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(54) **Swivel frame, and rail vehicle**

Drehrahmen und Schienenfahrzeug

Châssis à pivot et véhicule ferroviaire

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(56) References cited:
EP-A1- 0 431 690 EP-A1- 0 516 586
EP-A1- 0 911 238

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Description

[0001] The invention relates to a swivel frame for a rail vehicle, comprising a bottom frame for fixing on an undercarriage of the rail vehicle, and a top frame for accommodating a container, which top frame is connected to the bottom frame so that it can swing between a swung-in position, in which the top frame runs substantially parallel to the bottom frame, and a swung-out position, in which the top frame runs at an angle relative to the bottom frame.

[0002] NL8800161 discloses a swivel platform for a rail vehicle. The swivel platform is intended for loading a container from a road vehicle onto the rail vehicle, and vice versa. The bottom frame has two longitudinal beams, which are connected by three transverse bottom plates. In practice, the bottom plates are approximately 12 - 15 mm thick. The bottom frame is permanently fixed on a rail wagon, so that the swivel platform forms an integral part of the rail wagon. Such an adapted rail wagon is suitable only for the transport of so-called ACTS containers, i.e. containers which can be transferred between a road vehicle and a rail vehicle.

[0003] The costs of conversion of a rail wagon are relatively high, for example because of the necessary conversion time. The investment costs for conversion to a rail wagon with swivel platform can be written off only with long years of use of the converted rail vehicle. However, the demand for short-term transport contracts is in fact increasing. This is acting as a brake on the use of ACTS containers.

[0004] EP0911238A1 (corresponding to the preamble of claim 1 or 10) discloses a transport device for containers on railway wagons. The transport device comprises a base frame which supports a rotating frame on a rotary bearing mounting. The rotating frame has tracks for the container base rollers, as well as angled rails to guide and hold the container. The rotating frame can be locked relative to the base frame. The entire transport device can be removed by a crane from the railway wagon, so that the wagon can be used for other freight.

[0005] EP0516685A1 discloses a lateral locking device of turning platform on a railcar. The locking device has a bolt which is held by gravity in the closed position. After the bolt has been moved into the open position, it can be moved over by the two supporting rails of the turning platform when turning outwards and when turning back inwards. When the travel position is achieved again, the bolt moves back automatically in the closed position again. An opening lever is provided to move the bolt into the open position. The opening lever drops back into its initial position when the turning platform is turning outwards.

[0006] An object of the invention is to provide an improved swivel frame for a rail vehicle.

[0007] This object is achieved according to the features of claim 1.

[0008] The bottom frame is provided with a number of

corner blocks, which can be fixed detachably on the undercarriage of the rail vehicle. The corner blocks are, for example, of an ISO standard design, i.e. the corner blocks form so-called standardized corner castings. As a result of the fact that the corner blocks can be fixed detachably on a standard container rail vehicle, for example by means of so-called "ISO locking pins", the swivel frame according to the invention constitutes a removable swap body. The swivel frame fits as an adapter on a standard container piggyback wagon for rail transport. As a result of this, use of the swivel frame is flexible. A swivel frame fixed on a rail wagon is easy to remove from it, after which that rail wagon can be used again as a standard container piggyback wagon. In practice, standard container piggyback wagons for rail transport are relatively cheap to hire, even for quite short periods, so that the investment costs for use of ACTS containers are considerably reduced. By keeping a number of adapter frames according to the invention in stock, an ACTS hire company can also respond flexibly and quickly to demands from the market.

[0009] The swivel frame according to the invention comprises a locking mechanism, which locking mechanism has a locking position in which in the swung-in position the top frame is locked relative to the bottom frame, and has a releasing position in which the top frame can swing from its swung-in position relative to the bottom frame.

[0010] The locking mechanism comprises a blocking element, which can pivot about a first pivot axis between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, the blocking element having a stop, which in the first position of the blocking element secures the top frame in the swung-in position.

[0011] The locking mechanism further comprises a rotation shaft with a locking member fixed on it, which rotation shaft substantially transversely relative to the bottom frame and can rotate between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, in which the locking member has a further stop, which in the first position of the rotation shaft corresponding to the locking position secures the top frame in the swung-in position.

[0012] The rotation shaft with the locking member forms a second swing-out lock - in addition to the lock achieved by the blocking element. The rotation shaft is, for example, manually operable by a lever fixed radially on the rotation shaft.

[0013] In one embodiment, the bottom frame is designed in such a way that the bottom frame can be fixed only by means of the corner blocks on the undercarriage of the rail vehicle. The bottom frame is secured on the undercarriage of the rail vehicle only by means of the corner blocks. The bottom frame is self-supporting, i.e. the bottom frame can bear a container loaded onto the swivel frame without support between the corner blocks.

The forces exerted by the container upon the top frame are transmitted by the bottom frame to the corner blocks, after which the corner blocks divert these forces into the rail vehicle. The undercarriage of the swivel platform disclosed in NL8800161 would give way under the influence of the weight of a container if its beams and bedplates were not supported by a rail vehicle undercarriage.

[0014] The blocking element can be operated in various ways. For example, the locking mechanism has an operating handle, which operating handle can pivot about a second pivot axis between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, the first pivot axis and the second pivot axis running at a mutual distance and substantially parallel to each other, and the blocking element being movable by the operating handle.

[0015] The blocking element in this case can pivot about the first pivot axis between two positions, which positions correspond to the locking position and the releasing position respectively. The operating handle can pivot about a second pivot axis running substantially at a distance from and parallel to the first pivot axis. The operating handle likewise has two positions, which positions correspond to the locking position and the releasing position respectively.

[0016] In the locking position, i.e. the blocking element is situated in the first position, the stop of the blocking element prevents the top frame from swinging out from the swung-in position. After all, the stop of the blocking element retains the top frame. By moving the operating handle to its second position, the blocking element is taken to its second position, in which the stop of the blocking element is moved away out of the path of the top frame. The top frame can then swing out relative to the bottom frame.

[0017] Furthermore, the blocking element and the operating handle can be designed in various ways. For example, the blocking element and the operating handle are pivotably connected to each other, or the operating handle has an eccentric cam which is accommodated loosely in a corresponding recess in the blocking element.

[0018] It is noted that the swivel platform for a rail vehicle disclosed in NL8800161 has a locking pin, which is pretensioned by a spring towards a securing position. An operating handle can unlock the locking pin. The locking pin can, however, become stuck through wear or damage. The operating handle then shows a locked state, whilst the swivel frame is not locked. Unlike this known swivel platform, the locking according to the abovementioned embodiment of the invention has a forced locking movement with a pivoting blocking element.

[0019] It is possible according to the invention that the first position of the operating handle corresponding to the locking position forms a lowered position, in which the operating handle lies below the horizontal plane defined by the underside of the top frame, and in which the second position of the operating handle corresponding to the re-

leasing position forms an upstanding position, in which the operating handle projects upwards relative to said plane, and in which the blocking element is movable from its first position corresponding to the locking position to its second position corresponding to the releasing position by moving the operating handle from the lowered position to the upstanding position, and in which the operating handle is forced by the top frame from the upstanding position to the lowered position when the top frame swings from the swung-in position to the swung-out position. In this way it is ensured that the top frame is locked unless the operating handle is raised.

[0020] The centre of gravity of the blocking element can lie at such a distance from the first pivot axis that the blocking element moves to the locking position under the influence of gravity when the operating handle is in the lowered position. This means that under the influence of gravity, the blocking element is "pretensioned" towards the locking position. While the top frame is swinging inwards from the swung-out position, the top frame slides over the blocking element. In the process, the top frame pushes the stop of the blocking element slightly downwards. As soon as the top frame has swung past the blocking element, the stop of the blocking element goes up again immediately under the influence of gravity. The blocking element is then in the locking position, in which the top frame is secured.

[0021] The operating handle is raised to the upstanding position in order to unlock the blocking element. The top frame can then move over the stop of the blocking element. In the process, the top frame knocks against the operating handle. As a result of this, the operating handle falls to the lowered position and the blocking element goes into the locking position. When the centre of gravity is situated eccentrically relative to the pivot axis, a light knock is already sufficient.

[0022] In one embodiment, the bottom frame comprises a recess for accommodating a part of the operating handle in its lowered position, and a part of the operating handle accommodated in the recess can be secured by a securing member. The operating handle can be raised from the lowered position only when the securing member has been removed. In the locked position, the securing member preferably projects vertically from the bottom frame. This indicates in a clearly visible manner that the top frame is locked.

[0023] In this case the top frame can be provided with two longitudinal beams, which are fitted at a mutual distance and substantially parallel to each other, in which the locking member comprises at least two locking strips, which in the first position of the locking member corresponding to the locking position project upwards on either side of a longitudinal beam in the swung-in position of the top frame, and in which at least one locking strip moves against a longitudinal beam during the rotation of the rotation shaft out of the second position corresponding to the releasing position when the top frame is situated between the swung-in and swung-out position, in order

to prevent the rotation shaft from being rotatable to the first position after the swing out from the swung-in position. In this way it is ensured that the second lock can be closed only when the swivel frame, with or without container, is standing in the safe swung-in position.

[0024] It is possible that the bottom frame is provided on a front side thereof with a hook member, which can pivot between a closed position for engaging a front part of a container to be accommodated on the top frame, and an opened position, and in which the rotation shaft is connected by a transmission mechanism to the hook member. The hook element forms, for example, a substantially vertical container securing lock. By operation of the second swing-out lock, the hook member is moved at the same time.

[0025] The transmission mechanism can be designed in various ways. For example, the transmission mechanism is designed in such a way that when the rotation shaft turns, the hook member pivots in a direction opposite to the direction of rotation of the rotation shaft. As a result of this, the hook member is easily fixed in the closed position. In the event of a sudden deceleration, for example during a shunting collision, the hook member undergoes a force towards the opened position, whilst the operating lever of the rotation shaft has the tendency to turn to the locking position. As a result of the opposite directions of rotation, the lock remains closed.

[0026] The invention also relates to a rail vehicle according to the features of claim 10. The rail vehicle comprises an undercarriage, a number of wheels which are rotatably connected to the undercarriage, and also a swivel frame, which swivel frame is provided with a bottom frame for fixing on the undercarriage, and a top frame for accommodating a container, which top frame is connected to the bottom frame so that it can swing between a swung-in position, in which the top frame runs substantially parallel to the bottom frame, and a swung-out position, in which the top frame runs at an angle relative to the bottom frame. The bottom frame according to the invention is provided with a number of corner blocks, which can be fixed detachably on the undercarriage of the rail vehicle. For example, the bottom frame is fixed in a load-bearing manner on the undercarriage of the rail vehicle substantially only by means of the corner blocks.

[0027] The swivel frame is provided with a locking mechanism, which has a locking position in which in the swung-in position the top frame is locked relative to the bottom frame, and has a releasing position in which the top frame can swing from its swung-in position relative to the bottom frame. In this case, the locking mechanism is designed, for example, as described above.

[0028] The invention will now be explained in greater detail with reference to an exemplary embodiment shown in the drawing.

Figure 1 shows a perspective view of a swivel frame for a rail vehicle according to the invention, comprising a bottom frame and a top frame, in which the top

frame is in the swung-in position.

Figure 2 shows a perspective view of the swivel frame shown in Figure 1, in which the top frame is in the swung-out position.

Figure 3a shows an enlarged perspective view of the locking mechanism of the swivel frame shown in Figure 1.

Figures 3b - 3e show diagrammatic side views of the locking mechanism shown in Figure 3a.

Figure 4 shows a top view of a part of the swivel frame shown in Figure 1.

Figure 5a shows a side view of the vertical lock of the locking mechanism of the swivel frame shown in Figure 1, in which the vertical lock is in the closed position.

Figure 5b shows a detail Vb from Figure 5a.

Figure 5c shows a detail Vc from Figure 5a.

Figure 5d shows a side view of the vertical lock shown in Figure 5a, which is in the opened position.

Figure 5e shows a detail Ve from Figure 5d.

[0029] The swivel frame for a rail vehicle is shown in the figures in its entirety by 1. The swivel frame 1 is designed for loading a container from a road vehicle onto a rail vehicle, and vice versa. The swivel frame 1 comprises a bottom frame 3 for fixing on an undercarriage of the rail vehicle (not shown). The swivel frame 1 has a top frame 5, which is pivotably connected by means of a pivot joint 18 to the bottom frame 3. Such a pivot joint 18, for example in the form of a roller race, ball race or the like, is known per se and will therefore not be described in any further detail.

[0030] The bottom frame 3 has a longitudinal axis 14. The bottom frame 3 comprises a number of longitudinal beams 7, each extending substantially parallel to the longitudinal axis 14. The longitudinal beams 7 are connected by a number of transverse beams 8. Corner blocks 12 are fitted at the corners of the bottom frame 3. The corner blocks 12 are of ISO standard design, i.e. the corner blocks 12 are standardized corner castings. By use of the corner castings 12, the bottom frame 3 can be fixed on a standard container rail vehicle. For this purpose, the corner castings 12 are detachably fixed on the undercarriage of the rail vehicle, for example by means of ISO locking pins ("twist locks").

[0031] The bottom frame 3 with the longitudinal beams 7 and transverse beams 8 is self-supporting and connected only by means of the corner castings 12 to the rail vehicle. The bottom frame 3 is placed by means of the corner castings 12 on the undercarriage of the rail vehicle during transport. The weight of a container resting on the top frame 5 is transmitted by means of the longitudinal beams 7 and transverse beams 8 and the standardized corner castings 12 to the rail vehicle. The swivel frame 1 therewith forms a removable swap body, which fits as an adapter on a standard container piggyback wagon for rail transport.

[0032] In this exemplary embodiment, a transverse

plate 9 is furthermore fitted between two transverse beams 8 at the position of the pivot joint 18. The bottom frame 3 has an arcuate part 10. Two stops 11 are fitted on the front side of the bottom frame 3. In the event of a collision, the stops 11 prevent a container accommodated on the swivel frame 1 from being able to shoot forward.

[0033] The top frame 5 has a longitudinal axis 15. The top frame 5 can be swung between a swung-in and a swung-out position. In the swung-in position shown in Figure 1, the longitudinal axis 14 of the bottom frame 3 is substantially parallel to the longitudinal axis 15 of the top frame 5. In the swung-out position shown in Figure 2, said longitudinal axes 14, 15 of the bottom frame 3 and the top frame 5 respectively intersect each other.

[0034] The top frame 5 comprises two longitudinal bearers 16, each extending substantially parallel to the longitudinal axis 15. The longitudinal bearers 16 are connected to each other by means of transverse elements 17. Fitted between the longitudinal bearers 16 are a number of wheels 19, which can travel over the arcuate part 10 of the bottom frame 3.

[0035] The swivel frame 1 comprises a locking mechanism 30, by means of which the top frame 5 can be locked in the swung-in position relative to the bottom frame 3. The locking mechanism 30 in this exemplary embodiment has a first swing-out lock, a second swing-out lock and a vertical lock. The locking mechanism 30 will now be explained in greater detail with reference to Figures 3a - 3e.

[0036] The first swing-out lock of the locking mechanism 30 comprises a blocking element 32 which is connected to the bottom frame 3 so that it can pivot about a first pivot axis 35. The blocking element 32 can pivot or tumble about the pivot axis 35 between two positions. In the position shown in Figures 3a and 3b, the part of the blocking element 32 extending transversely inwards from the pivot axis 35 is tilted upwards slightly. This part forms a stop part having at its head end a stop 38 which can interact with a lug 23 on the longitudinal bearer 16 of the top frame 5. The top frame 5 is then locked.

[0037] The centre of gravity of the blocking element 32 lies on the side of the pivot axis 35 facing away from the stop 38 - in this exemplary embodiment between the pivot axis 35 and the outermost longitudinal beam 7 of the bottom frame 3. The part of the blocking element 32 extending transversely outwards from the pivot axis 35 forms a counterweight. The blocking element 32 falls without external influence into the locked position shown in Figures 3a, 3b and 3e.

[0038] Furthermore, an operating handle 33 is provided, which operating handle is connected to the bottom frame 3 so that it can pivot about a second pivot axis 36. The first and second pivot axes 35, 36 run at a mutual distance and substantially parallel to each other. When the top frame 5 is locked, the operating handle 33 has a lowered position (see Figure 3a). The operating handle 33 then lies below the horizontal plane defined by the underside of the top frame 5.

[0039] From the lowered position, by raising it, the operating handle 33 turns about the second pivot axis 36 to an upright position (Figure 3c). In the process, the operating handle 33 pushes against the blocking element 32, so that the stop 38 tilts downwards. The blocking element 32 in this way achieves the second position shown in Figure 3c, in which the top frame 5 has been released.

[0040] When the top frame 5 swings out, the longitudinal bearer 16 of the top frame 5 knocks against the operating handle 33 (see Figure 3d). This causes the operating handle 33 to fall back into the lowered position. In order to indicate in a clearly visible manner that the top frame 5 is locked, a securing member 41 is provided.

The securing element 41 can assume a horizontal and a vertical position. The bottom frame 3 has a recess 40 (see Figure 3a), in which a part of the operating handle 33 can be accommodated. After the operating handle 33 is lying in the recess 40, the securing member 41 can be placed upright over the end of the operating handle 33 accommodated in that recess 40.

[0041] During the inward swing of the top frame 5 the run-on shoe 22 shown in Figures 1, 2 and 3a makes contact with the upper surface of the stop part of the blocking element 32. The run-on shoe 22 eases the inward swing of the top frame 5.

[0042] The second swing-out lock of the locking mechanism 30 comprises a rotation shaft or pivot pin 45, which is rotatably connected to the bottom frame 3. A locking member is fixed on the rotation shaft 45. In this exemplary embodiment the locking member comprises four locking strips 43, which are fixed on the rotation shaft 45 at a distance from each other. The rotation shaft 45 can be moved manually between two positions by means of the operating lever 47.

[0043] In the first position of the rotation shaft 45, the longitudinal bearers 16 of the top frame 5 are accommodated between the locking strips 43. The height of the locking strips 43 is such that their top edges 46 project above the underside of the top frame 5. The locking strips 43 each have a stop 44 which faces the longitudinal bearers 16. The stops 44 secure the top frame 5 in the swung-in position. By lowering the operating lever 47 - backwards - the locking strips 43 go into a position below the top frame 5. The stops 44 no longer retain the longitudinal bearers 16, so that the top frame 5 can swing out.

[0044] The locking strips 43 are positioned in such a way that the locking strips 43 can assume the first locked position only if the top frame 5 is situated in the swung-in middle position. When the top frame 5 is swung out to a greater or lesser extent from the middle position, it is impossible for the locking strips 43 to tilt upwards, owing to the fact that the top frame 5 is then in the way. When the operating lever 47 is up, the top frame 5 is guaranteed to be locked.

[0045] The vertical lock of the locking mechanism 30 comprises a hook member 50 on the front side of the bottom frame 3 (see Figures 1 and 4). The hook member

50 is connected by means of a transmission mechanism 51 to the rotation shaft 45. When the operating lever 47 is in the upright position, the hook member 50 has a closed position, in which the hook member 50 can engage upon a bottom edge on the front side of a container. That container is then secured in the vertical direction. As shown in Figures 5a - 5e, the transmission mechanism 51 comprises a transmission strip 52, which extends substantially in the longitudinal direction of the bottom frame 3. The transmission strip 52 is pivotably fitted between the rotation shaft 45 and the hook element 50, in such a way that the hook member 50 moves forward when the operating lever 47 is pulled backwards. This therefore causes the hook member 50 to move towards the opened position.

[0046] In this exemplary embodiment, the transmission strip 52 has a transverse projection 53 (see Figure 5a), which in the closed position of the hook member 50 rests against a transverse beam 8 of the bottom frame 3. As a result of this, the transmission strip 52 is elastically deformed, so that the hook member 50 is securely fixed in its closed position.

[0047] The invention is not limited to the exemplary embodiment shown in the figures. The person skilled in the art can make various modifications insofar as they lie within the scope of the invention as defined by the appended claims. It is noted, for example, that the lock described above has independent significance. The invention therefore also relates to a swivel frame for a rail vehicle, comprising a bottom frame for fixing on an undercarriage of the rail vehicle, and a top frame for accommodating a container, which top frame is connected to the bottom frame so that it can swing between a swung-in position, in which the top frame runs substantially parallel to the bottom frame, and a swung-out position, in which the top frame runs at an angle relative to the bottom frame, a locking mechanism being provided, having a locking position, in which in the swung-in position the top frame is locked relative to the bottom frame, and having a releasing position, in which the top frame can swing from its swung-in position relative to the bottom frame. In this case the locking mechanism here is designed, for example, as described in one or more of the features according to one of Claims 4 - 11 and/or in combination with one or more of the features of the exemplary embodiment described above.

[0048] The invention furthermore relates to a rail vehicle, comprising an undercarriage, a number of wheels which are rotatably connected to the undercarriage, and also a swivel frame, which swivel frame is provided with a bottom frame for fixing on the undercarriage, and a top frame for accommodating a container, which top frame is connected to the bottom frame so that it can swing between a swung-in position, in which the top frame runs substantially parallel to the bottom frame, and a swung-out position, in which the top frame runs at an angle relative to the bottom frame, the swivel frame being provided with a locking mechanism, having a locking position, in

which in the swung-in position the top frame is locked relative to the bottom frame, and having a releasing position, in which the top frame can swing out of its swung-in position relative to the bottom frame, the bottom frame being provided with a number of corner blocks, which can be fixed detachably on the undercarriage of the rail vehicle. In this case, the locking mechanism is designed, for example, as described in one or more of the features according to one of Claims 4 - 11 and/or in combination with one or more of the features of the exemplary embodiment described above.

Claims

1. Swivel frame for a rail vehicle, comprising a bottom frame (3) for fixing on an undercarriage of the rail vehicle, and a top frame (5) for accommodating a container, which top frame (5) is connected to the bottom frame (3) so that it can swing between a swung-in position, in which the top frame (5) runs substantially parallel to the bottom frame (3), and a swung-out position, in which the top frame (5) runs at an angle relative to the bottom frame (3), wherein the bottom frame (3) is provided with a number of corner blocks (12), which can be fixed detachably on the undercarriage of the rail vehicle, wherein the swivel frame comprises a locking mechanism (30) having a locking position, in which in the swung-in position the top frame (5) is locked relative to the bottom frame (3), the locking mechanism having a releasing position, in which the top frame (5) can swing from its swung-in position relative to the bottom frame (3), **characterised in that** the locking mechanism (30) comprises:

- a blocking element (32) which can pivot about a first pivot axis (35) between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, and in which the blocking element has a stop (38), which in the first position of the blocking element (32) secures the top frame (5) in the swung-in position, and
- a rotation shaft (45) with a locking member (43) fixed on it, which rotation shaft (45) extends substantially transversely relative to the bottom frame (3) and can rotate between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, the locking member (43) having a further stop (44), which in the first position of the rotation shaft (45) corresponding to the locking position secures the top frame (5) in the swung-in position.

2. Swivel frame according to Claim 1, in which the bottom frame (3) is designed in such a way that the

bottom frame (3) can be fixed only by means of the corner blocks (12) on the undercarriage of the rail vehicle.

3. Swivel frame according to Claim 1, in which the locking mechanism (30) is provided with an operating handle (33), which can pivot about a second pivot axis (36) between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, the first pivot axis (35) and the second pivot axis (36) running at a mutual distance and substantially parallel to each other, and the blocking element (32) being movable by means of the operating handle (33). 5
4. Swivel frame according to Claim 3, in which the first position of the operating handle (33) corresponding to the locking position forms a defined by the underside of the top frame (5), and in which the second position of the operating handle (33) corresponding to the releasing position forms an upstanding position in which the operating handle (33) projects upwards relative to said plane, and in which the blocking element (32) is movable from its first position corresponding to the locking position to its second position corresponding to the releasing position by moving the operating handle (33) from the lowered position to the upstanding position, and in which the operating handle (33) is forced by the top frame (5) from the upstanding position to the lowered position when the top frame (5) swings from the swung-in position to the swung-out position. 10 15 20 25 30
5. Swivel frame according to Claim 4, in which the centre of gravity of the blocking element (32) lies at such a distance from the first pivot axis (35) that the blocking element (32) moves to the locking position under the influence of gravity when the operating handle (33) is in the lowered position. 35 40
6. Swivel frame according to Claim 4 or 5, in which the bottom frame (3) is provided with a recess (40) for accommodating a part of the operating handle (32) in its lowered position, and in which a part of the operating handle (33) accommodated in the recess (40) can be secured by a securing member (41). 45
7. Swivel frame according to Claim 1, in which the top frame (5) is provided with two longitudinal beams (7), which are fitted at a mutual distance and substantially parallel to each other, and in which the locking member (43) comprises at least two locking strips (43), which in the first position of the locking member corresponding to the locking position project upwards on either side of a longitudinal beam (7) in the swung-in position of the top frame (5), and in which at least one locking strip (43) moves against a longitudinal beam (7) on rotation of the rotation shaft 50 55

(45) out of the second position corresponding to the releasing position when the top frame is situated between the swung-in and swung-out position, in order to prevent the rotation shaft (45) from being rotatable to the first position after the swing out from the swung-in position.

8. Swivel frame according to Claim 1 or 7, in which the bottom frame (3) is provided on a front side thereof with a hook member (50), which can pivot between a closed position for engaging a container to be accommodated on the top frame (5), and an opened position, and in which the rotation shaft (45) is connected by a transmission mechanism (51) to the hook member (50).
9. Swivel frame according to Claim 8, in which the transmission mechanism (51) is designed in such a way that when the rotation shaft (45) rotates, the hook member (50) pivots in a direction opposite to the direction of rotation of the rotation shaft (45).
10. Rail vehicle, comprising an undercarriage, a number of wheels which are rotatably connected to the undercarriage, and also a swivel frame (1), which is provided with a bottom frame (3) for fixing on the undercarriage, and a top frame (5) for accommodating a container, which top frame (5) is connected to the bottom frame so that it can swing (3) between a swung-in position, in which the top frame (5) runs substantially parallel to the bottom frame (3), and a swung-out position, in which the top frame (5) runs at an angle relative to the bottom frame (3), **characterized in that** the bottom frame (3) is provided with a number of corner blocks (12), which can be fixed detachably on the undercarriage of the rail vehicle, wherein the swivel frame (1) is provided with a locking mechanism (30), having a locking position, in which in the swung-in position the top frame (5) is locked relative to the bottom frame (3), and having a releasing position, in which the top frame (5) can swing from its swung-in position relative to the bottom frame (3), and **characterised in that** the locking mechanism (30) comprises:
 - a blocking element (32) which can pivot about a first pivot axis (35) between a first position and a second position, which positions correspond to the locking position and the releasing position respectively, and in which the blocking element has a stop (38), which in the first position of the blocking element (32) secures the top frame (5) in the swung-in position, and
 - a rotation shaft (45) with a locking member (43) fixed on it, which rotation shaft (45) extends substantially transversely relative to the bottom frame (3) and can rotate between a first position and a second position, which positions corre-

spond to the locking position and the releasing position respectively, the locking member (43) having a further stop (44), which in the first position of the rotation shaft (45) corresponding to the locking position secures the top frame (5) in the swung-in position.

11. Rail vehicle according to Claim 10, in which the bottom frame (3) is fixed substantially only by means of the corner blocks (12) on the undercarriage of the rail vehicle.

Patentansprüche

1. Drehrahmen für ein Schienenfahrzeug, umfassend einen unteren Rahmen (3) zum Befestigen an einem Fahrgestell von dem Schienenfahrzeug und einen oberen Rahmen (5) zum Aufnehmen von einen Container, wobei der obere Rahmen (5) mit dem unteren Rahmen (3) so verbunden ist, dass er zwischen einer eingeschwenkten Position, in der der obere Rahmen (5) im Wesentlichen parallel zu dem unteren Rahmen (3) verläuft, und einer ausgeschwenkten Position, in der der obere Rahmen (5) in einem Winkel in Bezug auf den unteren Rahmen (3) verläuft, schwenken kann, wobei der untere Rahmen (3) mit einer Vielzahl von Eckblöcken (12) ausgestattet ist, die lösbar an dem Fahrgestell des Schienenfahrzeugs befestigt werden können, wobei der Drehrahmen einen Arretierungsmechanismus (30) umfasst, der eine Arretierungsposition aufweist, in welcher in der eingeschwenkten Position der obere Rahmen (5) in Bezug auf den unteren Rahmen (3) arretiert ist, wobei der Arretierungsmechanismus eine Freisetzungposition aufweist, in welcher der obere Rahmen (5) aus seiner eingeschwenkten Position in Bezug auf den unteren Rahmen (3) herauschwenken kann, **dadurch gekennzeichnet, dass** der Arretierungsmechanismus (30) das Folgende umfasst:

- ein Blockierelement (32), das sich um eine erste Drehachse (35) zwischen einer ersten Position und einer zweiten Position drehen kann, wobei die Positionen der Arretierungsposition beziehungsweise der Freisetzungposition entsprechen, und wobei das Blockierelement einen Anschlag (38) aufweist, der in der ersten Position des Blockier-elements (32) den oberen Rahmen (5) in der eingeschwenkten Position sichert, und
- einen Rotationsschaft (45) mit einem Arretierungselement (43), welches daran befestigt ist, wobei die Rotationsschaft (45) sich im Wesentlichen quer in Bezug auf den unteren Rahmen (3) erstreckt und zwischen einer ersten Position und einer zweiten rotieren kann, wobei die Po-

sitionen der Arretierungsposition beziehungsweise der Freisetzungposition entsprechen, wobei das Arretierungselement (43) einen weiteren Anschlag (44) aufweist, der in der ersten Position des Rotationsschafts (45), welche der Arretierungsposition entspricht, den oberen Rahmen (5) in der eingeschwenkten Position sichert.

2. Drehrahmen nach Anspruch 1, wobei der untere Rahmen (3) so gestaltet ist, dass der untere Rahmen (3) nur mittels der Eckblöcke (12) auf dem Fahrgestell des Schienenfahrzeugs befestigt werden kann.
3. Drehrahmen nach Anspruch 1, wobei der Arretierungsmechanismus (30) mit einem Bediengriff (33) ausgestattet ist, der sich um eine zweite Drehachse (36) zwischen einer ersten Position und einer zweiten Position drehen kann, wobei die Positionen der Arretierungsposition beziehungsweise der Freisetzungposition entsprechen, wobei die erste Drehachse (35) und die zweite Drehachse (36) in einem gegenseitigen Abstand und im Wesentlichen parallel zueinander verlaufen und wobei das Blockierelement (32) mittels des Bediengriffs (33) bewegbar ist.
4. Drehrahmen nach Anspruch 3, wobei die ersten Position von dem Bediengriff (33), die der Arretierungsposition entspricht, eine bildet, definiert durch die Unterseite von dem oberen Rahmen (5), und wobei die zweite Position von dem Bediengriff (33), die der Freisetzungposition entspricht, eine aufrechte Position bildet, in der der Bediengriff (33) nach oben in Bezug auf die Ebene vorsteht, und wobei das Blockierelement (32) aus seiner ersten Position, die der Arretierungsposition entspricht, in seine zweite Position, die der Freisetzungposition entspricht, bewegbar ist, indem der Bediengriff (33) aus der abgesenkten Position in die aufrechte Position bewegt wird, und wobei der Bediengriff (33) durch den oberen Rahmen (5) aus der aufrechten Position in die abgesenkte Position gezwungen wird, wenn der obere Rahmen (5) aus der eingeschwenkten Position in die ausgeschwenkte Position schwenkt.
5. Drehrahmen nach Anspruch 4, wobei der Schwerpunkt des Blockier-elements (32) in einem solchen Abstand zu der ersten Drehachse (35) liegt, dass sich das Blockierelement (32) unter dem Einfluss der Schwerkraft in die Arretierungsposition bewegt, wenn sich der Bediengriff (33) in der abgesenkten Position befindet.
6. Drehrahmen nach Anspruch 4 oder 5, wobei der untere Rahmen (3) mit einer Aussparung (40) ausgestattet ist, um einen Teil von dem Bediengriff (32) in seiner abgesenkten Position unterzubringen, und wobei ein Teil von dem Bediengriff (33), der in der

Aussparung (40) untergebracht ist, durch ein Sicherungselement (41) gesichert werden kann.

7. Drehrahmen nach Anspruch 1, wobei der obere Rahmen (5) mit zwei länglichen Trägern (7) ausgestattet ist, die in einem gegenseitigen Abstand und im Wesentlichen parallel zueinander montiert sind, und wobei das Arretierungselement (43) mindestens zwei Arretierungsleisten (43) umfasst, die in der ersten Position des Arretierungselements, welche der Arretierungsposition entspricht, an jeder Seite von einem länglichen Träger (7) in der eingeschwenkten Position des oberen Rahmens (5) nach oben hervorstehen, und wobei sich mindestens eine Arretierungsleiste (43) bei einer Rotation des Rotationsschafts (45) aus der zweiten Position heraus, welche der Freisetzungsposition entspricht, gegen einen länglichen Träger (7) bewegt, wenn der obere Rahmen zwischen der eingeschwenkten und ausgeschwenkten Position platziert ist, um den Rotationsschaft (45) daran zu hindern, dass er nach dem Ausschwenken aus der eingeschwenkten Position in die erste Position rotierbar ist. 5
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8. Drehrahmen nach Anspruch 1 oder 7, wobei der untere Rahmen (3) an einer Vorderseite mit einem Haken-
element (50) ausgestattet ist, das sich zwischen einer geschlossenen Position für das Ineinandergreifen mit einem Container, der auf dem oberen Rahmen (5) aufgenommen werden soll, und einer geöffneten Position drehen kann, und wobei der Rotationsschaft (45) durch ein Übertragungsmechanismus (51) mit dem Haken-
element (50) verbunden ist. 25
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9. Drehrahmen nach Anspruch 8, wobei der Übertragungsmechanismus (51) so gestaltet ist, dass, wenn der Rotationsschaft (45) rotiert, sich das Haken-
element (50) in einer Richtung entgegengesetzt zur Rotationsrichtung des Rotationsschafts (45) dreht. 35
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10. Schienenfahrzeug, umfassend ein Fahrgestell, eine Vielzahl von Rädern, die rotierbar mit dem Fahrgestell verbunden sind, und auch einen Drehrahmen (1), der mit einem unteren Rahmen (3) zum Befestigen an dem Fahrgestell und einem oberen Rahmen (5) zum Aufnehmen von einem Container ausgestattet ist, wobei der obere Rahmen (5) mit dem unteren Rahmen so verbunden ist, dass er zwischen einer eingeschwenkten Position, in der der obere Rahmen (5) im Wesentlichen parallel zu dem unteren Rahmen (3) verläuft, und einer ausgeschwenkten Position, in der der obere Rahmen (5) in einem Winkel in Bezug auf den unteren Rahmen (3) verläuft, schwenken (3) kann, **dadurch gekennzeichnet, dass** der untere Rahmen (3) mit einer Vielzahl von Eckblöcken (12) ausgestattet ist, die lösbar an dem Fahrgestell des Schienenfahrzeugs befestigt werden können, 45
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wobei der Drehrahmen (1) mit einem Arretierungsmechanismus (30) ausgestattet ist, der eine Arretierungsposition, in welcher in der eingeschwenkten Position der obere Rahmen (5) in Bezug auf den unteren Rahmen (3) arretiert ist, und eine Freisetzungsposition aufweist, in welcher der obere Rahmen (5) aus seiner eingeschwenkten Position in Bezug auf den unteren Rahmen (3) herausschwenken kann, und

dadurch gekennzeichnet, dass der Arretierungsmechanismus (30) das Folgende umfasst:

- ein Blockierelement (32), das sich um eine erste Drehachse (35) zwischen einer ersten Position und einer zweiten Position drehen kann, wobei die Positionen der Arretierungsposition beziehungsweise der Freisetzungsposition entsprechen, und wobei das Blockierelement einen Anschlag (38) aufweist, der in der ersten Position des Blockierelements (32) den oberen Rahmen (5) in der eingeschwenkten Position sichert, und
- einen Rotationsschaft (45) mit einem Arretierungselement (43), welches daran befestigt ist, wobei die Rotationsschaft (45) sich im Wesentlichen quer in Bezug auf dem unteren Rahmen (3) erstreckt und zwischen einer ersten Position und einer zweiten Position rotieren kann, wobei die Positionen der Arretierungsposition beziehungsweise der Freisetzungsposition entsprechen, wobei das Arretierungselement (43) einen weiteren Anschlag (44) aufweist, der in der ersten Position des Rotationsschafts (45), welche der Arretierungsposition entspricht, den oberen Rahmen (5) in der eingeschwenkten Position sichert.

11. Schienenfahrzeug nach Anspruch 10, wobei der untere Rahmen (3) im Wesentlichen nur mittels der Eckblöcke (12) an dem Fahrgestell des Schienenfahrzeugs befestigt ist.

Revendications

1. Châssis à pivot pour un véhicule ferroviaire, comprenant un châssis inférieur (3) pour fixation sur un train de roulage du véhicule ferroviaire et un châssis supérieur (5) pour loger un conteneur, lequel châssis supérieur (5) est relié au châssis inférieur (3) de manière à pouvoir basculer entre une position basculée intérieure, dans laquelle le châssis supérieur (5) s'étend sensiblement parallèlement au châssis inférieur (3), et une position basculée extérieure, dans laquelle le châssis supérieur (5) s'étend selon un angle par rapport au châssis inférieur (3), dans lequel le châssis inférieur (3) est pourvu d'un certain nombre de blocs d'angle (12) qui peuvent être fixés

de manière amovible sur le train de roulage du véhicule ferroviaire,

dans lequel le châssis à pivot comprend un mécanisme de verrouillage (30) ayant une position de verrouillage, dans lequel, dans la position basculée intérieure, le châssis supérieur (5) est verrouillé par rapport au châssis inférieur (3), le mécanisme de verrouillage ayant une position de libération, dans laquelle le châssis supérieur (5) peut basculer de sa position basculée intérieure par rapport au châssis inférieur (3),

caractérisé en ce que le mécanisme de verrouillage (30) comprend :

- un élément de blocage (32) pouvant pivoter autour d'un premier axe de pivotement (35) entre une première position et une seconde position, positions qui correspondent à, respectivement, la position de verrouillage et la position de libération, et dans lequel l'élément de blocage comporte une butée (38) qui, dans la première position de l'élément de blocage (32), fixe le châssis supérieur (5) dans la position basculée intérieure, et
 - un arbre de rotation (45) sur lequel est fixé un élément de verrouillage (43), lequel arbre de rotation (45) s'étend sensiblement transversalement par rapport au châssis inférieur (3) et peut tourner entre une première position et une seconde position, lesquelles positions correspondent respectivement à la position de verrouillage et à la position de libération, l'élément de verrouillage (43) ayant une butée supplémentaire (44) qui, dans la première position de l'arbre de rotation (45) correspondant à la position de verrouillage, fixe le châssis supérieur (5) dans la position basculée intérieure.
2. Châssis à pivot selon la revendication 1, dans lequel le châssis inférieur (3) est conçu de telle sorte que le châssis inférieur (3) peut n'être fixé qu'au moyen des blocs d'angle (12) sur le train de roulage du véhicule ferroviaire.
 3. Châssis à pivot selon la revendication 1, dans lequel le mécanisme de verrouillage (30) est muni d'une poignée de manoeuvre (33) pouvant pivoter autour d'un deuxième axe de pivotement (36) entre une première position et une seconde position, lesquelles positions correspondent respectivement à la position de verrouillage et à la position de libération, le premier axe de pivotement (35) et le second axe de pivotement (36) s'étendant à une distance mutuelle et sensiblement parallèles entre eux, et l'élément de blocage (32) étant mobile au moyen de la poignée de manoeuvre (33).
 4. Châssis à pivot selon la revendication 3, dans lequel

la première position de la poignée de manoeuvre (33) correspondant à la position de verrouillage est définie par la face inférieure du châssis supérieur (5), et dans lequel la seconde position de la poignée de manoeuvre (33) correspondant à la position de libération forme une position verticale dans laquelle la poignée de manoeuvre (33) dépasse vers le haut par rapport audit plan, et dans lequel l'élément de blocage (32) est mobile de sa première position correspondant à la position de verrouillage à sa seconde position correspondant à la position de libération en déplaçant la poignée de manoeuvre (33) de la position abaissée à la position verticale, et dans laquelle la poignée de manoeuvre (33) est forcée par le châssis supérieur (5) de la position verticale à la position abaissée quand le châssis supérieur (5) bascule de la position basculée intérieure à la position basculée extérieure.

5. Châssis à pivot selon la revendication 4, dans lequel le centre de gravité de l'élément de blocage (32) se trouve à une distance du premier axe de pivotement (35) telle que l'élément de blocage (32) se déplace dans la position de verrouillage sous l'influence de la gravité lorsque la poignée de manoeuvre (33) est dans la position abaissée.
6. Châssis à pivot selon la revendication 4 ou la revendication 5, dans lequel le châssis inférieur (3) est muni d'un évidement (40) pour loger une partie de la poignée de manoeuvre (32) dans sa position abaissée, et dans lequel une partie de la poignée de manoeuvre (33) logée dans l'évidement (40) peut être fixée par un élément de fixation (41) .
7. Châssis à pivot selon la revendication 1, dans lequel le châssis supérieur (5) est pourvu de deux poutres longitudinales (7) qui sont placées à une distance mutuelle et sensiblement parallèles l'une à l'autre, et dans lequel l'élément de verrouillage (43) comprend au moins deux bandes de verrouillage (43) qui, dans la première position de l'élément de verrouillage correspondant à la position de verrouillage, dépassent de chaque côté d'une poutre longitudinale (7) dans la position basculée intérieure du châssis supérieur (5), et dans lequel au moins une bande de verrouillage (43) se déplace contre une poutre longitudinale (7) lors de la rotation de l'arbre de rotation (45) hors de la seconde position correspondant à la position de libération lorsque la structure supérieure est située entre les positions de bascule intérieure et extérieure, afin d'empêcher que l'arbre de rotation (45) puisse tourner vers la première position après le basculement vers l'extérieur à partir de la position basculée intérieure.
8. Châssis à pivot selon la revendication 1 ou la revendication 7, dans lequel le châssis inférieur (3) est

muni sur son côté avant d'un élément de crochet (50) qui peut pivoter entre une position fermée pour engager un conteneur devant être logé sur le châssis supérieur (5), et une position ouverte, et dans lequel l'arbre de rotation (45) est relié par un mécanisme de transmission (51) à l'élément de crochet (50).

9. Châssis à pivot selon la revendication 8, dans lequel le mécanisme de transmission (51) est conçu de telle sorte que lorsque l'arbre de rotation (45) tourne, l'élément de crochet (50) pivote dans une direction opposée au sens de rotation de l'arbre de rotation (45).

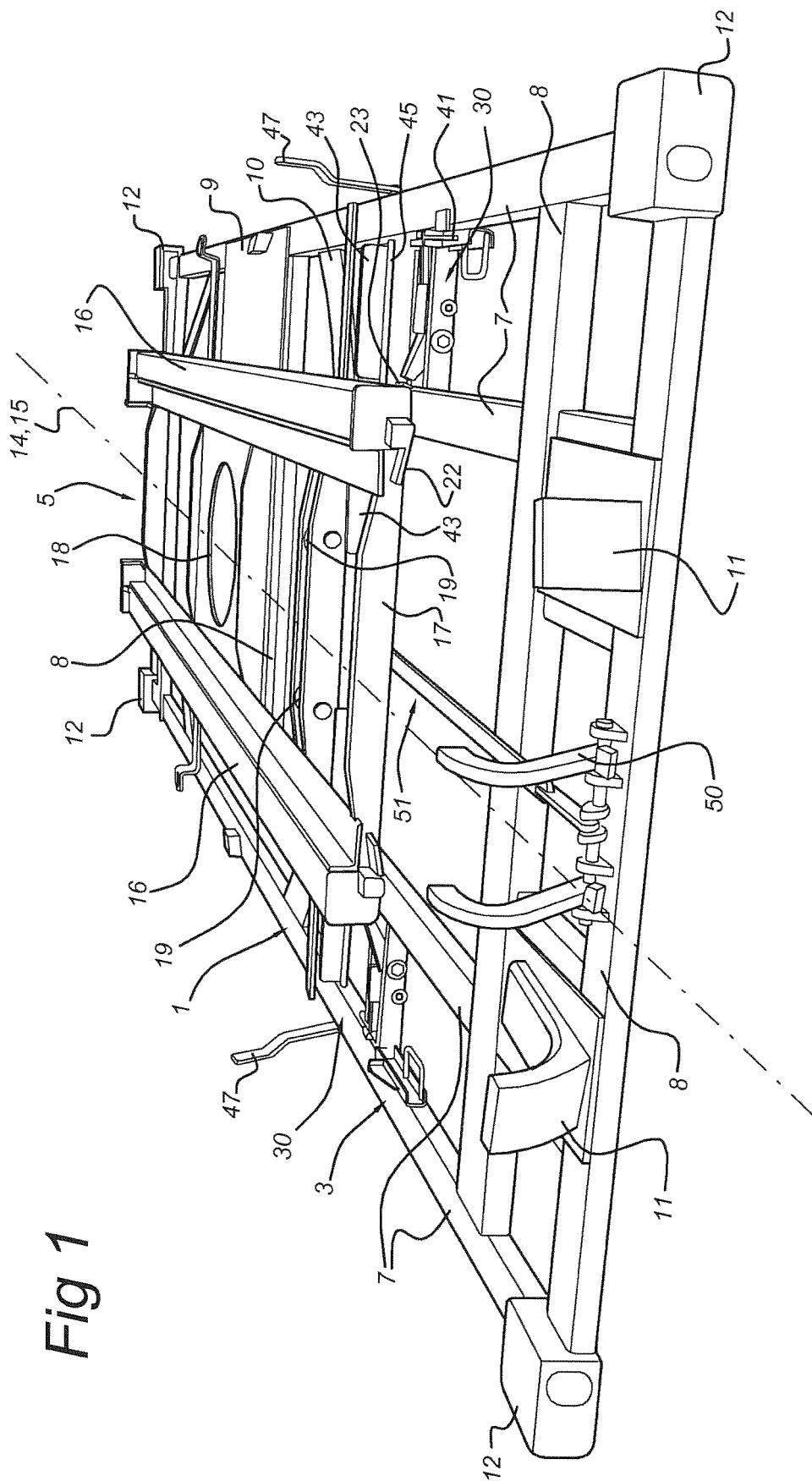
10. Véhicule ferroviaire, comprenant un train de roulage, un certain nombre de roues qui sont reliées de manière rotative au train de roulage, et également un châssis à pivot (1), qui est muni d'un châssis inférieur (3) pour fixation sur le train de roulage et d'un châssis supérieur (5) pour loger un conteneur, lequel châssis supérieur (5) est relié au châssis inférieur de manière à pouvoir basculer (3) entre une position basculée intérieure, dans laquelle le châssis supérieur (5) s'étend sensiblement parallèlement au châssis inférieur (3), et une position basculée extérieure, dans laquelle le châssis supérieur (5) s'étend selon un angle par rapport au châssis inférieur (3), **caractérisé en ce que** le châssis inférieur (3) est pourvu d'un certain nombre de blocs d'angle (12) qui peuvent être fixés de manière amovible sur le train de roulage du véhicule ferroviaire, dans lequel le châssis à pivot (1) est pourvu d'un mécanisme de verrouillage (30) ayant une position de verrouillage, dans lequel, dans la position basculée intérieure, le châssis supérieur (5) est verrouillé par rapport au châssis inférieur (3), et ayant une position de libération, dans laquelle le châssis supérieur (5) peut basculer de sa position basculée intérieure par rapport au châssis inférieur (3), **caractérisé en ce que** le mécanisme de verrouillage (30) comprend :

- un élément de blocage (32) pouvant pivoter autour d'un premier axe de pivotement (35) entre une première position et une seconde position, lesquelles positions qui correspondent, respectivement, à la position de verrouillage et à la position de libération, et dans lequel l'élément de blocage comporte une butée (38) qui, dans la première position de l'élément de blocage (32), fixe le châssis supérieur (5) dans la position basculée intérieure, et
- un arbre de rotation (45) sur lequel est fixé un élément de verrouillage (43), lequel arbre de rotation (45) s'étend sensiblement transversalement par rapport au châssis inférieur (3) et peut tourner entre une première position et une seconde position, lesquelles positions correspondent respectivement à la position de verrouillage

et à la position de libération, l'élément de verrouillage (43) ayant une butée supplémentaire (44) qui, dans la première position de l'arbre de rotation (45) correspondant à la position de verrouillage, fixe le châssis supérieur (5) dans la position basculée intérieure.

11. Véhicule ferroviaire selon la revendication 10, dans lequel le châssis inférieur (3) est fixé essentiellement uniquement au moyen des blocs d'angle (12) sur le train de roulage du véhicule ferroviaire.

Fig 1



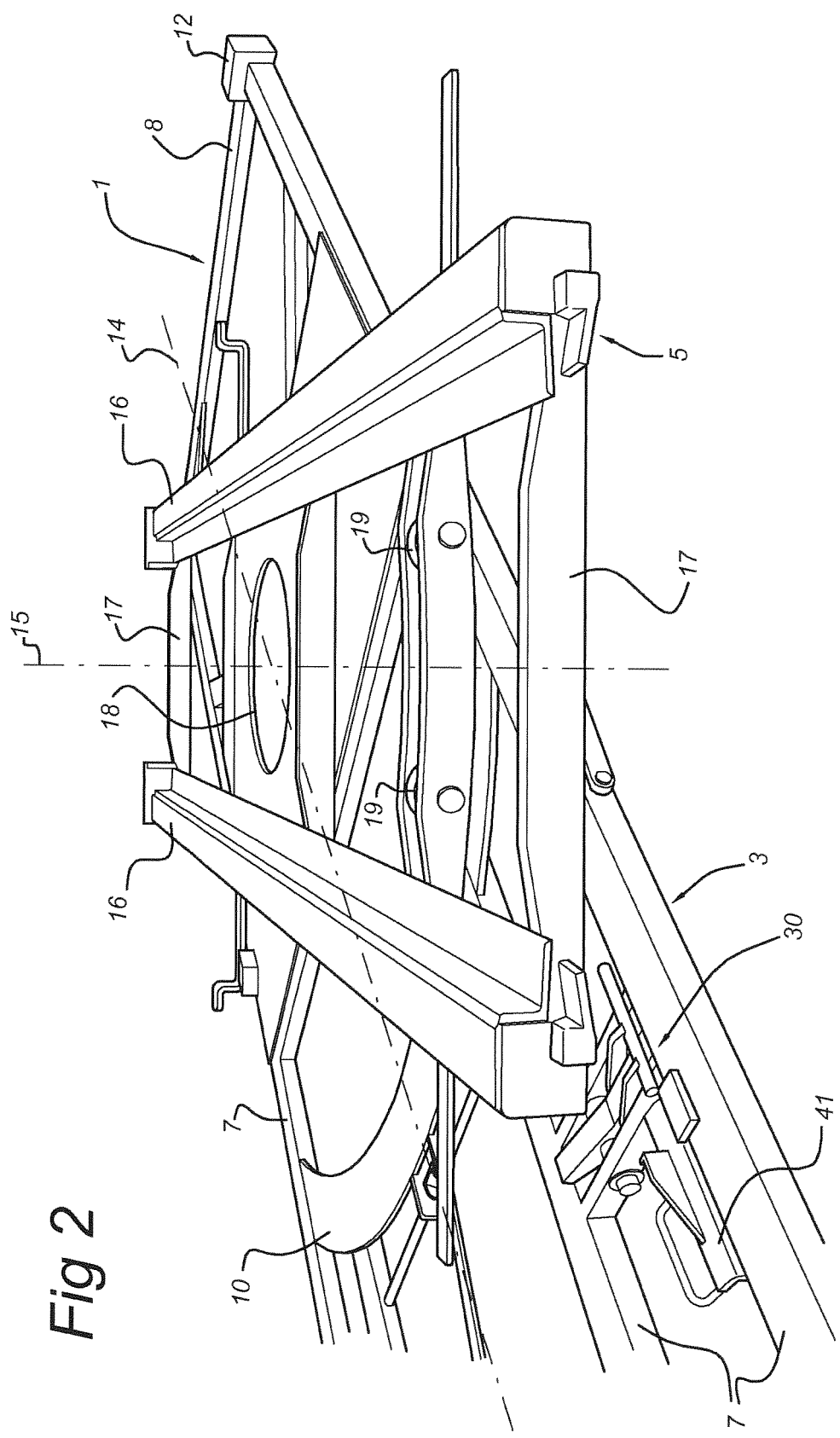


Fig 2

Fig 3a

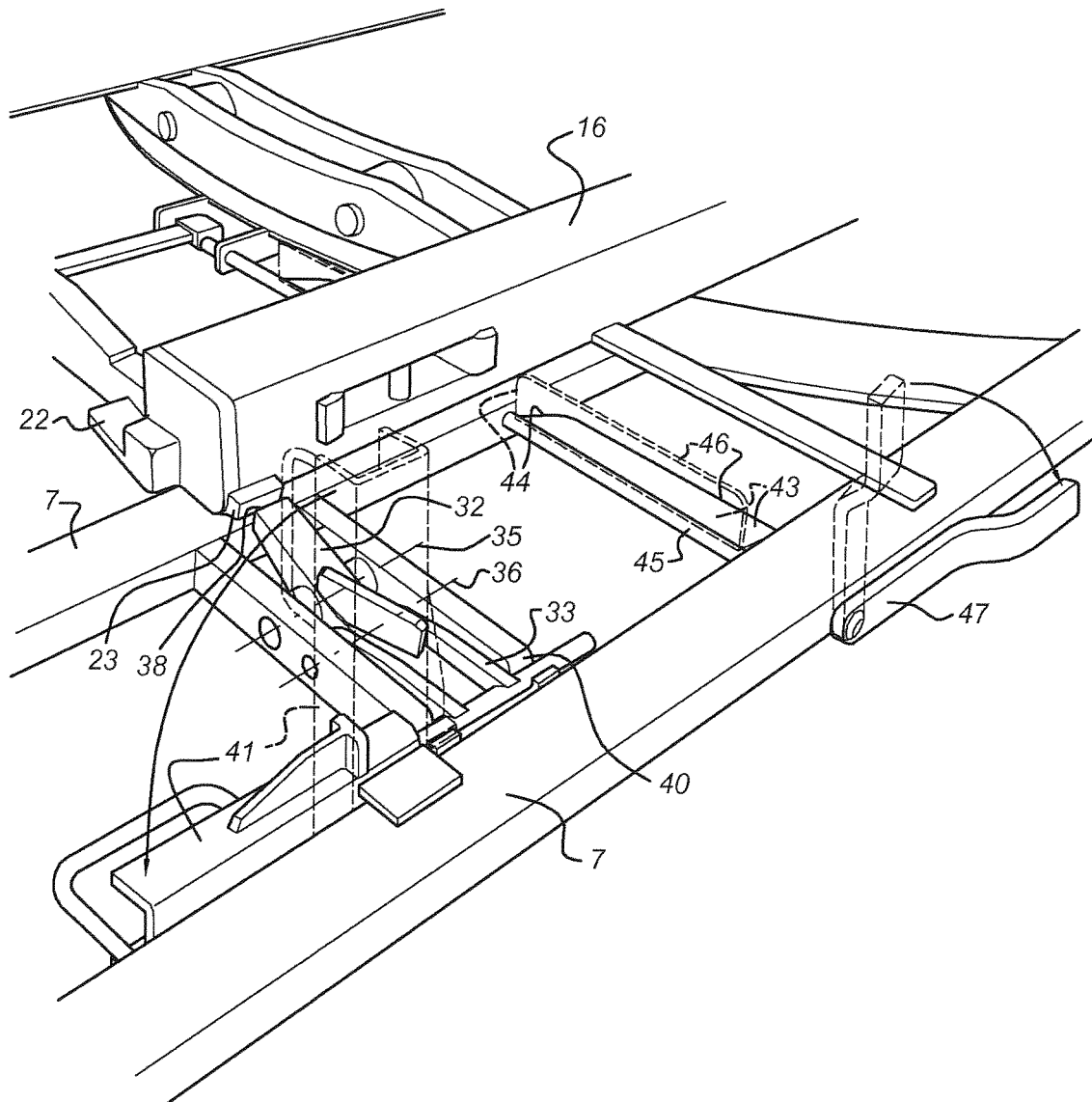


Fig 3b

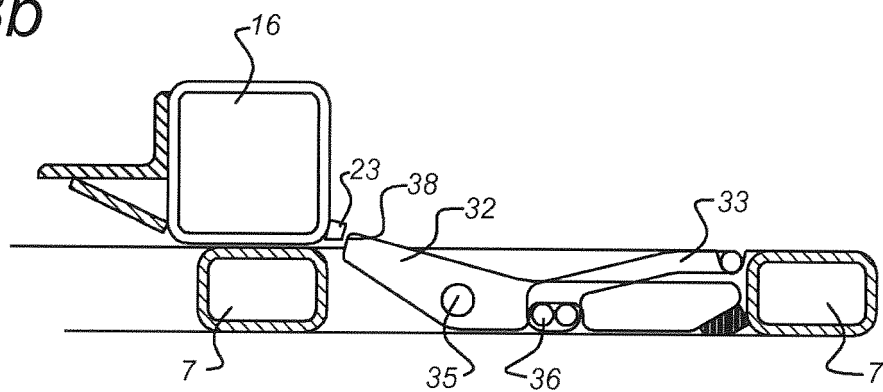


Fig 3c

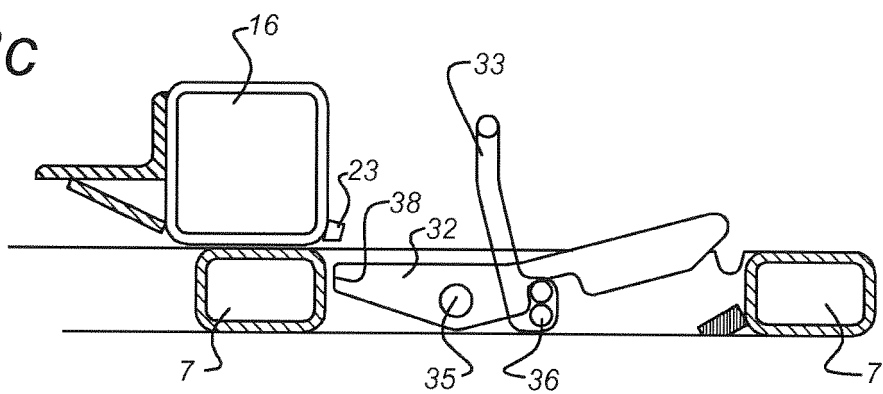


Fig 3d

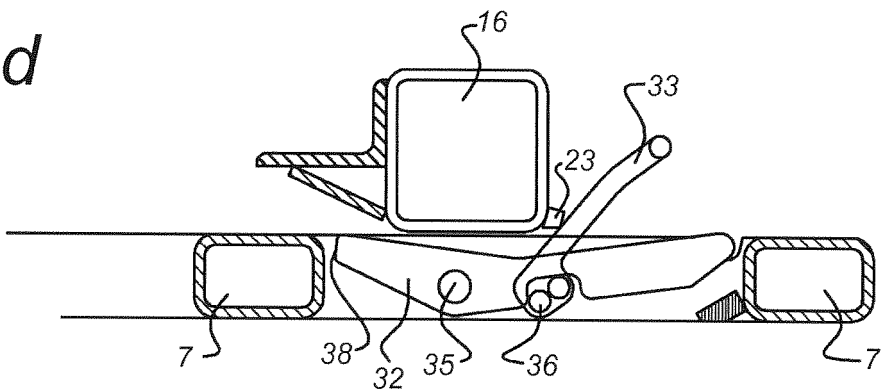


Fig 3e

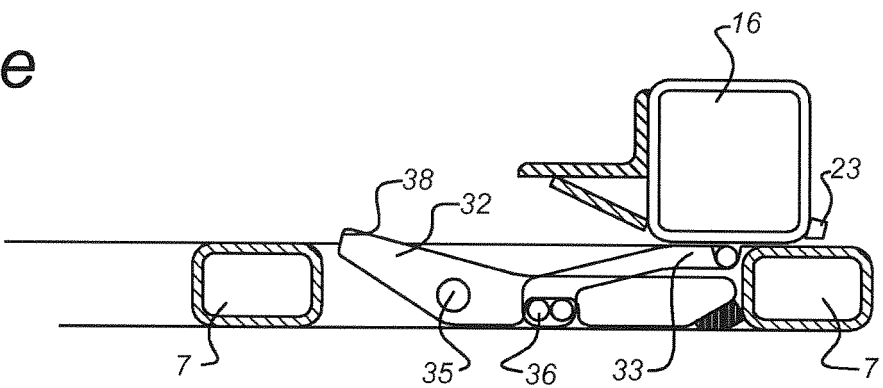


Fig 4

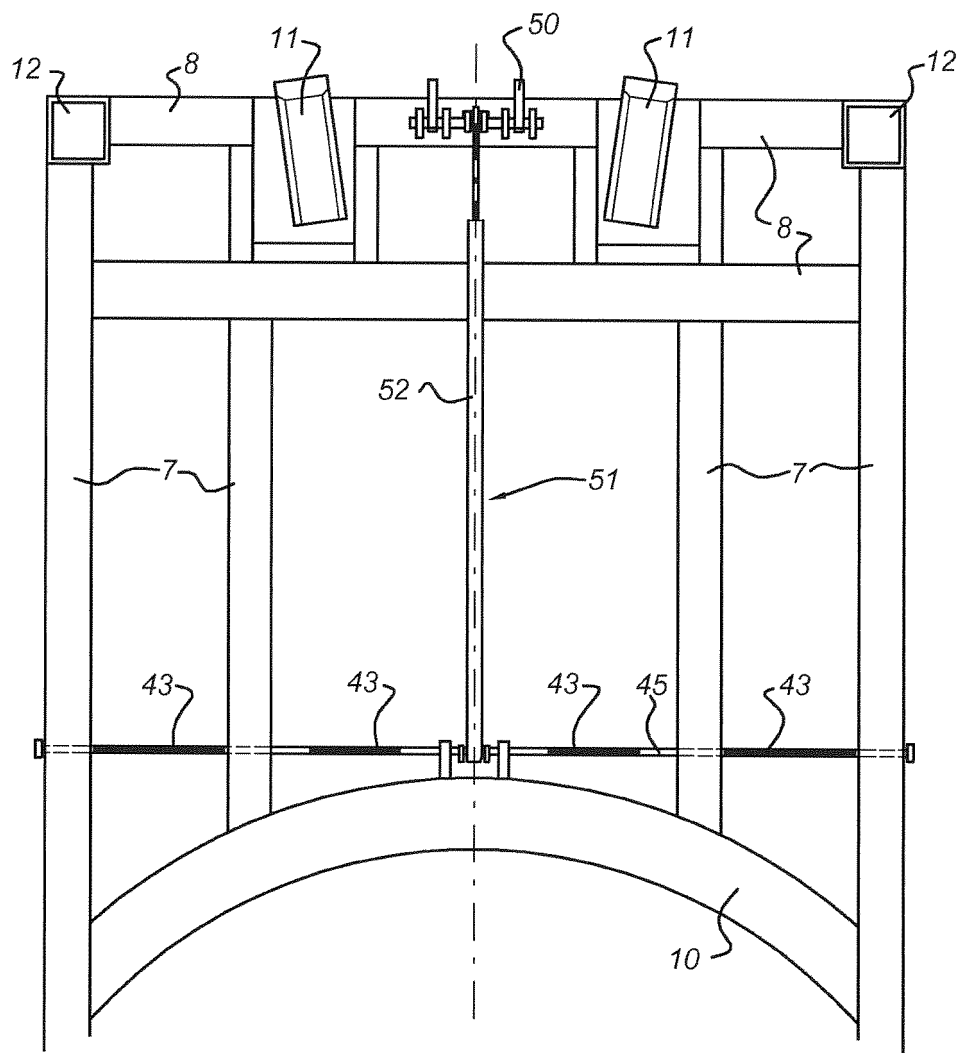


Fig 5a

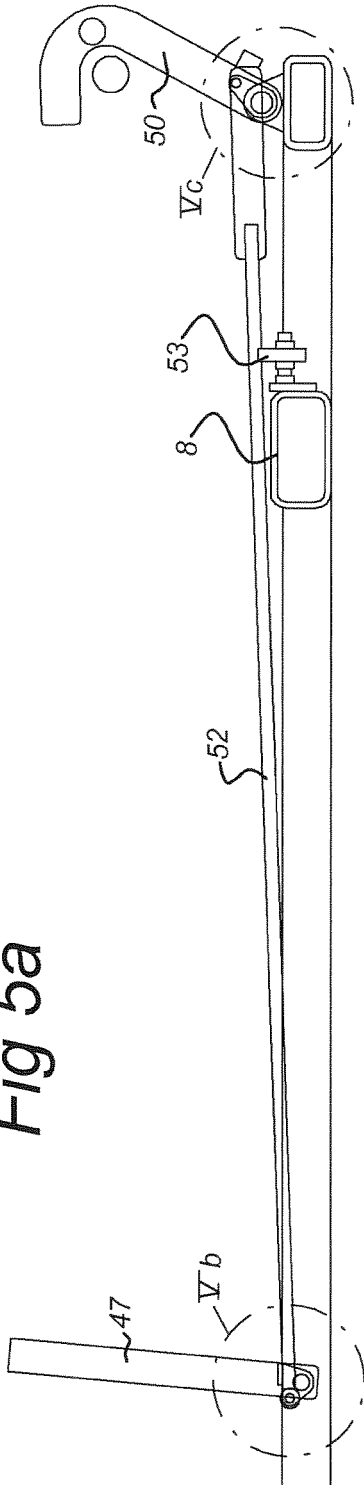


Fig 5b

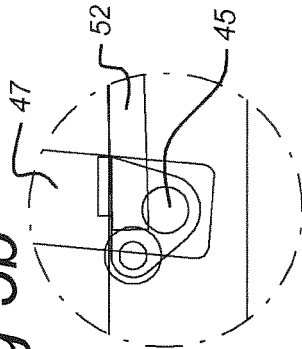


Fig 5c

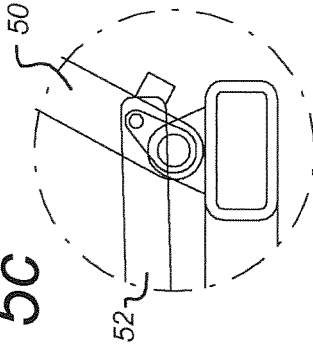


Fig 5e

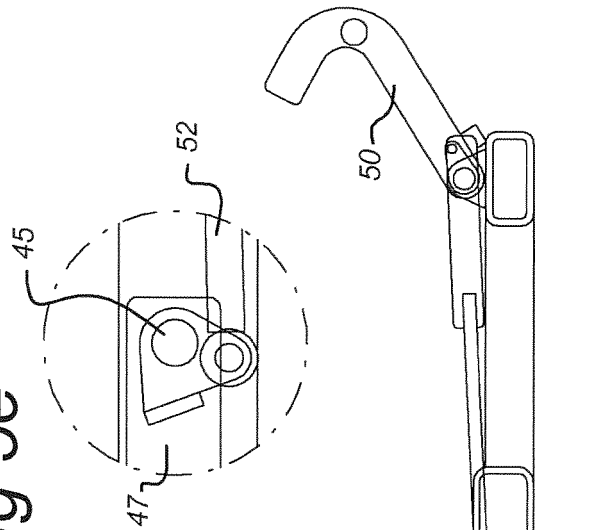
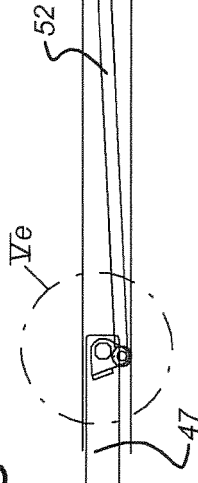


Fig 5d



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 8800161 [0002] [0013] [0018]
- EP 0911238 A1 [0004]
- EP 0516685 A1 [0005]