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

(11) **EP 4 458 730 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **23171799.2**

(22) Date of filing: **05.05.2023**

(51) International Patent Classification (IPC):
B65D 90/00 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65D 90/0013

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

(71) Applicant: **MacGregor Finland Oy**
20780 Kaarina (FI)

(72) Inventor: **Östberg, Juhana**
20100 Turku (FI)

(74) Representative: **Papula Oy**
P.O. Box 981
00101 Helsinki (FI)

(54) **CONTAINER LOCK FOR JOINING TOGETHER TWO CONTAINERS, METHOD**

(57) A container lock (1) comprising a one-piece lock body comprising: a front part (25), a rear part (26), a back part (7) comprising a recess (11) and back surfaces (22); and a locking mechanism (2) comprising: a locking element (3); and an operating part (5) configured to rotate the locking element (3) around a horizontal axis (X) or around a vertical axis (Y) between a locked position and an unlocked position, wherein for the locked position, the locking element (3) is configured to protrude horizontally out at least partly from the recess (11) and the back surfaces (22); and for the unlocked position, the operating part (5) is configured to be actuated to rotate the locking element (3) from the locked position to the unlocked position. Also a method is disclosed.

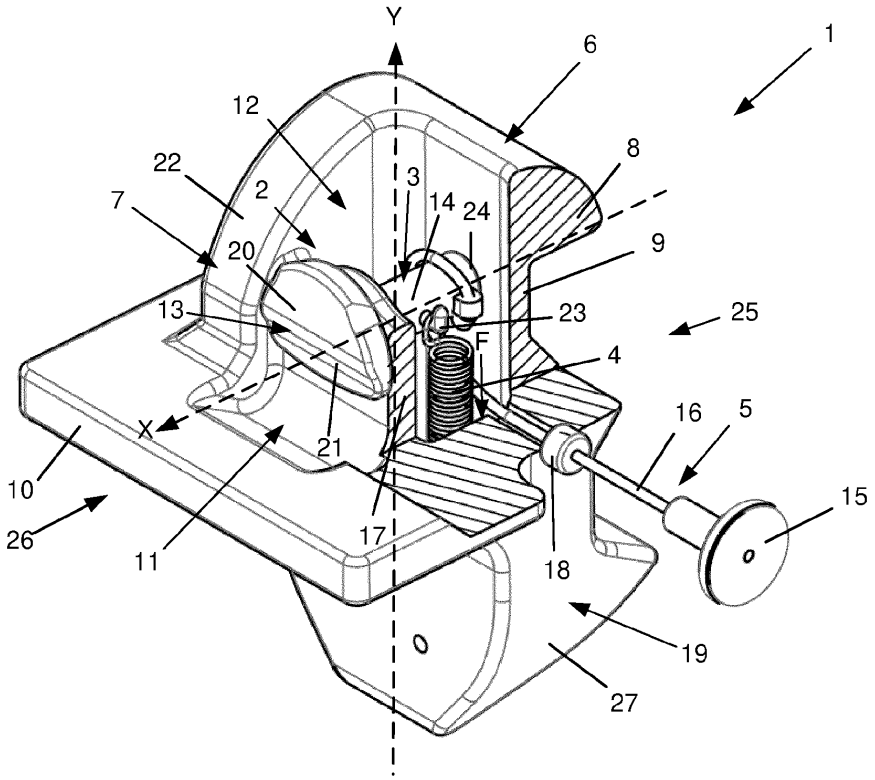


FIG. 1

EP 4 458 730 A1

Description

FIELD OF THE INVENTION

[0001] The present application relates generally to a container lock for joining together two containers stacked on top of each other. More specifically, the present application relates to joining together an upper and a lower container stacked on top of each other using a locking mechanism.

BACKGROUND OF THE INVENTION

[0002] Container locks are used in cargo ships to connect stacked containers together. The container locks are attached to the containers and detached from the containers manually when the ships are loaded and unloaded in container terminal ports. Handling of operating parts may be difficult and unergonomic and thus may be further improved.

SUMMARY

[0003] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter. The scope of protection sought for various embodiments of the present disclosure is set out by the independent claims.

[0004] Example embodiments of the present disclosure provide a container lock for joining together an upper and a lower containers stacked on top of each other. This type of the container lock presents a locking mechanism, which is reliable as jamming risk of the rotating parts may be minimized by an open and simple structure. It is also easy to use and ergonomic. From manufacturing point of view the optimized geometry may not bring any new challenges and conventional manufacturing methods may be applicable. As a result the manufacturing costs may not be higher than with traditional container locks.

[0005] According to a first aspect, a container lock for joining together two containers stacked on top of each other is disclosed. The container lock may comprise: a one-piece lock body comprising: a front part, a rear part, and side walls; an upper locking piece and a lower locking piece, wherein the upper locking piece may comprise a back part and an upper protrusion; a flange between the upper locking piece and the lower locking piece, wherein the back part may comprise a recess and back surfaces at least partly above the flange; and at least one cavity; and a locking mechanism, which may comprise: a locking element located at least partly in the recess; and an operating part connected to the locking element, which may be configured to rotate the locking element around a horizontal axis of the locking element located between the front part and the rear part or around a vertical axis of the locking element located between the upper locking piece and the lower locking piece between a locked position and an unlocked position, wherein in the locked position, the locking element may be configured to protrude horizontally out at least partly from the recess and the back surfaces to prevent the container lock from falling out from a bottom corner piece of a container; and in the unlocked position, the operating part may be configured to be actuated to rotate the locking element from the locked position to the unlocked position to allow the container lock to be inserted into or taken out from the bottom corner piece of the container.

[0006] The locking mechanism is reliable as jamming risk of the rotating parts may be minimized by open and simple structure. A grip element may be clearly visible from outside of the container lock. The grip element may also indicate a position of the locking element. This may not be the case with locking mechanisms that are fully located inside the lock body. By a clear locking indication, accidental cases of poorly secured container locks may be avoided. If the container lock is not properly secured to the bottom corner of the container, there may be a big risk that the container lock may drop off and cause serious injury when the container is lifted with a crane from a shore to a ship. In addition, a missing container lock may jeopardize safe transportation of containers on board the ship. Also the workload of stevedores in container terminals is huge as there may be thousands of repeating manual operations required when the container locks are attached to or detached from the containers during loading operations of the container ship. An improved ergonomics may also save time and energy. The grip element may be easy to grip even when wearing thick protective gloves. From manufacturing point of view the proposed structure may not bring any new challenges and conventional manufacturing methods may be applicable.

[0007] According to an example embodiment of the first aspect, the locking mechanism may further comprise at least one flexible element. The flexible element may return the container lock into locked position an keep it locked.

[0008] According to an example embodiment of the first aspect, the at least one flexible element may be connected from a first end to the locking element and from a second end to the lock body. This may allow the flexible element to twist or turn around the locking element.

[0009] According to an example embodiment of the first aspect, the at least one flexible element may be connected from the first end to a wire or a rope and from the wire or the rope to the locking element, and from the second end to the lock body. This may prevent the flexible element to twist or turn around the locking element.

[0010] According to an example embodiment of the first aspect, the at least one flexible element may be located inside the cavity. This may protect the flexible element and minimize jamming risk of the locking mecha-

nism.

[0011] According to an example embodiment of the first aspect, the at least one flexible element may be located inside the cavity vertically or horizontally. The flexible element may be located in different positions inside the cavity.

[0012] According to an example embodiment of the first aspect, in the locked position, the locking element may be configured to protrude horizontally out by a locking distance, which may be from 0 to 20 mm. The locking part protruding horizontally out by a locking distance may secure the container lock to the bottom corner of the container so that the container lock may not be turned or rotated in such a way that the container lock may drop off from the bottom corner of the container.

[0013] According to an example embodiment of the first aspect, the locking element may be configured to be rotated around the horizontal axis or the vertical axis of the locking element at least 30°. This means that the the locking element may have enough space to rotate around the axis from the unlocked position to the locked position. The locking element may have to rotate long enough to change the locking position.

[0014] According to an example embodiment of the first aspect, the container lock may further comprise a support wall; the support wall and/or the front part may comprise a support hole; and the locking element may be arranged rotatably into at least one support hole. The at least one support hole may allow attachment of the locking element firmly and rotatably to the support wall and/or the neck part.

[0015] According to an example embodiment of the first aspect, the locking element may comprise a locking part and a shaft. The locking part geometry may allow the container lock to be turned or rotated in such a way that the container lock may be inserted to or removed from the bottom corner of the container. The shaft may allow attachment of the locking part to the container lock body and/or the support wall.

[0016] According to an example embodiment of the first aspect, the locking part may comprise an upper part and a lower part, wherein in the locked position, thickness of the upper part may be greater than thickness of the lower part in a horizontal axis direction; or thickness of the locking part may lower gradually, stepwise, or linearly from the upper part towards the lower part; or the locking part may be a plate of even thickness arranged at an inclined angle, wherein in the locked position, the upper part may be configured to protrude horizontally out at least partly from the recess and the back surfaces. The locking part may have different designs to form the protrusion horizontally out from the recess and the back surfaces.

[0017] According to an example embodiment of the first aspect, at least part of the operating part may come out horizontally from the side wall substantially at the height of the flange; or vertically from the cavity of the lower locking piece. When the operating part comes out from the side wall or from the bottom part it may be easy to use.

[0018] According to an example embodiment of the first aspect, the operating part may comprise a grip element and an elongated operating element. With the grip element it may be easy to grip and pull or turn the operating element.

[0019] According to an example embodiment of the first aspect, the container lock may further comprise at least one stopper for limiting rotation of the locking element, wherein the at least one stopper may comprise at least one of the following: formation of the lock body, formation of the locking element, or a stop element. Different kind of stoppers may be used at various parts of the container locks.

[0020] According to an example embodiment of the first aspect, the operating element may comprise the stop element. The stop element may prevent the operating element to rotate to an unwanted position inside the lock body.

[0021] According to an example embodiment of the first aspect, the at least one stopper of the lock body and/or the locking element, and a force of the flexible element may be configured to keep the locking element in the locked position. The stoppers and the force may ensure that the locking element is in the locked position.

[0022] According to an example embodiment of the first aspect, wherein the recess may be arranged above the flange or wherein the recess may continue at least partly into the flange and may be arranged to accommodate at least part of the locking element. When the recess continues at least partly into the flange it may allow the upper part of the locking part to rotate at least party inside the recess and make it possible to insert the container lock into or take it out from the bottom corner of the container.

[0023] According to a second aspect, a method for joining together two containers stacked on top of each other with a container lock is disclosed. The container lock may comprises: a one-piece lock body, which may comprise: a front part, a rear part, and side walls; an upper locking piece and a lower locking piece, wherein the upper locking piece may comprise a back part and an upper protrusion; a flange between the upper locking piece and the lower locking piece, wherein the back part may comprises a recess and back surfaces of the side walls at least partly above the flange; and at least one cavity; and a locking mechanism, which may comprise: a locking element located at least partly in the recess; and an operating part connected to the locking element, wherein in the method: the operating part may rotate the locking element around a horizontal axis of the locking element located between the front part and the rear part or around a vertical axis of the locking element located between the upper locking piece and the lower locking piece, and may rotate the locking element between a locked position and an unlocked position; in the locked position, the locking element may protrude horizontally out at least partly

from the recess and the back surfaces to prevent the container lock to fall out from a bottom corner piece of a container; and in the unlocked position, the operating part may be actuated to rotate the locking element from the locked position to the unlocked position to allow the container lock to be inserted into or taken out from the bottom corner piece of the container. An improved ergonomics may save time and energy. A grip element may be easy to grip even when wearing thick protective gloves.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The accompanying drawings, which are included to provide a further understanding of the invention and constitute a part of this specification, illustrate embodiments of the invention and together with the description help to explain the principles of the invention. In the drawings:

Figure 1 shows schematically an example of a partial cross-sectional view of a container lock in a locked position, according to an example embodiment;
Figure 2 shows schematically an example of a side view of a container lock located inside a bottom corner piece in a locked position, according to an example embodiment;
Figure 3a shows schematically an example of a side view of a container lock and a bottom corner piece, when the container lock is in a locked position outside the corner piece, according to an example embodiment;
Figures 3b and 3c show schematically examples of side views of a container lock and a bottom corner piece, when an operating part is actuated to rotate a locking element from the locked position to an unlocked position to allow the container lock to be inserted inside the bottom corner piece, according to example embodiments;
Figure 3d shows schematically an example of a side view of a container lock and a bottom corner piece, when the container lock is inside the bottom corner piece in locked position, according to an example embodiment;
Figure 4a shows schematically an example of a side view of a container lock in an unlocked position, according to an example embodiment;
Figure 4b shows schematically an example of a side view of the container lock of Figure 4a in the unlocked position, according to an example embodiment;
Figure 5a shows schematically an example of a partial cross-sectional view of a container lock in a locked position, according to an example embodiment;
Figure 5b shows schematically an example of a side view of a container lock of Figure 5a in a locked position, according to an example embodiment;
Figure 6a shows schematically example of a side view of a container lock and a bottom corner piece, when an operating part is actuated to rotate a locking element from the locked position to an unlocked position to allow the container lock to be inserted inside the bottom corner piece, according to example embodiments;
Figure 6b shows schematically an example of a side view of a container lock and a bottom corner piece, when the container lock is inside the bottom corner piece in locked position, according to an example embodiment;
Figure. 7 illustrates an example of a method for joining together two containers stacked on top of each other with a container lock, according to an example embodiment.

[0025] Like references are used to designate like parts in the accompanying drawings.

DETAILED DESCRIPTION

[0026] Reference will now be made in detail to example embodiments, examples of which are illustrated in the accompanying drawings. The detailed description provided below in connection with the appended drawings is intended as a description of the present examples and is not intended to represent the only forms in which the present example may be constructed or utilized. The description sets forth the functions of the example and the sequence of steps or operations for constructing and operating the example. However, the same or equivalent functions and sequences may be accomplished by different examples.

[0027] On a cargo ship, containers may be transported on a deck on top of hatch covers in a number of parallel rows and lines and also in a number of tiers one on top of the other. The containers may have corner pieces on all their eight corners, by means of which corner pieces the containers may be locked to each other. Typically, two containers one above the other may be locked to each other with container locks installed into the corner pieces of the containers. When the container lock is used it may first be manually installed into a bottom corner of a container. Totally four pieces container locks may be installed into the bottom of the one container, one in each corner. In more detail, an upper locking piece of the container lock may now be inside the bottom corner of the container. Then the container may be lifted by crane onto another container on a deck of the ship. The lower locking pieces of the container locks that are hanging in the lifted bottom corners of the container may be guided and locked into the top corners of the container already on board the ship. Same procedure may be repeated to all containers that are lifted on the deck.

[0028] At the sea, the container locks may connect together the containers of one vertical stack. When the ship is heeling at rough weather each stack of containers may be tilted sideways. In this situation the container locks me be subjected to heavy tension load. The upper con-

tainer may pull the container lock upwards while the lower container may cause an opposite force downwards.

[0029] In a large container ship there may be several thousands of containers that may be loaded and unloaded during one port call. The container locks are handled manually when attached to and detached from the containers in container terminals. Known container locks may have manually operated securing elements that may be tightly located inside a container lock body, which elements may be unergonomic and difficult especially when operators are wearing obligatory protective gloves. Dirt may be easily collected inside the container lock jamming locking element, which may be a safety hazard. If the container lock is not properly secured to the bottom corner of the container there may be a big risk for a container lock to drop off during lifting the container from a shore to the ship. The dropping container lock might lead to severe injury, and in addition the missing container lock would spoil a regulated and safe securing system of the containers onboard the ship during a sea voyage.

[0030] According to an example embodiment, a locking mechanism of a container lock is disclosed, which is used to fix and secure the container lock to a bottom corner of a container. The container lock may be fixed to a corner piece located at the bottom corner of the container. The locking mechanism may be ergonomic and simple. It may also present an economical, reliable, and easy-to-operate locking mechanism to secure the container lock into the bottom corner of the container. The locking mechanism may comprise a locking element that may be rotated around a horizontal axis of the locking element or around a vertical axis of the locking element. The geometry of the locking element may be such that in a locked position the container lock that has been installed into a bottom corner of the container is secured and dropping off the container lock is prevented. Correspondingly, the geometry of the locking element may be such that in an unlocked position the container lock may be inserted to or removed from the bottom corner of the container. The geometry of the locking element may also be such that in the locked position the combined width of the locking element and the container lock body is larger than in the unlocked position. The locking element may comprise a lock part and a shaft, or the locking element may be supported by other means to enable rotation of the locking element around the essentially horizontal or vertical axis. The lock part and the shaft may be formed as a one piece that may be connected to a container lock in a manner that may enable the rotation of the lock part and the shaft in relation to the container lock. To manually operate the locking mechanism an operating part may be attached to the lock part or to the shaft. To arrange an automatic movement to the opposite direction the locking mechanism may comprise a flexible element, which may be a spring-type elastic element, for example. It may be attached at one end, a first end to the lock part or to the shaft while another end, a second end of the flexible element may be connected to the container lock body. The locking element may be rotated to the unlocked position by manually pulling, rotating, or turning a grip element, and the locking element may rotate back to the locked position because of the flexible element, when the grip element is released.

[0031] According to an example embodiment, a container lock comprises a one-piece lock body comprising: a front part, a rear part, a back part comprising a recess and back surfaces; and a locking mechanism. The locking mechanism may comprise a locking element; and an operating part, which may be configured to rotate the locking element around a horizontal axis or around a vertical axis between a locked position and an unlocked position. For the locked position, the locking element may be configured to protrude horizontally out at least partly from the recess and the back surfaces and for the unlocked position, the operating part may be configured to be actuated to rotate the locking element from the locked position to the unlocked position.

[0032] According to an example embodiment, a container lock for joining together two containers stacked on top of each other is disclosed. The container lock may comprise a one-piece lock body and a locking mechanism comprising a locking element, at least one flexible element, and an operating part. The locking element may comprise a locking part and a shaft. The shaft may rotate in at least one hole made to the lock body and/or a support wall or may be a tube that may rotate around a fixed axle. The shaft and the lock part may be connected or may be one-piece design. The operating part may comprise a grip element and an operating element. The grip element may automatically cause a rotation of the locking element back to locked position when the grip element is released. The grip element may be manually pulled, rotated, or turned to rotate the locking element to the unlocked position. When the locking element is in the unlocked position the container lock may be inserted into or taken out from the bottom corner of the container. The locking element may rotate between the locked and the unlocked positions, for example at least 30 degrees, at least 45 degrees, at least 450 degrees, from 60 to 300 degrees, or from 90 to 180 degrees. Also other rotation angles may be possible depending on the geometry of the locking element. The rotation of the locking element may be restricted e.g. by mechanical stoppers that may be made to the container lock body or the operating element. The grip element may comprise a wire handle, a solid handle, or an operating lever.

[0033] An example of Figure 1 shows schematically a partial cross-sectional view of a container lock 1 in a locked position. It may be possible to modify the container lock 1 geometry compared to what is presented in Figures 1 to 6b. The containers may have the container lock 1 on all their eight corners, by means of which container locks 1 the containers may be locked to each other. The actual containers are not presented in these drawings, but the containers may have a corner piece 29 on each corner. The container lock 1 thus may lock together the

container corner pieces 29 that are one above another.

[0034] According to an example embodiment, the container lock is formed so that the flexible element 4 is missing completely from the Figures 1 to 6b. This means that the operating part may be manually pulled, rotated, or turned to rotate the locking element to the unlocked position. The grip element may be pushed manually to rotate the locking element back to locked position.

[0035] According to an example embodiment a container lock 1 for joining together two containers stacked on top of each other is disclosed. The container lock 1 may comprise a one-piece lock body. The lock body may comprise a front part 25, a rear part 26, and side walls 27. The lock body may further comprise an upper locking piece 6 and a lower locking piece 19, wherein the upper locking piece 6 comprises a back part 7 and an upper protrusion 8. A flange 10 may be located between the upper locking piece 6 and the lower locking piece 19. The back part 7 may comprise a recess 11 and back surfaces 22 of the side walls 27 at least partly above the flange 10, and at least one cavity 12. The lower part of the recess 11 may be located at least partly inside the flange 10. The container lock 1 may further comprise a locking mechanism 2, which may comprise a locking element 3. The locking element 3 may be at least partly located in the cavity 12. The locking mechanism may further comprise an operating part 5 connected to the locking element 3 and may be configured to rotate the locking element 4 around a horizontal axis X of the locking element 3 or around a vertical axis Y of the locking element 3 between a locked position and an unlocked position.

[0036] According to an example embodiment, the at least one flexible element 4 may be connected from a first end to the locking element 3 and from a second end to the lock body.

[0037] According to an example embodiment, the at least one flexible element 4 may be connected from the first end to a wire or a rope, from the wire or the rope to the locking element 3, and from the second end to the lock body.

[0038] According to an example embodiment, the horizontal axis X of the locking element 3 may be located between the front part 25 and the rear part 26.

[0039] An example of Figure 1 shows that the locking element 3 is located between the front part 25 and the rear part 26 of the locking element. The vertical axis Y may be arranged perpendicular to the horizontal axis X.

[0040] According to an example embodiment, the vertical axis Y of the locking element 3 is located between the upper locking 6 piece and the lower locking piece 19.

[0041] In the locked position, the locking element 3 may be configured to protrude horizontally out at least partly from the recess 11 and the back surfaces 22 to prevent the container lock 1 to fall out from a bottom corner piece 29 of a container. In the unlocked position, the operating part 5 may be configured to be actuated to rotate the locking element 3 from the locked position to the unlocked position to allow the container lock 1 to be inserted into or taken out from the bottom corner piece 29 of the container.

[0042] According to an example embodiment, the recess 11 is arranged above the flange 10 or the recess 11 continues at least partly into the flange 10 and is arranged to accommodate at least part of the locking element 3.

[0043] According to an example embodiment, the locking element 3 comprises a locking part 13 and a shaft 14.

[0044] According to an example embodiment, the container lock 1 further comprises a support wall 17. The front part 25 may comprise a neck part 9 below the upper protrusion 8. The support wall 17 and/or the front part 25 may comprise a support hole 24. The support hole 24 may also be located in the neck part 9 of the front part 25. The locking element 3 may be arranged rotatably into at least one support hole 24. The shaft 14 may be arranged into the at least one hole 24. The at least one hole 24 may not be a through hole. The locking part 13 may be located outside the support wall 17 and may be installed on the rear part side 26 to allow the locking part 13 to protrude out of the back part 7. The support wall 17 may be located vertically between the side walls 27.

[0045] An example of Figure 1 shows that the support wall 17 and the neck part comprise a hole 24. In the neck part 9 the hole may not be a through hole.

[0046] According to an example embodiment, the locking part 13 comprises an upper part 20 and a lower part 21. In the locked position, thickness of the upper part 20 may be greater than thickness of the lower part 21 in a horizontal axis direction, or thickness of the locking part 13 may lower gradually, stepwise, or linearly from the upper part 20 towards the lower part 21. The locking part 13 may also be a plate of even thickness arranged at an inclined angle, wherein in the locked position, the upper part 20 may be configured to protrude horizontally out at least partly from the recess 11 and the back surfaces 22.

[0047] An example of Figure 1 shows, that thickness of the upper part 20 lowers gradually from the upper part 20 towards the lower part 21.

[0048] According to an example embodiment, the locking element 3 is configured to be rotated around the horizontal axis X or the vertical axis Y of the locking element 3 at least 30 °, at least 45°, at least 450°, from 60° to 300°, or from 90° to 180°.

[0049] According to an example embodiment, the at least one flexible element 4 may be located inside the cavity 12. The flexible element may be at least one of the following: a spring rubber band, and/or gravity actuated mass element.

[0050] According to an example embodiment, the at least one flexible element 4 may be located inside the cavity 12 vertically or horizontally.

[0051] In an example of Figure 1, the flexible element is located vertically inside the cavity 12. The flexible element 4 may be connected from the first end to a coupling part 23 of the locking element 3. The coupling part 23

may be attached to the shaft 14 or to the locking part 13. The flexible element 4 may be connected, from a second end to the lock body inside the cavity 12.

[0052] According to an example embodiment, the cavity 12 may be formed between the upper locking piece 6 and between the lower locking piece 19. The cavity 12 may go through the lock body in a vertical direction. The cavity 12 may be open from an upper part and/or a lower part the lock body.

[0053] According to an example embodiment, in the locked position, the locking element 3 may be configured to protrude horizontally out by a locking distance D, which is from 0 to 20 mm, or from 4 to 20 mm.

[0054] According to an example embodiment, the locking element 3 is configured to be located at least partly between the rear part 26 of the container lock 1 and a corner piece vertical wall 34. The locking element 3 may be configured to be located at least partly between the rear part 26 and a corner piece vertical wall 34, and/or it may rest at least partly on the upper part 32 of the corner piece 29.

[0055] According to an example embodiment, the operating part 5 comprises a grip element 15 and an elongated operating element 16. The elongated operating element 16 may be at least one of the following: a wire, a rope and/or a rod. The grip element 15 may be a handle or a knob.

[0056] According to an example embodiment, at least part of the operating part 5 comes out horizontally from the side wall 27 or vertically from the cavity 12. The at least part of the operating part 5 comes out horizontally from the side wall 27 substantially at the height of the flange 10. The at least part of the operating part 5 comes out vertically from the cavity 12 of the lower locking piece 19.

[0057] According to an example embodiment, at least part of the operating element 16 is configured to rotate around the locking element 3 or around the shaft 14.

[0058] According to an example embodiment, the container lock 1 further comprises at least one stopper for limiting rotation of the locking element 3. The at least one stopper may comprise at least one of the following: formation of the lock body, formation of the locking element 3, or a stop element 18. The stopper may be a mechanical stopper.

[0059] According to an example embodiment, the operating element 16 comprises the stop element 18. The stop element 18 may be located around the operating element 16.

[0060] According to an example embodiment, the at least one stopper of the lock body and/or the locking element 3, and a force F of the flexible element 4 are configured to keep the locking element 3 in the locked position. When the flexible element 4 is located vertically inside the cavity 12 direction of the force F caused by it may be vertical. When the flexible element 4 is located horizontally inside the cavity 12 direction of the force F caused by it may be horizontal

[0061] An example of Figure 1 shows that the grip element 15 is a knob and the elongated operating element 16 is a wire. At least part of the operating part may come out horizontally from the side wall 27 substantially at the height of the flange 10. The container lock 1 may further comprise at least one stopper, wherein the stopper may be a formation of the lock body or formation of the locking element 3 and a stop element 18. Figure 1 example shows that the operating element 16 comprises one stop element 18 to restrict rotation of the locking element 3. The flexible element 4 may be located vertically inside the cavity 12 and direction of the force F caused by it may be downwards.

[0062] An example of Figure 2 shows schematically a side view of a container lock 1 located inside a bottom corner piece 29 in a locked position. The bottom corner piece 29 belongs to an upper container. The container lock may be the container lock 1 of Figure 1. The container lock 1 may be inserted into or taken out from the bottom corner piece 29 of the container through a hole 30. In the locked position, the locking element 3 may be configured to protrude horizontally out by a locking distance D. The locking distance is from about 0 to 20 mm, for example. The upper protrusion 8 may have a lower surface 28. In the level of the upper protrusion lover surface 28 and parallel to it may locate a lower surface line 31, which may be above or at the same level as the bottom corner piece upper surface 32. The locking distance D may be measured from the level of the lower surface line 31.

[0063] An example of Figure 3a shows schematically a side view of a container lock 1 and a bottom corner piece 29, when the container lock 1 is in a locked position outside the corner piece 29. In the locked position, the locking element 3 may protrude horizontally out at least partly from the recess 11 and the back surfaces 22 of the container lock 1. In the locked position length of the operating part 5 may be in a shortest position outside the lock body because the operating element 16 may be rotated or twisted around the locking element 3, locking part 13, or the shaft 14. A stop element 18 may prevent the operating element 16 to slide more inside the lock body. The gripping element 15 and length of the operating element 16 may be easily seen form outside the lock body, which may make gripping and installation easier.

[0064] Examples of Figures 3b and 3c show schematically side views of the container lock 1 and the bottom corner piece 29 of Figure 3a, when an operating part 5 is actuated to rotate a locking element 3 from the locked position to an unlocked position to allow the container lock 1 to be inserted inside the bottom corner piece 29. In the unlocked position, the locking element 3 may not protrude horizontally out from the recess 11 and the back surfaces 22 of the container lock 1. The locking element 3 may be accommodated at least partly in the recess 11. The locking element 3 may be rotated to the unlocked position by manually pulling, rotating, or turning a grip element 15, and the locking element 3 may rotate back

to the locked position because of the flexible element 4, when the grip element 15 is released.

[0065] In the unlocked position length of the operating part 5 may be in a longest position outside the lock body because the operating element 16 may be released around the locking element 3, locking part 13, or the shaft 14.

[0066] An example of Figure 3d shows schematically a side view of a container lock 1 and a bottom corner piece 29 of Figures 3a to 3c, when the container lock 1 is inside the bottom corner piece 29 in locked position. In the locked position, the locking element 3 may be configured to protrude horizontally out by a locking distance D.

[0067] An example of Figure 4a shows schematically a side view of a container lock in an unlocked position. In the unlocked position, the locking element 3 may not protrude horizontally out from the recess 11 and the back surfaces 22 of the container lock 1. The locking element 3 may be accommodated at least partly in the recess 11. At least part of the upper part 20 of the locking element 3 may be accommodated in the recess 11.

[0068] An example of Figure 4b shows schematically a side view of the container lock 1 of Figure 4a in the locked position. The example Figure 4b clearly shows that in the unlocked position the locking element 3 does not protrude horizontally out from the recess 11 and the back surfaces 22.

[0069] An example of Figure 5a shows schematically a partial cross-sectional view of a container lock 1 in a locked position. An example of Figure 5b shows schematically a side view of a container lock 1 of Figure 5a. The container lock 1 of figure 5a and 5b may be otherwise similar as shown in Figure 1 but support wall 14 and the locking mechanism 2 may be different because the flexible element 4 may be in horizontal position, the locking element 3 may have a different form, and it may rotate around the vertical axis Y.

[0070] According to an example embodiment a container lock 1 for joining together two containers stacked on top of each other is disclosed. The container lock 1 may comprise a one-piece lock body. The lock body may comprise a front part 25, a rear part 26, and side walls 27. The lock body may further comprise an upper locking piece 6 and a lower locking piece 19, wherein the upper locking piece 6 comprises a back part 7 and an upper protrusion 8. A flange 10 may be located between the upper locking piece 6 and the lower locking piece 19. The back part 7 may comprise a recess 11 and back surfaces 22 of the side walls 27 above the flange 10, and at least one cavity 12. The container lock 1 may further comprise a locking mechanism 2, which may comprise a locking element 3. The locking element 3 may be at least partly located in the cavity 12. An example of Figure 5a shows that the locking mechanism may further comprise an operating part 5 connected to the locking element 3 and is configured to rotate the locking element 4 around the vertical axis Y of the locking element 3 between a locked position and an unlocked position.

[0071] According to an example embodiment, the at least one flexible element 4 may be connected from a first end to the locking element 3 and from a second end to the lock body.

[0072] According to an example embodiment, the at least one flexible element 4 may be connected from the first end to a wire or a rope, from the wire or the rope to the locking element 3, and from the second end to the lock body.

[0073] According to an example embodiment, the container lock 1 further comprises a support wall 17. The support wall 17 may be located horizontally above the flange 10 between the side walls and the front part 25. The front part 25 may comprise a neck part 9 below the upper protrusion 8. The support wall 17 may comprise a support hole 24. The locking element 3 may be arranged rotatably into at least one support hole 24. The shaft 14 may be arranged into the at least one hole 24. The locking part 13 may be located above the support wall 17.

[0074] According to an example embodiment, the horizontal axis X of the locking element 3 is located between the front part 25 and the rear part 26.

[0075] According to an example embodiment, the vertical axis Y of the locking element 3 is located between the upper locking 6 piece and the lower locking piece 19.

[0076] An example of Figure 5a shows that the locking element 3 is located above the flange and is configured to rotate around the vertical axis Y of the locking element 3. In the locked position, the locking element 3 may be configured to protrude horizontally out at least partly from the recess 11 and the back surfaces 22 to prevent the container lock 1 to fall out from a bottom corner piece 29 of a container. In the unlocked position, the operating part 5 may be configured to be actuated to rotate the locking element 3 from the locked position to the unlocked position to allow the container lock 1 to be inserted into or taken out from the bottom corner piece 29 of the container.

[0077] According to an example embodiment, the recess 11 is arranged above the flange 10. The recess 11 may be located partly above the flange and partly above the support wall 14 and may be arranged to accommodate at least part of the locking element 3. The locking element 3 may comprise a locking part 13 and a shaft 14.

[0078] According to an example embodiment, the locking part 13 comprises an upper part 20 and a lower part 21. In the locked position, thickness of the upper part 20 may be greater than thickness of the lower part 21 in a horizontal axis direction, or thickness of the locking part 13 may lower gradually, stepwise, or linearly from the upper part 20 towards the lower part 21.

[0079] An example of Figure 5a and 5b show, that thickness of the upper part 20 forms a step from the upper part 20 towards the lower part 21. This step may allow an upper part bottom surface 32 to be located on a corner piece upper surface 23 as shown in Figure 6b.

[0080] According to an example embodiment, the lock-

ing element 3 is configured to be rotated around the vertical axis Y of the locking element 3 at least 30°, at least 45°, at least 450°, from 60° to 300°, or from 90° to 180°.

[0081] In an example of Figure 5a, the flexible element is located horizontally at least partly inside the cavity 12. The flexible element 4 may be connected from the first end to a coupling part 23 of the locking element 3. The coupling part 23 may be attached to the shaft 14 or to the locking part 13. The flexible element 4 may be connected, from a second end to the lock body inside the cavity 12.

[0082] According to an example embodiment, the cavity 12 may be formed between the upper locking piece 6 and between the lower locking piece 19. The cavity 12 may go through the lock body in a vertical direction from the support wall 14 to the lower locking piece 19. The cavity 12 may be open from a lower part of the lock body. The cavity 12 may be closed from the upper part of the lock body by the support wall 14.

[0083] According to an example embodiment, in the locked position, the locking element may be configured to protrude horizontally out by a locking distance D, which is 4 to 20 mm.

[0084] According to an example embodiment, the locking element 3 is configured to be located at least partly between the rear part 26 and a corner piece vertical wall 34, and/or it may rest at least partly on the upper part 32 of the corner piece 29.

[0085] According to an example embodiment, the operating part 5 comprises a grip element 15 and an elongated operating element 16. The elongated operating element 16 may be at least one of the following: a wire, a rope and/or a rod. The grip element 15 may be a handle or a knob.

[0086] According to an example embodiment, at least part of the operating part 5 comes out horizontally from the side wall 27 or vertically from the cavity 12. The at least part of the operating part 5 comes out horizontally from the side wall 27 substantially at the height of the flange 10. The at least part of the operating part 5 comes out vertically from the cavity 12 of the lower locking piece 19.

[0087] According to an example embodiment, at least part of the operating element 16 is configured to rotate around the locking element 3 or around the shaft 14.

[0088] According to an example embodiment, the container lock 1 further comprises at least one stopper for limiting rotation of the locking element 3. The at least one stopper may comprise at least one of the following: formation of the lock body, formation of the locking element 3, or a stop element 18. The stopper may be a mechanical stopper.

[0089] According to an example embodiment, the operating element 16 comprises the stop element 18. The stop element 18 may be located around the operating element 16.

[0090] According to an example embodiment, the at least one stopper of the lock body and/or the locking element 3, and a force F of the flexible element 4 are configured to keep the locking element 3 in the locked position. When the flexible element 4 is located horizontally inside the cavity 12 direction of the force F caused by it may be horizontal

[0091] An example of Figure 5a shows that the grip element 15 is a knob and the elongated operating element 16 is a wire. At least part of the operating part may come out horizontally from the side wall 27 substantially at the height of the flange 10. The container lock 1 may further comprise at least one stopper, wherein the stopper may be a formation of the lock body or formation of the locking element 3 and a stop element 18. Figure 5a example shows that the operating element 16 comprises one stop element 18 to restrict rotation of the locking element 3. The flexible element 4 may be located horizontally inside the cavity 12 between the side walls. The direction of the force F caused by it may be from one side wall 22 to another.

[0092] An example of Figure 5b shows schematically a side view of a container lock 1, when the container lock 1 is in a locked position. In the locked position, the locking element 3 may protrude horizontally out at least partly from the recess 11 and the back surfaces 22 of the container lock 1. In the locked position length of the operating part 5 may be in a shortest position outside the lock body because the operating element 16 may be rotated or twisted around the locking element 3, locking part 13, or the shaft 14. A stop element 18 may prevent the operating element 16 to slide more inside the lock body. The gripping element 15 and length of the operating element 16 may be easily seen form outside the lock body, which may make gripping and installation easier. In the locked position, the locking element 3 may be configured to protrude horizontally out by the locking distance D. The locking distance is from about 0 to 20 mm, for example. The upper protrusion 8 may have a lower surface 28. In the level of the upper protrusion lower surface 28 and parallel to it may locate a lower surface line 31, which may be above or at the same level as the bottom corner piece upper surface 32. The locking distance D may be measured from the level of the lower surface line 31.

[0093] Example of Figure 6a shows schematically side view of the container lock 1 and the bottom corner piece 29, when the operating part 5 is actuated to rotate a locking element 3 from the locked position to an unlocked position to allow the container lock 1 to be inserted inside the bottom corner piece 29. In the unlocked position, the locking element 3 may be accommodated at least partly in the recess 11. The locking element 3 may be rotated to the unlocked position by manually pulling, rotating, or turning a grip element 15. The locking element 3 may rotate back to the locked position because of the flexible element 4, when the grip element 15 is released.

[0094] In the unlocked position length of the operating part 5 may be in a longest position outside the lock body because the operating element 16 may be released around the locking element 3, locking part 13, or the shaft

14.

[0095] An example of Figure 6b shows schematically a side view of a container lock 1 and a bottom corner piece 29 of Figure 6b, when the container lock 1 is inside the bottom corner piece 29 in locked position. In the locked position, the locking element 3 may be configured to protrude horizontally out by the locking distance D. The upper part bottom surface 33 of the locking part 13 may be brought into contact with a horizontal surface of the bottom corner piece upper surface 32 in a form-fitting manner.

[0096] Figure. 7 illustrates an example of a method for joining together two containers stacked on top of each other with a container lock, according to an example embodiment. The container lock 1 may comprise: a one-piece lock body comprising a front part 25, a rear part 26, and side walls 27. The lock body may further comprise an upper locking piece 6 and a lower locking piece 19, wherein the upper locking piece 6 may comprise a back part 7 and an upper protrusion 8. The lock body may also comprise a flange 10 between the upper locking piece 6 and the lower locking piece 19, wherein the back part 7 may comprises a recess 11 and back surfaces 22 of the side walls 27 at least partly above the flange 10, and at least one cavity 12. The container lock may further comprise a locking mechanism 2 comprising: a locking element 3 located at least partly in the recess 11, and an operating part 5 connected to the locking element 3.

[0097] At operation 700, the method may comprise that the operating part 5 may rotate the locking element 3 around a horizontal axis X of the locking element 3 located between the front part 25 and the rear part 26 or around a vertical axis Y of the locking element 3 located between the upper locking piece 6 and the lower locking piece 19 between a locked position and an unlocked position.

[0098] At operation 710, the method may comprise that for the locked position, the locking element 3 may protrude horizontally out at least partly from the recess 11 and the back surfaces 22 to prevent the container lock 1 to fall out from a bottom corner piece 29 of a container.

[0099] At operation 720, the method may comprise that for the unlocked position, the operating part 5 may be actuated to rotate the locking element 3 from the locked position to the unlocked position to allow the container lock 1 to be inserted into or taken out from the bottom corner piece 29 of the container.

[0100] Further features of the method directly result from functionalities of, for example, the container lock. Different variations of the method may be also applied, as described in connection with the various example embodiments.

[0101] The method for joining together two containers stacked on top of each other with a container lock 1 may be configured to perform or cause performance of any aspect of the method(s) described herein.

[0102] Any range or device value given herein may be extended or altered without losing the effect sought. Also, any embodiment may be combined with another embodiment unless explicitly disallowed.

[0103] Although the subject matter has been described in language specific to structural features and/or acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as examples of implementing the claims and other equivalent features and acts are intended to be within the scope of the claims.

[0104] It will be understood that the benefits and advantages described above may relate to one embodiment or may relate to several embodiments. The embodiments are not limited to those that solve any or all of the stated problems or those that have any or all of the stated benefits and advantages. It will further be understood that reference to 'an' item may refer to one or more of those items.

[0105] The steps or operations of the methods described herein may be carried out in any suitable order, or simultaneously where appropriate. Additionally, individual blocks may be deleted from any of the methods without departing from the scope of the subject matter described herein. Aspects of any of the embodiments described above may be combined with aspects of any of the other embodiments described to form further embodiments without losing the effect sought.

[0106] The term 'comprising' is used herein to mean including the method, blocks, or elements identified, but that such blocks or elements do not comprise an exclusive list and a method or apparatus may contain additional blocks or elements.

[0107] Although subjects may be referred to as 'first', 'second', or 'third' subjects, this does not necessarily indicate any order or importance of the subjects. Instead, such attributes may be used solely for the purpose of making a difference between subjects.

[0108] It will be understood that the above description is given by way of example only and that various modifications may be made by those skilled in the art. The above specification, examples and data provide a complete description of the structure and use of exemplary embodiments. Although various embodiments have been described above with a certain degree of particularity, or with reference to one or more individual embodiments, those skilled in the art could make numerous alterations to the disclosed embodiments without departing from scope of this specification.

Claims

1. A container lock (1) for joining together two containers stacked on top of each other, wherein the container lock (1) comprises:

   a one-piece lock body comprising:

a front part (25), a rear part (26), and side walls (27);
an upper locking piece (6) and a lower locking piece (19), wherein the upper locking piece (6) comprises a back part (7) and an upper protrusion (8);
a flange (10) between the upper locking piece (6) and the lower locking piece (19), wherein the back part (7) comprises a recess (11) and back surfaces (22) at least partly above the flange (10); and
at least one cavity (12); and

a locking mechanism (2) comprising:

a locking element (3) located at least partly in the recess (11); and
an operating part (5) connected to the locking element (3), configured to rotate the locking element (3) around a horizontal axis (X) of the locking element (3) located between the front part (25) and the rear part (26) or around a vertical axis (Y) of the locking element (3) located between the upper locking (6) piece and the lower locking piece (19) between a locked position and an unlocked position, wherein

for the locked position, the locking element (3) is configured to protrude horizontally out at least partly from the recess (11) and the back surfaces (22) to prevent the container lock (1) to fall out from a bottom corner piece (29) of a container; and
for the unlocked position, the operating part (5) is configured to be actuated to rotate the locking element (3) from the locked position to the unlocked position to allow the container lock (1) to be inserted into or taken out from the bottom corner piece (29) of the container.

2. The container lock (1) according to claim 1, wherein the locking mechanism (2) further comprises at least one flexible element (4).

3. The container lock (1) according to claim 2, wherein the at least one flexible element (4) is located inside the cavity (12).

4. The container lock (1) according to claim 3, wherein the at least one flexible element (4) is located inside the cavity (12) vertically or horizontally.

5. The container lock (1) according to any one of the preceding claims, wherein in the locked position, the locking element (3) is configured to protrude horizontally out by a locking distance (D), which is from 0 to 20 mm.

6. The container lock (1) according to any one of the preceding claims, wherein the locking element (3) is configured to be rotated around the horizontal axis (X) or vertical axis (Y) of the locking element (3) at least 30°.

7. The container lock (1) according to any one of the preceding claims, wherein

the container lock (1) further comprises a support wall (17) ;
the support wall (17) and/or the front part (25) comprises a support hole (24); and
the locking element (3) is arranged rotatably into at least one support hole (24).

8. The container lock (1) according to any one of the preceding claims, wherein the locking element (3) comprises a locking part (13) and a shaft (14).

9. The container lock (1) according to claim 8, wherein the locking part (13) comprises an upper part (20) and a lower part (21), wherein

in the locked position, thickness of the upper part (20) is greater than thickness of the lower part (21) in a horizontal axis direction; or thickness of the locking part (13) lowers gradually, stepwise, or linearly from the upper part (20) towards the lower part (21) ; or
the locking part (13) is a plate of even thickness arranged at an inclined angle, wherein in the locked position, the upper part (20) is configured to protrude horizontally out at least partly from the recess (11) and the back surfaces (22).

10. The container lock (1) according to any one of the preceding claims, wherein at least part of the operating part (5) comes out

horizontally from the side wall (27) substantially at the height of the flange (10); or
vertically from the cavity (12) of the lower locking piece (19).

11. The container lock (1) according to any one of the preceding claims, wherein the operating part (5) comprises a grip element (15) and an elongated operating element (16).

12. The container lock (1) according to any one of the preceding claims, wherein the container lock (1) further comprises at least one stopper for limiting rotation of the locking element (3), wherein the at least one stopper comprises at least one of the following:

formation of the lock body, formation of the locking element (3), or a stop element (18).

13. The container lock (1) according to or claim 12, wherein the at least one stopper of the lock body and/or the locking element (3), and a force (F) of the flexible element (4) are configured to keep the locking element (3) in the locked position.

14. The container lock (1) according to any one of the preceding claims, wherein the recess (11) is arranged above the flange (10) or wherein the recess (11) continues at least partly into the flange (10) and is arranged to accommodate at least part of the locking element (3).

15. A method for joining together two containers stacked on top of each other with a container lock (1), wherein the container lock (1) comprises:

a one-piece lock body comprising:

a front part (25), a rear part (26), and side walls (27);
an upper locking piece (6) and a lower locking piece (19), wherein the upper locking piece (6) comprises a back part (7) and an upper protrusion (8);
a flange (10) between the upper locking piece (6) and the lower locking piece (19), wherein the back part (7) comprises a recess (11) and back surfaces (22) at least partly above the flange (10); and
at least one cavity (12); and

a locking mechanism (2) comprising:

a locking element (3) located at least partly in the recess (11); and
an operating part (5) connected to the locking element (3),wherein in the method:

the operating part (5) rotates the locking element (3) around a horizontal axis (X) of the locking element (3) located between the front part (25) and the rear part (26) or around a vertical axis (Y) of the locking element (3) located between the upper locking piece (6) and the lower locking piece (19) between a locked position and an unlocked position;
for the locked position, the locking element (3) protrudes horizontally out at least partly from the recess (11) and the back surfaces (22) to prevent the container lock (1) to fall out from a bottom corner piece (29) of a container; and
for the unlocked position, the operating part (5) is actuated to rotate the locking element (3) from the locked position to the unlocked position to allow the container lock (1) to be inserted into or taken out from the bottom corner piece (29) of the container.

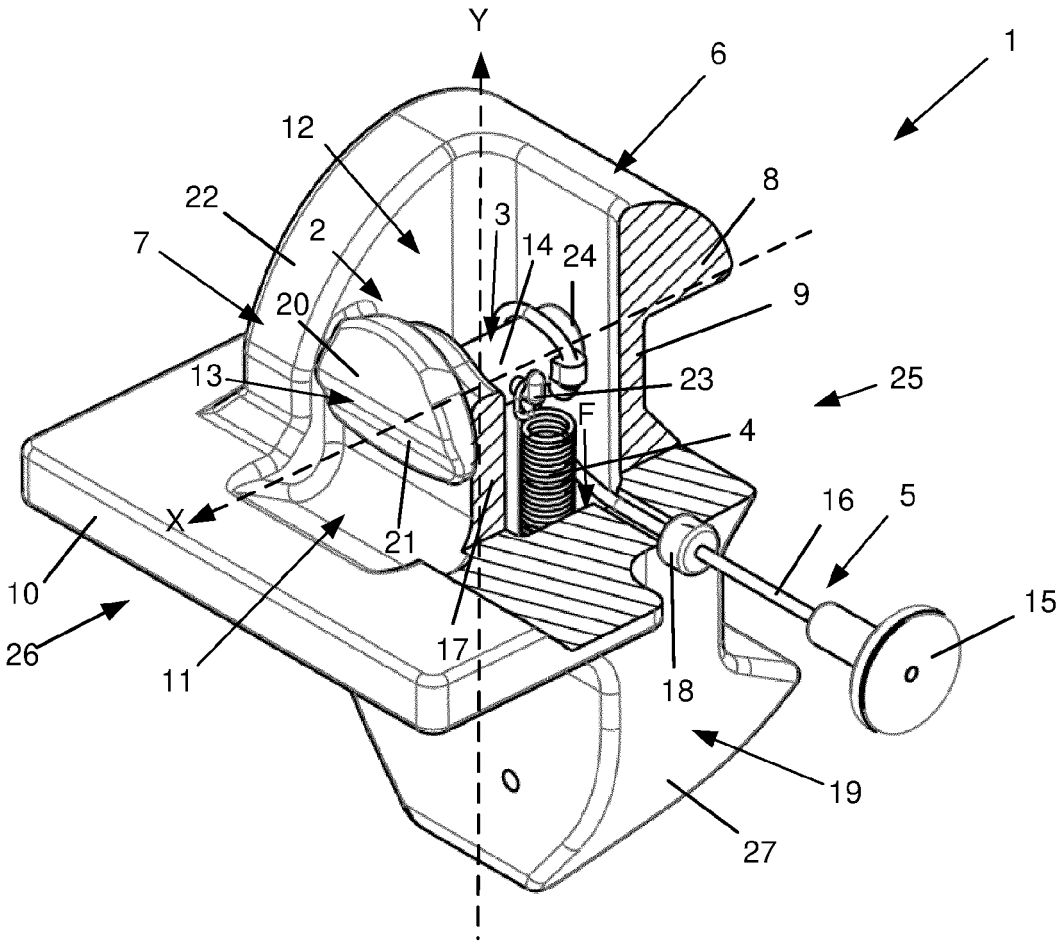

Y
1
6
12
22
2
3
14
24
8
7
20
9
13
23
25
F
4
X
21
16
5
10
15
26
11
17
18
19
27

FIG. 1

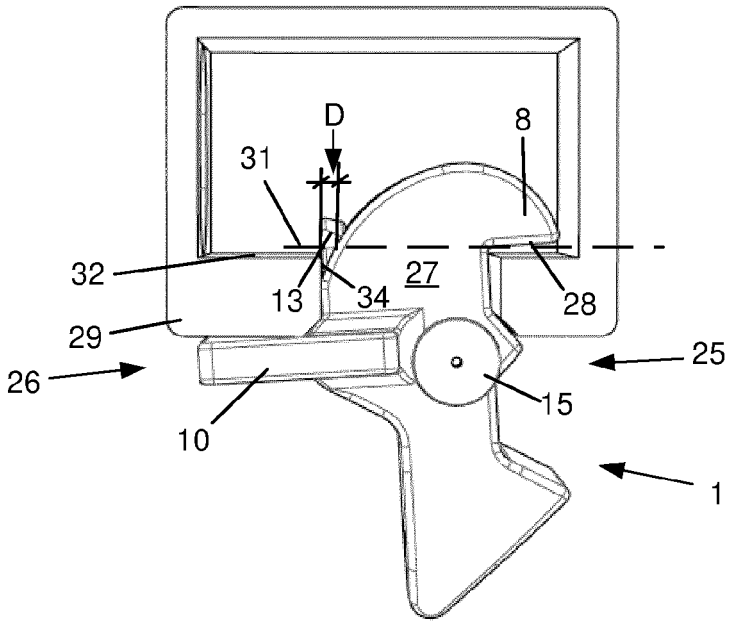

D
8
31
32
27
13
34
28
29
25
26
15
10
1

FIG. 2

FIG. 3a

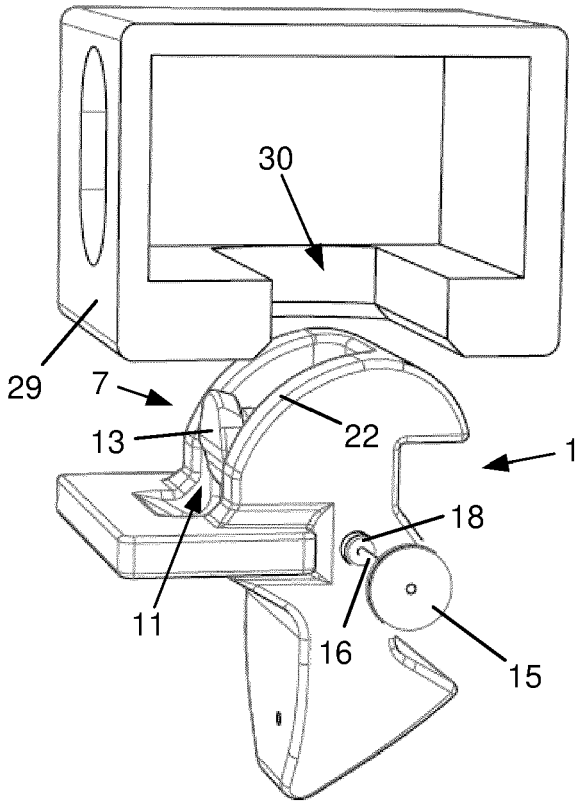
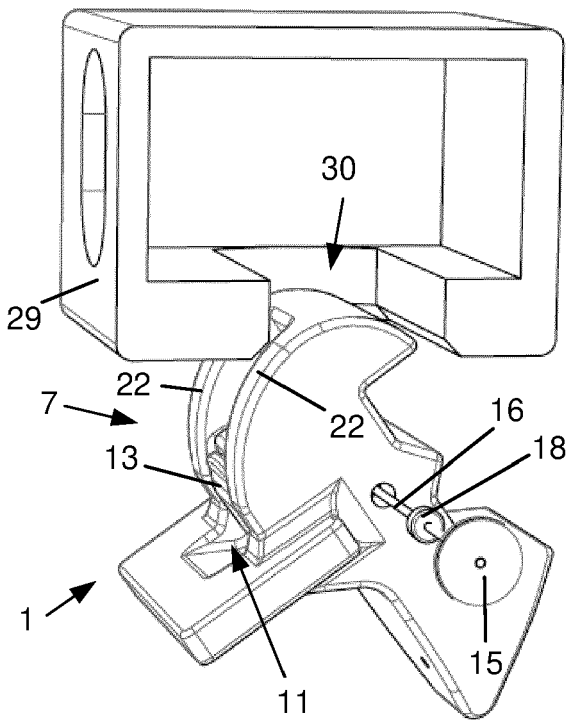


FIG. 3b



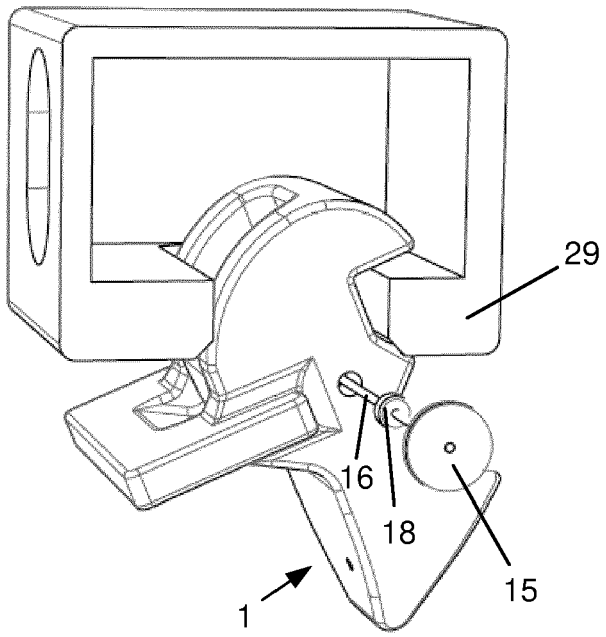


FIG. 3c

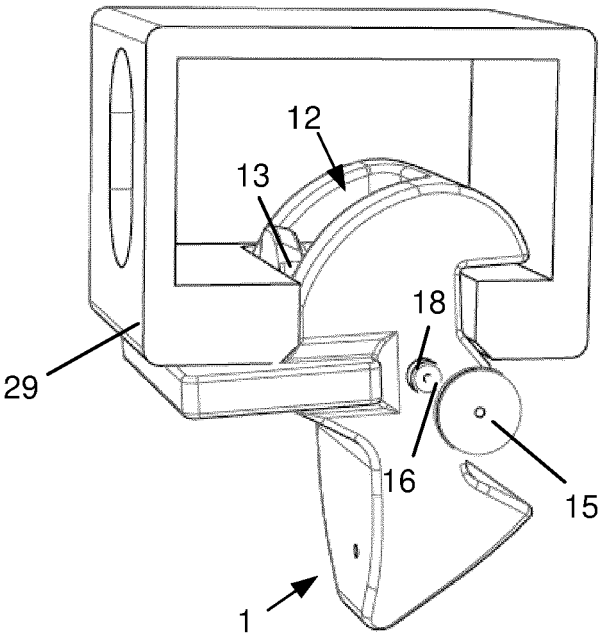


FIG. 3d

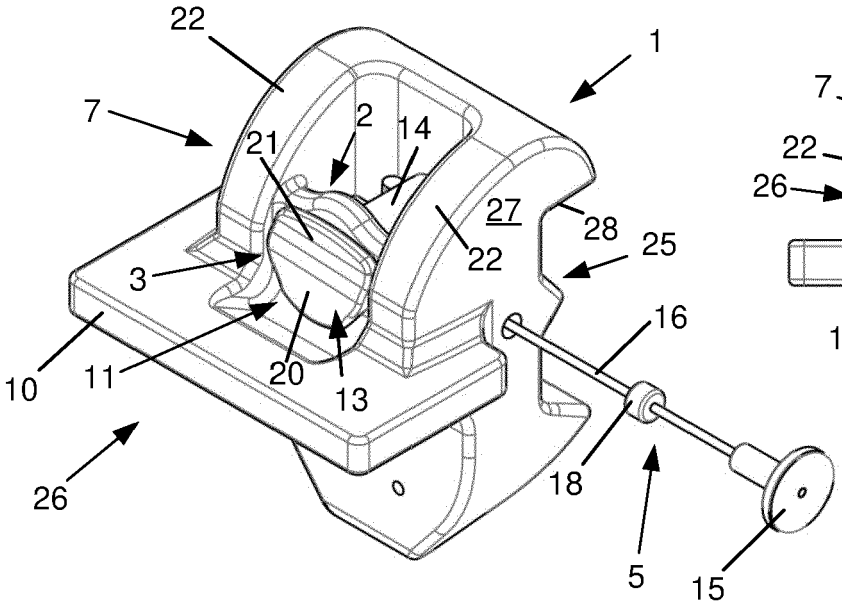


FIG. 4a

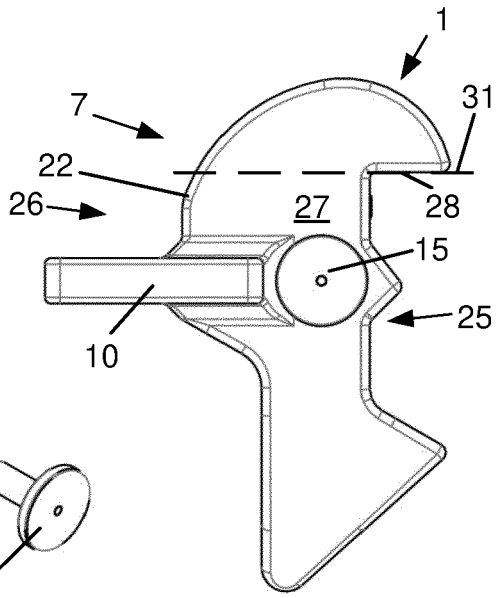


FIG. 4b

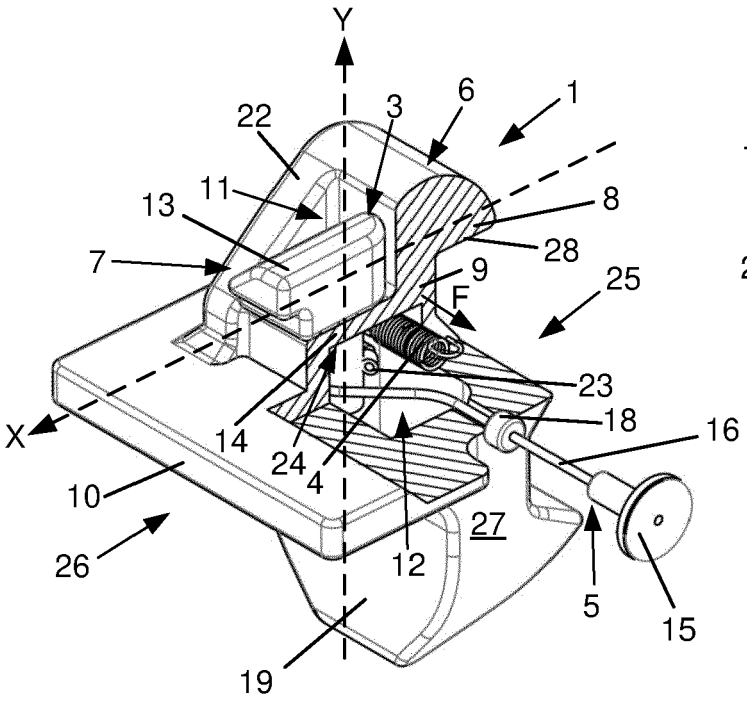


FIG. 5a

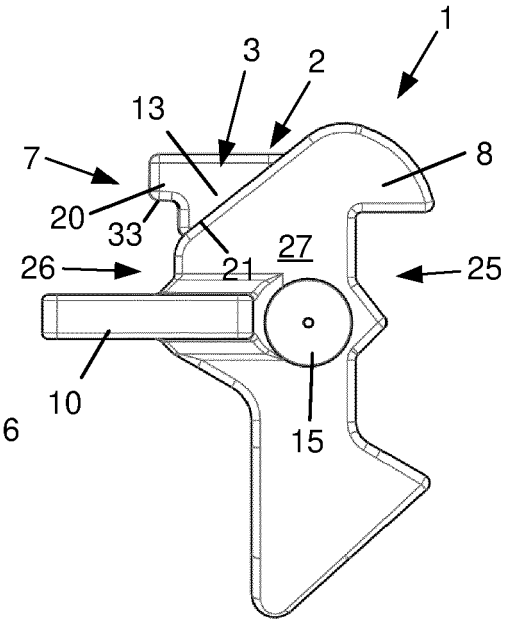


FIG. 5b

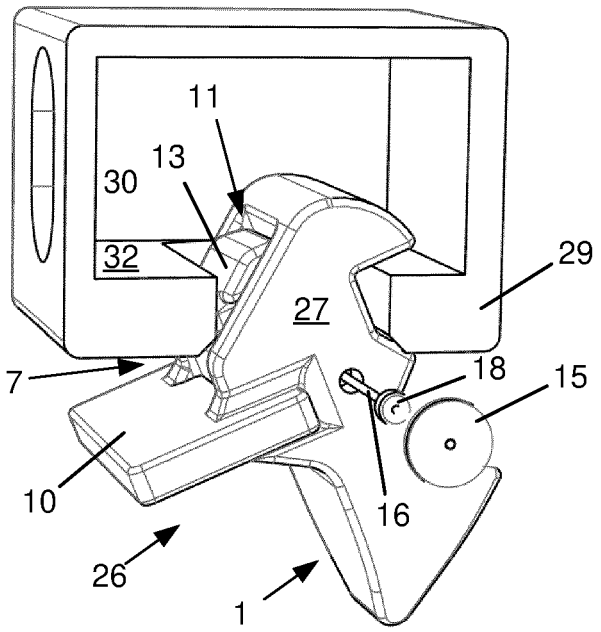


FIG. 6a

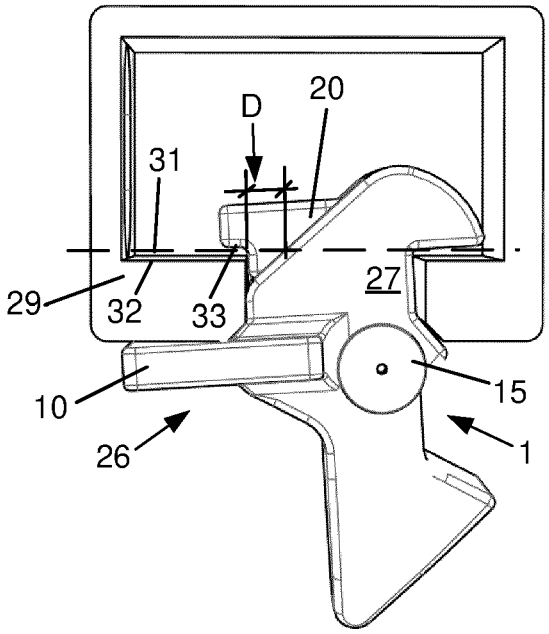


FIG. 6b

700
An operating part rotates a locking element around a horizontal axis of the locking element located between a front part and a rear part or around a vertical axis of the locking element located between an upper locking piece and an lower locking piece between a locked position and an unlocked position.

710
For the locked position, the locking element protrudes horizontally out at least partly from a recess and the back surfaces to prevent the container lock to fall out from a bottom corner piece of a container.

720
For the unlocked position, the operating part is actuated to rotate the locking element from the locked position to the unlocked position to allow the container lock to be inserted into or taken out from the bottom corner piece of the container.

FIG. 7

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 17 1799

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 101 05 785 A1 (SEC SHIP S EQUIPMENT CT BREMEN [DE]) 8 August 2002 (2002-08-08) * paragraph [0065] - paragraph [0082]; figures 7-26 *	1-15	INV. B65D90/00
A	US 2001/052169 A1 (HOVE JOHN [US]) 20 December 2001 (2001-12-20) * paragraph [0023] - paragraph [0029]; figures 1-8 *	1-15	
A	DE 10 2021 120918 A1 (GERMAN LASHING ROBERT BOECK GMBH [DE]) 16 February 2023 (2023-02-16) * paragraph [0024] - paragraph [0035]; figures 1-17 *	1-15	
A	WO 02/36908 A2 (BREWSTER JOHN B [US]) 10 May 2002 (2002-05-10) * page 15, line 23 - page 23, line 19; figures 2-32 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 August 2023	Lämmel, Gunnar

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 17 1799

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-08-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10105785 A1	08-08-2002	NONE	
US 2001052169 A1	20-12-2001	NONE	
DE 102021120918 A1	16-02-2023	NONE	
WO 0236908 A2	10-05-2002	AT 555040 T	15-05-2012
		AU 3057302 A	15-05-2002
		AU 2002230573 B2	06-07-2006
		BR 0107416 A	14-01-2003
		CA 2427648 A1	10-05-2002
		EP 1330375 A2	30-07-2003
		MX PA03003821 A	15-10-2004
		US 2005258330 A1	24-11-2005
		WO 0236908 A2	10-05-2002

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82