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(73) Proprietors:
• **CBW Holding B.V.**
3846 CG Harderwijk (NL)
• **CT-X Holding AG**
3001 Bern (CH)

(72) Inventor: **Wijnbergen, Leendert**
8071 RW Nunspeet (NL)

(74) Representative: **Houben, Christiaan Hein Willem
Frans et al**
Exter Polak & Charlouis B.V. (EP&C)
P.O. Box 3241
2280 GE Rijswijk (NL)

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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, wherein the bottom frame is provided with a number of corner blocks, which can be fixed detachably on the undercarriage of the rail vehicle, the swivel frame further comprising 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 from its swung-in position 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] EP 0 911 238 A1 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] EP 0 516 586 A1 discloses a lateral locking device of a 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 out-

wards.

[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 invention in that the locking mechanism comprises a set of first swing-out locks arranged on either side of the top frame and a set of second swing-out locks, arranged on either side of the top frame as well, for locking the top frame relative to the bottom frame, each of the swing-out locks having a locking position and a releasing position. 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.

[0008] 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.

[0009] In one embodiment, a first locking mechanism is provided, 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 can comprise 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 blocking element can be operated in vari-

ous 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.

[0012] 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.

[0013] 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.

[0014] 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.

[0015] 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.

[0016] 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 releasing 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 up-

standing 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.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] In one embodiment, the locking mechanism 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. 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.

[0021] 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.

[0022] 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.

[0023] 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.

[0024] The invention also 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, wherein the bottom frame is provided with a number of corner blocks, which can be fixed detachably on the undercarriage of the rail vehicle the swivel frame further comprising 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 from its swung-in position relative to the bottom frame, whereby the locking mechanism comprises a set of first swing-out locks arranged on either side of the top frame and a set of second swing-out locks, arranged on either side of the top frame as well, for locking the top-frame relative to the bottom frame, each of the swing-out locks having a locking position and a releasing position. 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.

[0025] In one embodiment, 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.

[0026] 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.

[0027] 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.

[0028] 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").

[0029] 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.

[0030] 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.

[0031] 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.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] 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.

[0036] 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.

[0037] 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.

[0038] 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.

[0039] 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.

[0040] 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.

[0041] 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 bear-

ers 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.

[0042] 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.

[0043] 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.

[0044] 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.

[0045] The invention is not limited to the exemplary embodiment shown in the figures. The person skilled in the art can make various modifications which lie within the scope of the invention.

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, the swivel frame further comprising 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 bottom frame (3), **characterized in that** the locking mechanism (30) comprises a set of first swing-out locks arranged on either side of the top frame (5) and a set of second swing-out locks, arranged on either side of the top frame (5) as well, for locking the top-frame (5) relative to the bottom frame (3), each of the swing-out locks having a locking position and a releasing position.

2. Swivel frame as claimed in claim 1, **characterized in that** in the swung-in position the top frame (5) is locked relative to the bottom frame (3) when at least one set of locking mechanisms (30) is in the locking position and **in that** only when all sets of locking mechanisms (30) are in the releasing position, the top frame (5) can swing from its swung-in position relative to the bottom frame (3).
3. Swivel frame as claimed in claim 1 or 2, **characterized in that** each locking mechanism comprises a stop (38;44) facing the top frame (5) which interacts with a side of the top frame (5) when in locking position.
4. 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.
5. Swivel frame according to Claim 1, in which the locking mechanism (30) is provided with 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.
6. Swivel frame according to Claim 5, 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).
7. Swivel frame according to Claim 6, in which the first

- position of the operating handle (33) 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 (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.
8. Swivel frame according to Claim 7, 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.
 9. Swivel frame according to Claim 7 or 8, in which the bottom frame (3) is provided with a recess (40) for accommodating a part of the operating handle (33) in the 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).
 10. Swivel frame according to one of the preceding claims, in which the locking mechanism (30) is provided with 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.
 11. Swivel frame according to Claim 10, 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 (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.
 12. Swivel frame according to Claim 10 or 11, 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).
 13. Swivel frame according to Claim 12, 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).
 14. 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 (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, the swivel frame further comprising 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), **characterized in that** the locking mechanism (30) comprises a set of first swing-out locks arranged on either side of the top frame (5) and a set of second swing-out locks, arranged on either side of the top frame (5) as well, for locking the top-frame (5) relative to the bottom frame (3), each of the swing-out locks having a locking position und a releasing position.
 15. Rail vehicle according to Claim 14, in which the bottom frame (3) is fixed substantially only by means of the corner blocks (12) on the undercarriage of the rail vehicle.
 16. Rail vehicle according to Claim 14 or 15, in which 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).

Patentansprüche

1. Drehrahmen für ein Schienenfahrzeug, umfassend einen unteren Rahmen (3) zum Befestigen an einem Fahrgestell des Schienenfahrzeugs und einen oberen Rahmen (5) zum Aufnehmen eines Containers, wobei der obere Rahmen (5) derart mit dem unteren Rahmen (3) verbunden ist, dass er sich zwischen einer eingeschwenkten Position, in welcher der obere Rahmen (5) im Wesentlichen parallel zu dem unteren Rahmen (3) verläuft, und einer ausgeschwenkten Position, in welcher der obere Rahmen (5) in einem Winkel relativ zu dem unteren Rahmen (3) verläuft, drehen kann, wobei der untere Rahmen (3) mit etlichen Eckblöcken (12) versehen ist, welche lösbar an dem Fahrgestell des Schienenfahrzeugs befestigt werden können, wobei der Drehrahmen ferner einen Verriegelungsmechanismus (30) aufweist, welcher eine Verriegelungsposition aufweist, in welcher der obere Rahmen (5) in der eingeschwenkten Position relativ zu dem unteren Rahmen (3) verriegelt ist, und eine Freigabeposition aufweist, in welcher sich der obere Rahmen (5) aus seiner eingeschwenkten Position relativ zu dem unteren Rahmen (3) drehen kann, **dadurch gekennzeichnet, dass** der Verriegelungsmechanismus (30) einen Satz von ersten Ausschwenkarretierungen, welche an beiden Seiten des oberen Rahmens (5) angeordnet sind, und einen Satz von zweiten Ausschwenkarretierungen, welche auch an beiden Seiten des oberen Rahmens (5) angeordnet sind, zum Verriegeln des oberen Rahmens (5) relativ zu dem unteren Rahmen (3) umfasst, wobei jede der Ausschwenkarretierungen eine Verriegelungsposition und eine Freigabeposition aufweist.
2. Drehrahmen nach Anspruch 1, **dadurch gekennzeichnet, dass** in der eingeschwenkten Position der obere Rahmen (5) relativ zu dem unteren Rahmen (3) verriegelt ist, wenn mindestens ein Satz von Verriegelungsmechanismen (30) in der Verriegelungsposition ist, und dass sich nur, wenn alle Sätze von Verriegelungsmechanismen (30) in der Freigabeposition sind, der obere Rahmen (5) aus seiner eingeschwenkten Position relativ zu dem unteren Rahmen (3) drehen kann.
3. Drehrahmen nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** jeder Verriegelungsmechanismus einen dem oberen Rahmen (5) gegenüberliegenden Anschlag (38; 44) umfasst, welcher mit einer Seite des oberen Rahmens (5) in der Verriegelungsposition zusammenwirkt.

4. Drehrahmen nach Anspruch 1, wobei der untere Rahmen (3) in einer derartigen Art und Weise ausgestaltet ist, dass der untere Rahmen (3) nur mittels der Eckblöcke (12) an dem Fahrgestell des Schienenfahrzeugs befestigt werden kann.
5. Drehrahmen nach Anspruch 1, wobei der Verriegelungsmechanismus (30) mit einem Blockierelement (32) versehen ist, welches sich um eine erste Drehachse (35) zwischen einer ersten Position und einer zweiten Position drehen kann, wobei die Positionen der Verriegelungsposition bzw. der Freigabeposition entsprechen, und wobei das Blockierelement einen Anschlag (38) aufweist, welcher in der ersten Position des Blockierelements (32) den oberen Rahmen (5) in der eingeschwenkten Position sichert.
6. Drehrahmen nach Anspruch 5, wobei der Verriegelungsmechanismus (30) mit einem Bediengriff (33) versehen ist, welcher sich um eine zweite Drehachse (36) zwischen einer ersten Position und einer zweiten Position drehen kann, wobei die Positionen der Verriegelungsposition bzw. der Freigabeposition 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.
7. Drehrahmen nach Anspruch 6, wobei die erste Position des Bediengriffs (33), welche der Verriegelungsposition entspricht, eine abgesenkte Position bildet, in welcher der Bediengriff unterhalb der horizontalen Ebene liegt, welche durch die Unterseite des oberen Rahmens (5) definiert wird, und wobei die zweite Position des Bediengriffs (33), welche der Freigabeposition entspricht, eine aufrechte Position bildet, in welcher der Bediengriff (33) relativ zu der Ebene nach oben hervorragt, und wobei das Blockierelement (32) von seiner ersten Position, welche der Verriegelungsposition entspricht, zu seiner zweiten Position, welche der Freigabeposition entspricht, durch Bewegen des Bediengriffs (33) von der abgesenkten Position zu der aufrechten Position bewegbar ist, und wobei der Bediengriff (33) durch den oberen Rahmen (5) von der aufrechten Position zu der abgesenkten Position gedrückt wird, wenn sich der obere Rahmen (5) von der eingeschwenkten Position zu der ausgeschwenkten Position dreht.
8. Drehrahmen nach Anspruch 7, wobei der Schwerpunkt des Blockierelements (32) in einer derartigen Entfernung von der ersten Drehachse (35) liegt, dass sich das Blockierelement (32) unter dem Einfluss der Schwerkraft zu der Verriegelungsposition bewegt, wenn der Bediengriff (33) in der abgesenkten Position ist.

9. Drehrahmen nach Anspruch 7 oder 8, wobei der untere Rahmen (3) mit einer Aussparung (40) zum Aufnehmen eines Teils des Bediengriffs (33) in der abgesenkten Position versehen ist, und wobei ein Teil des Bediengriffs (33), welcher in der Aussparung (40) aufgenommen ist, durch ein Sicherungselement (41) gesichert werden kann.
10. Drehrahmen nach einem der vorhergehenden Ansprüche, wobei der Verriegelungsmechanismus (30) mit einer Drehwelle (45) mit einem daran befestigten Verriegelungselement (43) versehen ist, wobei sich die Drehwelle (45) im Wesentlichen quer relativ zu dem unteren Rahmen (3) erstreckt und sich zwischen einer ersten Position und einer zweiten Position drehen kann, wobei die Positionen der Verriegelungsposition bzw. der Freigabeposition entsprechen, wobei das Verriegelungselement (43) einen weiteren Anschlag (44) aufweist, welcher in der ersten Position der Drehwelle (45), welche der Verriegelungsposition entspricht, den oberen Rahmen (5) in der eingeschwenkten Position sichert.
11. Drehrahmen nach Anspruch 10, wobei der obere Rahmen (5) mit zwei Längsträgern (7) versehen ist, welche in einem gegenseitigen Abstand und im Wesentlichen parallel zueinander angebracht sind, und wobei das Verriegelungselement (43) mindestens zwei Verriegelungstreifen (43) umfasst, welche in der ersten Position des Verriegelungselements, welche der Verriegelungsposition entspricht, an beiden Seiten eines Längsträgers (7) in der eingeschwenkten Position des oberen Rahmens (5) nach oben hervorragen, und wobei sich mindestens ein Verriegelungstreifen (43) bei einer Drehung der Drehwelle (45) aus der zweiten Position, welche der Freigabeposition entspricht, gegen einen Längsträger (7) bewegt, wenn sich der obere Rahmen zwischen der eingeschwenkten und ausgeschwenkten Position befindet, um zu verhindern, dass die Drehwelle (45) nach dem Ausschwenken von der eingeschwenkten Position zu der ersten Position drehbar ist.
12. Drehrahmen nach Anspruch 10 oder 11, wobei der untere Rahmen (3) an einer Vorderseite davon mit einem Hakenelement (50) versehen ist, welches zwischen einer geschlossenen Position zum Eingriff bringen eines auf dem oberen Rahmen (5) aufzunehmenden Containers und einer offenen Position gedreht werden kann, und wobei die Drehwelle (45) über einen Übertragungsmechanismus (51) mit dem Hakenelement (50) verbunden ist.
13. Drehrahmen nach Anspruch 12, wobei der Übertragungsmechanismus (51) in einer derartigen Art und Weise ausgestaltet ist, dass, wenn sich die Drehwelle (45) dreht, sich das Hakenelement (50) in einer Richtung entgegengesetzt zu der Drehrichtung der

Drehwelle (45) dreht.

14. Schienenfahrzeug umfassend ein Fahrgestell, etliche Räder, welche drehbar mit dem Fahrgestell verbunden sind, und ferner einen Drehrahmen (1), welcher mit einem unteren Rahmen (3) für ein Befestigen an dem Fahrgestell und einem oberen Rahmen (5) zum Aufnehmen eines Containers versehen ist, wobei der obere Rahmen (5) derart mit dem unteren Rahmen (3) verbunden ist, dass er sich zwischen einer eingeschwenkten Position, in welcher der obere Rahmen (5) im Wesentlichen parallel zu dem unteren Rahmen (3) verläuft, und einer ausgeschwenkten Position, in welcher der obere Rahmen (5) in einem Winkel relativ zu dem unteren Rahmen (3) verläuft, drehen kann, wobei der untere Rahmen (3) mit etlichen Eckblöcken (12) versehen ist, welche lösbar an dem Fahrgestell des Schienenfahrzeugs befestigt werden können, wobei der Schwenkrahmen ferner einen Verriegelungsmechanismus (30) umfasst, welcher eine Verriegelungsposition aufweist, in welcher der obere Rahmen (5) in der eingeschwenkten Position relativ zu dem unteren Rahmen (3) verriegelt ist, und welcher eine Freigabeposition aufweist, in welcher sich der obere Rahmen (5) aus seiner eingeschwenkten Position relativ zu dem unteren Rahmen (3) drehen kann, **dadurch gekennzeichnet, dass** der Verriegelungsmechanismus (30) einen Satz von ersten Ausschwenkarretierungen, welche an beiden Seiten des oberen Rahmens (5) angeordnet sind, und einen Satz von zweiten Ausschwenkarretierungen, welche auch an beiden Seiten des oberen Rahmens (5) angeordnet sind, zum Verriegeln des oberen Rahmens (5) relativ zu dem unteren Rahmen (3) umfasst, wobei jede Ausschwenkarretierung eine Verriegelungsposition und eine Freigabeposition aufweist.
15. Schienenfahrzeug nach Anspruch 14, wobei der untere Rahmen (3) im Wesentlichen nur mittels der Eckblöcke (12) an dem Fahrgestell des Schienenfahrzeugs befestigt ist.
16. Schienenfahrzeug nach Anspruch 14 oder 15, wobei der Drehrahmen (1) mit einem Verriegelungsmechanismus (30) versehen ist, welcher eine Verriegelungsposition aufweist, in welcher der obere Rahmen (5) in der eingeschwenkten Position relativ zu dem unteren Rahmen (3) verriegelt ist, und welcher eine Freigabeposition aufweist, in welcher sich der obere Rahmen (5) aus seiner eingeschwenkten Position relativ zu dem unteren Rahmen (3) drehen kann.

Revendications

1. Châssis à pivot pour un véhicule ferroviaire, com-

- prenant un châssis inférieur (3) destiné à être fixé sur un train roulant du véhicule ferroviaire, et un châssis supérieur (5) pour loger un conteneur, lequel châssis supérieur (5) est raccordé au châssis inférieur (3) de sorte qu'il peut pivoter entre une position pivotée vers l'intérieur dans laquelle le châssis supérieur (5) s'étend sensiblement parallèlement au châssis inférieur (3) et une position pivotée vers l'extérieur dans laquelle le châssis supérieur (5) s'étend selon un angle par rapport au châssis inférieur (3), dans lequel le châssis inférieur (3) est prévu avec un certain nombre d'équerres (12) qui peuvent être fixées de manière détachable sur le train roulant du véhicule ferroviaire, le châssis à pivot comprenant en outre un mécanisme de verrouillage (30) ayant une position de verrouillage dans laquelle, dans la position pivotée vers l'intérieur, le châssis supérieur (5) est bloqué par rapport au châssis inférieur (3), et ayant une position de déverrouillage dans laquelle le châssis supérieur (5) peut pivoter à partir de sa position pivotée vers l'intérieur par rapport au châssis inférieur (3), **caractérisé en ce que** le mécanisme de verrouillage (30) comprend un ensemble de premiers verrous pivotés vers l'extérieur agencés de chaque côté du châssis supérieur (5) et un ensemble de seconds verrous pivotés vers l'extérieur, agencés également de chaque côté du châssis supérieur (5), pour bloquer le châssis supérieur (5) par rapport au châssis inférieur (3), chacun des verrous pivotés vers l'extérieur ayant une position de verrouillage et une position de déverrouillage.
2. Châssis à pivot selon la revendication 1, **caractérisé en ce que** dans la position pivotée vers l'intérieur, le châssis supérieur (5) est bloqué par rapport au châssis inférieur (3) lorsqu'au moins un ensemble de mécanismes de verrouillage (30) est dans la position de verrouillage et **en ce que**, uniquement lorsque tous les ensembles de mécanismes de verrouillage (30) sont dans la position de déverrouillage, le châssis supérieur (5) peut pivoter de sa position pivotée vers l'intérieur par rapport au châssis inférieur (3).
 3. Châssis à pivot selon la revendication 1 ou 2, **caractérisé en ce que** chaque mécanisme de verrouillage comprend une butée (38 ; 44) faisant face au châssis supérieur (5) qui interagit avec un côté du châssis supérieur (5) lorsqu'il est dans la position de verrouillage.
 4. Châssis à pivot selon la revendication 1, dans lequel le châssis inférieur (3) est conçu de sorte que le châssis inférieur (3) peut être fixé uniquement au moyen d'équerres (12) sur le train roulant du véhicule ferroviaire.
 5. Châssis à pivot selon la revendication 1, dans lequel le mécanisme de verrouillage (30) est prévu avec un élément de verrouillage (32) qui peut pivoter autour d'un premier axe de pivot (35) entre une première position et une seconde position, lesquelles positions correspondent respectivement à la position de verrouillage et à la position de déverrouillage, et dans lequel l'élément de verrouillage a une butée (38) qui, dans la première position de l'élément de verrouillage (32), fixe le châssis supérieur (5) dans la position pivotée vers l'intérieur.
 6. Châssis à pivot selon la revendication 5, dans lequel le mécanisme de verrouillage (30) est prévu avec une poignée de commande (33) qui peut pivoter autour d'un second axe de pivot (36) entre une première position et une seconde position, lesquelles positions correspondent respectivement à la position de verrouillage et à la position de déverrouillage, le premier axe de pivot (35) et le second axe de pivot (36) s'étendant à une distance mutuelle et de manière sensiblement parallèle l'un par rapport à l'autre, et l'élément de verrouillage (32) étant mobile au moyen de la poignée de commande (33).
 7. Châssis à pivot selon la revendication 6, dans lequel la première position de la poignée de commande (33) correspondant à la position de verrouillage forme une position abaissée, dans laquelle la poignée de commande se trouve au-dessous du plan horizontal définie par la face inférieure du châssis supérieur (5), et dans lequel, la seconde position de la poignée de commande (33) correspondant à la position de déverrouillage forme une position droite dans laquelle la poignée de commande (33) fait saillie vers le haut par rapport audit plan, et dans lequel l'élément de verrouillage (32) est mobile de sa première position correspondant à la position de verrouillage à sa seconde position correspondant à la position de déverrouillage en faisant passer la poignée de commande (33) de la position abaissée à la position droite, et dans lequel la poignée de commande (33) est forcée par le châssis supérieur (5) de la position droite à la position abaissée lorsque le châssis supérieur (5) pivote de la position pivotée vers l'intérieur à la position pivotée vers l'extérieur.
 8. Châssis à pivot selon la revendication 7, dans lequel le centre de gravité de l'élément de verrouillage (32) se trouve à une distance telle du premier axe de pivot (35), que l'élément de verrouillage (32) se déplace dans la position de verrouillage sous l'influence de la gravité lorsque la poignée de commande (33) est dans la position abaissée.
 9. Châssis à pivot selon la revendication 7 ou 8, dans lequel le châssis inférieur (3) est prévu avec un évitement (40) pour loger une partie de la poignée de commande (33) dans sa position abaissée, et dans

lequel une partie de la poignée de commande (33) logée dans l'évidement (40) peut être fixée par un élément de fixation (41).

10. Châssis à pivot selon l'une quelconque des revendications précédentes, dans lequel le mécanisme de verrouillage (30) est prévu avec un arbre de rotation (45) avec un élément de verrouillage (43) fixé sur ce dernier, lequel arbre de rotation (45) s'étend sensiblement de manière transversale 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 déverrouillage, 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 pivotée vers l'intérieur.
11. Châssis à pivot selon la revendication 10, dans lequel le châssis supérieur (5) est prévu avec deux poutres longitudinales (7) qui sont montées à une distance mutuelle et de manière sensiblement parallèle entre elles, 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, font saillie vers le haut de chaque côté d'une poutre longitudinale (7) dans la position pivotée vers l'intérieur du châssis supérieur (5), et dans lequel au moins une bande de verrouillage (43) se déplace contre une poutre longitudinale (7) suite à la rotation de l'arbre de rotation (45) hors de la seconde position correspondant à la position de déverrouillage lorsque le châssis supérieur est situé entre la position pivotée vers l'intérieur et la position pivotée vers l'extérieur, afin d'empêcher la rotation de l'arbre de rotation (45) dans la première position après le pivotement vers l'extérieur à partir de la position pivotée vers l'intérieur.
12. Châssis à pivot selon la revendication 10 ou 11, dans lequel le châssis inférieur (3) est prévu sur son côté avant avec un élément formant crochet (50) qui peut pivoter entre une position fermée pour mettre en prise un conteneur à loger sur le châssis supérieur (5), et une position ouverte et dans lequel l'arbre de rotation (45) est raccordé par un mécanisme de transmission (51) à l'élément formant crochet (50).
13. Châssis à pivot selon la revendication 12, dans lequel le mécanisme de transmission (51) est conçu de sorte que lorsque l'arbre de rotation (45) tourne, l'élément formant crochet (50) pivote dans une direction opposée à la direction de rotation de l'arbre de rotation (45).

14. Véhicule ferroviaire comprenant un train roulant, un certain nombre de roues qui sont raccordées de manière rotative au train roulant, et également un châssis à pivot (1) qui est prévu avec un châssis inférieur (3) destiné à être fixé sur le train roulant, et un châssis supérieur (5) pour loger un conteneur, lequel châssis supérieur (5) est raccordé au châssis inférieur (3) de sorte qu'il peut pivoter entre une position pivotée vers l'intérieur dans laquelle le châssis supérieur (5) s'étend de manière sensiblement parallèle au châssis inférieur (3) et une position pivotée vers l'extérieur dans laquelle le châssis supérieur (5) s'étend selon un angle par rapport au châssis inférieur (3), dans lequel le châssis inférieur (3) est prévu avec un certain nombre d'équerres (12) qui peuvent être fixées de manière détachable sur le train roulant du véhicule ferroviaire, le châssis à pivot comprenant en outre un mécanisme de verrouillage (30) ayant une position de verrouillage dans laquelle, dans la position pivotée vers l'intérieur, le châssis supérieur (5) est bloqué par rapport au châssis inférieur (3) et ayant une position de déverrouillage dans laquelle le châssis supérieur (5) peut pivoter de sa position pivotée vers l'intérieur par rapport au châssis inférieur (3), **caractérisé en ce que** le mécanisme de verrouillage (30) comprend un ensemble de premiers verrous pivotés vers l'extérieur agencés de chaque côté du châssis supérieur (5) et un ensemble de seconds verrous pivotés vers l'extérieur, agencés de chaque côté du châssis supérieur (5) également, pour bloquer le châssis supérieur (5) par rapport au châssis inférieur (3), chacun des verrous pivotés vers l'extérieur ayant une position de verrouillage et une position de déverrouillage.

15. Véhicule ferroviaire selon la revendication 14, dans lequel le châssis inférieur (3) est fixé sensiblement uniquement au moyen d'équerres (12) sur le train roulant du véhicule ferroviaire.

16. Véhicule ferroviaire selon la revendication 14 ou 15, dans lequel le châssis à pivot (1) est prévu avec un mécanisme de verrouillage (30), ayant une position de verrouillage dans laquelle, dans la position pivotée vers l'intérieur, le châssis supérieur (5) est bloqué par rapport au châssis inférieur (3) et ayant une position de déverrouillage dans laquelle le châssis supérieur (5) peut pivoter à partir de sa position pivotée vers l'intérieur par rapport au châssis inférieur (3).

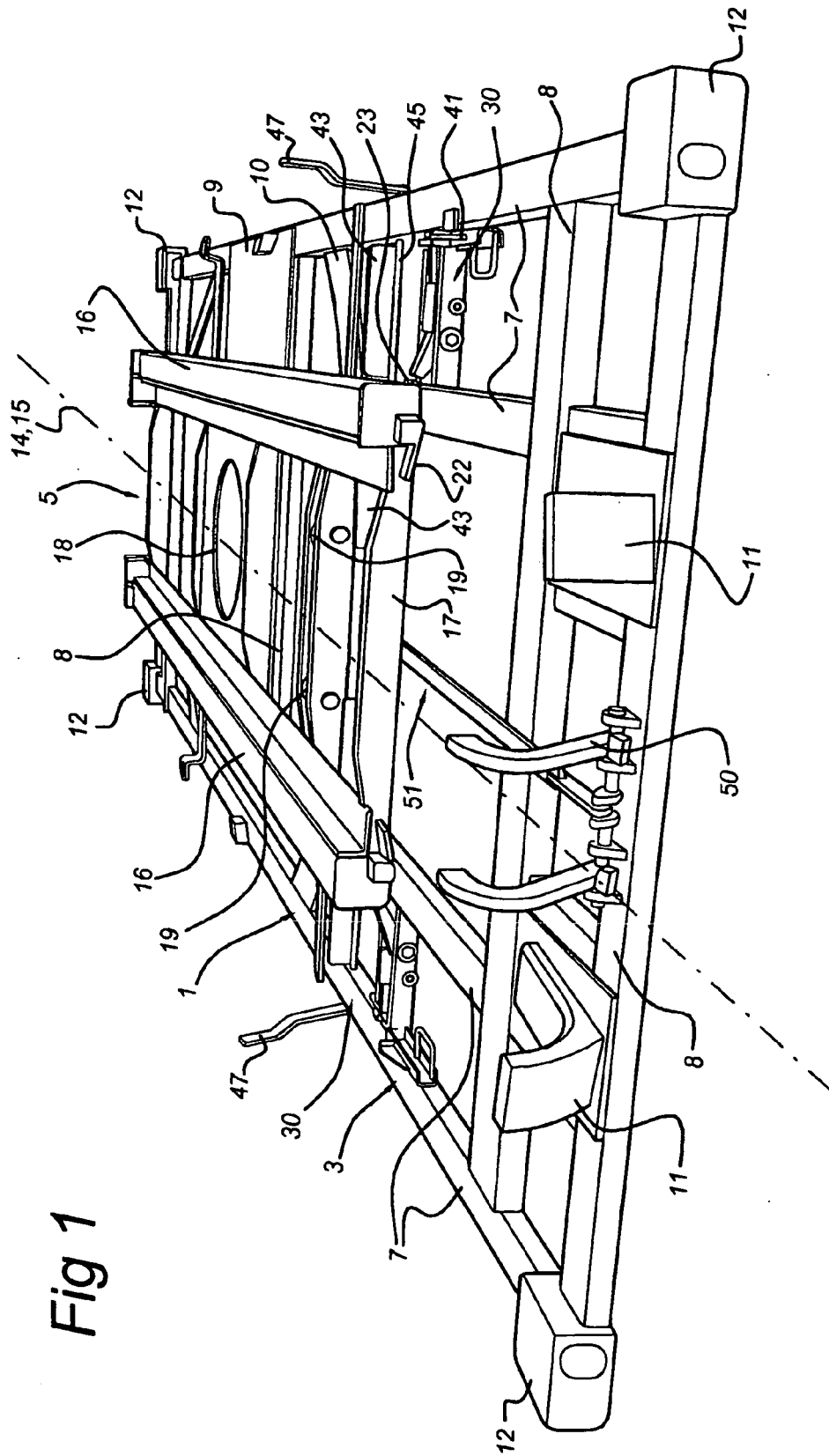


Fig 1

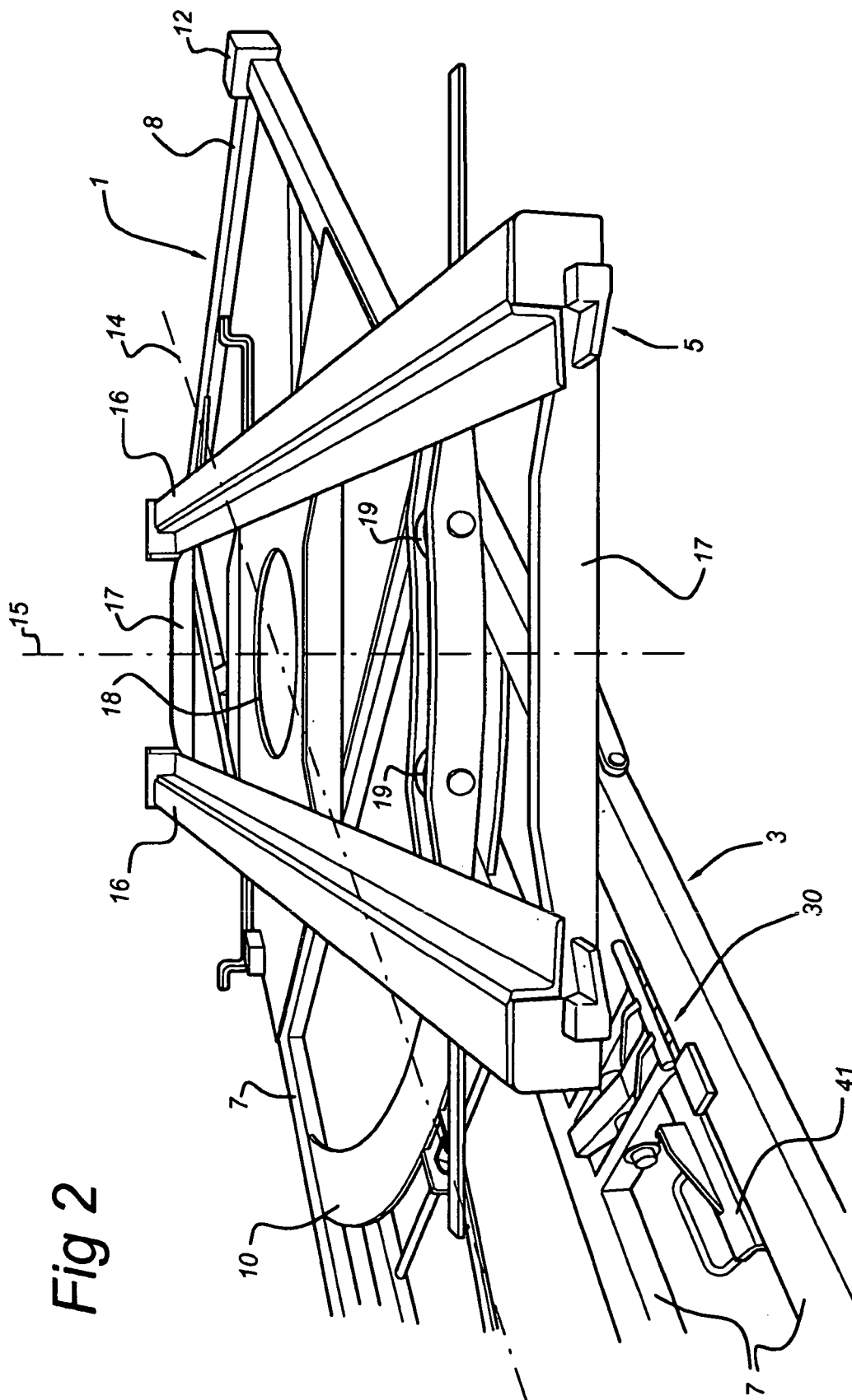


Fig 3a

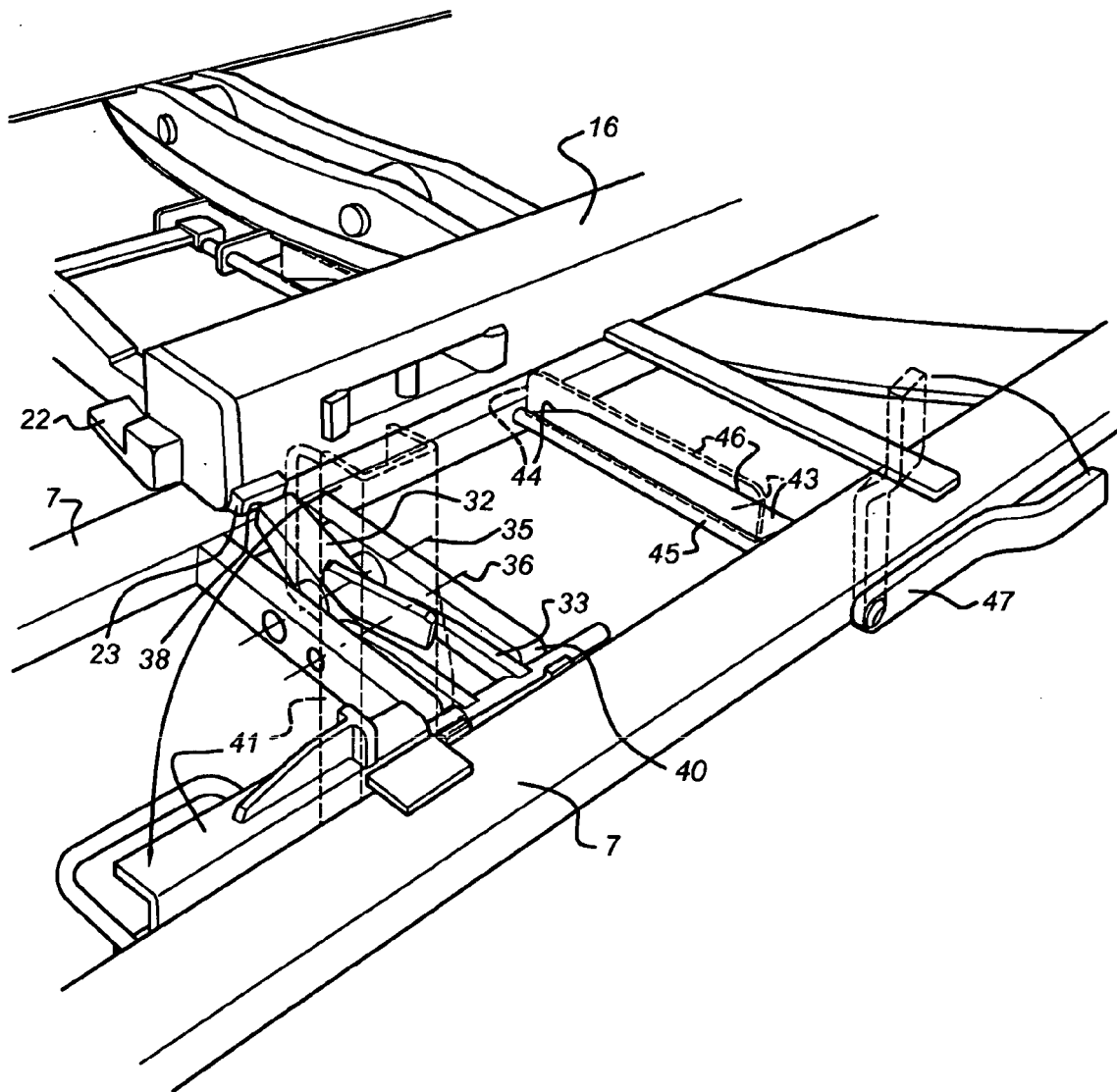


Fig 3b

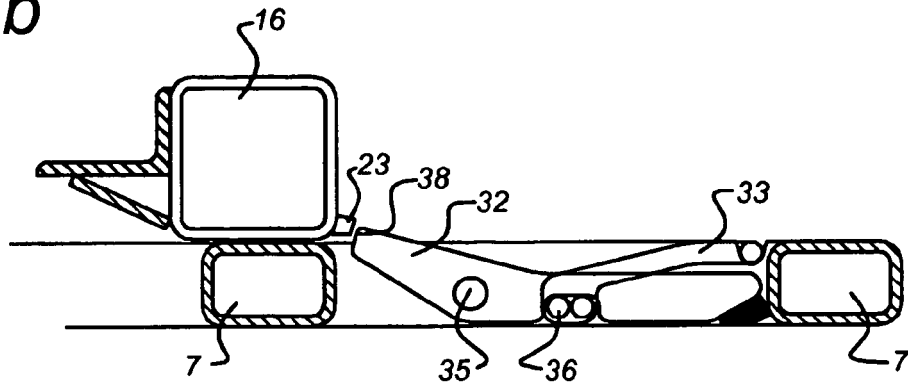


Fig 3c

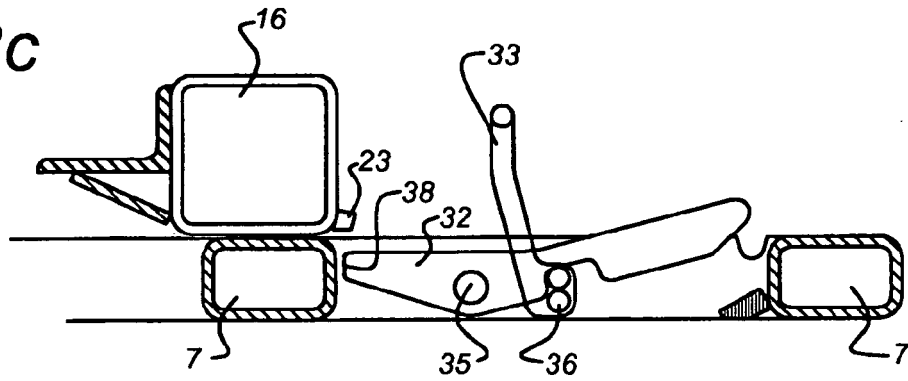


Fig 3d

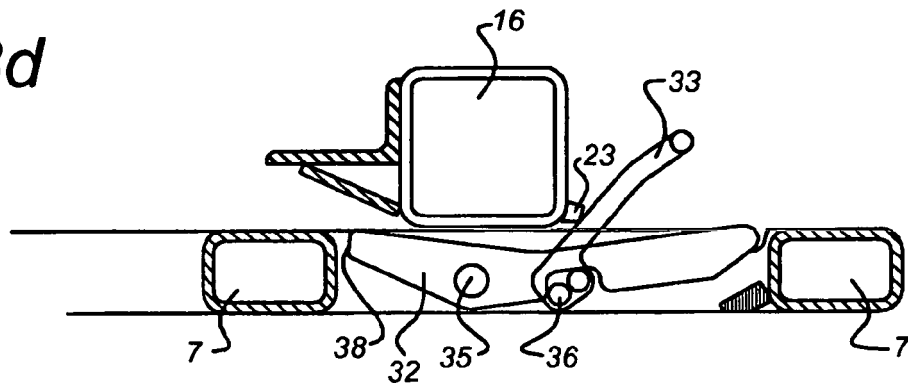


Fig 3e

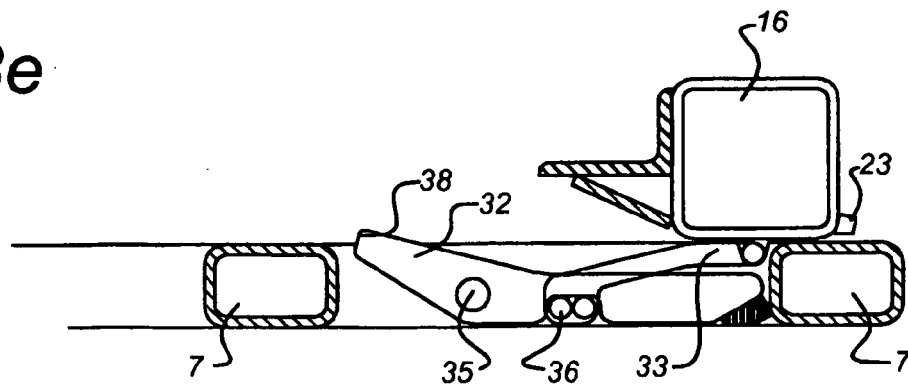


Fig 4

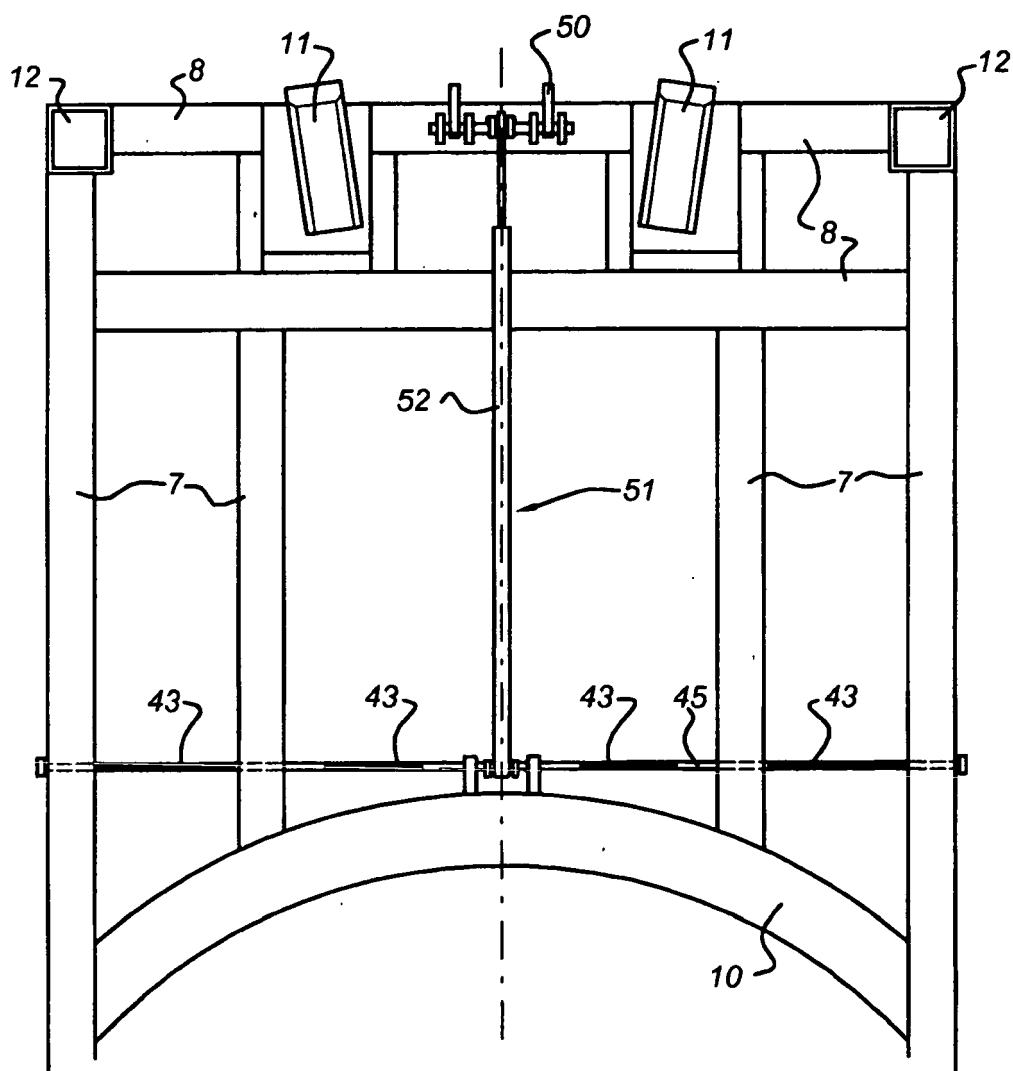


Fig 5a

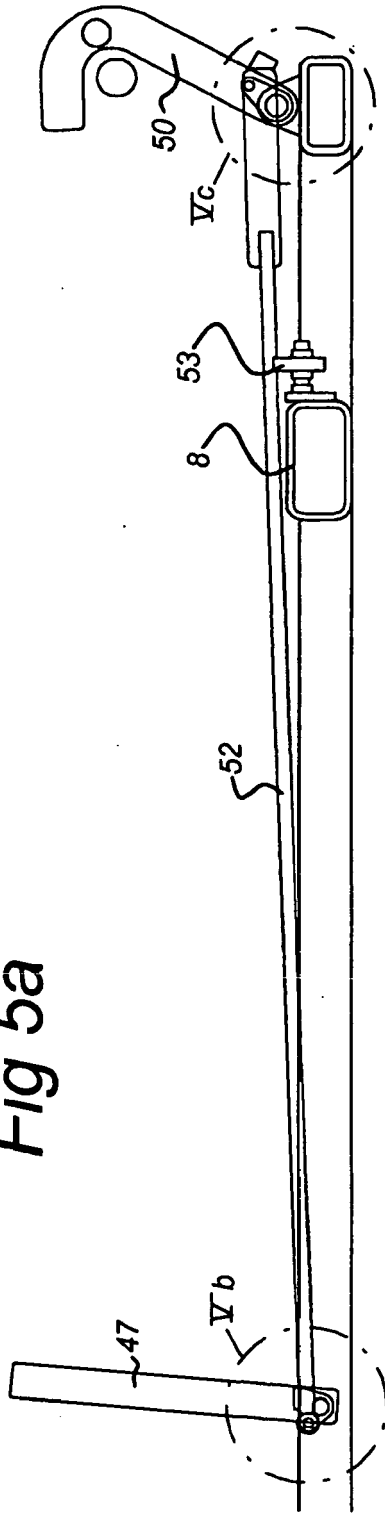


Fig 5b

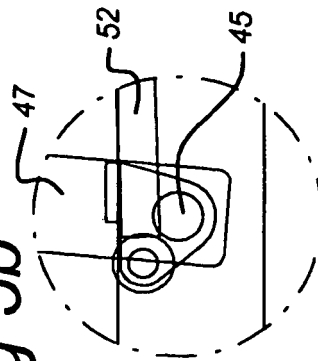


Fig 5c

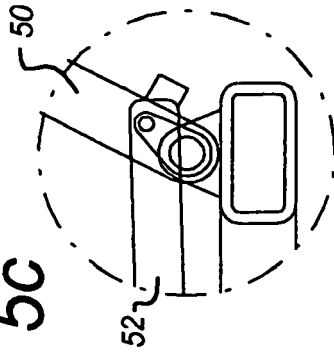


Fig 5e

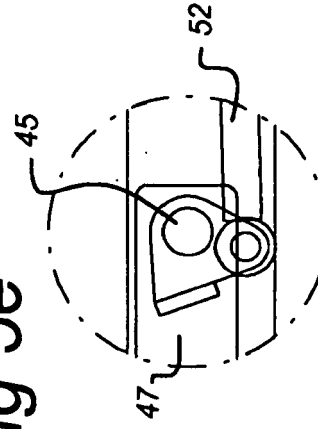
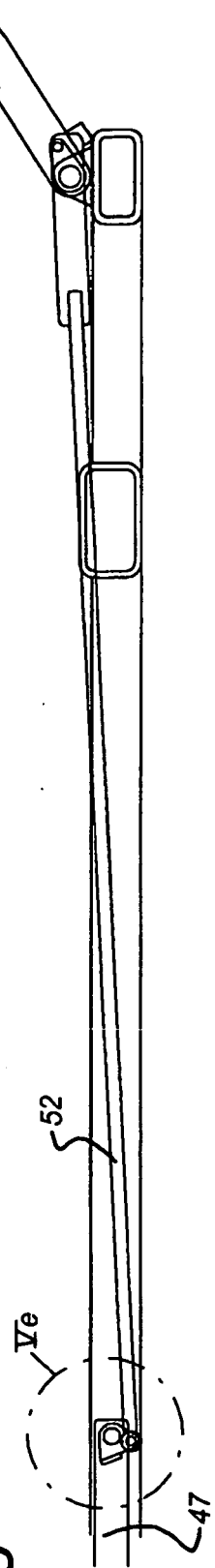


Fig 5d



REFERENCES CITED IN THE DESCRIPTION

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