(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 851 356 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.07.2021 Bulletin 2021/29

(51) Int Cl.:
B61G 5/04 *(2006.01)* ***B61G 1/36*** *(2006.01)*

(21) Application number: **21150558.1**

(22) Date of filing: **07.01.2021**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
KH MA MD TN

(30) Priority: **16.01.2020 AT 5000720 U**

(71) Applicant: **Dellner Couplers AB**
791 95 Falun (SE)

(72) Inventors:
- **Ostrowicka, Krystyna**
  80-175 Gdansk (PL)
- **Tärestam Per-Gunnar**
  79161 Falun (SE)

(74) Representative: **Tilmann, Max Wilhelm et al**
König-Szynka-Tilmann-von Renesse
Patentanwälte Partnerschaft mbB
Mönchenwerther Straße 11
40545 Düsseldorf (DE)

(54) TRAIN COUPLER ADAPTER AND TRAIN

(57) The invention relates to a train coupler adapter for connecting a coupler of a first geometry with a draw hook coupler, whereby the adapter has

• a front section with an interface suitable to couple with a coupler of a first geometry,

• a rear section with an opening suitable for the tip of the hook of the draw hook coupler to be inserted into,

• a safety bracket at the rear section that has a traversing section (that is positioned beneath the opening and traverses over the opening),

whereby the safety bracket is attached to the rear section in a manner that allows the safety bracket to swivel relative to the rear section, whereby a blocking element is provided that limits the swivel angle of the safety bracket, whereby the blocking element has

• a first part that is connected to the safety bracket and

• a second part that is connected to a remove clamp, whereby the remove clamp can be moved from a clamping position to a non-clamping position.

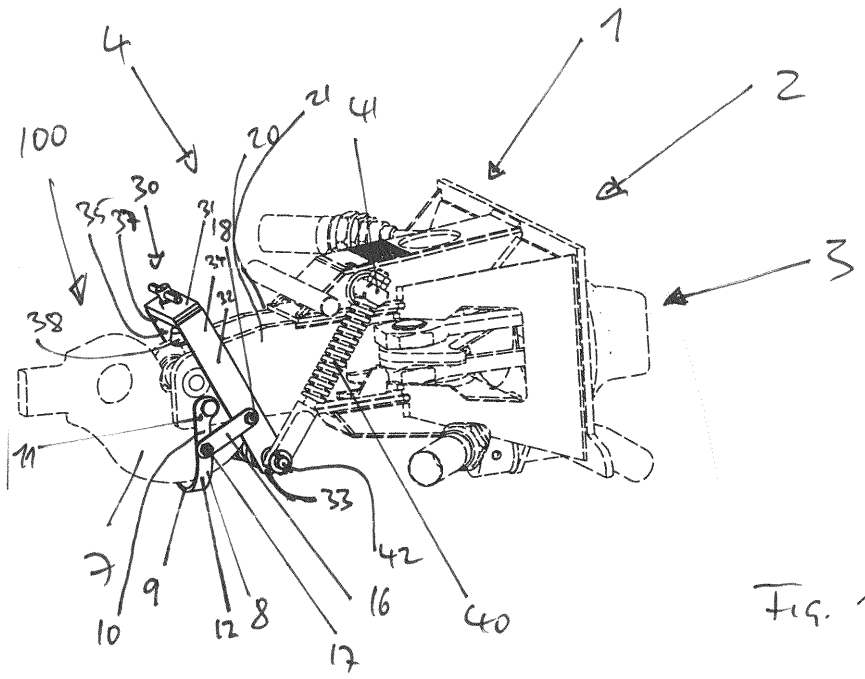

Fig. 1

EP 3 851 356 A1

Description

[0001] The invention relates to a train coupler adapter for connecting a coupler of a first geometry with a draw hook coupler. The invention also relates to a system of such an adapter and a draw hook coupler. The invention also relates to a train with a first car with a coupler of a first geometry and a second car with a draw hook coupler. The invention also relates to a method for connecting such an adapter with a hook of a draw hook coupler.

[0002] From EP 2 384 948 A1 and WO 2015/162122 A1 a train coupler adapter for connecting a coupler of a first geometry with a draw hook coupler is known, whereby the disclosed adapter has a front section with an interface suitable to couple with a coupler of a first geometry and a rear section with an opening suitable for the tip of the hook of the draw hook coupler to be inserted into and a safety bracket at the rear section that has a traversing section that is positioned between the opening and that traverses over the opening.

[0003] Given this background the problem to be solved by the invention was to suggest a train coupler adapter, a system of such an adapter with a draw hook coupler and a train with a first car with a coupler of a first geometry and a second car with a draw hook coupler and a method for connecting an adapter with a hook of a draw hook coupler that would allow the train coupler adapter to be connected to the hook of the draw hook coupler with handling operations that predominantly can be performed from the front.

[0004] This problem is solved by a train coupler adapter according to claim 1, a system according to claim 9, a train according to claim 10 and a method according to claim 11. Further embodiments of the invention are described in the subordened claims and in the description following hereafter.

[0005] The invention is based on the idea of making the safety bracket swivel relative to the rear section, while at the same time providing a blocking element that limits the swiveling motion of the safety bracket. Such an arrangement allows the rear section to be attached to the hook of the draw hook coupler in an easy manner. During the attachment phase, the safety bracket preferably is allowed to swivel relative to the rear section. If the safety bracket is allowed to swivel relative to the rear section, this allows the tip of the hook to be more easily introduced into the opening of the rear section, because the safety bracket will make room for the maneuvering of the rear section relative to the hook and will not be in the way of any relative motion of the hook relative to the rear section, be it transvers movements or rotational movements. The invention does, however also provide the blocking element to limit the swivel angel of the safety bracket relative to the rear section. This allows to keep the safety bracket in a certain position/ in a certain area. This feature can, for example, be used to make sure that the safety bracket remains in a certain area once the hook has been connected to the rear section of the adapter and hence allows the safety bracket to be used as reassurance to prevent that the hook decouples from the rear section of the adapter.

[0006] The invention is directed to a train coupler adapter. These adapters are used, if a car of a train, for example a passenger car of a train is to be connected to different car of a train, for example a locomotive, for example a shunting lock (shunting locomotive), which might have a coupler geometry that is not suitable to couple with the coupler geometry of the first train of the car. A train coupler adapter hence makes sure that it can be coupled to the coupler of the first car of the train as well as being coupled to the draw hook coupler of the second car of the train in such a manner that it allows towing and/or pushing forces to be transmitted from the first car of the train to the second car of the train or vice versa.

[0007] The adapter has a front section, this front section has an interface that is suitable to couple with a coupler of a first geometry. In a preferred embodiment, the first geometry is the geometry of a central buffer coupling (German term: "Mittelpufferkupplung"). Embodiments of the invention are feasible, where the first geometry of the coupler is a draw hook (German term: "Zughaken"), or the first geometry of the coupler is a automatic coupling, for example of the built-type "Scharfenberg" (German term: "Automatische Kupplung; Bauart Scharfenberg"), for example the couplers that have become known in the industry under the abbreviation "type 10", or the first geometry of the coupler is an automatic coupling of the type as they have become known in the industry under the names US AAR, India AAR, China type 17 or SA3, or the first geometry of the coupler is for example of a Albert coupler or of a Miller Hook and Platform coupler or of a Norwegian coupler or of a Johnston coupler or of a bell-and-hook coupler or of a Janney/MCB/ARA/AAR/APTA coupler or of a Willison/SA3 coupler or of a Westinghouse H2C coupler or of a WABCO N-Type or of a Topmlinson couler or of a ward coupler or of a shibata coupler.

[0008] The interface at the front section of the adapter can be of a reduced design relative to the design of a complete coupler head of the first geometry. Often, it is sufficient for the purposes of shunting cars of a train to work with reduced designs on the interface of the adapter. The interface of the adapter only needs to make sure that the adapter is attached to the coupler on the car of a train sufficiently securely for the traveling speeds of the shunting. Likewise, the interface needs to be sufficiently strong to allow the pushing forces and/or pulling forces that occur during shunting to be safely transmitted to the coupler on the car of the train. The interface for these purposes need not have to have the electronic connections or the hydraulic connections that a fully designed coupler had would normally have. In an alternative embodiment of the invention, the interface of the front section of the adapter is a coupler head that has all counter elements that a coupler head of a normal train of a car that would couple to the coupler of the car of the train would have, for example would also have the electronic connections

and the hydraulic connections.

[0009] The adapter also has a rear section with an opening suitable for the tip of the hook of the draw hook coupler to be inserted into. The opening can be a blind-hole in the sense that the tip of the hook of the draw hook coupler remains inside the opening, once it is inserted into the opening. In a preferred embodiment, the opening is, however, a through-opening that allows the tip of the hook to leave the opening on the opposite side to that side, on which the tip of the hook has been inserted into the opening.

[0010] The hook could for example be the hook of a draw hook coupler as shown in DIN 25 605 Blatt 1.

[0011] The adapter further has a safety bracket at the rear section. The safety bracket has a traversing section that is positioned beneath the opening. The traversing section traverses over the opening. In a preferred embodiment, the traversing section does not traverse over the opening directly at the mouth of the opening, but is arranged at a distance to the mouth of the opening. With a hook, which has been inserted with its tip into the opening, the safety bracket can be used to limit a travel of the tip of the hook out of the opening. The safety bracket hence can be used to prevent the hook from disconnecting to the adapter. The term "beneath" is considered to describe the position of the traversing section relative to the rear section in a situation, where front section and the rear section are arranged in such a manner that the front section is arranged next to the rear section, but not immediately above or immediately below the rear section.

[0012] The safety bracket is attached to the rear section in a manner that allows the safety bracket to swivel relative to the rear section.

[0013] According to the invention, the adapter has a blocking element that limits the swivel angle of the safety bracket. The blocking element has a first part and a second part. The first part of the blocking element can be connected to the safety bracket. The second part of the safety bracket is connected to a remove clamp that is attached to either the front section or the rear section, whereby the remove clamp can be moved from a clamping position to a non-clamping position.

[0014] By way of the second part of the blocking element being attached to the remove clamp and the first part of the blocking element being attached to the safety bracket, a movement performed by the remove clamp when being moved from the clamping position into the non-clamping position can be used to move the safety bracket. In a preferred embodiment, the safety bracket is arranged with its traversing section positioned beneath the opening and traversing over the opening when the remove clamp is in the clamping position. In a preferred embodiment, the safety bracket swivels relative to the rear section when the remove clamp is moved from the clamping position to the non-clamping position. In a preferred embodiment the traversing section of the safety bracket is closer towards the front section in the non-clamping position than in the clamping position.

[0015] In a preferred embodiment the safety bracket has a first arm arranged on one side of the rear section. The first arm has a first part and a second part. The first part of the first arm is attached to the rear section. The attachment of the first part of the first arm to the rear section is provided in such a manner that it allows the second part of the first arm to swivel relative to the rear section. This can, for example be obtained by providing the first part of the first arm with a through hole and by a bolt that bolts the first part of the first arm to the rear section to pass through this through-hole, whereby the first part of the first arm is held to the rear section by way of the bolt sufficiently loosely to allow a swivel movement of the second part of the first arm relative to the rear section. In alternative embodiments, bearings, like bushes or ball bearings can be used as part of the connection of the first part of the first arm to the rear section.

[0016] In a preferred embodiment the safety bracket also has a second arm. The second arm is arranged on the opposite side of the rear section relative to that side, on which the first arm is arranged. The second arm has a first part and has a second part. The first part of the second arm is attached to the rear section. The attachment of the first part of the second arm to the rear section is provided in such a manner that it allows the second part of the second arm to swivel relative to the rear section. This can, for example be obtained by providing the first part of the second arm with a through hole and by a bolt that bolts the first part of the second arm to the rear section to pass through this through-hole, whereby the first part of the second arm is held to the rear section by way of the bolt sufficiently loosely to allow a swivel movement of the second part of the second arm relative to the rear section. In alternative embodiments, bearings, like bushes or ball bearings can be used as part of the connection of the first part of the second arm to the rear section

[0017] In a preferred embodiment, the first arm and/or the second arm are punched parts.

[0018] According to the invention, the safety bracket has a traversing section that is connected to the second part of the first arm and the second part of the second arm or is made as one-piece with the second part of the first arm and the second part of the second arm. In a preferred embodiment, the second part of the first arm includes one end of the first arm. In a preferred embodiment, the second part of the second arm includes one end of the first arm. In a preferred embodiment, the traversing section hence connects one end of the first arm with one end of the second arm. The connection between the traversing section and the second part of the first arm and/or the connection between the traversing section and the second part of the second arm can be a fixed connection, for example a connection obtained by welding or by glueing. The connection between the traversing section and the second part of the first arm and/or the connection between the traversing section and the sec-

ond part of the second arm can, however, also be a form-fit connection, for example by way of parts of the traversing section passing through openings in the second part of the first arm or the second part of the second arm. These parts can be provided with locks, for example nuts that are screwed onto external threads provided on parts on the traversing section. In the embodiment, where the traversing section is made as one-piece with the second part of the first arm and the second part of the second arm, the first arm, the second arm and the traversing section can be embodied by one single, unitary piece, for example a U-shaped or horseshoe-shaped piece.

[0019] In a preferred embodiment, the remove clamp has a traversing section that is positioned above the opening and traverses over the opening, when the remove clamp is in the clamping position. In a preferred embodiment, the traversing section has a socket that can take up the tip of the hook of a draw hook coupler. In a preferred embodiment, the traversing section has an elastic element, preferably a rubber element, whereby the socket is arranged in the elastic element. In a preferred embodiment, the rubber element is attached to a metal plate that forms part of the traversing section.

[0020] In a preferred embodiment the remove clamp has

- a first arm arranged on one side of the rear section, whereby a first part of the first arm is attached to the rear section or the front section in a manner that allows a second part of the first arm to swivel relative to the rear section and/or the front section,
- a second arm arranged on the opposite side of the rear section relative to that side, on which the first arm is arranged, whereby a first part of the second arm is attached to the rear section in a manner that allows a second part of the second arm to swivel relative to the rear section (4) and/or the front section,

the traversing section of the remove clamp being connected to the second part of the first arm and the second part of the second arm or being made as one-piece with the second part of the first arm and the second part of the second arm.

[0021] In a preferred embodiment, the blocking element connects the first arm of the safety bracket to the first arm of the remove clamp. In a preferred embodiment, the blocking element is connected to the first arm of the safety bracket in a manner that allows the blocking element to swivel relative to the first arm of the safety bracket. In a preferred embodiment, the blocking element is connected to the remove clamp in a manner that allows the blocking element to swivel relative to the remove clamp.

[0022] In a preferred embodiment a first blocking element connects the first arm of the safety bracket to the first arm of the remove clamp and a second blocking element connects the second arm of the safety bracket to the first arm of the remove clamp.

[0023] In a preferred embodiment a vertical support with a first end and a second end is provided, whereby the first end of the vertical support is attached to the front section or the rear section and the first arm of the remove clamp is attached to the second end of the vertical support in a manner that allows the first arm of the remove clamp to swivel about the second end of the vertical support.

[0024] In a preferred embodiment the second end of the vertical support is arranged lower than the first part of the first arm.

[0025] In a preferred embodiment, the vertical support extends along a longitudinal axis and the first arm of the remove clamp extends along a longitudinal axis, whereby in the clamping position, the angle between the longitudinal axis of the vertical support and the longitudinal axis of the first arm is between 15° and 120°, preferably between 20° and 100°, preferably between 40° and 80°. In a preferred embodiment, the angle between the longitudinal axis of the vertical support and the longitudinal axis of the first arm in the non-clamping position is smaller than the angle between the longitudinal axis of the vertical support and the longitudinal axis of the first arm in the clamping position.

[0026] In a preferred embodiment, the blocking element extends along a longitudinal axis and the first arm of the remove clamp extends along a longitudinal axis, whereby in the clamping position, the angle between the longitudinal axis of the blocking element and the longitudinal axis of the first arm is between 15° and 120°, preferably between 20° and 100°, preferably between 40° and 80°. In a preferred embodiment, the angle between the longitudinal axis of the blocking element and the longitudinal axis of the first arm in the non-clamping position is larger than the angle between the longitudinal axis of the blocking and the longitudinal axis of the first arm in the clamping position.

[0027] In a preferred embodiment, the vertical support contains a coil spring, the coil spring allowing the first end and the second end of the vertical support to move towards each other under application of a force.

[0028] In a preferred embodiment, the rear section has a first plate and has a second plate that is arranged parallel to the first plate. The first plate and/or the second plate do not need to be plane plates. It is feasible that the first plate and/or the second plate have steps, creases, kinks or bends. For example, a design is feasible, where the first plate and the second plate are connected directly to each other at a first end and then each have a bend section, which allows a mouth to be provided by the first plate and the second plate. Such an arrangement would still be considered to have the second plate arranged parallel to the first plate.

[0029] In a preferred embodiment, the first plate and/or the second plate has a rear end and the rear end preferably has a rounded end and not a rectangular shaped end.

[0030] In a preferred embodiment, a bolt passes be-

tween the first plate and the second plate. The bolt preferably is fixedly attached to the first plate and/or the second plate. The bolt can be of such a shape that it can be inserted into the mouth of the hook of the draw hook coupler.

[0031] In a preferred embodiment, a surface section of the first plate delimits the opening. In a preferred embodiment, a surface section of the second plate delimits the opening. In a preferred embodiment a surface section of the bolt delimits the opening.

[0032] In a preferred embodiment, the opening is delimited completely by a surface section of the first plate, a surface section of the second plate and a surface section of the bolt. This can be obtained by having the first plate being directly connected to the second plate, for example at a location opposite the location, where the bolt passes between the first plate and the second plate. In an alternative preferred embodiment, the opening is delimited completely by a surface section of the first plate, a surface section of the second plate, a surface section of the bolt and a surface section of an intermediate element arranged between the first plate and the second plate opposite to the location where the bolt is arranged.

[0033] In a preferred embodiment, the first arm is attached to the first plate. In a preferred embodiment, the second arm is attached to the second plate.

[0034] The system according to the invention has an adapter according to the invention and has a draw hook coupler, whereby the tip of the hook of the draw hook coupler has been inserted into the opening of the adapter.

[0035] In a preferred embodiment, the traversing section of the safety bracket is arranged beneath the hook of the draw hook coupler.

[0036] In a preferred embodiment the traversing section of the remove clamp sits on the tip of the hook.

[0037] The train according to the invention has a first car with a coupler of a first geometry. The train according to the invention also has a second car with a draw hook coupler. According to the invention, the train is provided with an adapter according to the invention, whereby the tip of the hook of the draw hook coupler has been inserted into the opening of the adapter and the interface of the adapter has been coupled to the coupler.

[0038] In a preferred embodiment, the car of the train that has a draw hook coupler is a shunting locomotive.

[0039] According to the method of the invention in a first step the tip of the hook of the draw hook coupler is inserted into the opening and in a second step the remove clamp is moved from the non-clamping position, where the traversing section of the remove clamp does not sit on the tip of the hook, to the clamping position, where the traversing section of the remove clamp sits on the tip of the hook, whereby the movement of the remove clamp from the non-clamping position to the clamping position leads to the blocking element pushing the traversing section of the safety bracket beneath the opening (5) and to traverse over the opening.

[0040] Below, the invention will be described by reference to figures that only show embodiments of the invention. They show:

- Fig. 1 a perspective, schematic view onto the system according to the invention with the remove clamp in the clamping position;
- Fig. 2 a rear view onto the system according to Fig. 1;
- Fig. 3 a side view onto the system of Fig. 1;
- Fig. 4 a side view onto the system of Fig. 1, but with the remove clamp in the non-clamping position;
- Fig. 5 a top view onto a train coupler adapter as used in the system of Fig. 1 and
- Fig. 6 a sectional view of the adapter according to Fig. 5, the section being made along the line A-A in Fig. 5.

[0041] A train coupler adapter 1 for connecting a coupler of a first geometry with a draw hook coupler 100 is shown in Fig. 1 to 4 as part of the system according to the invention. The 1 has a front section 2 with an interface 3 suitable to couple with a coupler of a first geometry and a rear section 4 with an opening 5 suitable for the tip 6 of the hook 7 of the draw hook coupler 100 to be inserted into. A safety bracket 8 at the rear section 4 has a traversing section 9 that is positioned beneath the opening 5 and traverses over the opening 5. The safety bracket 8 is attached to the rear section 4 in a manner that allows the safety bracket 8 to swivel relative to the rear section 4 (Fig. 3; Fig. 4). A blocking element 16 is provided that limits the swivel angle of the safety bracket 8. The blocking element 16 has a first part 17 that is connected to the safety bracket 8 and a second part 18 that is connected to a remove clamp 30, whereby the remove clamp 30 can be moved from a clamping position (Fig. 3) to a non-clamping position (Fig. 4).

[0042] The safety bracket 8 has a first arm 10 arranged on one side of the rear section 4, whereby a first part 11 of the first arm 10 is attached to the rear section 4 in a manner that allows a second part 12 of the first arm 10 to swivel relative to the rear section 4. A second arm 13 of the safety bracket 8 is arranged on the opposite side of the rear section 4 relative to that side, on which the first arm 10 is arranged, whereby a first part 14 of the second arm 13 is attached to the rear section 4 in a manner that allows a second part 15 of the second arm 13 to swivel relative to the rear section 4. The traversing section 9 is made as one-piece with the second part 12 of the first arm 10 and the second part 15 of the second arm 13. The first arm 10 the second arm 13 and the traversing section 9 form a u- or horseshoe-shaped piece.

[0043] The remove clamp 30 has a traversing section 31 that is positioned above the opening 5 and traverses over the opening 5, when the remove clamp 30 is in the clamping position (Fig. 3).

[0044] The remove clamp 30 has a first arm 32 arranged on one side of the rear section 4 whereby a first part 33 of the first arm 32 is attached to the rear section 4 or the front section 2 in a manner that allows a second

part 34 of the first arm 32 to swivel relative to the rear section 4 and/or the front section 2. A second arm 35 of the remove clamp 30 is arranged on the opposite side of the rear section 4 relative to that side, on which the first arm 32 is arranged, whereby a first part 36 of the second arm 35 is attached to the rear section 4 or the front section 2 in a manner that allows a second part 37 of the second arm 35 to swivel relative to the rear section and/or the front section. The traversing section 31 of the remove clamp 30 is connected to the second part 34 of the first arm 32 and the second part 37 of the second arm 35.

[0045] A first blocking element 16 connects the first arm 10 of the safety bracket 8 to the first arm 32 of the remove clamp 30 and a second blocking element 16 connects the second arm 13 of the safety bracket 8 to the first arm 35 of the remove clamp 30.

[0046] A vertical support 40 in the form a coil spring with a first end 41 and a second end 42 is provided, whereby the first end 41 of the vertical support 40 is attached to the front section 2 and the first arm 32 of the remove clamp 30 is attached to the second end 42 of the vertical support 40 in a manner that allows the first arm 32 of the remove clamp 30 to swivel about the second end 42 of the vertical support 40. The second end 42 of the vertical support 40 is arranged lower than the first part 33 of the first arm 32.

[0047] As can be seen from Fig. 3 the vertical support 40 extends along a longitudinal axis and the first arm 32 of the remove clamp 30 extends along a longitudinal axis, whereby in the clamping position, the angle between the longitudinal axis of the vertical support 40 and the longitudinal axis of the first arm 32 is approx. 60°. As can be seen in the comparison of Fig. 3 and Fig. 4 the angle between the longitudinal axis of the vertical support 40 and the longitudinal axis of the first arm 32 in the non-clamping position (Fig. 4) is smaller than the angle between the longitudinal axis of the vertical support and the longitudinal axis of the first arm in the clamping position (Fig. 3).

[0048] As can be seen from Fig. 3 the blocking element 16 extends along a longitudinal axis and the first arm 32 of the remove clamp 30 extends along a longitudinal axis, whereby in the clamping position, the angle between the longitudinal axis of the blocking element 16 and the longitudinal axis of the first arm 32 is approx. 90°. As can be seen in the comparison of Fig. 3 and Fig. 4 the angle between the longitudinal axis of the blocking element 16 and the longitudinal axis of the first arm 32 in the non-clamping position (Fig. 4) is larger than the angle between the longitudinal axis of the blocking 116 and the longitudinal axis of the first arm 32 in the clamping position (Fig. 3).

[0049] The rear section 4 has a first plate 20 and a second plate 21 that is arranged parallel to the first plate 20. A bolt 22 passes between the first plate 20 and the second plate 21. A surface section of the first plate 20 delimits the opening 5. A surface section of the second plate 21 delimits the opening 5 and a surface section of the bolt 22 delimits the opening 5. The opening 5 is also delimited by a surface section of an intermediate element 23 arranged between the first plate 20 and the second plate 21.

[0050] The first arm 10 is attached to the first plate 20. The second arm 11 is attached to the second plate 21.

[0051] An elastic element of the traversing section 31 in form of a rubber element 38 has a recess to receive the tip 6 of the hook 7.

[0052] According to the method of the invention in a first step the tip (6) of the hook (7) of the draw hook coupler (100) is inserted into the opening (5) (Fig. 4) and in a second step the remove clamp (30) is moved from the non-clamping position (Fig. 4), where the traversing section (31) of the remove clamp (30) does not sit on the tip (6) of the hook (7), to the clamping position (Fig. 3), where the traversing section (31) of the remove clamp (30) sits on the tip (6) of the hook (7), whereby the movement of the remove clamp (30) from the non-clamping position to the clamping position leads to the blocking element (16) pushing the traversing section (9) of the safety bracket (8) beneath the opening (5) and to traverse over the opening (5).

Claims

1. Train coupler adapter (1) for connecting a coupler of a first geometry with a draw hook coupler (100), whereby the adapter (1) has

   - a front section (2) with an interface (3) suitable to couple with a coupler of a first geometry,
   - a rear section (4) with an opening (5) suitable for the tip (6) of the hook (7) of the draw hook coupler (100) to be inserted into,
   - a safety bracket (8) at the rear section (4) that has a traversing section (9 that is positioned beneath the opening (5) and traverses over the opening (5),

   characterized in that
   the safety bracket (8) is attached to the rear section (4) in a manner that allows the safety bracket (8) to swivel relative to the rear section (4),
   whereby a blocking element (16) is provided that limits the swivel angle of the safety bracket (8), whereby the blocking element (16) has

   - a first part (17) that is connected to the safety bracket (8) and
   - a second part (18) that is connected to a remove clamp (30), whereby the remove clamp (30) can be moved from a clamping position to a non-clamping position.

2. Adapter according to claim 1, **characterized in that** the safety bracket (8) has

• a first arm (10) arranged on one side of the rear section (4), whereby a first part (11) of the first arm (10) is attached to the rear section (4) in a manner that allows a second part (12) of the first arm (10) to swivel relative to the rear section (4),
• a second arm (13) arranged on the opposite side of the rear section (4) relative to that side, on which the first arm (10) is arranged, whereby a first part (14) of the second arm (13) is attached to the rear section (4) in a manner that allows a second part (15) of the second arm (13) to swivel relative to the rear section (4),
• the traversing section being connected to the second part of the first arm and the second part of the second arm or being made as one-piece with the second part (12) of the first arm (10) and the second part (15) of the second arm (13).

3. Adapter according to claim 1 or 2, **characterized in that** the remove clamp (30) has a traversing section (31) that is positioned above the opening (5) and traverses over the opening (5), when the remove clamp (30) is in the clamping position.

4. Adapter according to any one of claims 1 to 3, **characterized in that** the remove clamp (30) has

• a first arm (32) arranged on one side of the rear section (4), whereby a first part (33) of the first arm (32) is attached to the rear section (4) or the front section (2) in a manner that allows a second part (34) of the first arm (32) to swivel relative to the rear section (4) and/or the front section (2),
• a second arm (35) arranged on the opposite side of the rear section (4) relative to that side, on which the first arm (32) is arranged, whereby a first part (36) of the second arm (35) is attached to the rear section (4) or the front section (2) in a manner that allows a second part (37) of the second arm (35) to swivel relative to the rear section (4) and/or the front section (2),
• the traversing section (31) of the remove clamp (30) being connected to the second part (34) of the first arm (32) and the second part (37) of the second arm (35) or being made as one-piece with the second part of the first arm and the second part of the second arm.

5. Adapter according to claim 4, **characterized in that**

• the blocking element (16) connects the first arm (10) of the safety bracket (8) to the first arm (32) of the remove clamp (30) or
• the blocking element connects the second arm of the safety bracket to the second arm of the remove clamp.

6. Adapter according to claim 4, **characterized in that**

• a first blocking element connects the first arm of the safety bracket to the first arm of the remove clamp and
• a second blocking element connects the second arm of the safety bracket to the second arm of the remove clamp.

7. Adapter according to any one of claims 4 to 6, **characterized in that** a vertical support (40) with a first end (41) and a second end (42) is provided, whereby the first end (41) of the vertical support (40) is attached to the front section (2) or the rear section (4) and the first arm (32) of the remove clamp (30) is attached to the second end (42) of the vertical support (40) in a manner that allows the first arm (32) of the remove clamp (30) to swivel about the second end (42) of the vertical support (40).

8. Adapter according to claim 7, **characterized in that** the second end (42) of the vertical support (40) is arranged lower than the first part (11) of the first arm (10) of the safety bracket (8).

9. System of an adapter according to any one of claims 1 to 8 and a draw hook coupler (100), whereby the tip (6) of the hook (7) of the draw hook coupler (100) has been inserted into the opening (5) of the adapter (1) and the traversing section (31) of the remove clamp (30) sits on the tip (6) of the hook (7).

10. Train with a first car with a coupler of a first geometry and a second car with a draw hook coupler, **characterized in that** an adapter (1) according to any one of claims 1 to 8 is provided, whereby the tip (6) of the hook (7) of the draw hook coupler (100) has been inserted into the opening (5) of the adapter (1) and the interface (3) of the adapter (1) has been coupled to the coupler.

11. Method for connecting an adapter according to any one of claims 1 to 8 with a hook (7) of a draw hook coupler (100), whereby in a first step the tip (6) of the hook (7) of the draw hook coupler (100) is inserted into the opening (5) and in a second step the remove clamp (30) is moved from the non-clamping position, where the traversing section (31) of the remove clamp (30) does not sit on the tip (6) of the hook (7), to the clamping position, where the traversing section (31) of the remove clamp (30) sits on the tip (6) of the hook (7), whereby the movement of the remove clamp (30) from the non-clamping position to the clamping position leads to the blocking element (16) pushing the traversing section (9) of the safety bracket (8) beneath the opening (5) and to traverse over the opening (5).

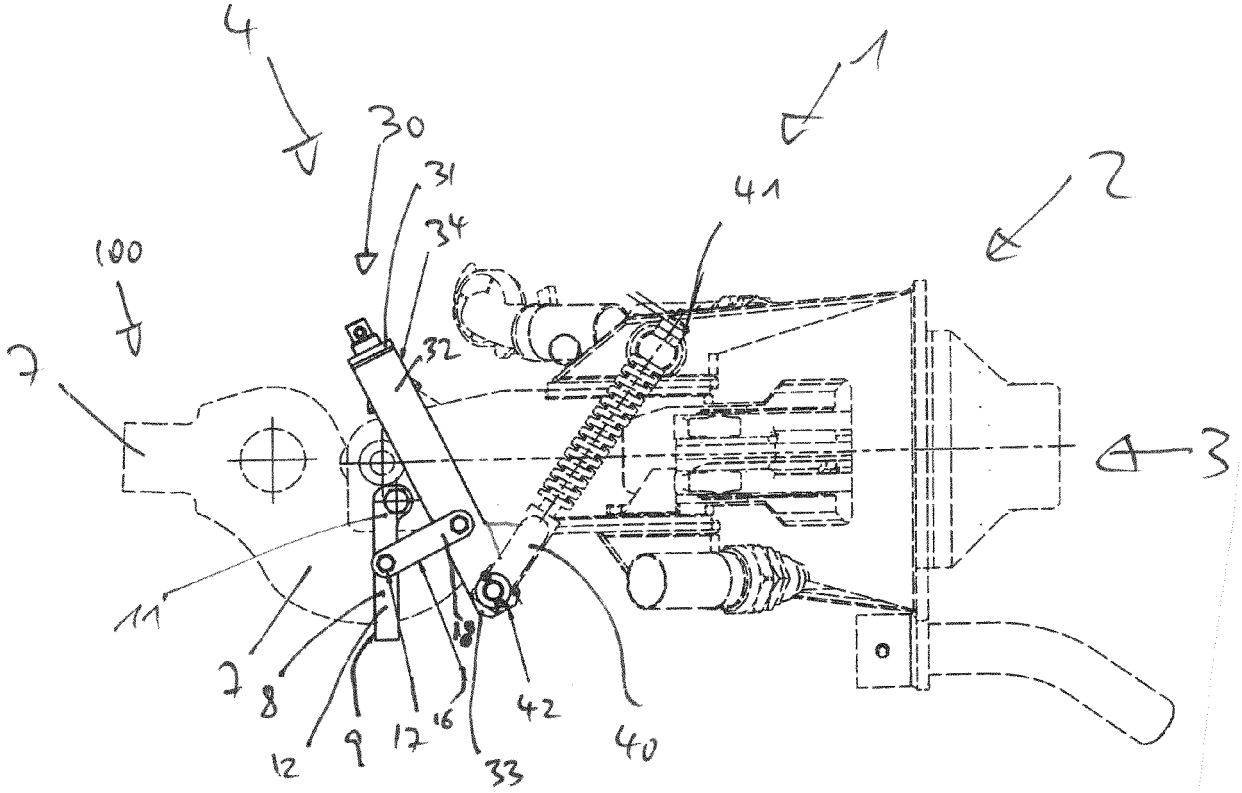
4
30
31
34
41
1
2
100
7
32
3
11
8
9
12
17
16
18
33
42
40

Fig. 3

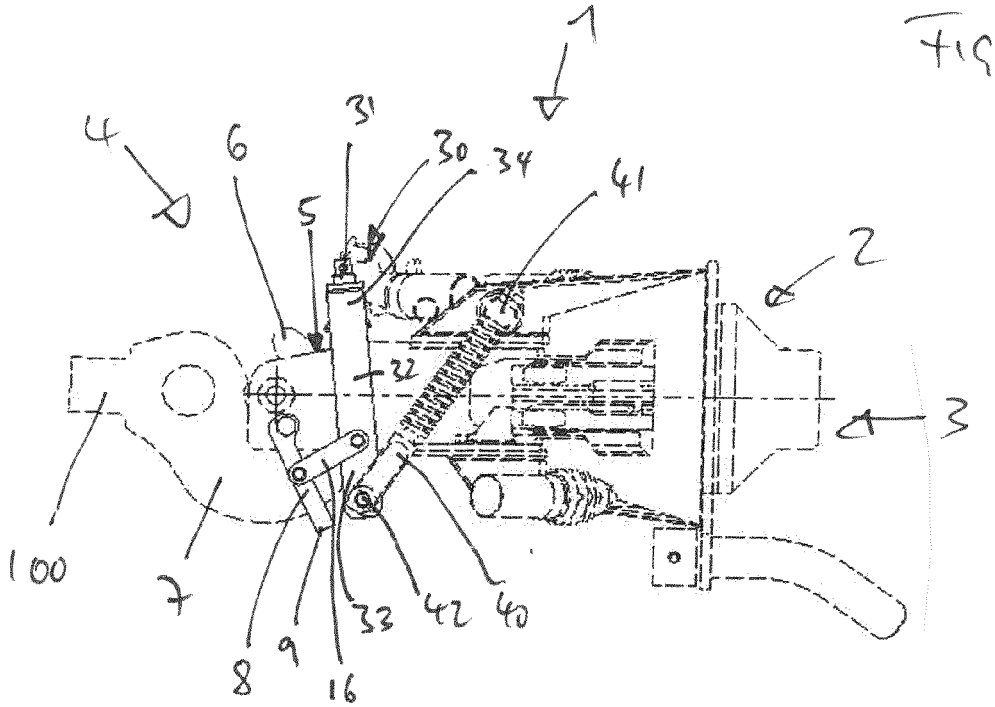
1
4
6
31
30
34
41
5
2
22
3
100
7
8
9
16
33
42
40

Fig. 4

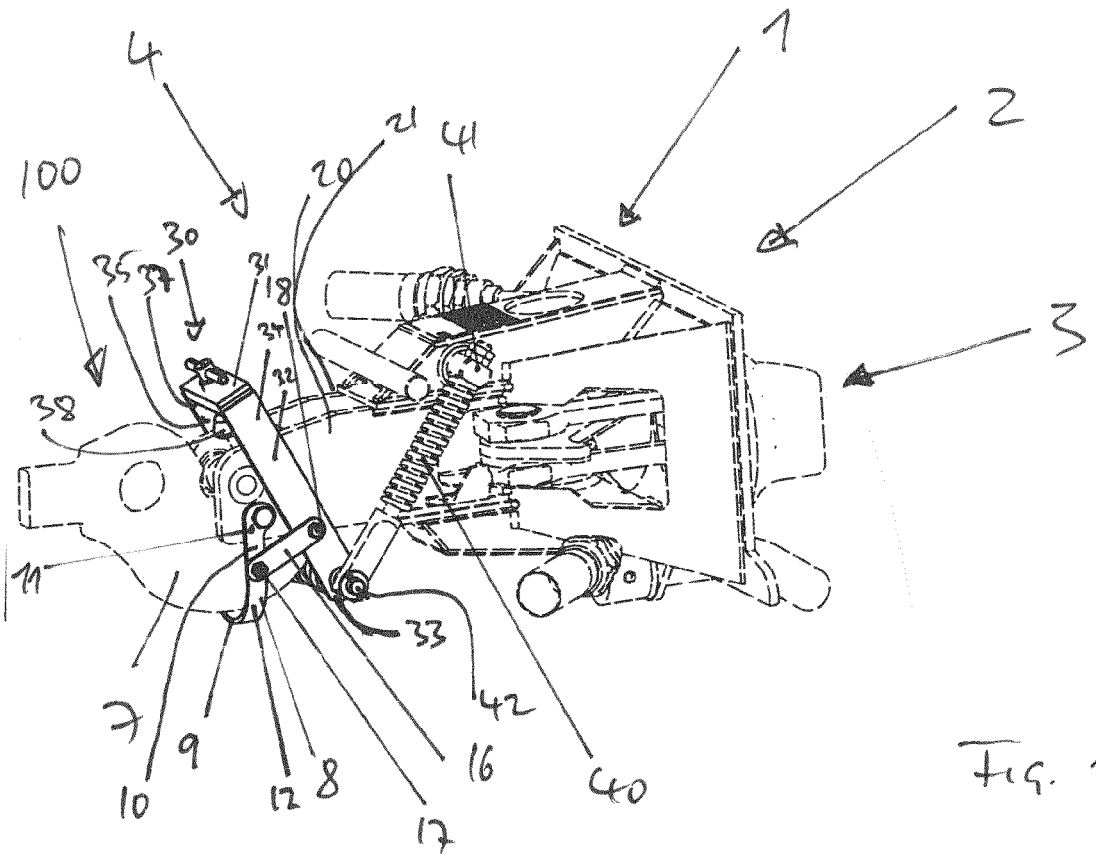
4
1
2
3
100
21
20
41
30
35
37
31
18
34
32
38
11
33
42
7
9
16
40
10
12
8
17

Fig. 1

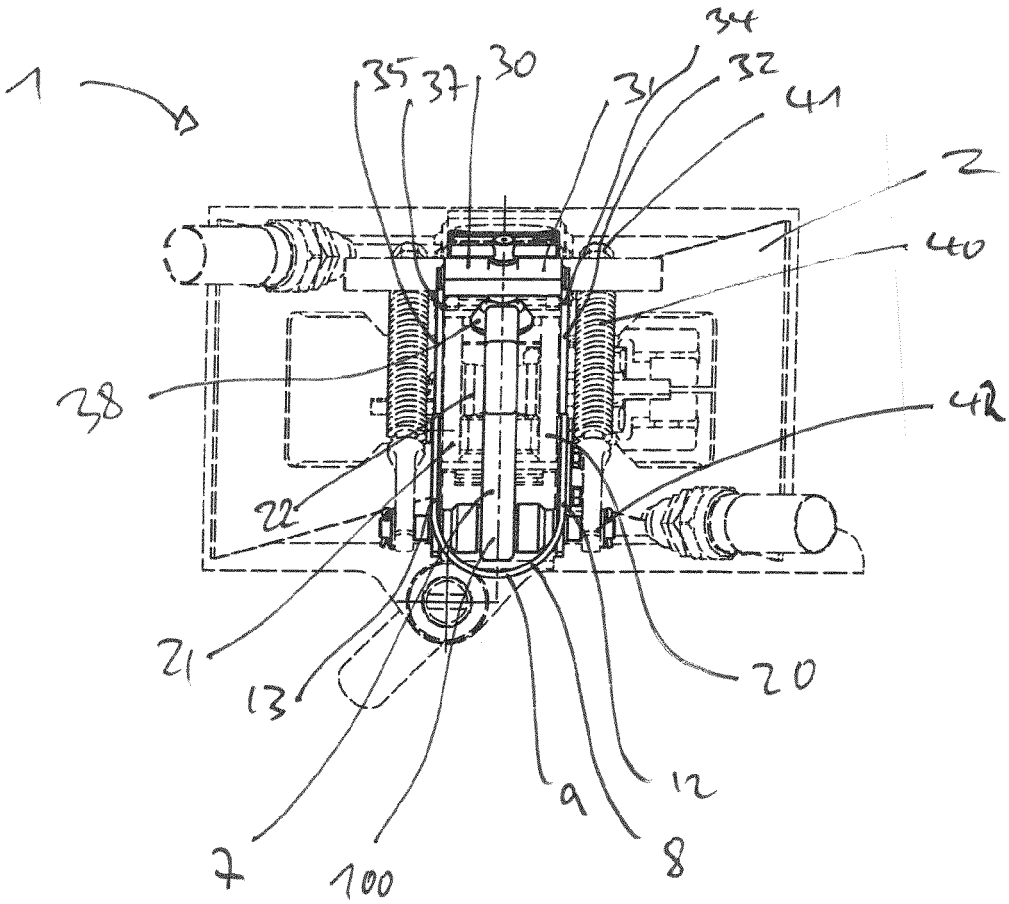
1
34
35
37
30
31
32
41
2
40
38
42
22
21
13
20
9
12
7
100
8

Fig. 2

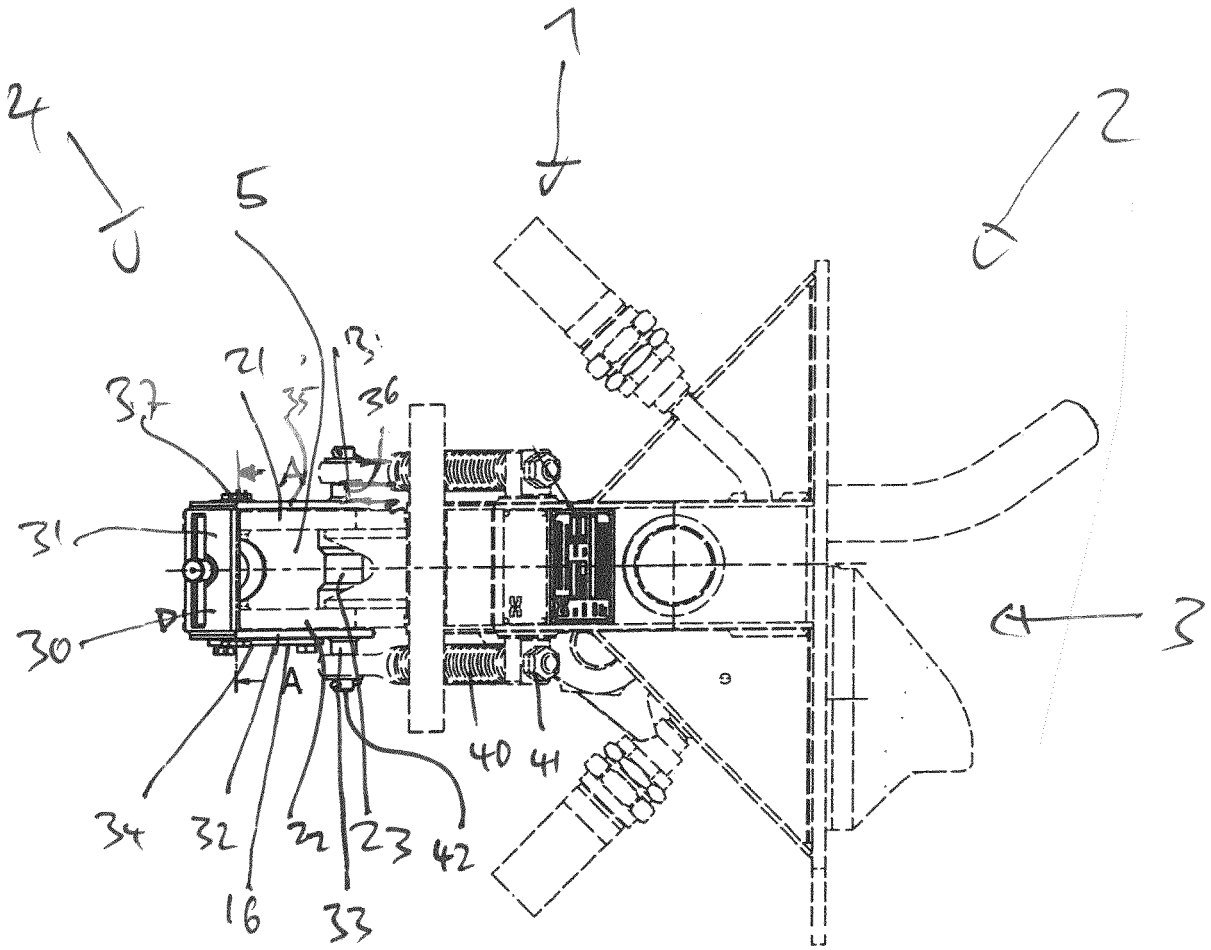
1
2
3
4
5
21
22
30
31
32
33
34
35
36
37
40
41
42
A
A

FIG. 5

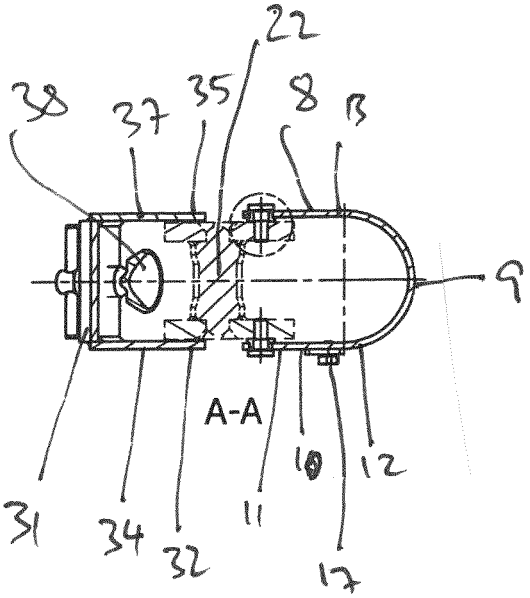
22
38
37
35
8
13
9
A-A
31
34
32
11
10
17
12

FIG. 6

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 15 0558

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 2 384 948 A1 (VOITH PATENT GMBH [DE]) 9 November 2011 (2011-11-09) * figures 3, 4 *	1-11	INV. B61G5/04 B61G1/36
A,D	WO 2015/162122 A1 (VOITH PATENT GMBH [DE]) 29 October 2015 (2015-10-29) * figure 1 *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)

B61G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 May 2021	Crama, Yves

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 15 0558

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-05-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2384948 A1	09-11-2011	CN 102233883 A	09-11-2011
		DK 2384948 T3	28-01-2013
		EP 2384948 A1	09-11-2011
		ES 2400381 T3	09-04-2013
		PL 2384948 T3	31-05-2013
		SI 2384948 T1	30-04-2013
		US 2011274480 A1	10-11-2011
WO 2015162122 A1	29-10-2015	DE 102014207689 A1	29-10-2015
		WO 2015162122 A1	29-10-2015

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 2384948 A1 **[0002]**
- WO 2015162122 A1 **[0002]**