by squeezing.

Moreover the locking means 25 according to Figs 1-2b is spring-loaded in relation to the housing 7 by means of a helical spring element 57 which is arranged in a substantially circular seat 59 extending into the housing 7. The helical spring element 57 is clamped with its one circular end face against the housing 7 and with its other circular end face against the lead-in portion 51 of the locking means, the locking means 25 being provided with a circular guide 61 for guidingly holding the spring 57. The spring load contributes to retain the locking means 25 in its engaged position by pressing in a spring-loaded manner the locking means 25 in the longitudinal direction of the oval holes 43, 45 out of the housing 7. The spring load also allows the locking means 25 in its engaged position to be yieldably retained to be able to absorb any shock loads applied to the locking heads 13, 15. The yieldable spring-loaded attachment of the locking means 25 thus allows such an applied shock load to be absorbed by transverse displacement of the coupling portions 47, 49 of the locking means and the lead-in portion 51 inwards to the housing 7.

In an embodiment according to Fig. 2a, the guide 61 of the locking means is provided with a bevelled edge to allow the spring 57 to be pressed back when the locking means 25 is rotated from the open position to the locked position.

The housing parts 9, 11 as shown in Figs 1-2b are arranged with complementary lugs 63 and recesses 65, respectively, which are engaged with each other in a form-fitting manner in the joined position of the housing

parts 9, 11. The recesses 65 and the lugs 63 prevent the housing parts 9, 11 from being displaced relative to each other along the joint surface formed between them in the connected position.

5 Figs 4a-4c show a twist-lock device 1 according to the invention with an alternative embodiment of the housing parts 109, 111 and the locking means 125. In addition to the housing parts 109, 111 and the locking means 125, the twist-lock device is arranged with elements similar
10 to those of the twist-lock device 1 according to Fig. 1. Merely differences between the embodiment shown in Figs 3a-3c and the embodiment shown in Figs 4a-4c will be described below.

In the same way as in the embodiment according to
15 Figs 3a-3c above, the housing parts 109, 111 according to Figs 4a-4c are at the short sides opposing the hook-shaped grip coupling 133 provided with engaging portions 139, 141 projecting from the respective housing parts 109, 111 to allow interconnection of the housing parts
20 109, 111 by a locking means 125. Each engaging portion 139, 141 is in this embodiment provided with an open engaging through slot 143, 145 extending from the lateral edge inwards. Preferably, the engaging slot 143, 145 is bent at right angles away from the housing 107. When the
25 two housing parts 109, 111 are joined to form the housing 107, the engaging slots 143, 145 of the respective housing parts 109, 111 extend in opposite directions through the lateral edge of each engaging portion 139, 141.

30 In the embodiment shown in Figs 4a-4b, the locking means 125 is formed as an elongate pin, whose ends are provided with coupling portions 147, 149 which extend outside the pin and which in the shown embodiment have a rounded shape.

35 When connecting the two housing parts 109, 111 to each other by the locking means 125, the two housing parts 109, 111 are first brought together by means of

the hook-shaped grip coupling 133. Subsequently the locking means 125 is inserted between the engaging portions 139, 141 of the two housing parts, after which the hingedly interconnected housing parts 109, 111 are moved from an open position to a closed position, which is shown in Fig. 4a. Then the locking means 125 is rotated into the engaging through slots 143, 145 which extend inwards from the edge of the engaging portion 139, 141 of each housing part. The locking means 125 is inserted into the respective engaging slots 143, 145 by rotation in a plane that is substantially transverse to the joint surface between the housing parts 109, 111. When the locking means 125 has been rotated to a position where it extends substantially perpendicular relative to the joint surface between the housing parts 109, 111, the locking means 125 is moved transversely into the bent part of said engaging slots 143, 145 away from the housing 107 to its engaged position.

Besides the embodiment according to Figs 4a-4c has a structure equivalent to that of the embodiment according to Figs 1-2b with regard to the lead-in arranged on the locking means and adapted to guide the actuating means, the wire lock, the hook-shaped grip coupling, the spring-loaded retaining of the locking means, the retaining, yieldable in the locked position, of the locking means to allow compensation for shock loads and the arrangement of differences in level to counteract displacement of the housing parts relative to each other in the joint surface, and therefore these functions will not be additionally described for the embodiment according to Figs 4a-4c.

In an embodiment shown in a partial view in Fig. 5, the housing parts 209, 211 are articulated to each other at one short side by means of a hook-shaped grip coupling 233. The grip coupling is formed with a male portion 235 and a female portion 237 arranged on the respective housing parts. When bringing the housing parts 209, 211 toge-

ther, the male portion 235 of a housing part 209, 211 is received in the corresponding female portion 237 of the opposite housing part 209, 211. This embodiment allows the portions of the first housing part and the second
5 housing part which together form the grip coupling 233 to mirror each other along the joint surface between the housing parts 209, 211.

In another alternative embodiment of the invention (not shown) it is possible to provide the engaging portions, in the connected position of the housing parts,
10 with open engaging through slots extended inwards at the same side of the housing from the lateral edge, said engaging slots preferably being bent at right angles away from the housing. In this alternative embodiment, the
15 locking means is inserted for connecting the housing parts to each other by a substantially transverse motion transversely to the longitudinal direction of the locking means into the engaging slots to an engaged position, in contrast to the embodiment shown in Figs 4a-4c where the
20 locking means in a first position according to Fig. 4a is rotated into the engaging slots to its engaged position.

It will be appreciated by a person skilled in the art that a twist-lock device 1 according to the invention also comprises other designs than those described above,
25 for instance the kind of twist-lock device which merely comprises one locking head turnable by an actuating means.

It will also be appreciated by a person skilled in the art that the actuating means can be arranged in
30 various ways; for instance a lever extending into the housing can be connected to the shaft portion positioned in the housing. By operating the lever, a rotation can be transferred to at least one locking head connected to said shaft portion.

35 Moreover it is obvious to a person skilled in the art that it is possible to perform loading and unloading, as described above in connection with Fig. 1, where the

lower container is provided with twist-lock devices 1 according to the invention. In this case, the upper container is lowered towards said lower container to be brought into locking engagement with said twist-lock devices by means of the corner fittings arranged on the upper container. In unloading, it is in the same way possible to unlock and retain the locking head in such a manner that the twist-lock device can be released from the upper container as this is raised from the lower container.

CLAIMS

1. A twist-lock device (1) to be connected to a corner fitting (5) of a container (3), comprising at least a first and a second housing part (9, 11; 109, 111; 209, 211), which housing parts (9, 11; 109, 111; 209, 211) abut against each other and form a housing (7; 107) by being interconnected by at least one locking means (25; 125), said housing (7; 107) enclosing parts of a rotatable engaging part (13, 15) which is at least partially insertable into and releasable in said corner fitting (5), the engaging part (13, 15) being rotatably mounted in said housing (7; 107) by means of a shaft portion (19) extending into the same, characterised in that said locking means (25; 125) is elongate and in its transverse direction laterally displaced relative to said shaft portion (19), the locking means (25; 125) being movable towards and away from the shaft portion (19) and yieldably loaded in one of these directions.

2. A twist-lock device (1) as claimed in claim 1, wherein said locking means (25; 125) is at its ends formed with coupling portions (47, 49; 147, 149) widened at least in one direction.

3. A twist-lock device (1) as claimed in claim 1 or 2, wherein said locking means (25; 125) is arranged to be engaged with the first housing part and the second housing part (9, 11; 109, 111; 209, 211) from a disengaged position to an engaged position, and vice versa, to allow connection and disconnection of said housing parts (9, 11; 109, 111; 209, 211).

4. A twist-lock device (1) as claimed in any one of the preceding claims, wherein each housing part (9, 11; 109, 111; 209, 211) at least at one side is provided

with projecting opposite engaging portions (39, 41; 139, 141), which are arranged to engagingly cooperate with the respective ends of said locking means (25; 125).

5 5. A twist-lock device (1) as claimed in claim 4, wherein said engaging portions (39, 41; 139, 141) of said housing parts (9, 11; 109, 111; 209, 211) are provided with holes/recesses (43, 45; 143, 145) for form-fitting
10 engaging cooperation with the respective ends of said locking means (25; 125), said recesses (43, 45; 143, 145) having an extent in at least one direction that allows the locking means (25; 125) to move in said direction towards and away from the shaft portion (19).

15 6. A twist-lock device (1) as claimed in claim 5, wherein said recesses (43, 45; 143, 145) are formed through the respective engaging portions (39, 41; 139, 141).

20 7. A twist-lock device (1) as claimed in any one of claims 1-6, wherein said locking means is a quick coupling.

 8. A twist-lock device (1) as claimed in any one of
25 claims 4-6, wherein said locking means (25; 125) is so elongate as to grasp said engaging portions (39, 41; 139, 141), and wherein the locking means (25; 125) in its engaged position extends with its longitudinal axis substantially transversely to the parting plane of the hous-
30 ing and is movable between a disengaged position and an engaged position.

 9. A twist-lock device (1) as claimed in any one of claims 1-8, wherein the locking means (25; 125) is
35 arranged to be rotatable about its longitudinal axis to be moved into locking engagement with the first and the second housing part (9, 11; 109, 111; 209, 211).

10. A twist-lock device (1) as claimed in any one of claims 4-9, wherein the projecting engaging portions (39, 41) of each housing part (9, 11; 209, 211) are formed with oval through holes (43, 45) for holding corresponding end portions of the locking means (25).

11. A twist-lock device (1) as claimed in any one of claims 1-8, wherein the locking means (25) is rotatably arranged so that the motion of its longitudinal axis forms a plane substantially transversely to a joint surface between the housing parts (9, 11; 209, 211) to move said locking means (25) into locking engagement with the first and the second housing part (9, 11; 209, 211).

12. A twist-lock device (1) as claimed in any one of claims 4-8 or 11, wherein the projecting engaging portion (139, 141) of each housing part (109, 111) is formed with an open through slot (143, 145) extended from one lateral edge inwards to the centre of the housing (107).

13. A twist-lock device (1) as claimed in any one of the preceding claims, wherein said locking means (25; 125) is spring-loaded against an engaged position.

14. A twist-lock device (1) as claimed in claim 13, wherein said locking means (25; 125) in said engaged position is yieldably retained by said spring load.

15. A twist-lock device (1) as claimed in any one of the preceding claims, wherein said locking means (25; 125) forms a guide for an actuating means (17) which extends to the inner parts of the housing (7; 107) and is arranged to actuate said rotatable engaging part (13, 15).

16. A twist-lock device (1) as claimed in any one of the preceding claims, wherein the first housing part

23

and the second housing part (9, 11; 109, 111; 209, 211) are hingedly connectable to each other by a grip coupling (33; 133; 233) on the opposite side of said shaft portion in relation to said locking means (25; 125).

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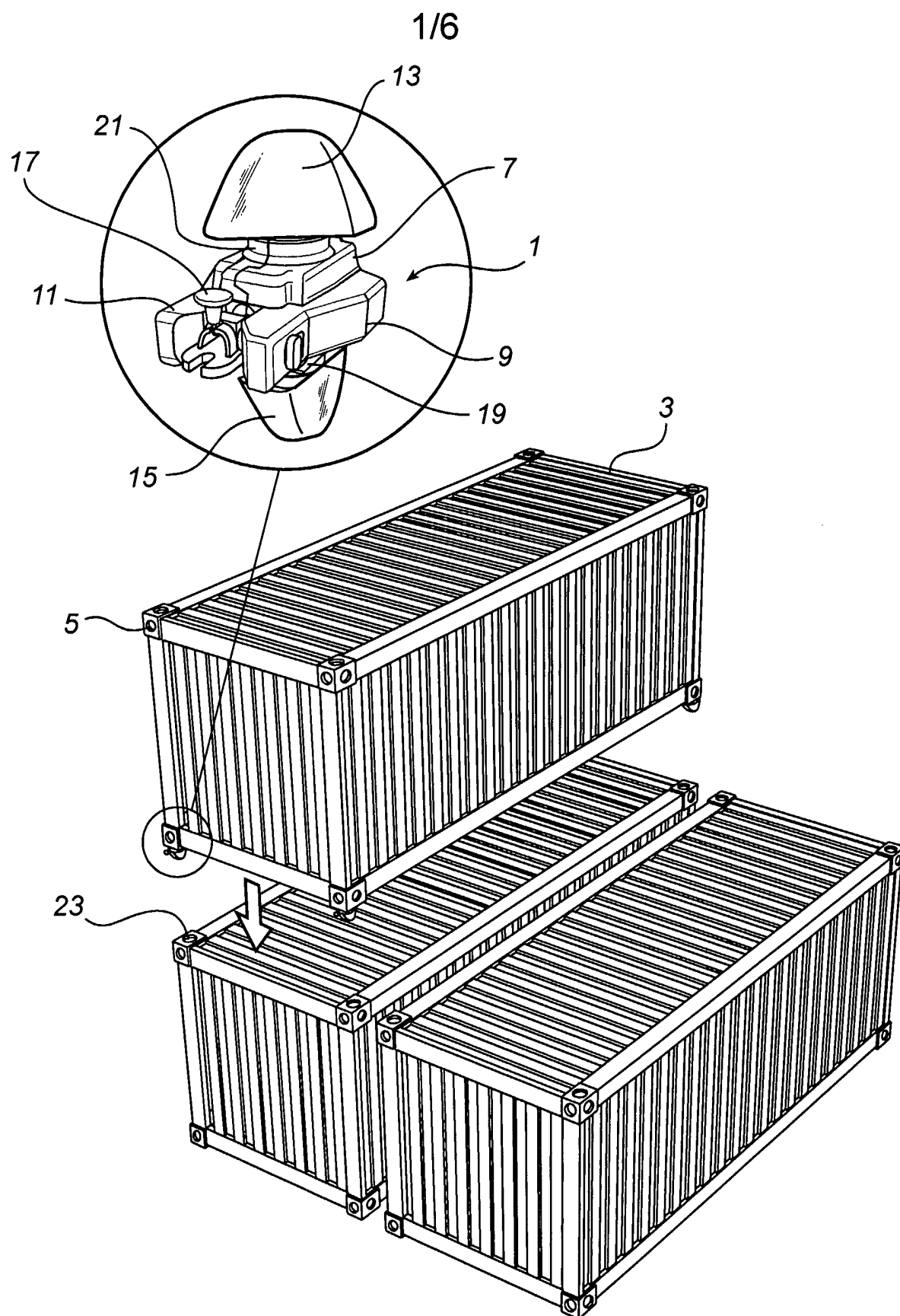
17. A twist-lock device (1) as claimed in claim 16, wherein said grip coupling is formed with grip hooks (35, 37; 235, 237) insertable into each other.

10 18. A twist-lock device (1) as claimed in claim 16 or 17, wherein said grip coupling (33; 133; 233) consists of a swing joint.

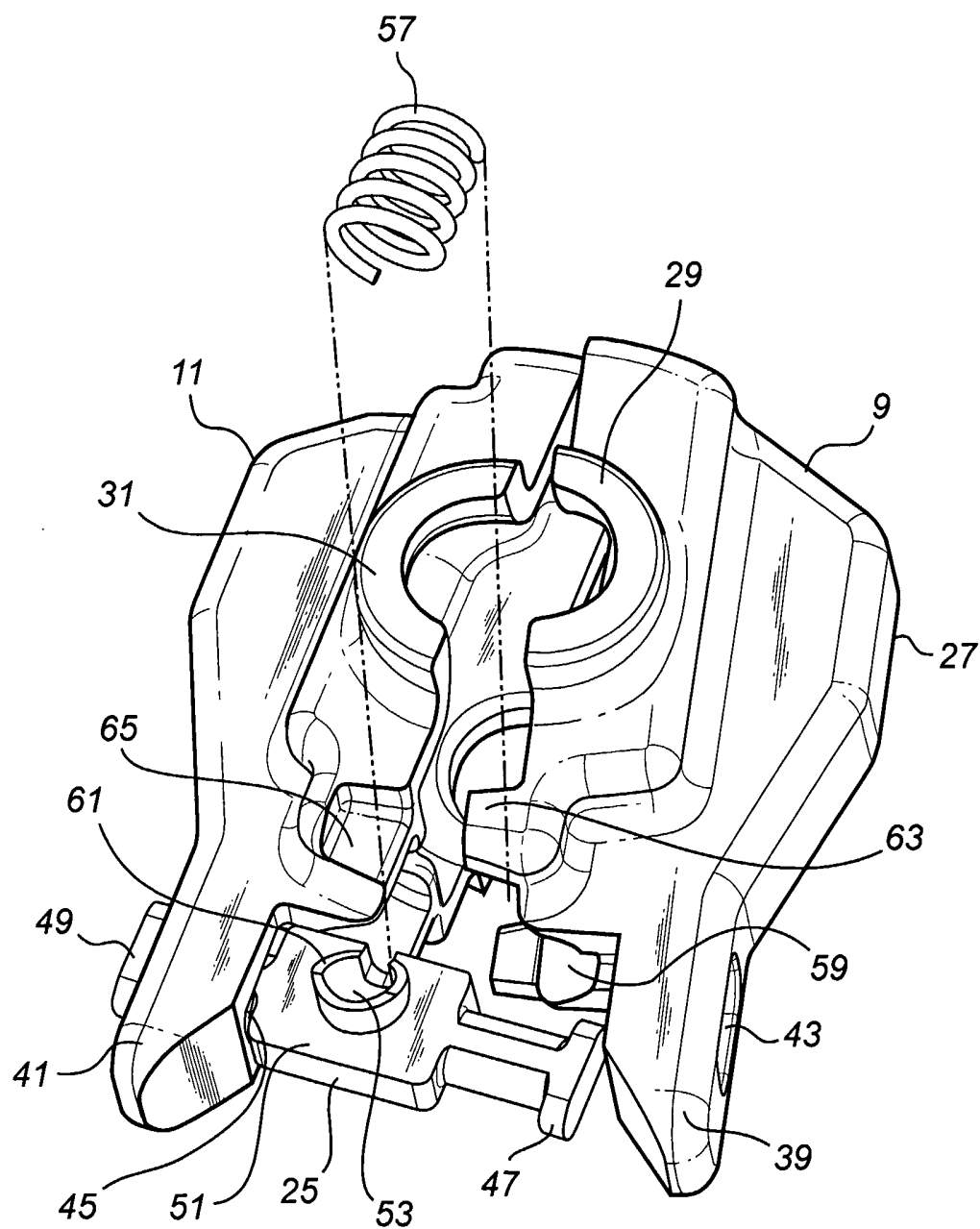
15 19. A twist-lock device (1) as claimed in any one of the preceding claims, wherein a joint surface between the first housing part and the second housing part (9, 11; 109, 111; 209, 211) is formed with at least one opposite complementary difference in level (63, 65) to counteract displacement of the housing parts (9, 11; 109, 20 111; 209, 211) relative to each other parallel to said joint surface.

20. A twist-lock device (1) as claimed in claim 19, wherein said difference in level consists of at least one
25 projecting lug (63) which is form-fittingly held in at least one opposite complementary recess (65).

21. A twist-lock device (1) as claimed in any one of the preceding claims, wherein the first housing part
30 and the second housing part (9, 11; 109, 111; 209, 211) are symmetrical along a parting plane between the housing parts (9, 11; 109, 111; 209, 211).

*Fig. 1*

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*Fig. 2a*

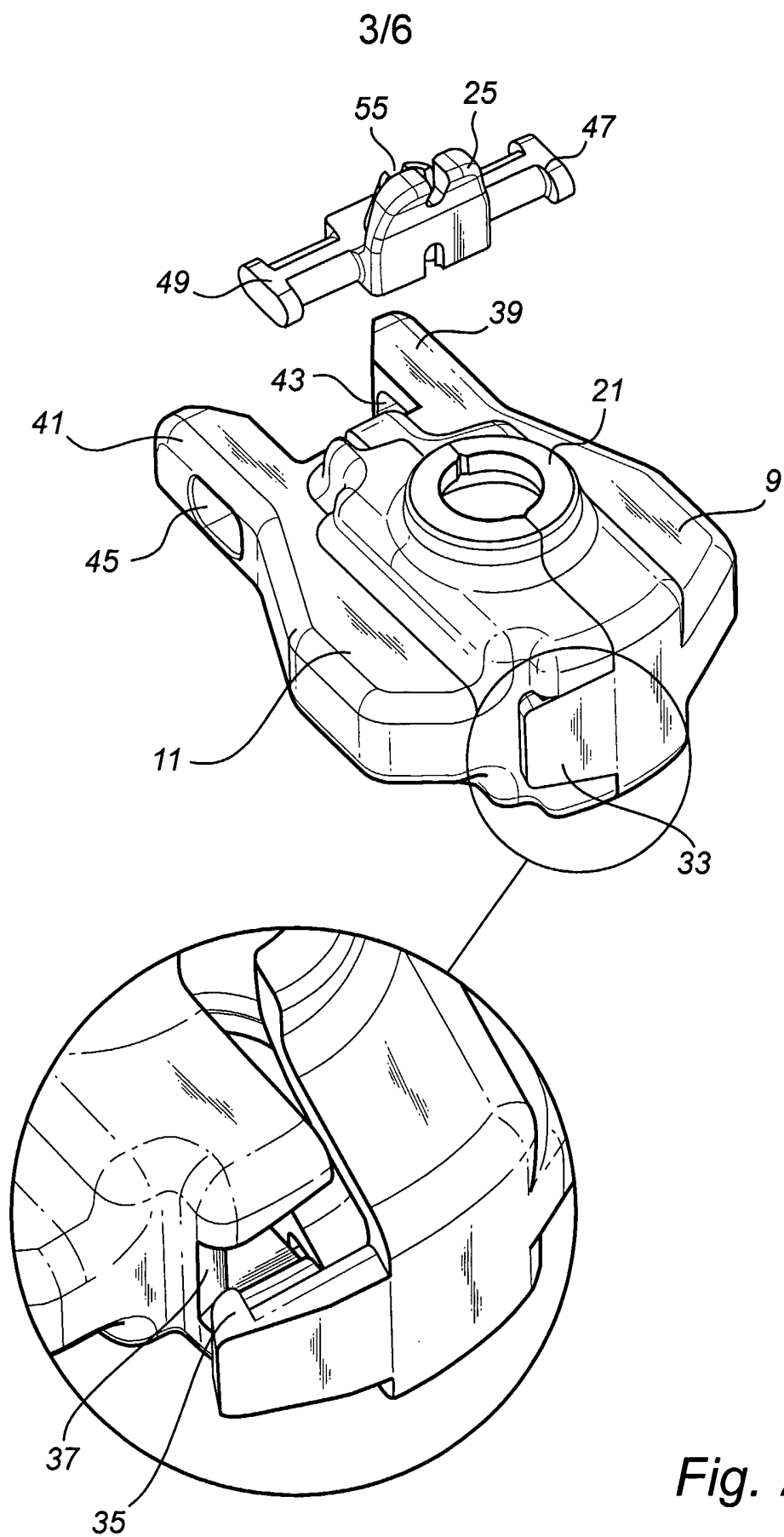


Fig. 2b

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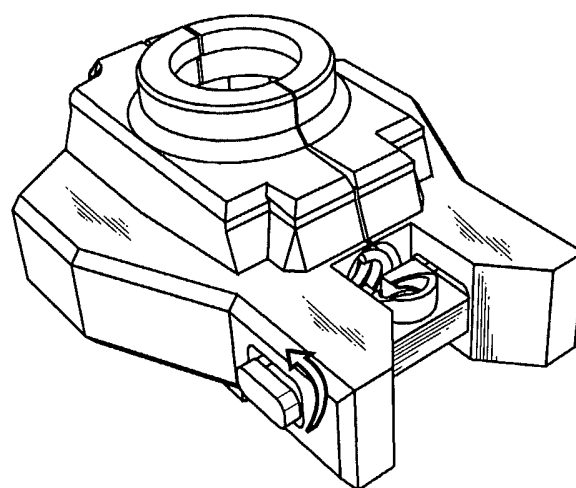
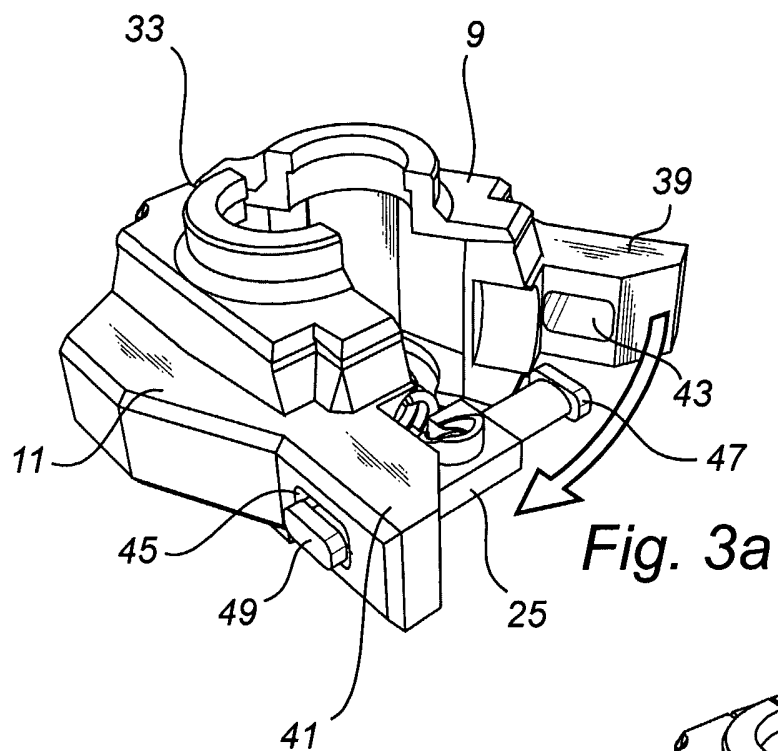


Fig. 3b

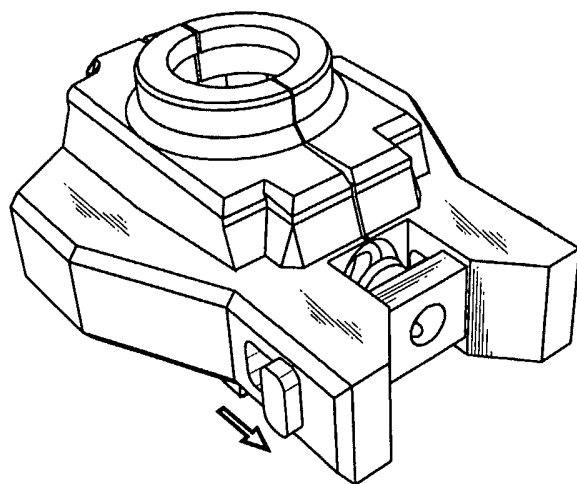


Fig. 3c

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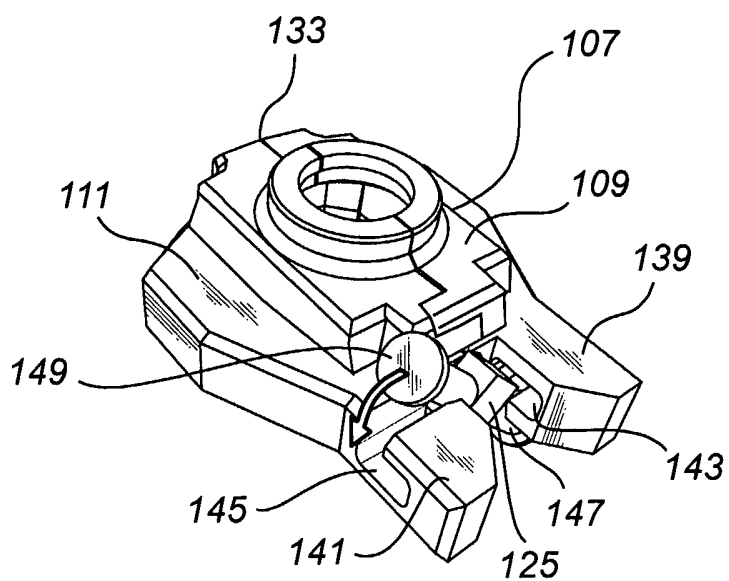


Fig. 4a

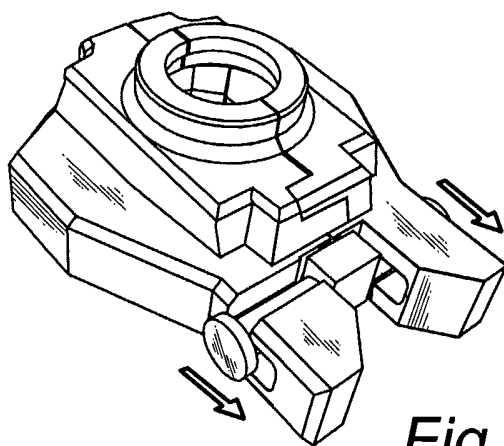


Fig. 4b

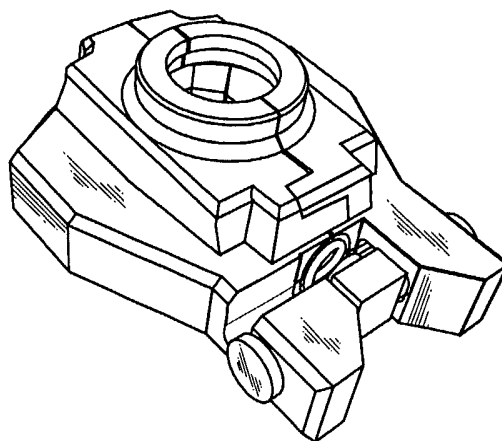
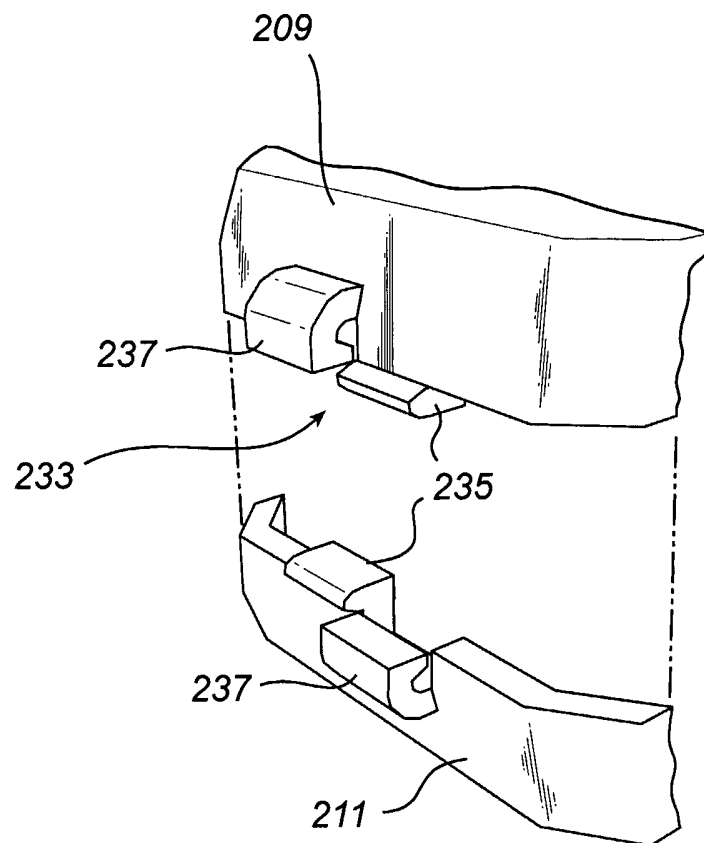


Fig. 4c

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*Fig. 5*

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2005/000461

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60P 7/13, B63B 25/24, B65D 90/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B60P, B63B, B65D

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 3261070 A (A ABOLINS), 19 July 1966 (19.07.1966), column 2, line 69 - column 3, line 18, figure 1 --	1-21
A	US 3578374 A (JOHN J GLASSMEYER), 11 May 1971 (11.05.1971), column 3, line 3 - line 21, figure 7, abstract --	1-21
A	WO 03101823 A1 (PARK, SE-JONG), 11 December 2003 (11.12.2003), figure 3, abstract --	1-21

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

21 June 2005

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2005/000461**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

28/05/2005

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				KR	2003031402 A	21/04/2003

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				KR	2003031402 A	21/04/2003
