

5 **Fixing device for fixing a interchangeable container in or on a pick-up area of a
vehicle as well as a vehicle with this type of fixing device**

10 The invention relates to a fixing device for fixing a interchangeable container in or
on a pick-up area of a vehicle with at least one support structure positioned in the
pick-up area, with at least one pick-up floor positioned in the pick-up area, with at
least one rail-style guide element spaced from the pick-up floor which is fixed to the
support structure or the interchangeable container and which has a guide surface and
15 with at least one interchangeable container or support aid positioned on the support
structure which is positioned between the guide element and pick-up floor when
transferring the interchangeable container into the pick-up area or out of the pick-up
area and can at least be partially slid onto or rolled off touching the guide surface of
the rail-style guide element and can be or is supported against transverse movement
20 to the direction of transfer as well as a vehicle with this type of fixing device.

Vehicles are known in the state of the art technology with which interchangeable
containers can be transported, where U-profiles are positioned in the pick-up area in
order to fix the interchangeable containers, in which the interchangeable containers
25 can be led into position on their castors. They are guided using the side walls of the
U-profiles, which are in direct contact with the flanks of the interchangeable
container castors. In this type of fixing device, it has proven disadvantageous that the
interchangeable container castors are subject to a high degree of wear and that it is
constantly necessary to maintain an identical wheel distance between the front and
30 rear wheels of the interchangeable container.

Furthermore, there are vehicles for transporting interchangeable containers in which
the interchangeable containers are not or are insufficiently guided during transfer to
the pick-up area and are fixed using a form closure. It has proven disadvantageous
35 here to align the interchangeable container in such a way in the pick-up area so as to
create the form closure, even with poor insight.

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Further, when driving the vehicle over bumpy roads, a relative movement between the interchangeable container and pick-up are in the direction transverse to the pick-up floor can never be fully prevented due to the forces of inertia, which can lead to damages to the interchangeable container and/or pick-up floor.

One objective of the embodiment of the invention is to make it easier to position and fix a interchangeable container in or on a pick-up area of a vehicle and to improve this.

This objective was solved with the input of the fixing device mentioned, where the guide surface of at least one incline guide element has an incline in relation to the pick-up floor.

When the guide surface of at least one incline guide element has an incline in relation to the pick-up floor, the interchangeable container is held in two directions transverse to the transfer direction. This guarantees that the interchangeable container lies on the pick-up floor not only during cornering, but also on bumpy roads and that it is extensively fixed in place relative to the support structure.

The interchangeable container can be positioned in the pick-up area using wheels or castors, for example. To this end, a ramp is anticipated in the design of the fixing device, with which the interchangeable container can be rolled onto pick-up floor of the pick-up area. This makes it possible to overcome a height discrepancy between the road and the pick-up floor.

Furthermore, it is conceivable that the interchangeable container is positioned on runners or similar on the pick-up floor of the pick-up area.

The provision of the guide element means the interchangeable container can be led in a linear manner.

The transfer direction can be parallel to the vehicle's longitudinal axis or transversal axis. Furthermore, interim forms are conceivable, for example that the direction of transfer runs diagonal to the vehicle's longitudinal axis.

The vehicle can be any kind, in particular a land vehicle, water vehicle and/or aircraft. If the vehicle concerns a land vehicle, this can be a car, lorry or tilting vehicle. Tilting vehicles include bicycles, pedelecs, motorbikes or motor vehicles which resemble motorbikes, such as, in particular, two, three or four-wheeled
5 scooters, tilting trikes, quads or similar.

If the vehicle is a tilting vehicle, it proves advantageous if this includes a load-bearing pick-up area positioned in front of or behind a driver area and in the direction of travel.

10 In order to be able to guarantee the pick-up of different interchangeable containers, an adjustment unit is anticipated in the design of the fixing device with which the incline of the guide surface of the guide element can be adjusted either in stages or infinitely in respect to the pick-up floor.

15 In addition, the adjustment of the fixing device can be further improved for numerous interchangeable containers if the fixing device includes at least one clamping unit with which the guide element can be clamped in direction to the support device and/or through which the support device can be clamped in direction
20 to the guide element.

The clamping unit and the adjustment unit can include a joint component. It is further conceivable that the adjustment unit and clamping unit include components which are separate or can be separated from one another.

25 It proves advantageous if the guide element and the support structure or, if the guide element and interchangeable container are temporarily or permanently fixable or fixed to one another or include a joint component and/or if the support device and support structure, or if the support device and interchangeable container are
30 temporarily or permanently fixable or are fixed to one another or include a joint component.

If the guide element and the support structure or the guide element and interchangeable container are temporarily or permanently fixable or fixed to one
35 another, the guide element can be easily replaced or repaired. If the guide element

and support structure or guide element and interchangeable container include a joint component, the fixing device can be formed so as to reduce components.

The same applies accordingly for the support device.

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The guide element and support device can generally be positioned at any height in respect to the pick-up floor. It proves advantageous if the guide element and the support device are positioned at the height of a surface of the interchangeable container facing the pick-up floor, which has a minimal distance to the pick-up floor.

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In the continued development of the fixing device, it is anticipated that the support device includes at least one support element which can at least be partially slid or rolled off the touching the guide surface of the rail-type guide element and in particular includes a runner or castor and/or the support aid includes at least one

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load-bearing element with which the support aid can be fixed to the interchangeable container or support structure and to which one end of the support element can be positioned.

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Through the provision of a support element and a load-bearing element, the support aid can easily be fixed to the interchangeable container or the support structure. The support element may, for example, have a runner-style form and glide along touching the guide surface of the guide element when transferring the interchangeable container into a pick-up area or out of a pick-up area. Furthermore, the support element can have a castor-style design and roll off along the guide element. In such a

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case, the castor-style designed support element is fixed to the load-bearing element using a bearing.

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In general, the guide element can be positioned both on the support structure of the pick-up area as well as on the interchangeable container. The support body here is positioned on the respective other component. In other words, if the guide element is positioned on the support structure of the pick-up area, the support aid is positioned on the interchangeable container. If the guide element is positioned on the interchangeable container, the support aid is positioned on the support structure of the pick-up area.

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For the embodiment of the fixing device, it is anticipated that at least one guide element is positioned on the support structure of the pick-up area and/or that at least one support aid is positioned on the interchangeable container.

- 5 In order to further increase the stability of the position of the interchangeable container within the pick-up area, at least two guide elements and at least two support devices are anticipated in the embodiment of the fixing device, which are respectively positioned on opposite sides to one another and the interchangeable container is positioned between both guide elements and support aids.

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It is generally conceivable that both guide elements and both support aids are positioned respectively on the same side of the interchangeable container. In such a case, these can be positioned at different heights to one another. It is further conceivable that the guide elements are respectively positioned on different sides of the interchangeable container. This further increases the stability of the

15 interchangeable container when positioning in the pick-up area. Both of the guide elements and both of the support aids can be positioned at the same height, in particular with the same distance to the pick-up floor or include different heights, in particular distance to the vehicle floor.

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It proves advantageous if the support device includes at least two support elements which are positioned on opposite sides of the support element to one another and extend across the width of the interchangeable container - observed transverse to the transfer direction.

- 25 In such a case, the support device can be supported by two guide elements opposite one another. This means the fixing device can be formed with reduced components.

In order to make it easier to position the interchangeable container on the pick-up area, it proves advantageous if the fixing device includes at least one centring unit

30 which includes at least two guide elements which together incorporate a funnel-shaped section through which the interchangeable container can essentially be positioned in the middle of the pick-up area when transferring onto or into the pick-up area.

- 35 This is a simple way to guarantee the guidance of the interchangeable container when transferring to the pick-up area.

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In order to fix the interchangeable container against movement in or against the direction of transfer after it has been positioned in the pick-up area, at least one retaining element positioned on the support structure or interchangeable container is anticipated in the design of the fixing device, which can be transferred from a locked position to a release position by engaging in pick-up on the interchangeable container or on the support structure and fixes the interchangeable container against moving in the direction of transfer, in which the interchangeable container is released for movement in the direction of transfer.

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The retaining element can create a form or traction closure between the interchangeable container and pick-up area.

In the continued development of the last design mentioned, it proves advantageous if the retaining element has a pin-style form and can be transferred in or transverse to the transfer direction from the locked position to the release position and back.

This makes the retaining element simple and cost-effective to manufacture.

Furthermore, it proves advantageous in the continued development if the retaining element is positioned on the pick-up floor of the pick-up area and can be transferred transverse to the direction of transfer of the locked position to the release position and back and/or if the retaining element includes at least one reset device through which the retaining pin can be pre-clamped in the locked position.

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This can guarantee that the retaining element automatically clicks in to the interchangeable container as soon as this is in the pick-up area.

The retaining element can be equipped with a mechanical or electro-mechanical unlocking element in order to release the retaining element which, for example, can be manually activated by the vehicle operator, in order to release the interchangeable container from the retaining element.

In order to balance the manufacturing tolerances of the interchangeable container, in particular the pick-up device and retaining element, it is anticipated in the embodiment of the fixing device that the pick-up device includes a contour which

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tapers in the direction of transfer on which the retaining element fits in the locked position.

5 This guarantees an essentially backlash-free fixing of the retaining element in the pick-up device.

Ultimately, the objective was solved by a vehicle with a pick-up area in which a interchangeable container can be fixed by a fixing device with at least one of the previously mentioned characteristics, which has at least one support structure
10 positioned in the pick-up area, at least one pick-up floor positioned in the pick-up area, at least one rail-style guide element spaced from the pick-up floor which is fixed to the supporting structure or the interchangeable container and a guide surface and with at least one interchangeable container or support aid positioned on the supporting structure which is positioned between the guide element and pick-up floor
15 when transferring the interchangeable container into the pick-up area or out of the pick-up area and can at least be partially slid onto or rolled off touching the guide surface of the rail-style guide element and can be or is supported against transverse movement to the direction of transfer, whereby at least the guide surface of at least one guide element has an incline in relation to the pick-up floor.

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Further features, details and advantages of the invention will become apparent from the appended claims, the drawings and the following description of a preferred embodiment of the fixing device.

25 The drawing shows:

Figure 1 A sectional back view of a vehicle with a fixing device according to the invention;

30 Figure 2 A detailed view of an area according to Figure 1;

Figure 3 A perspective plan view of a support aid of a fixing device;

Figure 4 A bottom view of a interchangeable container with two support aids;

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Figure 5 A perspective plan view of a pick-up area of the vehicle;

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Figure 6 A plan view of the pick-up area of the vehicle according to Figure 5.

5 The figures show fixing device equipped overall with references 2 for fixing a interchangeable container 4 in or on a pick-up area 6 of the vehicle 8. A support structure 10 is positioned in pick-up area 6 of the vehicle 8. Further, the pick-up area 6 of the vehicle 8 includes a pick-up floor 12 positioned in pick-up area 6.

10 The fixing device 2 includes at least one rail-style guide element 14 spaced from the pick-up floor 12. In the embodiments shown in the Figures, the rail-style guide element is fixed to support structure 10 of the vehicle 8. The guide element 14 includes a guide surface 16. Moreover, the fixing device 2 includes support aids 18 which are fixed to the interchangeable container 4 in the embodiments shown in the Figures. The support aids 18 include two support elements 20 which have a castor-
15 style form and are fixed to a load-bearing element 22. The support aids 18 are fixed to the floor of the interchangeable container 4 via the load-bearing element 22. Furthermore, the support elements 20 of the support aid 18 fit to the guide surface 16 of the guide element 14, if the interchangeable container 4 is positioned in the pick-up area 6.

20 When transferring and positioning the interchangeable container 4 in the pick-up area 6 of the vehicle 8, the interchangeable container 4 is supported via support aid 18 on the guide surface 16 and is supported on this by touch sliding or rolling against movement transverse to the direction of transfer. The guide surfaces 16 are inclined
25 in relation to the pick-up floor 12.

30 In order to be able to set the incline of guide surface 16 of the guide element 14, the fixing device 2 includes an adjustment unit 24 which can be used to adjust the incline of the guide surface 16 in relation to the pick-up curve 12.

30 The Figures show an embodiment of the fixing device 2 in which the guide element 14 is detachably fixed to the support structure 10 of the vehicle 6. The support elements 18 are also detachably fixed to interchangeable container 4.

Guide element 14 and support element 18 are positioned on one of the surfaces of the interchangeable container 4 facing the pick-up floor 12, whereby the distance to the pick-up floor 12 is minimal.

5 In order to guarantee the guidance of the interchangeable container when transferring to pick-up area 6, two guide elements 14 are anticipated in the embodiment shown in the Figures, which are positioned on opposite sides to one another in relation to the interchangeable container 4. This holds the interchangeable container 4 on both sides with guide element 14.

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In order to fix the interchangeable container 4 against movement in the direction of transfer, the fixing device 2 includes a pin-style retaining element 26 which is fixed into the pick-up floor 12. The pin-style retaining element 26 can fit into a correspondingly formed pick-up device 28 in the interchangeable container 4 if the
15 interchangeable container 4 is positioned in pick-up area 6. To this end, the retaining element 26 is pre-clamped in a locked position by a reset element which cannot be seen in the Figures, in which the retaining element 26 fits into the pick-up device 28. The retaining element 26 can be transferred from the locked position into a release position, in which the retaining element 26 is unmeshed from the pick-up device 28
20 in the interchangeable container 4, in order to remove interchangeable container 4 from the pick-up area 6.

Figure 1 shows a view of an area of the vehicle 8. This includes a cargo bicycle in the embodiment shown in the Figure. To this end, the vehicle 8 includes three wheels
25 30 with which the vehicle 8 can be driven on a driving surface. The interchangeable container 4 for its part includes castors 32 with which the interchangeable container 4 can be brought up to the pick-up area 6 via a ramp, for example.

Figure 1 shows that the interchangeable container 4 is essentially centred in pick-up
30 area 6 of the vehicle 8 using fixing device 2. This enables the mass point of the interchangeable container 4 to be aligned transversely with the mass point of the vehicle 8, whereby the driving properties of the vehicle 8 are improved.

Figure 2 shows a detailed view of the area according to Figure 1.

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Figure 3 shows a detailed view of the support element 18. In Figure 3 it can be seen that the support element 18 includes a load-bearing element 22 where the castor-style support elements 20 are formed on its free ends.

5 In Figure 4 it can be seen that the support elements 18 can be positioned in the front and back area of the interchangeable container 4 according to Figure 3. This are detachably screwed to the floor of the interchangeable container 4 according to the embodiment in Figure 4.

10 Figures 5 and 6 show a pick-up area 6 of the vehicle 8.

The features of the invention disclosed in the above description, in the claims and in the drawing, may be essential both individually and in any combination in the realisation of the invention in its various embodiments.

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Reference list

	2	Fixing device
	4	Interchangeable container
5	6	Pick-up area
	8	Vehicle
	10	Support structure
	12	Pick-up floor
	14	Guide element
10	16	Guide surface
	18	Support aid
	20	Support element
	22	Load-bearing element
	24	Adjustment unit
15	26	Retaining element
	28	Pick-up
	30	Wheels
	32	Castors

Claims

1. Fixing device (2) for fixing a interchangeable container (4) in or on the pick-up
area (6) of a vehicle (8) with at least one support structure (10) positioned in the
5 pick-up area (6), with at least one pick-up floor (12) positioned in the pick-up
area (6), with at least one rail-style guide device (14) spaced from the pick-up
floor (12) which is fixed to the support structure (10) or the interchangeable
container (4) and which has a guide surface (16) and with at least support aid (18)
10 positioned on a interchangeable container (4) or on the support structure (10)
which is positioned between the guide element (14) and pick-up floor (12) when
transferring the interchangeable container (4) into the pick-up area (6) or out of
the pick-up area (6) and can at least be partially slid onto or rolled off touching
the guide surface (16) of the rail-style guide element (14) and can be or is
15 supported against transverse movement to the direction of transfer,
characterised by the fact that at least the guide surface (16) of at least one guide
element (14) has an incline in relation to the pick-up floor (12).
2. Fixing device (2) according to claim 1, characterised by at least one adjustment
20 unit (24), with which the incline of the guide surface (16) of the guide element
(14) can be adjusted in stages or infinitely in relation to pick-up floor (12).
3. Fixing device (2) according to claim 1 or 2, characterised by at least one
clamping unit which includes at least one clamping element with which the guide
25 element (14) can be clamped in the direction to the support element (18) and/or
with which the support element (18) can be clamped in the direction to the guide
element (14).
4. Fixing device (2) according to at least one of the previous claims, characterised
30 by the fact that the guide element (14) and the support structure (10) or, that the
guide element (14) and interchangeable container (4) are temporarily or
permanently fixable or fixed to one another or include a joint component and/or
that the support aid (18) and support structure (10) or that the support aid (18)
and interchangeable container (4) are temporarily or permanently fixable or are
35 fixed to one another or include a joint component.

- 5 5. Fixing device (2) according to at least one of the previous claims, characterised by the fact that the guide element (14) and the supporting element (18) are positioned at the height of one of the surfaces of the interchangeable container (4) facing one of the pick-up floors (12), with a minimal distance to the pick-up floor (12).
- 10 6. Fixing device (2) according to at least one of the previous claims, that the support aid (18) includes at least one support element (20) which can at least be partially slid or rolled off the touching the guide surface (16) of the rail--style guide aid (14) and in particular includes a runner or castor and/or the support aid (18) includes at least one load-bearing element (22) with which the support aid (18) can be fixed to the interchangeable container (4) or support structure (10) and to which one end of the support element (20) can be positioned.
- 15 7. Fixing device (2) according to at least one of the previous claims, characterised by the fact that at least one guide element (14) is positioned on the support structure (10) of the pick-up area (6) and/or that at least one support element (18) is positioned on the interchangeable container (4).
- 20 8. Fixing device (2) according to at least one of the previous claims, characterised by at least two guide elements (14) and at least two support aids (18), which are positioned respectively opposite one another and that the interchangeable container (4) is positioned between both guide elements (14) and support aids (18).
- 25 9. Fixing device (2) according to one of the claims 6 to 8, characterised by the fact that the support aid (18) includes at least two support elements (20) which are positioned on opposite sides of the load-bearing element (22) and that it is stretched across the width of the interchangeable container (4) - when observed
- 30 transverse to the direction of transfer.
- 35 10. Fixing device (2) according to claim 8 or 9, characterised by a centring unit which includes at least two guide aids (14) which combined incorporate a funnel-shaped section through which the interchangeable container (4) is essentially positioned centrally in the pick-up area (6) during transfer on or in the pick-up area (6).

11. Fixing device (2) according to at least one of the previous claims, characterised by at least one retaining element (26) attached to the support structure (10) or the interchangeable container (4), which fits into a pick-up device (28) on the interchangeable container (4) or the support structure (10) and fixes the interchangeable container (4) against movement in the transfer direction, can be transferred into a release position in which the interchangeable container (4) is released for movement in the direction of transfer.
12. Fixing device (2) according to claim 11, characterised by the fact that the retaining element (26) has a pin-style shape and can be transferred from the locked position into the release position and back transverse to the transfer direction.
13. Fixing device (2) according to claim 11 or 12, characterised by the fact that the retaining element (26) is positioned on the pick-up floor (12) of the pick-up area (6) and can be transferred transverse to the direction of transfer of the locked position to the release position and back and/or if the retaining element (26) includes at least one reset device through which the retaining element (26) can be pre-clamped in the locked position.
14. Fixing device (2) according to one of the claims 11 to 13, characterised by the fact that the pick-up device (28) includes a contour tapering in the transfer direction, on which the retaining element (26) fits into the locked position.
15. Vehicle (8) with a pick up area (6) in which a interchangeable container (4) can be fixed by a fixing device (2) according to one of the claims 1 to 14, which is fixed to at least one support structure (10) positioned in the pick-up area (6), which at least one pick-up floor (12) positioned in the pick-up area (6), which at least one rail-style guide element (14) spaced to the pick-up floor (12), which is fixed to the support structure (10) or the interchangeable container (4) and which has a guide surface (16) and which includes at least one support aid (18) positioned on a interchangeable container (4) or on the support structure (10) which is positioned between the guide element (14) and pick-up floor (12) when transferring the interchangeable container (4) into the pick-up area (6) or out of the pick-up area (6) and can at least be partially slid onto or rolled off touching the guide surface (16) of the rail-style guide element (14) and can be or is supported against transverse movement to the direction of transfer, whereby at

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least the guide surface (16) of at least one guide element (14) has an incline in relation to the pick-up floor (12).

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