

**DEVICE FOR LOCKING/UNLOCKING A LOWER CORNER FITTING OF A
CONTAINER HAVING A STANDARDIZED FASTENING ELEMENT, AND
CONTAINER**

5 TECHNICAL FIELD

[0001] The present invention relates to a device for locking/unlocking a lower corner fitting of a first container having a standardized fastening element constituted by an upper corner fitting of a second container arranged beneath
10 said first container or by a support cradle.

PRIOR ART

[0002] A device for locking/unlocking a lower corner fitting of a first container
15 having such a standardized fastening element is known from US 3 980 185 A, said device including:

- an actuating handwheel intended to be permanently secured within a corresponding upper corner fitting of said first container, said handwheel being able to be engaged and rotated by an external control member between an
20 engaged position and a rotated position;
- a twist lock intended to be permanently secured to said lower corner fitting of said first container and including a first locking member comprising a lower pin suitable for being inserted into said fastening element, said first locking member being rotatable between a locking position intended to secure said
25 twist lock to said fastening element when said lower pin is housed therein and an unlocking position intended to allow insertion or extraction of this lower pin into or out of this fastening element;
- a coupling shaft rigidly connecting said handwheel and this lower pin of the twist lock, so that rotation of said handwheel from its engaged position to its
30 rotated position causes rotation of said first locking member from its locking position to its unlocking position, and vice versa.

[0003] Unfortunately, in the event of jamming or breakage of the actuating handwheel or the shaft as a result, for example, of impact or deformation of this first container, it is no longer possible to ensure unlocking of the lower corner fitting from the standardized fastening element.

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[0004] Furthermore, because the twist lock is permanently secured to the lower corner fitting, a container equipped with such locking/unlocking devices cannot be securely attached to supports with integrated twist locks.

10 [0005] To address these issues, a locking/unlocking device of this type is known from FR 3 088 626 A1, wherein the twist lock can be disengaged from the lower corner fitting of the first container.

15 [0006] To this end, this document proposes providing the twist lock with a dog coupling member mounted so as to move between an engaged position, in which the shaft and the lower pin of this lock are coupled, and an disengaged position, in which these two elements are uncoupled, so as to allow the twist lock to be disengaged from the lower corner fitting.

20 [0007] The removable nature of the twist lock thus allows a container equipped with such locking/unlocking devices to be securely attached to supports with integrated twist locks.

25 [0008] In the event of jamming or breakage of the actuating handwheel or the shaft, moving the dog coupling member to the disengaged position allows the lower pin of the twist lock to be rotated manually to its unlocking position, so as to ensure unlocking of said lower corner fitting of said first container from said standardized fastening element.

30 [0009] However, such a device requires a coupling member with this dog coupling member mounted at the lower end of the shaft and permanently housed in the lower corner fitting at the axis of rotation.

[0010] Placed in the upper central area of the lower corner fitting of the container so as to be aligned with the vertical axis of rotation of the lower pin, this coupling member can unfortunately interfere with certain types of twist locks integrated into supports, so as to prevent locking of this corner fitting to these supports.

DISCLOSURE OF THE INVENTION

[0011] The present invention aims to improve the situation.

[0012] For this purpose, it proposes a device for locking/unlocking a lower corner fitting of a first container having a standardized fastening element constituted either by an upper corner fitting of a second container arranged beneath said first container or by a support cradle.

[0013] This device includes:

- an actuating handwheel intended to be permanently secured within a corresponding upper corner fitting of said first container, said handwheel being able to be engaged and rotated by an external control member between an engaged position and a rotated position;
- a twist lock intended to be removably secured to said lower corner fitting of said first container and including a first locking member comprising a lower pin suitable for being inserted into said fastening element, said first locking member being rotatable between a locking position intended to secure said twist lock to said fastening element when said lower pin is housed therein and an unlocking position intended to allow insertion or extraction of this lower pin into or out of this fastening element;
- means for ensuring mechanical coupling between said handwheel and said twist lock, so that rotation of said handwheel from its engaged position to its rotated position causes rotation of said first locking member from its locking position to its unlocking position, and vice versa.

[0014] According to the invention, said coupling means include a lever provided on said first locking member as well as a transmission mechanism intended to be permanently secured within said lower corner fitting along one of its edges, said mechanism comprising a finger mounted for translational
5 movement and coupled to a first end of a connecting cable, the second end of which is coupled to said handwheel, said finger being able to be translated via said connecting cable during the rotation of said handwheel toward its rotated position, so as to act on said lever and cause said first locking member to rotate toward its unlocking position.

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[0015] The advantage of such a transmission mechanism cooperating with a lever provided on said first locking member of the twist lock is that it can be implanted inside the lower corner fitting of a container along one of its edges in an area free from any risk of interference with the upper pin of another type
15 of twist lock integrated into a support, so as to allow a container fitted with locking/unlocking devices according to the invention to be securely attached to such supports fitted with integrated twist locks.

[0016] For reasons of manufacturing simplicity and cost, said transmission
20 mechanism preferably includes a sleeve and a bushing slidably mounted inside said sleeve and rigidly connected to said finger passing through said sleeve at a slot extending along the latter.

[0017] In order to ensure automatic return of the finger when the handwheel is
25 returned to its engaged position, said transmission mechanism advantageously includes a main spring housed in said sleeve between said bushing and a stop end formed at one end of said sleeve, said main spring elastically returning said finger and said bushing to their rest position.

30 [0018] In order to "absorb" the additional tensile displacement of the connecting cable caused by the residual rotation of the handwheel, said transmission mechanism also advantageously includes a shuttle rigidly

connected to said first end of said connecting cable and slidably mounted inside said bushing, as well as an over-travel spring housed in said bushing between an end wall thereof and said shuttle.

5 [0019] In order to optimize the operation of the device according to the invention, said twist lock preferably includes a first spring permanently urging said first locking member toward its locking position, so as to automatically cause its return to this locking position when said handwheel is brought back toward its engaged position.

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[0020] In this case, and in order not to disrupt the rotational movement of the first locking member toward its unlocking position, via the action of the finger secured to the bushing on the lever, said over-travel spring of said transmission mechanism advantageously has a greater stiffness than that of
15 the spring equivalent to said first spring of said twist lock and to said main spring of this transmission mechanism.

[0021] In order to obtain sufficient traction of the connecting cable during rotation of the handwheel, the second end of this connecting cable is
20 advantageously rigidly connected to said handwheel at an attachment point radially offset from its axis of rotation.

[0022] In order to allow the twist lock to be disengaged from the standardized fastening element in the event of damage to the handwheel, the connecting
25 cable or the transmission mechanism, said twist lock advantageously includes a control cable provided at one of its ends with a gripping handle and capable, when pulled by an operator with a certain pulling force, of driving said first locking member toward its unlocking position.

30 [0023] In addition, and to allow the twist lock to be disengaged from a lower corner fitting of said first container, said twist lock preferably includes a second locking member comprising an upper pin intended to be inserted into said

lower corner fitting, said second locking member being rotatable with respect to said first locking member between a first locking position intended to secure said twist lock to said lower corner fitting when said upper pin is housed therein, and an unlocking position intended to allow said upper pin to be
5 extracted from said lower corner fitting.

[0024] Preferably, and in order to facilitate this disengagement of said twist lock from a lower corner fitting of said first container, said control cable is also capable, when pulled by an operator with a greater pulling force, of driving said
10 second locking member toward its unlocking position.

[0025] A second aspect of the invention relates to a container including four such locking/unlocking devices, each arranged along a respective vertical edge of this container.
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BRIEF DESCRIPTION OF THE DRAWINGS

[0026] An illustrative and non-limiting detailed description of an embodiment of the invention will now be given with reference to the appended drawings, in which:
20 - Figure 1 is a cross sectional view of a container fitted with four locking/unlocking devices according to the invention, taken along the vertical median transverse plane of the corner fittings of a first longitudinal end of this container;
- Figures 2, 3 and 4 show the successive steps involved in attaching the container of Figure 1 to a second container by means of its four
25 locking/unlocking devices according to the invention;
- Figure 5 is a top view of the actuating handwheel of a device according to the invention permanently secured within an upper corner fitting of the container shown in Figure 1 and occupying its engaged position;
- Figure 6 is an elevation view of the transmission mechanism of a device
30 according to the invention, permanently secured within a lower corner fitting of the container shown in Figure 1;

- Figure 7 is a cross sectional view of the transmission mechanism shown in Figure 6, taken along its median vertical transverse plane;
- Figure 8 is a perspective view of the twist lock of a device according to the invention intended to be removably secured to a lower corner fitting of the container shown in Figure 1;
- Figure 9 is a perspective view from a different angle of the twist lock shown in Figure 8 without its housing;
- Figure 10 is an enlarged view of the lower part of the twist lock of Figure 8 without its housing;
- Figure 11 is a perspective cross sectional view of the twist lock of Figure 8 in a horizontal plane through its housing;
- Figures 12A, 12B, 12C and 12D are top views and horizontal cross sectional views, respectively, taken at different levels of the twist lock of Figure 8 in its resting configuration;
- Figures 13A, 13B, 13C and 13D show top views and horizontal cross sectional views, respectively, taken at different levels of the twist lock of Figure 8 in its intermediate configuration;
- Figure 14 is a top view of the rotating actuating handwheel of a device according to the invention, in an intermediate position corresponding to the twist lock of this device reaching its intermediate configuration;
- Figures 15 and 16 show top views of the twist lock and handwheel, respectively, of a device according to the invention when the handwheel has reached its rotated position; and
- Figures 17A and 17B are top and horizontal cross sectional views, respectively, of the twist lock of Figure 8 in its end configuration.

DETAILED DESCRIPTION

[0027] Figures 1 to 4 show a container 1 equipped with four locking/unlocking devices according to the invention D, each arranged along a respective vertical edge of this container 1 and allowing it to be attached to/detached

from a second container 2 (shown in Figures 3 and 4) or a support, not shown, arranged beneath this container 1.

[0028] An orthogonal reference frame XYZ is defined with respect to this container 1, comprising three axes perpendicular to one another in pairs, namely:

- an X axis, defining a longitudinal direction of this container 1 and parallel to the ground;
- a Y axis, defining a transverse direction of this container 1, also parallel to the ground and which together with the X axis defines a horizontal XY plane; and
- 10 - a Z axis, defining a vertical direction, perpendicular to the ground as well as to the horizontal XY plane.

[0029] In the remainder of the description and with reference to the reference frame defined above, the terms "longitudinal" or "longitudinally" will refer to a direction parallel to the X axis, the terms "transverse" or "transversely" will refer to a direction parallel to the Y axis, and the terms "vertical" or "vertically" will refer to a direction parallel to the Z axis.

[0030] Furthermore, and by convention, the terms "lower" and "upper" will be understood in relation to the general orientation of the container 1. The term "lower" will thus indicate a greater proximity to the ground in the vertical direction than the term "upper".

[0031] As shown in Figures 1 to 4, the container 1 has an upper corner fitting 10 and a lower corner fitting 15, which are vertically aligned and spaced apart, at each of its vertical edges.

[0032] These corner fittings 10, 15 are substantially rectangular parallelepiped in shape, and are hollow in order to each define an internal volume.

[0033] Each upper corner fitting 10 (or lower corner fitting 15) has a longitudinally oriented oblong upper opening 11 (or lower opening 16) on its upper wall 10A (or lower wall 15A).

5 [0034] Each of the locking devices D includes an actuating handwheel 100 permanently housed in a corresponding upper corner fitting 10 of the container 1 and rotatably mounted on the lower wall 10B of the latter about a vertical axis V, between an engaged position shown by Figures 1 and 4, and a position rotated at about 90° to the latter shown by Figures 2 and 3.

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[0035] As better shown in Figure 5, this actuating handwheel 100 is intended to be engaged and rotated by an external control member O mounted on lifting equipment such as a crane and shown schematically in Figures 2 and 3.

15 [0036] This external control member O is able to occupy an insertion position, not shown, in which it extends in a longitudinal direction so that it can be inserted into an upper corner fitting 10 through its opening 11 and rotatably coupled to the actuating handwheel 100.

20 [0037] As shown in Figures 2 and 3, this external control member O can also be rotated through about 90° from this insertion position to an operating position, in which it extends in a transverse direction, so as to also cause rotation of the actuating handwheel 100 into its rotated position.

25 [0038] It can be seen from Figures 2 and 3 that, in this operating position, the external control member O protrudes transversely on both sides of the opening 11 in the corresponding upper corner fitting 10, securing it to this upper corner fitting 10 of the container 1 and allowing the latter to be lifted by lifting equipment.

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[0039] Each locking device D also includes a transmission mechanism 200 permanently secured within a lower corner fitting 15 against and along one of its upper transverse edges.

5 [0040] Referring to Figure 6, this transmission mechanism 200 comprises a cylindrical sleeve 210 with a transverse axis attached by screws to a side wall 15B of this lower corner fitting 15 and closed at one of its ends by a stop end 220.

[0041] This sleeve 210 houses a helical compression spring 230, a first end of
10 which abuts against the end piece 220 and which will be referred to in the following as the main spring.

[0042] As shown in Figure 7, this transmission mechanism 200 also comprises a hollow cylindrical bushing 240 slidably mounted transversely
15 inside this sleeve 210 and rigidly connected to a curved finger 250 passing through the sleeve 210 at a slot 211 extending along the latter.

[0043] An end wall 241 of the bushing 240 rests against the second end of the main spring 230, so that the latter elastically biases the bushing 240 and the
20 finger 250 toward their rest positions shown in Figures 6 and 7.

[0044] The bushing 240 houses a second helical compression spring 260, a first end of which abuts against its end wall 241 and which will be referred to in the following as the over-travel spring.

25 [0045] The transmission mechanism 200 further comprises a shuttle 270 slidably mounted transversely inside this bushing 240, one end 271 of which rests in abutment against the second end of the over-travel spring 260.

30 [0046] This shuttle 270 is rigidly connected to a first end of a connecting cable 400 passing successively through the over-travel spring 260, the end wall

241 of the bushing 240, the main spring 230, the end piece 220 and the side wall 15B facing the inside of the container 1 of the lower corner fitting 15.

5 [0047] Referring to Figures 1 to 4, this connecting cable 400 then extends vertically along the corresponding vertical edge of the container 1, then passes through the lower part of a side wall of the corresponding upper corner fitting 10 facing the inside of the container 1. As shown in Figure 5, its second end is further rigidly connected to the handwheel 100 at an attachment point P which is radially offset from its vertical axis of rotation V.

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[0048] In order to avoid any risk of water flowing into the interior of the container 1 via the port for the passage of the connecting cable 400 provided in the lower part of such a side wall of this upper corner fitting 10, a curved guide duct through which this connecting cable 400 passes and which rises
15 vertically along this wall will advantageously be attached and sealed against the periphery of this side wall from its side facing the interior of this container 1.

[0049] Each locking device further comprises a twist lock 500 removably secured
20 to a corresponding lower corner fitting 15 of the container 1.

[0050] The removable nature of the twist locks 500 in particular allows a container 1 equipped with such locking/unlocking devices D to be securely attached to supports with integrated twist locks.

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[0051] This removable nature of the twist locks 500 also means that they can be regularly serviced (in particular, cleaned and lubricated) so as to ensure optimum operation over their entire life cycle, and replaced if necessary without having to dismantle the entire locking device D.

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[0052] Shown alone in Figure 8, this twist lock 500 includes a first locking member 510 comprising a lower pin 511 suitable for being inserted, as will be

seen in greater detail later, into a standardized fastening element consisting either of an upper corner fitting 10' of a second container 2 arranged beneath the container 1 as shown in Figures 2 and 3, or of a support cradle such as a ship's deck or the floor of a trailer.

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[0053] As shown in Figures 1 to 4, this first locking member 510 also comprises a shaft 512 with a vertical axis V extending upwards from the lower pin 511 and provided at its top with a tapered head 513 forming a shoulder.

10 [0054] Preferably made in one piece from a metal material by injection molding or machining, this first locking member 510 further comprises a lever 514 extending in a radial direction from the tapered head 513 of this shaft 512.

[0055] The twist lock 500 also includes a second locking member 520
15 comprising an upper pin 521 housed, as shown in Figures 1 to 4, in a corresponding lower corner fitting 15 of the container 1 so as to secure the twist lock 500 to the container 1.

[0056] With reference to Figure 9, this second locking member 520 also
20 comprises a cylindrical sleeve 522 with a vertical axis V extending beneath the upper pin 521, and an annular collar 523 projecting radially from the lower end of this sleeve 522.

[0057] Advantageously consisting of two hollow metal half-bodies screwed
25 together using several bolts, the second locking member 520 further features a blind recess 524 with a vertical axis V, visible in Figures 1 to 4, and opening out at its lower end.

[0058] As shown in these figures, this blind recess 524 houses the upper
30 portion of the shaft 512 complementary to this recess 524, so that this second locking member 520 is only rotatable with respect to the first locking member 510 about the vertical axis V of this shaft 520 (the cooperation between the

head 513 forming a shoulder and the upper part of the recess 524 preventing any relative translational movement between these two locking members 510, 520 in a vertical direction).

5 [0059] This second locking member 520 further features a cutout 525 formed in the upper pin 521 and opening out at the top of the recess 524, this cutout 525 visible in Figure 9 being passed through by the lever 514.

[0060] With reference to Figures 9 and 10, the first locking member 510
10 further comprises a flange 515 projecting from the lower portion of the shaft 512, and a protrusion 516 also projecting from the lower portion of the shaft 512 above this flange 515.

[0061] As shown in Figure 8, the twist lock 500 also includes a hollow housing
15 530 extending vertically between the lower pin 511 and the upper pin 521, and encasing the elements of the locking members 510, 520 arranged between these two pins 511, 521, so that the locking members 510, 520 are able to rotate about the vertical axis V with respect to this housing 530.

20 [0062] This housing 530 comprises an upper nesting portion 531 having a shape and dimensions complementary to those of the opening 16 of a lower corner fitting 15 of the container 1, as well as a lower nesting portion 532 having a shape and dimensions complementary to those of the opening 11' of a standardized fastening element constituted by an upper corner fitting 10'
25 of a second container 2 or by a support cradle.

[0063] As can be seen in Figure 8, the housing 530 is advantageously made up of two symmetrical hollow half-bodies screwed together using four bolts and each made in one piece from a metal material by injection molding or machining.
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[0064] The twist lock 500 further comprises a first torsion spring 540 arranged around the shaft 512 beneath the flange 515.

[0065] Referring to Figure 10, the first vertical end strand 541 of this spring 540 passes through a complementarily shaped notch 515A provided on the flange 515 so as to be constrained to rotate about the vertical axis V with the first locking member 510.

[0066] As shown in Figure 11, its second end strand 542, oriented in a horizontal direction, is held in abutment against an inner stop wall 533 of the housing 530 so as to be constrained to rotate about the vertical axis V with this housing 530.

[0067] The twist lock 500 further comprises a second torsion spring 550 arranged around the shaft 512 above the flange 515.

[0068] Again with reference to Figure 10, the first vertical end strand 551 of this spring 550 passes through a complementarily shaped notch 516A formed in the protrusion 516 so as to be constrained to rotate about the vertical axis V with the first locking member 510, this first end strand 551 also passing through an arcuate aperture 523A formed in the lower wall of the collar 523 and centered on the vertical axis of rotation V. Its second vertical end strand 552 passes through a port of corresponding size 523B, also formed in the lower wall of the collar 523, so as to be constrained to rotate about the vertical axis V with the latter and the second locking member 520.

[0069] Lastly, the twist lock 500 includes a control cable 560, one end of which is attached to the collar 523 and partially wound around it, this cable 560 passing through the housing 530 via a port 534 (see Figure 8) and being provided with a gripping handle, not shown, at its second end, located outside the housing 530.

[0070] In the resting configuration of this twist lock 500 shown in Figures 1, 4 and 12A to 12D, the first locking member 510 occupies its locking position in which a first stop surface 515B of the flange 515 rests in abutment against an

inner side wall 535 of the housing 530 (see Figure 12D) and toward which it is elastically biased by the first torsion spring 540.

5 [0071] In this locking position of this first locking member 510, it may be noted that the lower pin 511 is oriented at an angle of about 60° with respect to the lower nesting portion 532 of the housing 530, from which it protrudes laterally on both sides, so as to secure the twist lock 500 to a standardized fastening element (10') when this lower pin 511 is housed therein.

10 [0072] Still in the resting configuration, the second locking member 520 also occupies a first locking position toward which it is elastically biased by the second torsion spring 550 and in which its upper pin 521 is oriented at an angle of about 90° with respect to the upper nesting portion 531 of the housing 530, from which it protrudes laterally on both sides, so as to secure
15 the twist lock 500 to a corresponding lower corner fitting 15 of the container 1 when this upper pin 521 is housed therein.

[0073] It will be noted that in this resting configuration, the first vertical end 551 of the second spring 550 is close to a first end edge of the arcuate aperture 523A.

20 [0074] To lift and position the first container 1 on a second container 2 (or on a support, not shown), the first container 1 must first be attached to lifting equipment, not shown.

25 [0075] For this purpose, each external control member O of this lifting equipment must first be inserted through the opening 11 of a respective upper corner fitting 10 of this container 1 (or that of a corresponding support cradle), so as to be rotatably coupled to a corresponding actuating handwheel 100.

30 [0076] As shown in Figure 2, these external control members O must then be rotated through about 90° to their operating position, in which they extend in

transverse directions so as to also cause the actuating handwheels 100 to rotate into their rotated position.

5 [0077] Each of the external control members O is thereby secured to the upper corner fitting 10 of the container 1 in which it is housed, so as to attach this first container 1 to the lifting equipment. The container 1 can then be lifted by this lifting equipment and moved in line with the second container 2 (or support).

10 [0078] The rotation of each handwheel 100 caused by that of a corresponding external control member O also pulls the connecting cable 400, causing the bushing 240 to move along the sleeve 210 counter to the main spring 230, so that the finger 250 acting on the lever 514 causes the first locking member 510 of the corresponding twist lock 500 to rotate counter to its first spring 540.

15 [0079] This rotation continues until these twist locks 500 reach the intermediate configuration shown in Figures 2, 3 and 13A to 13D, in which their lower pins 511 align with the lower nesting portions 532 of their housings 530, so that they no longer protrude laterally (see Figure 13D) and, as shown
20 in Figure 3, these lower pins 511 can be inserted into the upper corner fittings 10' of the second container 2 (or into the support cradles), while the lower nesting portions 532 of the housings 530 are housed in the openings 11' of these upper corner fittings 10' (or cradles).

25 [0080] As shown in Figure 13D, the first locking members 510 of these twist locks 500 then occupy their unlocking position, in which a second stop surface 515C of the flange 515 rests in abutment against an inner side wall 536 of the housing 530.

30 [0081] It will be noted that this rotation of the first locking member 510 also results, due to the abutting cooperation between the first end strand 551 of the second spring 550 and the first end edge 523Aa of the aperture 523A (see

Figure 13B), in a simultaneous rotation in the same direction of the second locking member 520, which occupies a second intermediate locking position in which it is oriented at an angle of about 30° with respect to the upper nesting portion 531 of the housing 530, from which it continues to project laterally on both sides (see Figure 13A), so that the twist locks 500 remain secured to the lower corner fittings 15 of the container 1.

[0082] It should also be noted that the twist lock 500 occupies its intermediate configuration before the end of the rotational movement of the handwheel 100, as soon as the latter reaches an intermediate position shown in Figure 14.

[0083] Since this intermediate configuration of the twist lock 500 corresponds to an end position of the first locking member 510 (due to the abutting cooperation between the second stop surface 515C of the flange 515 and the inner side wall 536 of the housing 530), the presence of the over-travel spring 260 makes it possible, as shown in Figures 15 and 16, to "absorb" the additional tensile displacement of the connecting cable 400 caused by the residual rotation of the handwheel 100 to its rotated position.

[0084] In order not to disrupt the rotational movement of the first locking member 510 toward its unlocking position, via the action of the finger 250 secured to the bushing 240 on the lever 514, this over-travel spring 260 advantageously has a stiffness which is significantly greater than that of the spring equivalent to the springs 230 and 540, so as not to be compressed during this movement of the first locking member 510.

[0085] Once the first container 1 has been positioned on the second container 2 (or on the support), the external control members O must be pivoted back to their insertion position so as to allow them to be removed from the upper corner fittings 10 of this container 1 as shown in Figure 4.

[0086] This rotation of the external control members O will also cause the actuating handwheels 100 to rotate back into their engaged position and the connecting cable 400 to slacken.

5 [0087] Since the levers 514 are no longer biased by the cables 400, the first locking members 510 automatically return, by virtue of the return force of the first springs 540, to their initial locking position, securing the twist locks 500 to the upper corner fittings 10' of the second container 2 (or to the support cradles) and thus locking them to the lower corner fittings 15 of the first
10 container 1, so that it can be attached to the second container 2.

[0088] Additionally, with the finger 250 no longer constrained by the lever 514, the springs 230 and 260 will also cause the bushing 240 and the finger 250 to return to their rest position.

15 [0089] To detach this first container 1 from the second container 2 (or from a support), it is understood that the twist locks 500 must each be disengaged from a corresponding upper corner fitting 10' of this second container 2 (or from a corresponding support cradle).

20 [0090] This disengagement can be carried out very easily by means of four external control members O mounted on lifting equipment, which are inserted through the corresponding openings 11 in the upper corner fittings 10 of this container 1 (or in those of the support cradles), so as to be rotatably coupled to a
25 corresponding actuating handwheel 100.

[0091] These external control members O must then be rotated by about 90° with respect to this insertion position to their operating position, so as to rotate the actuating handwheels 100 into their rotated position and, via the connecting
30 cables 400, bring the twist locks 500 into their intermediate configuration (see Figure 3), in which the first locking members 510 of these locks 500 occupy their

unlocking position, allowing the lower pins 511 to be extracted from the upper corner fittings 10' of the container 2 (or from the support cradles).

5 [0092] The container 1 is then detached from the container 2 (or support) so that it can be lifted by the lifting equipment and moved.

10 [0093] In the event of damage, for example, to the handwheel 100, the connecting cable 400 or the transmission mechanism 200 of a locking device D, the twist lock 500 of this device D can also be manually disengaged from a corresponding upper corner fitting 10' of the container 2 (or from a corresponding support cradle).

15 [0094] To do this, the operator must exert a certain pulling force on the control cable 560 via the gripping handle, not shown, and counter to the first spring 540, so as to cause the first and second locking members 510, 520 to rotate simultaneously until the twist lock 500 occupies its intermediate configuration shown in Figures 13A to 13D.

20 [0095] In order to hold the twist lock 500 in this intermediate configuration against this spring 540 when the handle is released, the housing 530 will advantageously comprise means, not shown, for keeping the control cable 560 in the pulled position.

25 [0096] After the first locking members 510 of the twist locks 500 have been brought into and held in their unlocking position, the first container 1 is detached from the second container 2 (or support) so that it can be lifted by the lifting equipment and moved.

30 [0097] As already mentioned, each twist lock 500 can also be manually disengaged from a lower corner fitting 15 of the container 1, for example for maintenance purposes.

[0098] To do this, the operator must first exert a certain pulling force on the control cable 560 via the gripping handle, not shown, and counter to the first spring 540, so as to cause the first and second locking members 510, 520 to rotate simultaneously until the twist lock 500 occupies its intermediate configuration shown in Figures 13A to 13D.

[0099] This operator must then exert a greater pulling force on the control cable 560 counter to the two springs 540, 550 in such a way as to cause additional rotation of the second locking member 520 only, until this twist lock 500 reaches the end configuration shown in Figures 17A and 17B, in which this second locking member 520 occupies its unlocking position, in which its upper pin 521 no longer protrudes laterally from the upper nesting portion of the housing 530, so as to allow it to pass through this opening 11 and be extracted from the corresponding lower corner fitting 15 of the container 1.

[0100] Figure 17B shows that this additional rotation of the second locking member 520 is made possible by the arcuate aperture 523A in the collar 523, in whose frame of reference the first vertical end 551 of the second spring 550 moves along this aperture 523A.

[0101] To re-attach the twist lock 500 to a lower corner fitting 15 of the container 1, its first locking member 510 must first be manually rotated (by gripping its lower pin 511) with respect to the housing 530 and counter to the first spring 540 to its unlocking position, in which the twist lock 500 occupies its intermediate configuration shown in Figures 13A to 13D.

[0102] While manually holding this first locking member 510 in the unlocking position, the operator must then present the twist lock 500 beneath a lower corner fitting 15 of the container 1 so that the upper nesting portion 531 of the housing 530 is aligned with the lower opening 16 of this lower corner fitting 15.

[0103] They must then slide this twist lock 500 vertically upwards so as to cause, through the cooperation between the peripheral edge of this opening 16 and the inclined contact surfaces of the upper pin 521, an additional rotation in the same direction as before of the second locking member 520 counter to the two springs 540, 550 to its unlocking position (corresponding to the end configuration of the twist lock 500 shown in Figures 17A and 17B), in which this upper pin 521 no longer protrudes laterally from the upper nesting portion 531 of the housing 530, so as to allow it to pass through this opening 16 and be inserted into the lower corner fitting 15, while this upper nesting portion 531 is housed in this same opening 16.

[0104] As soon as this upper pin 521 has passed through the opening 16, the twist lock 500 automatically returns, by virtue of the return force of the spring 550, to its intermediate configuration of Figures 13A to 13D, ensuring that this twist lock 500 is secured to the lower corner fitting 15.

[0105] The operator can then release the twist lock 500 so that, by virtue of the return force of the spring 540, it automatically returns to its resting configuration.

[0106] According to embodiments not shown, certain elements of the locking/unlocking device D according to the invention can be shaped differently. Its actuating mechanism could, for example, be devoid of an over-travel spring and/or the return means of its twist lock could be of a different type.

[0107] Numerous other embodiments of the present invention are, of course, conceivable, and in this respect it should be recalled that this invention is not limited to the embodiments described above and shown in the figures, but also encompasses all execution variants within the abilities of a person skilled in the art.

Claims

1. A device (D) for locking/unlocking a lower corner fitting (15) of a first container (1) having a standardized fastening element constituted either by an upper corner fitting (10') of a second container (2) arranged beneath said first container (1) or by a support cradle, said device (D) including:
- an actuating handwheel (100) intended to be permanently secured within a corresponding upper corner fitting (10) of said first container (1), said handwheel (100) being able to be engaged and rotated by an external control member (O) between an engaged position and a rotated position;
 - a twist lock (500) intended to be removably secured to said lower corner fitting (15) of said first container (1) and including a first locking member (510) comprising a lower pin (511) suitable for being inserted into said fastening element (10'), said first locking member (510) being rotatable between a locking position intended to secure said twist lock (500) to said fastening element (10') when said lower pin (511) is housed therein and an unlocking position intended to allow insertion or extraction of this lower pin (511) into or out of this fastening element (10');
 - means (514, 200, 400) for ensuring mechanical coupling between said handwheel (100) and said twist lock (500), so that rotation of said handwheel (100) from its engaged position to its rotated position causes rotation of said first locking member (510) from its locking position to its unlocking position, and vice versa;
- characterized in that said coupling means include a lever (514) provided on said first locking member (510) as well as a transmission mechanism (200) intended to be permanently secured within said lower corner fitting (15) along one of its edges, said mechanism (200) comprising a finger (250) mounted for translational movement and coupled to a first end of a connecting cable (400), the second end of which is coupled to said handwheel (100), said finger (250) being able to be translated via said connecting cable (400) during the rotation of said handwheel (100) toward its

rotated position, so as to act on said lever (514) and cause said first locking member (510) to rotate toward its unlocking position.

2. The device (D) according to claim 1, characterized in that said
5 transmission mechanism (200) includes a sleeve (210) and a bushing (240) slidably mounted inside said sleeve (210) and rigidly connected to said finger (250) passing through said sleeve (210) at a slot (211) extending along the latter.

3. The device (D) according to claim 2, characterized in that said
10 transmission mechanism (200) includes a main spring (230) housed in said sleeve (210) between said bushing (240) and a stop end (220) formed at one end of said sleeve (210), said main spring (230) elastically returning said finger (250) and said bushing (240) to their rest position.

15 4. The device (D) according to claim 3, characterized in that said transmission mechanism (200) also includes a shuttle (270) rigidly connected to said first end of said connecting cable (400) and slidably mounted inside said bushing (240), as well as an over-travel spring (260) housed in said bushing (240) between an end wall (241) thereof and said shuttle (270).

20 5. The device (D) according to one of claims 1 to 4, characterized in that said twist lock (500) includes a first spring (540) permanently urging said first locking member (510) toward its locking position, so as to automatically cause its return to this locking position when said handwheel (100) is brought back
25 toward its engaged position.

6. The device (D) according to claims 4 and 5, characterized in that said over-travel spring (260) of said transmission mechanism (200) has a greater stiffness than that of the spring equivalent to said first spring (540) of said twist
30 lock (500) and to said main spring (230) of this transmission mechanism.

7. The device (D) according to one of claims 1 to 6, characterized in that the second end of said connecting cable (400) is rigidly connected to said handwheel (100) at an attachment point (P) radially offset from its axis of rotation (V).
- 5 8. The device (D) according to one of claims 1 to 7, characterized in that said twist lock (500) includes a control cable (560) provided at one of its ends with a gripping handle and capable, when pulled by an operator with a certain pulling force, of driving said first locking member (510) toward its unlocking position.
- 10 9. The device (D) according to one of claims 1 to 8, characterized in that said twist lock (500) includes a second locking member (520) comprising an upper pin (521) intended to be inserted into said lower corner fitting (15), said second locking member (520) being rotatable with respect to said first locking member (510) between a first locking position intended to secure said twist lock (500) to said lower corner fitting (15) when said upper pin (521) is housed therein, and an unlocking position intended to allow said upper pin (521) to be extracted from said lower corner fitting (15).
- 15 10. The device (D) according to claims 8 and 9, characterized in that said control cable (560) is also capable, when pulled by an operator with a greater pulling force, of driving said second locking member (520) toward its unlocking position.
- 20 11. A container (1) including four locking/unlocking devices (D) according to one of claims 1 to 10, each arranged along a respective vertical edge of this container (1).
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