CLAIMS

1. A shackle assembly (1), comprising a shackle body (2), a shackle pin (4) and a pin displacement mechanism (6) for moving the shackle pin (4) along its centreline (5) between a shackle closed position and a shackle open position, wherein the pin displacement mechanism (6) comprises a rotation element (7) which is mounted to the shackle body (2) and rotatable with respect to the shackle body (2) about an axis of rotation (13) which extends perpendicularly to the centreline (5) of the shackle pin (4) and a transmission (8, 9, 11, 12, 14, 15) between the rotation element and the shackle pin (4) for transmitting a rotation of the rotation element (7) to a displacement of the shackle pin (4) along its centreline (5), characterized in that the rotation element and the transmission (6) form part of a four-bar linkage, wherein the rotation element comprises a first bar (7) which is pivotally coupled to a second bar (8) through a first journal (11), which second bar (8) is pivotally coupled to a third bar (9) through a second journal (12) remote from the first journal (11), which third bar (9) is rotatably coupled to the shackle body (2) remote from the second journal (12), wherein the shackle body (2) forms a fourth bar, wherein the second bar (8) is rotatably coupled to the shackle pin (4) through a pin pivot (15), wherein the pin pivot (15) lies at a distance from the first and second journals (11, 12), and wherein all of the first bar, the second bar, the third bar and the fourth bar (7–10) and both of the first journal and the second journal (11–14) are dimensioned and arranged such that the pin pivot (15) is movable in the same direction as the direction of the centreline (5) of the shackle pin (4).

2. A shackle assembly (1) according to claim 1, wherein the shackle body (2) extends in a main plane and

wherein the axis of rotation (13) extends perpendicularly to said main plane.

3. A shackle assembly (1) according to claim 2, wherein the shackle body (2) comprises a U-shape having a bottom and legs extending from the bottom, whereas end portions of the legs are provided with eyes (3) for receiving the shackle pin (4), wherein the axis of rotation (13) extends at a level between said bottom and the shackle pin (4).

~~4. A shackle assembly (1) according to any one of the preceding claims, wherein the rotation element and the transmission (6) form part of a four-bar linkage, wherein the rotation element comprises a first bar (7) which is pivotally coupled to a second bar (8) through a first journal (11), which second bar (8) is pivotally coupled to a third bar (9) through a second journal (12) remote from the first journal (11), which third bar (9) is rotatably coupled to the shackle body (2) remote from the second journal (12), wherein the shackle body (2) forms a fourth bar, wherein the second bar (8) is rotatably coupled to the shackle pin (4) through a pin pivot (15), wherein the pin pivot (15) lies at a distance from the first and second journals (11, 12), and wherein the bars (7-10) and the journals (11-14) are dimensioned and arranged such that the pin pivot (15) is movable in the same direction as the direction of the centreline (5) of the shackle pin (4).~~

~~5~~4. A shackle assembly (1) according to any one of the preceding claim~~s 1-4~~, wherein the four-bar linkage forms a Hoekens linkage, in which the first journal (11), the second journal (12) and the pin pivot (15) are aligned.

~~6~~5. A shackle assembly (1) according to any one of the preceding claim~~s 1-4 or 5~~, wherein the pin pivot (15) is located outside a circumference of the shackle body (2) in the shackle closed position.

~~7~~6. A shackle assembly (1) according to any one of the preceding claim~~s 1-6~~, wherein a linear actuator (16) is

rotatably mounted to both the shackle body (2) and the third bar (9).

~~8~~7. A shackle assembly (1) ~~according to any one of the claims 1-3~~, comprising a shackle body (2), a shackle pin (4) and a pin displacement mechanism (6) for moving the shackle pin (4) along its centreline (5) between a shackle closed position and a shackle open position, wherein the pin displacement mechanism (6) comprises a rotation element (7) which is mounted to the shackle body (2) and rotatable with respect to the shackle body (2) about an axis of rotation (13) which extends perpendicularly to the centreline (5) of the shackle pin (4) and a transmission (8, 9, 11, 12, 14, 15) between the rotation element and the shackle pin (4) for transmitting a rotation of the rotation element (7) to a displacement of the shackle pin (4) along its centreline (5), wherein the rotation element comprises a first bar (7) which is pivotally coupled to a second bar (8) through a first journal (11), which second bar (8) is rotatably coupled to the shackle pin (4) through a pin pivot (15) at a distance from the first journal (11), and wherein the shackle pin (4) is guided along its centreline (5) by the shackle body (2), ~~.~~

~~9. A shackle assembly (1) according to claims 8,~~ wherein a linear actuator (16) is rotatably mounted to both the first bar (7) and the second bar (8) at a distance from the axis of rotation (13), the first journal (11) and the pin pivot (15).

~~10~~8. A shackle assembly (20), comprising a shackle body (21), a shackle pin (22) and a pin displacement mechanism (23) for moving the shackle pin (22) along its centreline between a shackle closed position and a shackle open position, wherein the shackle pin (22) is provided with a lateral projection (24) located at a distance from the shackle body (21) in the shackle closed position, wherein the shackle assembly (20) is provided with a fluid bellow (26) which is located between the lateral projection (24) and the shackle

body (22) such that upon introducing a fluid into the fluid bellow (26) it pushes the lateral projection (24) including the shackle pin (22) away from the shackle body (21), hence moving the shackle pin (22) from the shackle closed position to the shackle open position.

~~11~~9. A shackle assembly (20) according to claim ~~10~~8, wherein the lateral projection is formed by a flange (24) and the fluid bellow (26) surrounds at least a portion of the shackle pin (22) in the shackle open position.

~~12~~10.A shackle assembly (20) according to claim ~~11~~9, wherein the fluid bellow comprises a coil-shaped flexible tube (26).

~~13~~11.A shackle assembly (20) according to any one of the claims ~~10~~8-~~12~~10, wherein the shackle pin (22) engages a spring which is located between the shackle pin (22) and the shackle body (21) so as to move the shackle pin (22) from the shackle open position to the shackle closed position when fluid is released from the fluid bellow (26).

~~14~~12.A shackle assembly (20) according to any one of the claims ~~10~~8-~~12~~10, wherein the lateral projection is formed by a plate (24) which is reciprocatingly slidable within a cylinder (27) that is fixed to the shackle body (21), wherein a space in the cylinder (27) at a side of the plate (24) facing away from the shackle body (20) forms a pressure chamber for receiving a pressurized fluid so as to be able to move the shackle pin (22) from the open shackle position to the closed shackle position.