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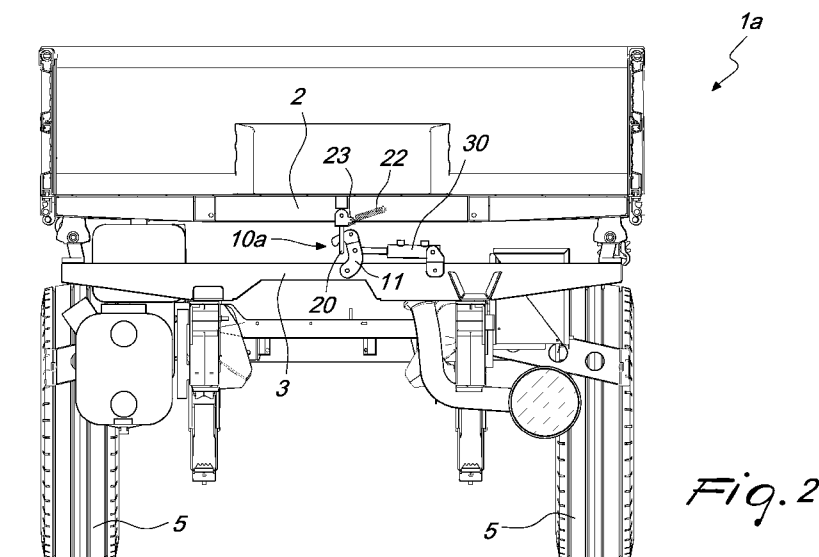
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(54) Title: TIPPING BODY FOR VEHICLES IN GENERAL WITH SAFETY MEANS



(57) Abstract: A tipping body (1a, 1b) for vehicles in general with safety means, which comprises a tipping bed (2) associated with the chassis (3) of a vehicle by way of pivoting means for the tipping of the bed (2), comprising, in a point that is spaced from the pivoting means, means (10a, 10b) for the removable locking of the tipping, which can be inserted automatically when the bed (2) is lowered onto the chassis (3).

TIPPING BODY FOR VEHICLES IN GENERAL WITH SAFETY MEANS

Technical field

The present invention relates to a tipping body for vehicles in general
5 with safety means.

Background art

As is known, a problem currently encountered with tipping bodies is the one related to safety, in order to prevent the body from accidentally tipping due to a load that is not perfectly balanced and/or fixed or due to
10 issues of construction geometry and/or simply due to insufficient weight.

With the solutions of the background art, motor vehicles provided with a tipping body are in fact generally used in a multifunctional manner to transport loose material, such as sand, grass, inert materials and the like, which require the body to tip, and to transport material that cannot be
15 tipped, including mobile equipment loaded by means of adapted ramps.

During the ascent or descent of materials and means performed by way of ramps or the like, the body can rise unexpectedly from its normal inactive position, creating a severe danger situation.

The same dynamics can be observed during normal starting of the
20 motor vehicle from a standstill with a load having an elevated and rearward center of gravity, such as for example the transport of boards for the building field and an insufficient fixing of the goods to the chassis of the motor vehicle, and therefore a self-tipping of the body occurs, particularly with a sudden start from a standstill, or on an uphill road.

Obviously, all these uncontrolled body tipping situations are the
25 source of very severe dangers both for the operator and for nearby people, with consequences that in some cases can be disastrous.

In order to try to obviate these problems, especially in bodies with three-side tipping, bolts are used which can lock the rotation of the body by
30 way of the manual insertion of a bolt.

This solution is certainly valid from a theoretical viewpoint but in practice has proved to be scarcely satisfactory, because the operator frequently forgets to insert the bolt, or another source of danger possibly arises from the fact that the operator performs inadvertently the tipping
5 operations with the bolt in the locking position, thus possibly causing damage to the motor vehicle and to the means intended for tipping.

Disclosure of the Invention

The aim of the invention is to solve the problems cited above, by providing a tipping body for vehicles in general, with safety means, which
10 allows to always have a situation of safe locking of the body in the lowered position, without entailing risks due to forgetfulness in actuation or due to incorrect actuation.

Within this aim, an object of the invention is to provide a tipping body in which it is possible to perform traditional tipping operations yet act
15 always in conditions of maximum safety.

Another object of the present invention is to provide a tipping body that thanks to its particular constructive features is capable of giving the greatest assurances of reliability and safety in use.

Another object of the present invention is to provide a tipping body
20 that can be obtained easily starting from elements and materials commonly available on the market and is further competitive from a merely economic standpoint.

This aim and these and other objects that will become better apparent hereinafter are achieved by a tipping body for vehicles in general with
25 safety means, according to the invention, comprising a tipping bed which is associated with the chassis of a vehicle by way of pivoting means for the tipping of said bed, characterized in that it comprises, in a point that is spaced from said pivoting means, means for the removable locking of said tipping, which can be inserted automatically when said bed is lowered onto
30 said chassis.

Brief description of the drawings

Further characteristics and advantages will become better apparent from the description of a preferred but not exclusive embodiment of a tipping body for vehicles in general with safety means, illustrated by way of
5 non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic side elevation view of the chassis of a vehicle with tipping body according to the invention;

Figure 2 is a sectional view of the body shown in Figure 1, taken along the line II-II of Figure 1;

10 Figure 3 is an enlarged-scale view of a detail of the removable locking means with the corresponding circuit for actuating the body shown in Figure 2;

Figure 4 is an enlarged-scale view of a detail of the removable locking means shown in Figure 2 during the step for uncoupling said
15 removable locking means to tip the body;

Figure 5 is an enlarged-scale view of a detail of the removable locking means shown in Figure 2 during the final step of the lowering of the body;

Figure 6 is an enlarged-scale view of a detail of the removable
20 locking means shown in Figure 2 during the step of automatic coupling of the removable locking means at the end of the lowering of the body;

Figure 7 is a sectional view of a variation of the body shown in Figure 1, taken along the line II-II of Figure 1;

Figure 8 is an enlarged-scale view of a detail of the removable
25 locking means with the corresponding circuit for actuating the body shown in Figure 7;

Figures 9 and 10 are two enlarged-scale views of details of the removable locking means shown in Figure 7 during the step for uncoupling said removable locking means to tip the body;

30 Figures 11 and 12 are two enlarged-scale views of details of the

removable locking means shown in Figure 2 during the final step of the lowering of the body;

Figure 13 is an enlarged-scale view of a detail of the removable locking means shown in Figure 7 during the step of automatic coupling of the removable locking means at the end of the lowering of the body;

Figures 14 to 16 are views of three possible actuation circuits of the body shown in the preceding figures.

Ways of carrying out the invention

With reference to the figures, the tipping body for vehicles in general with safety means, generally designated by the reference numerals 1a and 1b in its two embodiments, comprises a tipping bed 2, which in a per se known manner is associated with the chassis 3 of a vehicle 4, which can be shaped in any way and is referenced only by the wheels 5 in the drawings.

The bed 2 is connected to the chassis 3 by way of pivoting means, which are of a per se known type, and therefore are not described in detail, and allow to tip the bed with respect to the chassis.

The peculiarity of the invention resides in that in a point that is spaced from the pivoting means of the bed 2 means for removable locking of the tipping are provided, which are generally designated by the reference numerals 10a and 10b in the two proposed embodiments.

Advantageously, the means 10a and 10b for removable locking of the tipping have the peculiarity that they engage automatically when the bed 2 is lowered onto the chassis 3 and are disengaged before the lifting piston is actuated.

In greater detail, with particular reference to Figures 2 to 6, the removable locking means 10a comprise a locking hook 11, which is hinged at 12 to the chassis 3 and has an upper hook-like portion with an outside curve 14 which, in the locking position, is inclined downwardly.

A coupling ring 20 is provided correspondingly on the bed 2 and is pivoted at 21 to the bed 2 and retained in a stable position by means of a

return spring 22, which acts between the bed 2 and a protrusion 23 which is connected to the base of the coupling ring 20.

The hook 11 is connected to a release cylinder 30, which is controlled by a sequential valve 31a, which is arranged on a circuit 32a that has a hydraulic pump 33a for introducing a pressurized fluid whose circulation is controlled by a control system 34a for operating the lifting, which is located on the duct 32a upstream with respect to the sequential valve 31a downstream of which the single-action lifting piston of the bed 2, generally designated by the reference numeral 35, is arranged.

With the described arrangement, when the control system 34a is actuated, the release cylinder 30 is actuated preliminarily and disengages the hook 11 from the coupling ring 20, and then the lifting piston 35 is actuated and can act on the bed 2 for its tipping in extreme safety, with the assurance of uncoupling with possibility of free rotation.

During the lowering of the bed 2, as shown in Figures 5 and 6, the hook 11 has returned to its inactive position, by way of the spring of the cylinder 30, and the ring 20, during the lowering of the bed 2, engages with its inclined outside curve, oscillating in contrast with the return action applied by the return spring 22, so that the coupling ring 20 can move beyond the hook 11 and then couple automatically with it by way of the elastic return applied by the return spring 22, thus achieving the automatic locking of the body when it is lowered onto the chassis 3 of the vehicle.

As regards the embodiment shown in Figures 7 to 13, the removable locking means 10b comprise a locking hook 41, which is integral with the bed 2 and has a hook-shaped upper portion with an outer curve 42 which is inclined downwardly.

A coupling element 43 is provided correspondingly on the chassis 3 and is pivoted at 44 to the chassis 3 and retained in a stable position by means of a return spring 45, which acts between the bed 2 and a protrusion 46 that is connected to the base of the coupling element 43.

The coupling element 43 is associated with a release cylinder 47, controlled by a sequential valve 31b, which is arranged on a circuit 32b which has a hydraulic pump 33b for introducing a pressurized fluid whose circulation is controlled by a control system 34b to actuate lifting, which is
5 arranged on the duct 32b upstream with respect to the sequential valve 31b downstream of which the single-acting lifting piston 35 of the bed 2 is arranged.

More precisely, the coupling element 43 is associated with the release cylinder 47 by means of a slider 48, which is integral with the coupling
10 element 43 and can move in a guide 49 defined in the head of the piston of the release cylinder 47.

With the described arrangement, when the control system 34b is actuated, the release cylinder 47 is actuated preliminarily and disengages the coupling element 43 from the locking hook 41, and then the lifting piston 35
15 is actuated and can act on the bed 2 to tip it in extreme safety with the assurance of uncoupling with possibility of free rotation.

During the lowering of the bed 2, as highlighted in Figures 11 to 13, the coupling element 43 has return to its inactive position, by means of the spring 50 of the release cylinder 47, and the locking hook 41, during the
20 lowering of the bed 2, engages with its inclined outside curve, causing the oscillation, in contrast with the return action applied by the return spring 45, of said coupling element 43, which can move beyond the locking hook 41 and thus couple automatically with it by way of the elastic return applied by the return spring 45, thus achieving the automatic locking of the body when
25 it is lowered onto the chassis 3 of the vehicle.

From what has been described above it can thus be seen that the invention achieves the intended aim and objects, and in particular the fact is stressed that the solutions used ensure that, even with bodies having a relatively low weight, a force is always applied which is sufficient for the
30 insertion of the locking means, since the locking coupling is provided by the

oscillation of the coupling ring in contrast with the return spring, so that the ring can initially move beyond the hook and be subsequently returned to the locking position.

Moreover, the circuit used gives assurance that upon tipping the
5 release of the hook from the ring is achieved automatically and preliminarily, followed by tipping by means of the single-acting cylinder.

It should be added to the above that a position sensor 51 is provided, which is adapted to detect the position of the coupling element 43 and which, when the coupling element 43 moves away from the locking hook
10 41, automatically engages an intermittent buzzer and activates a warning light that indicates that the body is being lifted.

During the lowering of the body, when the coupling element 43 and the locking hook 41 couple again, the position sensor 51 deactivates the buzzer and the warning lights, indicating that the body is in the lowered
15 position and in locked conditions.

Three circuits for actuating the tipping bodies 1a and 1b are disclosed with reference to Figures 14 to 16.

The first actuation circuit, generally designated by the reference numeral 100a in Figure 14, is composed of an electrical system and a
20 hydraulic system, which comprise, respectively, an electromagnet, which defines the release cylinder 30 or 47 and is connected directly to an electric switch 52a, which can be switched by an operator into the lifting position and into the descent position of the body by means of a control lever 53a, so as to move the removable locking means 10a or 10b.

25 Once the removable locking means 10a or 10b have been moved, they press on the position sensor 51, which provides sequentiality, which in this case is of the electrical type, which actuates the valve 31a or 31b, provided in this actuation circuit 100a by an electric valve connected directly to an oil tank 54 and to the lifting piston 35, which is of the hydraulic type.

30 As an alternative, the lifting piston 35 can be replaced with an electric

tipping piston 55 which is connected directly to the electric switch 52a.

The second actuation circuit, generally designated by the reference numeral 100b in Figure 15, is composed of a pneumatic system and a hydraulic system, which comprise respectively the release cylinder 30 or 47, provided by a pneumatic piston and connected directly to an air control distribution unit 52b, which can be switched by an operator to the lifting position and to the descent position of the body by means of a control lever 53b, so as to move the removable locking means 10a or 10b.

Once the removable locking means 10a or 10b have been moved, they press on the position sensor 51, which provides sequentiality and in this case is provided by a valve that actuates the valve 31a or 31b, which is provided in this actuation circuit 100b by a hydraulic-pneumatic valve which is connected directly to an oil tank 54 and to the lifting piston 35, which is of the hydraulic type.

The third actuation circuit, generally designated by the reference numeral 100c in Figure 16, is composed of a hydraulic system which comprises the release cylinder 30 or 47 provided by a hydraulic piston and is connected directly to a hydraulic control distribution unit 52c, which can be switched by an operator into the lifting position and into the lowering position of the body by means of an actuation lever 53c, so as to move the removable locking means 10a or 10b.

Once the removable locking 10a or 10b have been moved, they press on the position sensor 51, which provides sequentiality, which in this case is provided by a valve which actuates the valve 31a or 31b, which is provided, in this actuation circuit 100c, by a hydraulic valve which is connected directly to an oil tank 54 and to the lifting piston 35, which is of the hydraulic type.

This allows the automatic disengagement of the removable locking means 10a and 10b before the body rises and allows the automatic reset, in a sequential manner, of said removable locking means 10a or 10b,

maintaining their functionalities independently of the weight of the body.

The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

5 Thus, for example, the same solution idea regarding automatic release and reengagement can be used for locking and releasing vehicle-mountable equipment.

All the details may further be replaced with other technically equivalent elements.

10 In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to requirements.

The disclosures in Italian Patent Application no. MI2010A00125 1, from which this application claims priority, are incorporated herein by
15 reference.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each
20 element identified by way of example by such reference signs.

CLAIMS

1. A tipping body (1a, 1b) for vehicles in general with safety means, comprising a tipping bed (2) which is associated with a chassis (3) of a vehicle by way of pivoting means for the tipping of said bed, characterized
5 in that it comprises, in a point that is spaced from said pivoting means, means (10a, 10b) for the removable locking of said tipping, which can be inserted automatically when said bed (2) is lowered onto said chassis (3).

2. The tipping body (1a) according to claim 1, characterized in that said means (10a) for removable locking of the tipping comprise a locking
10 hook (11) which is associated with the chassis (3) of the vehicle and can engage a coupling ring (20) which is connected to said bed (2).

3. The tipping body (1a) according to one or more of the preceding claims, characterized in that it comprises a release cylinder (30) which is connected to said hook (11) for its oscillation with respect to said coupling
15 ring (20), which is actuated by a hydraulic circuit (32a) which is fed by a hydraulic pump (33a) and is provided with a sequential valve (31a) for the actuation of said locking hook (11) ahead of the actuation of the lifting piston (35) of said bed (2).

4. The tipping body (1a) according to one or more of the preceding
20 claims, characterized in that said coupling ring (20) is pivoted to said bed (2) for its oscillation in contrast with a return spring (22), which is adapted to keep it engaged with said hook (11).

5. The tipping body (1a) according to one or more of the preceding claims, characterized in that said locking hook (11) has, on the outside
25 curve (14), a portion that is inclined downwardly.

6. The tipping body (1a) according to one or more of the preceding claims, characterized in that it comprises, between said locking hook (11) and said coupling ring (20), an electrical position sensor which drives a signaling element.

30 7. The tipping body (1b) according to claim 1, characterized in that

said means (10b) for the removable locking of tipping comprise a locking hook (41), which is integral with said bed (2) and has, on the outer curve (42), a portion that is inclined downwardly.

8. The tipping body (1b) according to claim 7, characterized in that it
5 comprises a release cylinder (47), which is connected to a coupling element (43) which is pivoted to said chassis (3) for its oscillation with respect to said locking hook (41), which is actuated by a hydraulic circuit (32b) which is fed by a hydraulic pump (33b) and is provided with a sequential valve (31b) for the actuation of said coupling element (43) ahead of the actuation
10 of the lifting piston (35) of said bed (2).

9. The tipping body (1b) according to one or more of claims 7 and 8, characterized in that said coupling element (43) is pivoted to said chassis (3) for its oscillation in contrast with a return spring (45), which is adapted to keep it engaged with said locking hook (41).

15 10. The tipping body (1b) according to one or more of claims 7 to 9, characterized in that it comprises, between said locking hook (41) and said coupling element (43), a position sensor that drives a signaling element.

11. The tipping body (1b) according to one or more of claims 7 to 10, characterized in that it comprises, between said coupling element (43) and
20 said release cylinder (47), a slider (48) which is integral with said coupling element (43) and can move in a guide (49) which is formed in the head of the piston of said release cylinder (47).

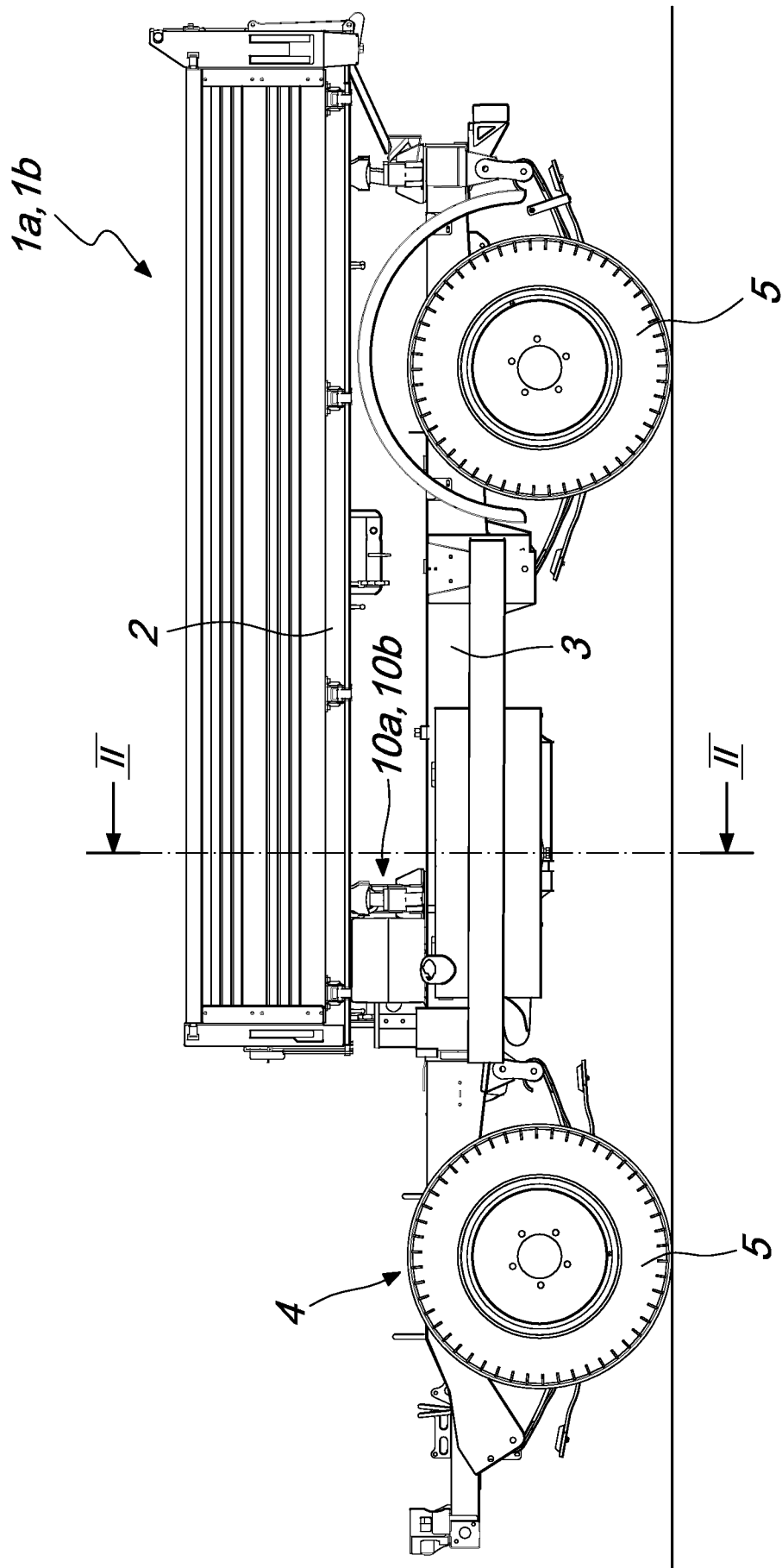
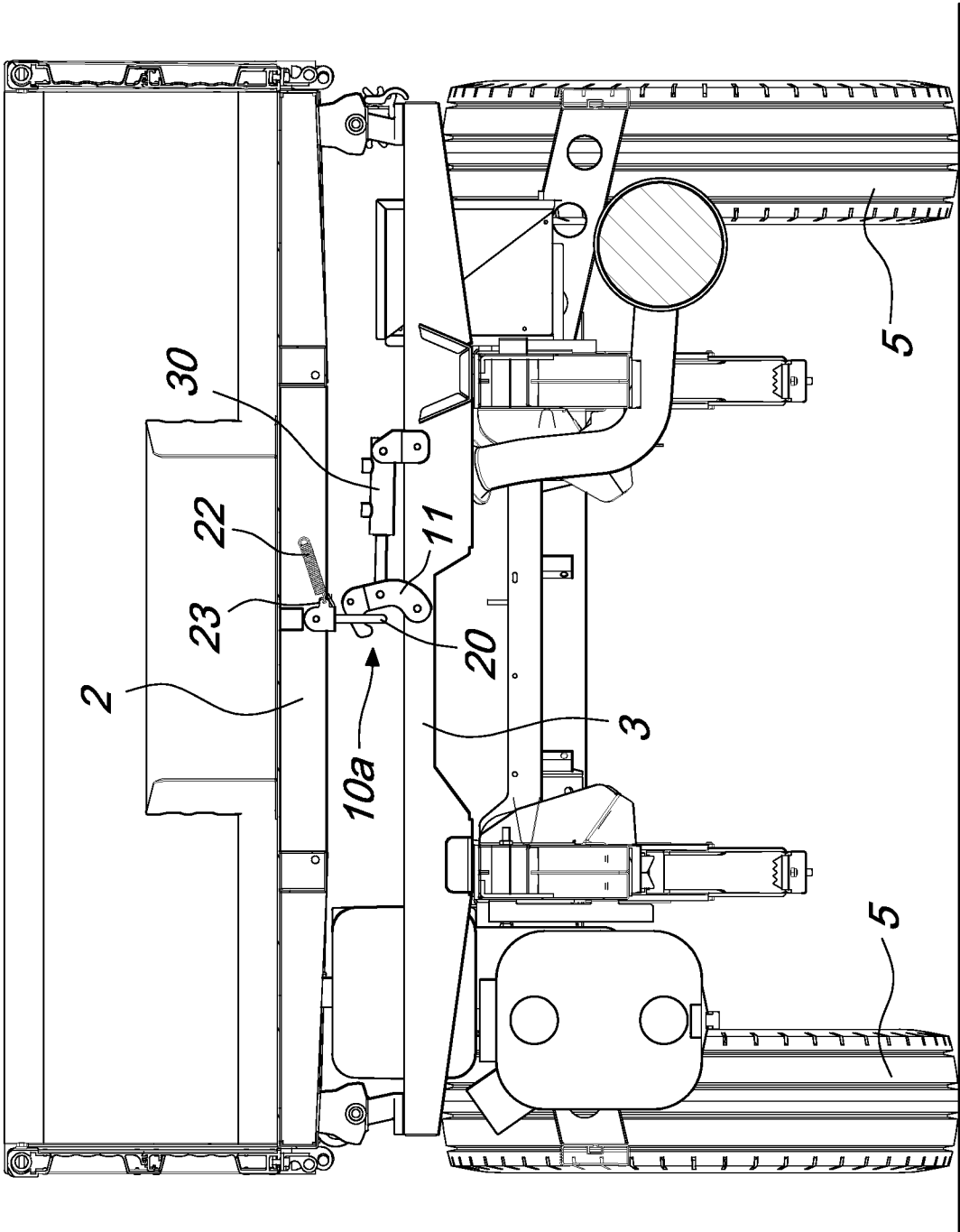


Fig. 1

1a

Fig. 2



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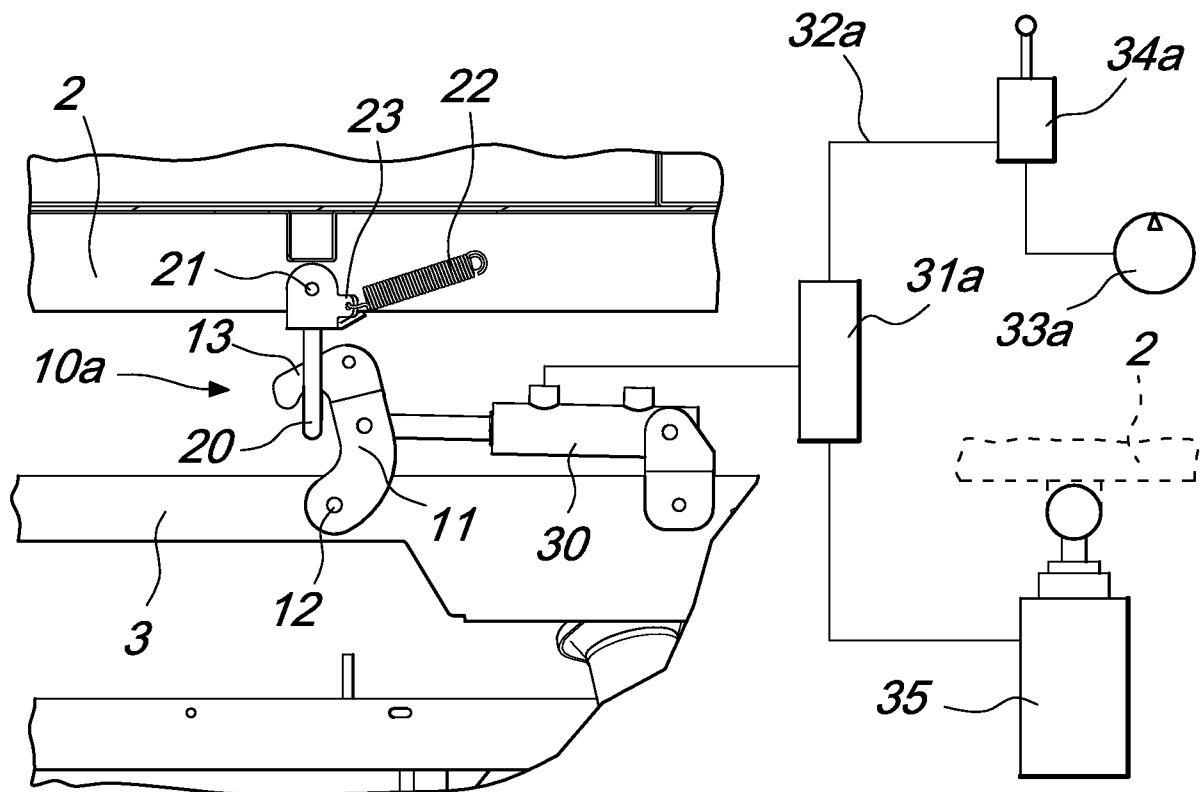


Fig. 3

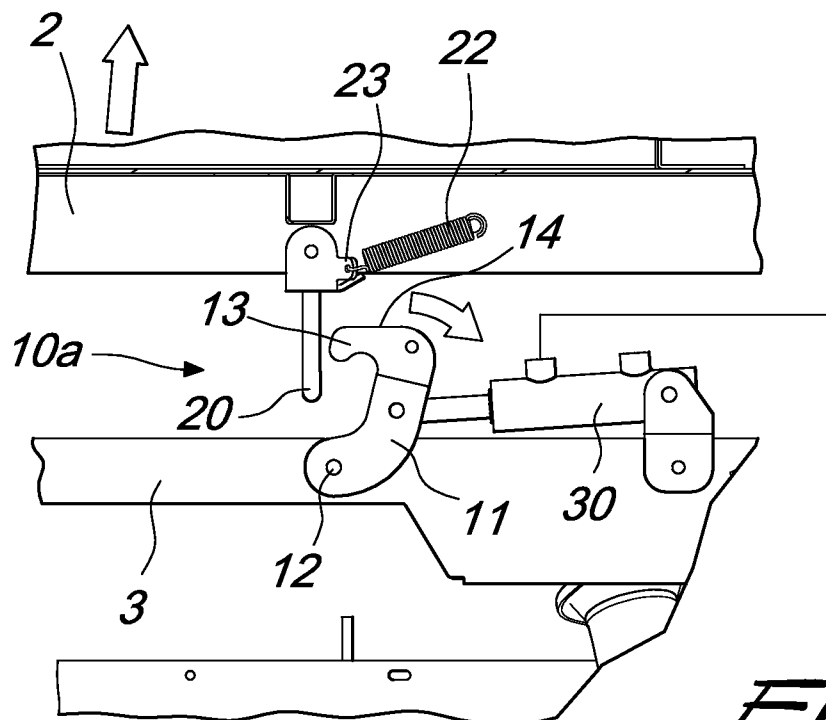


Fig. 4

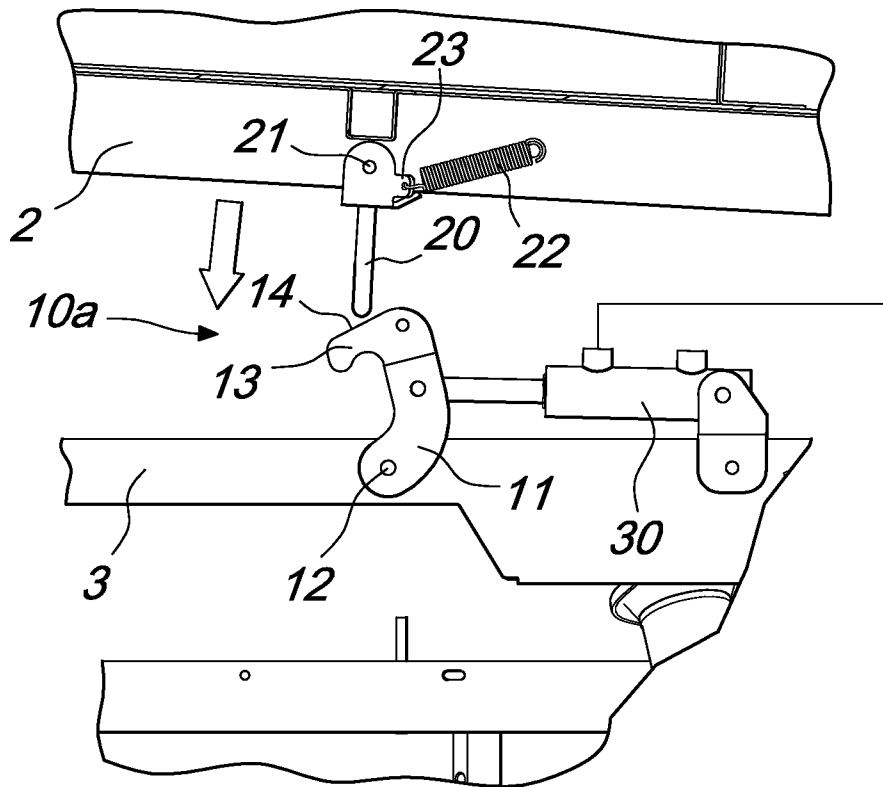


Fig. 5

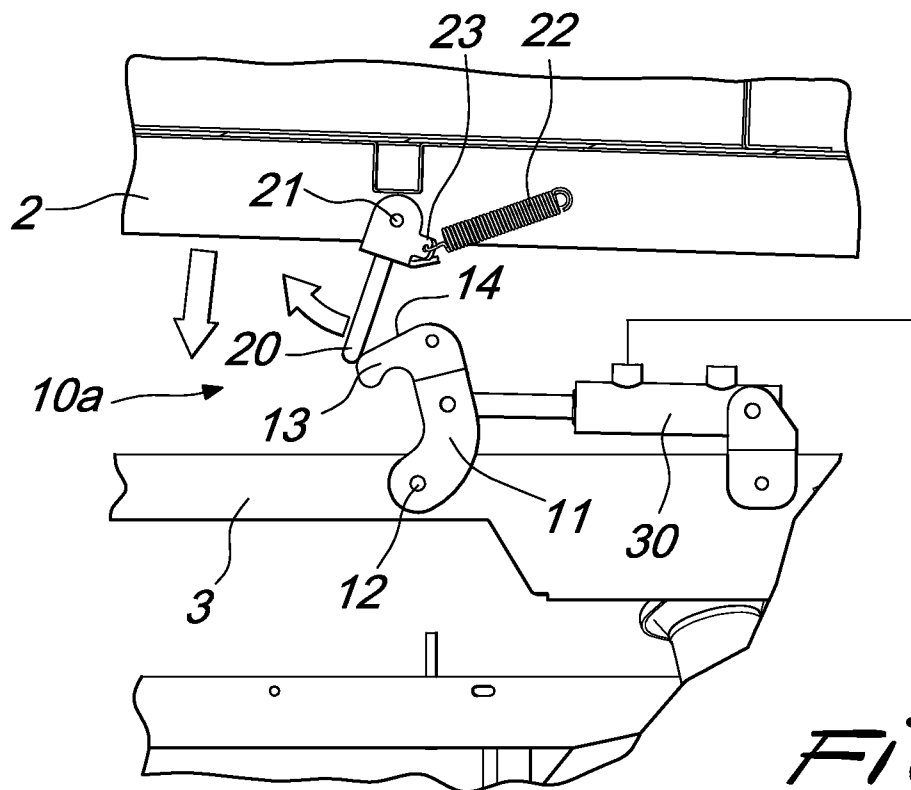
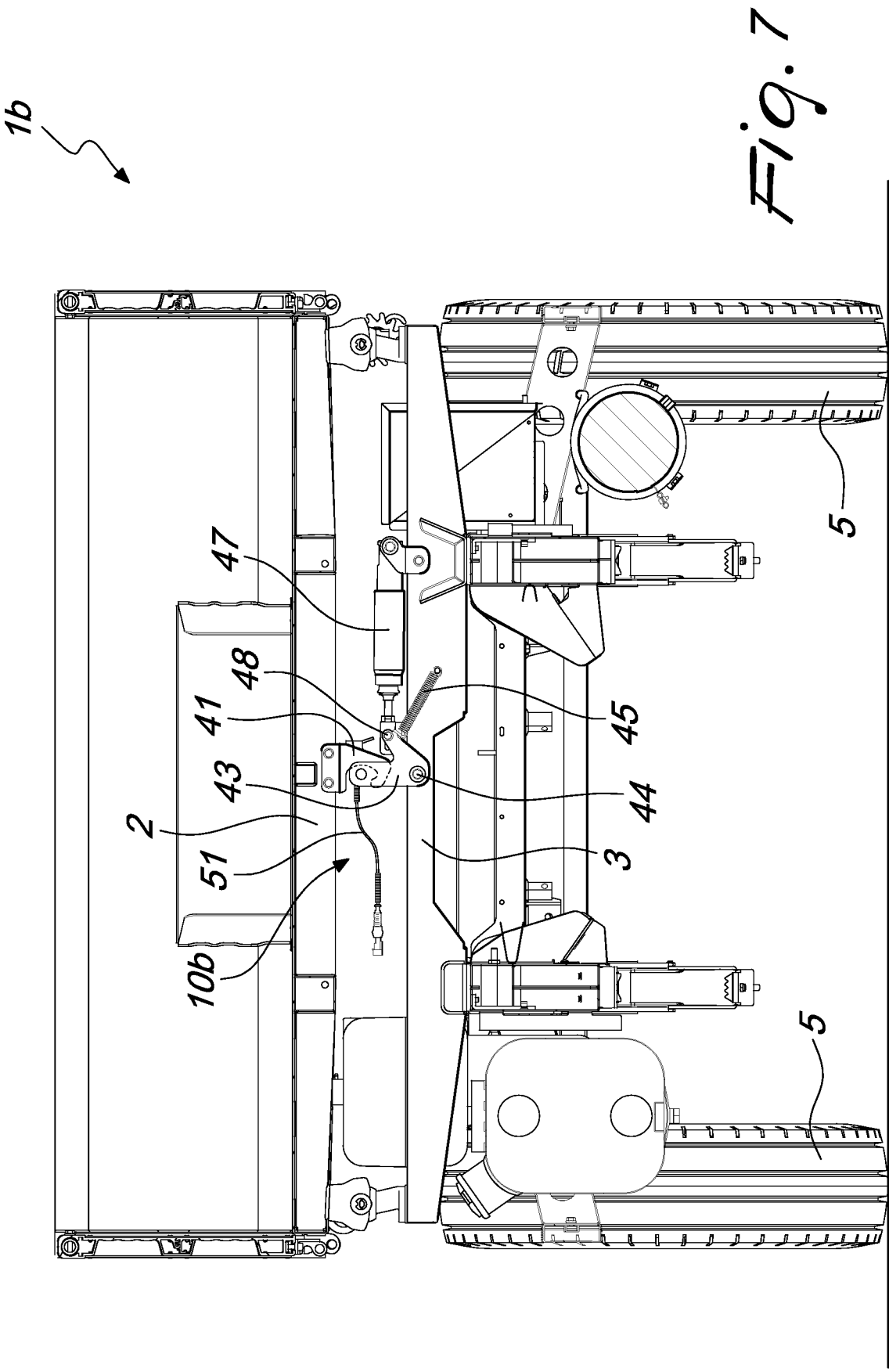
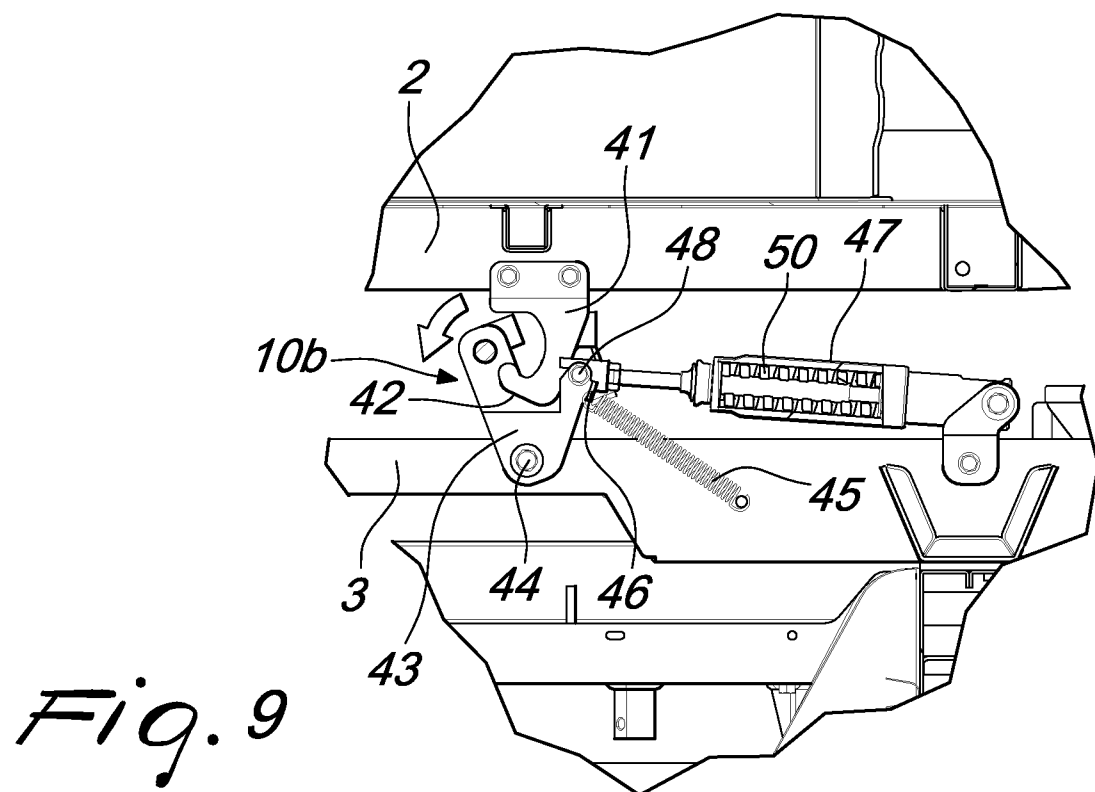
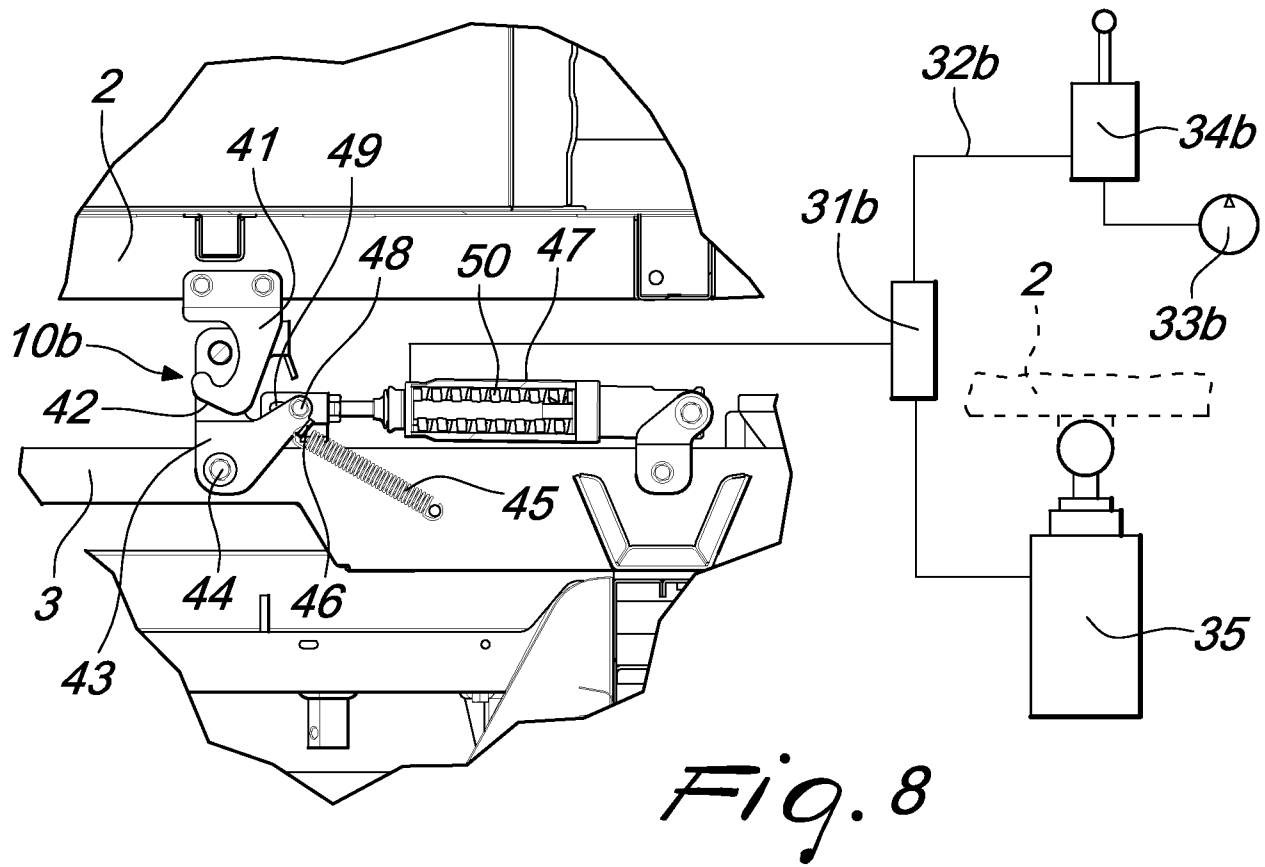


Fig. 6





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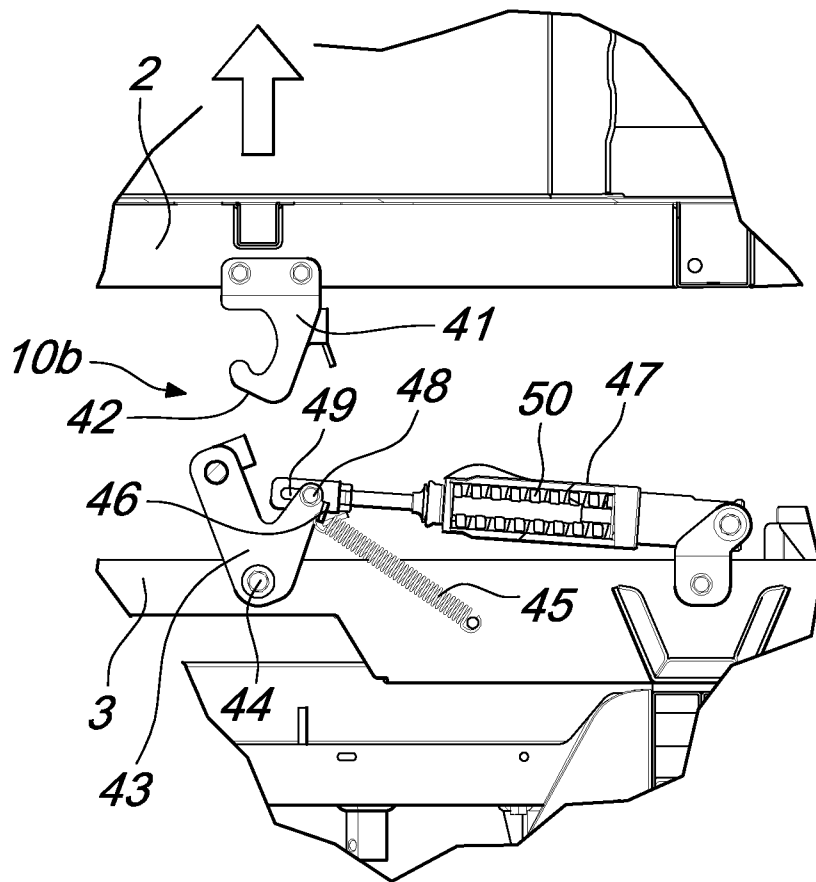


Fig. 10

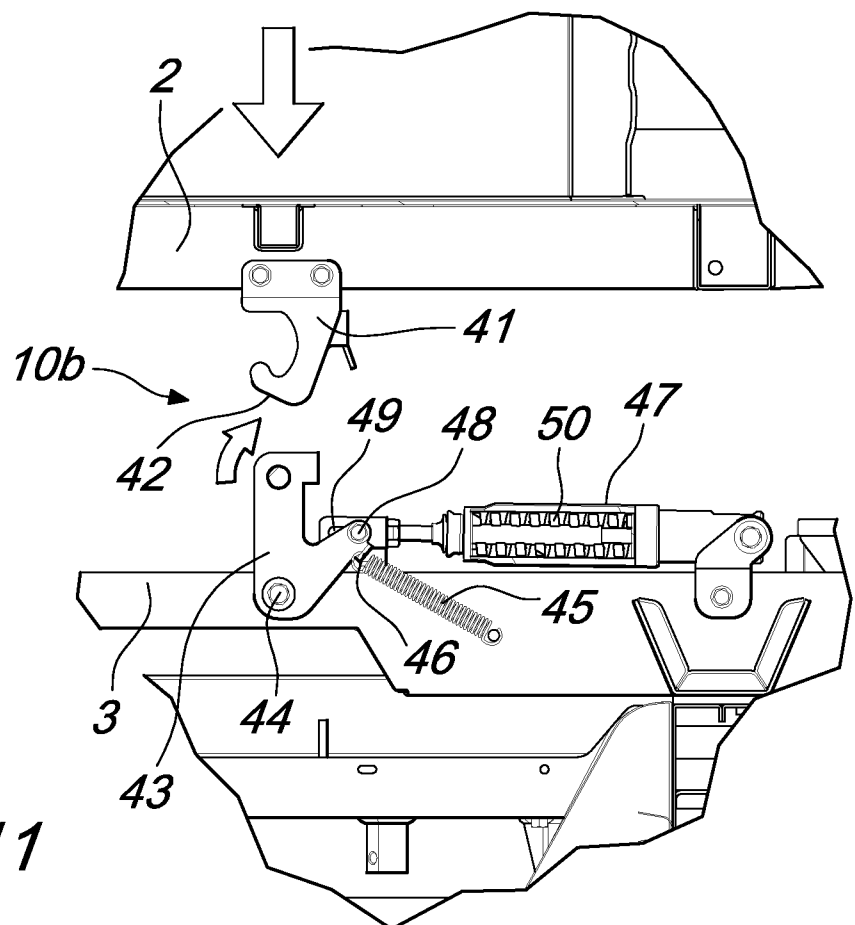


Fig. 11

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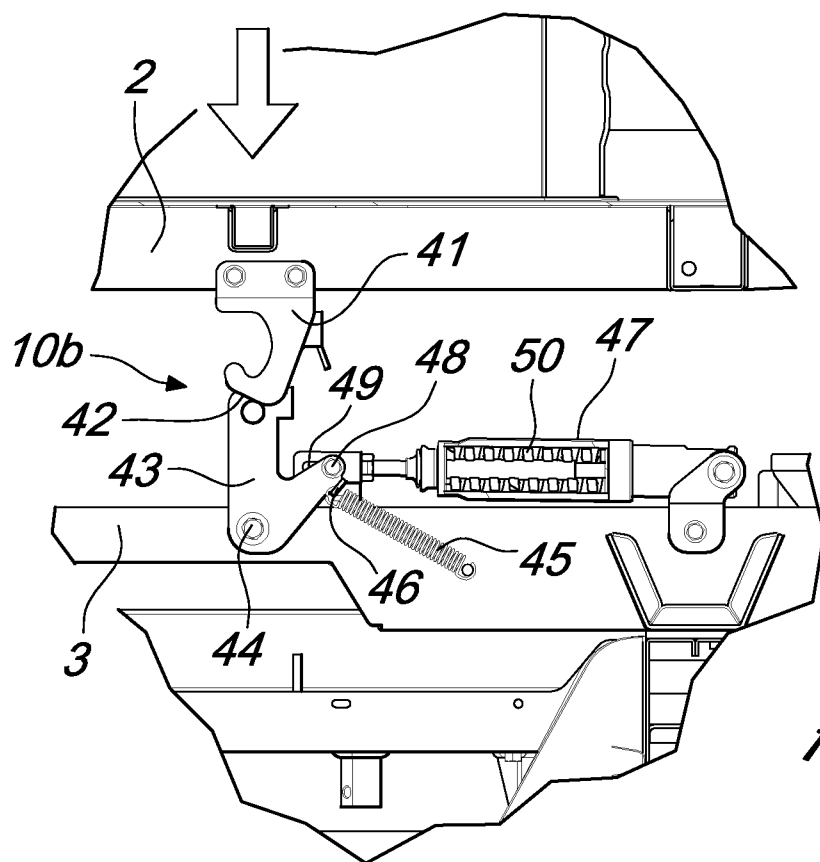


Fig. 12

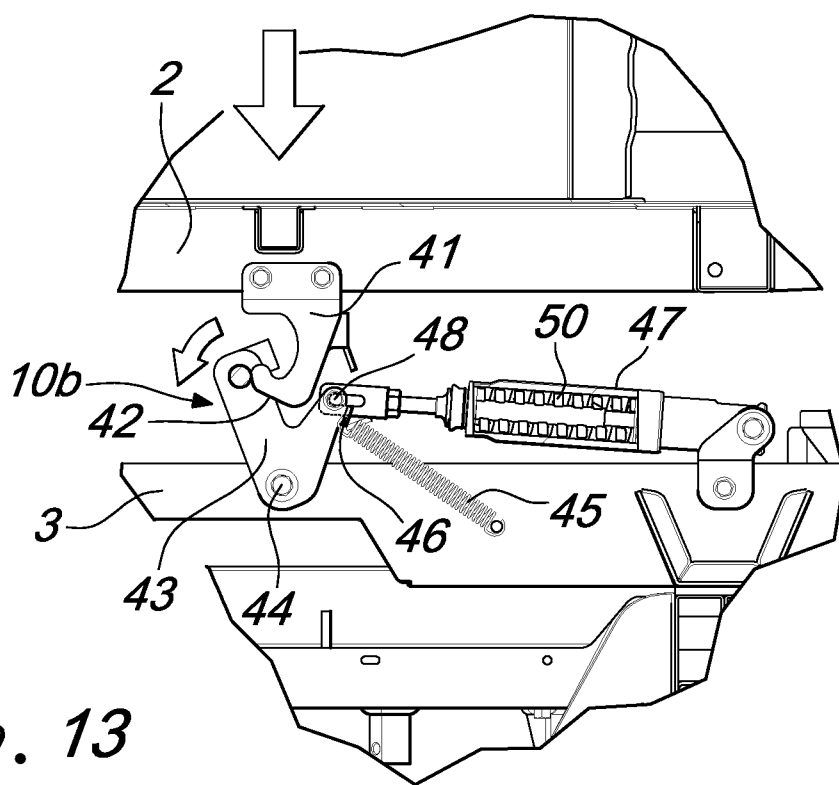
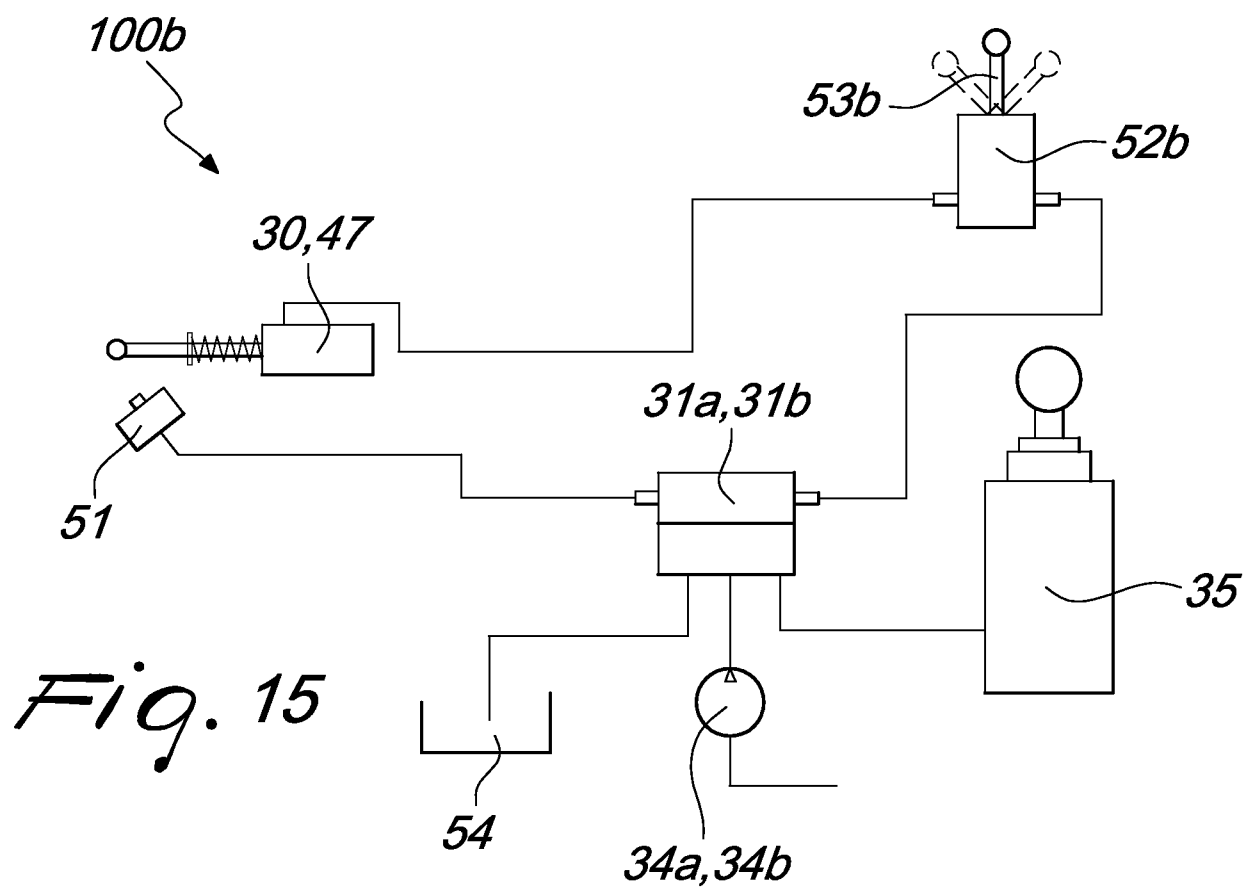
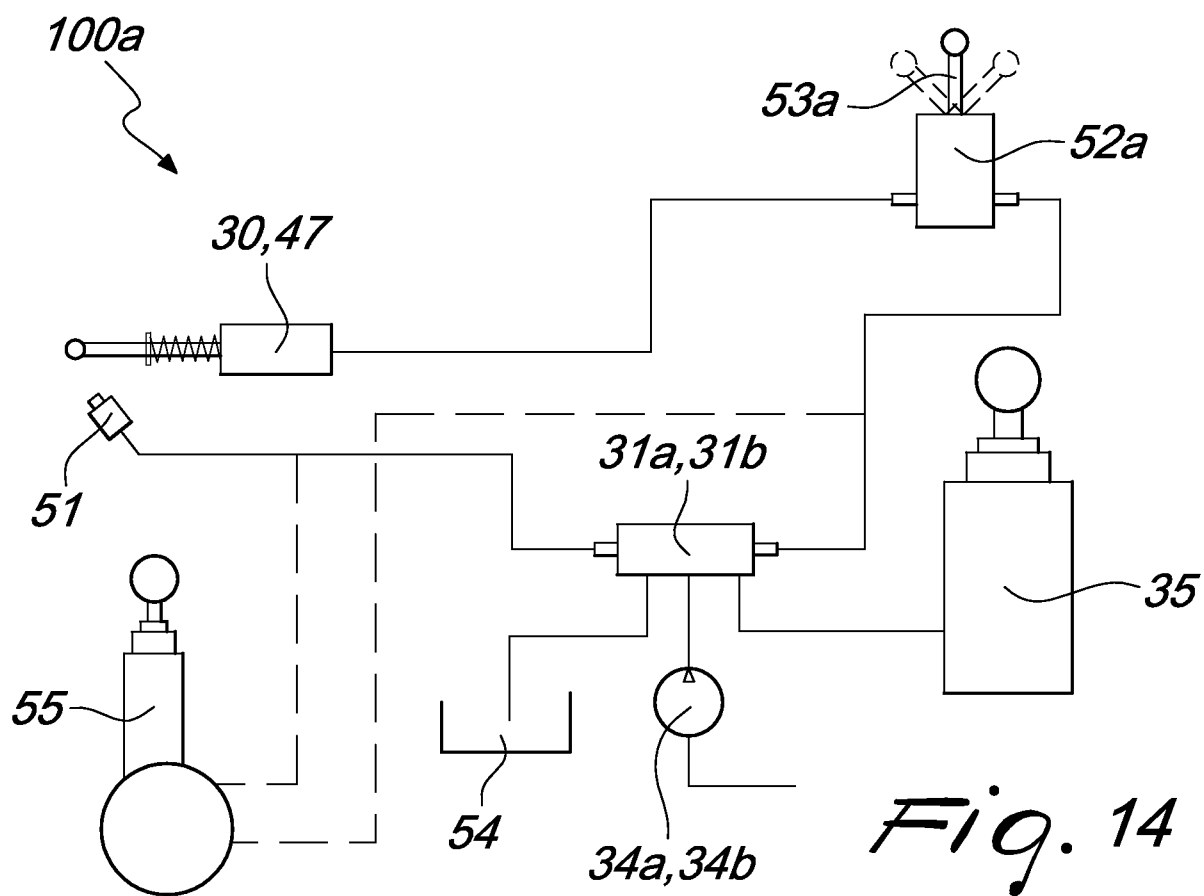
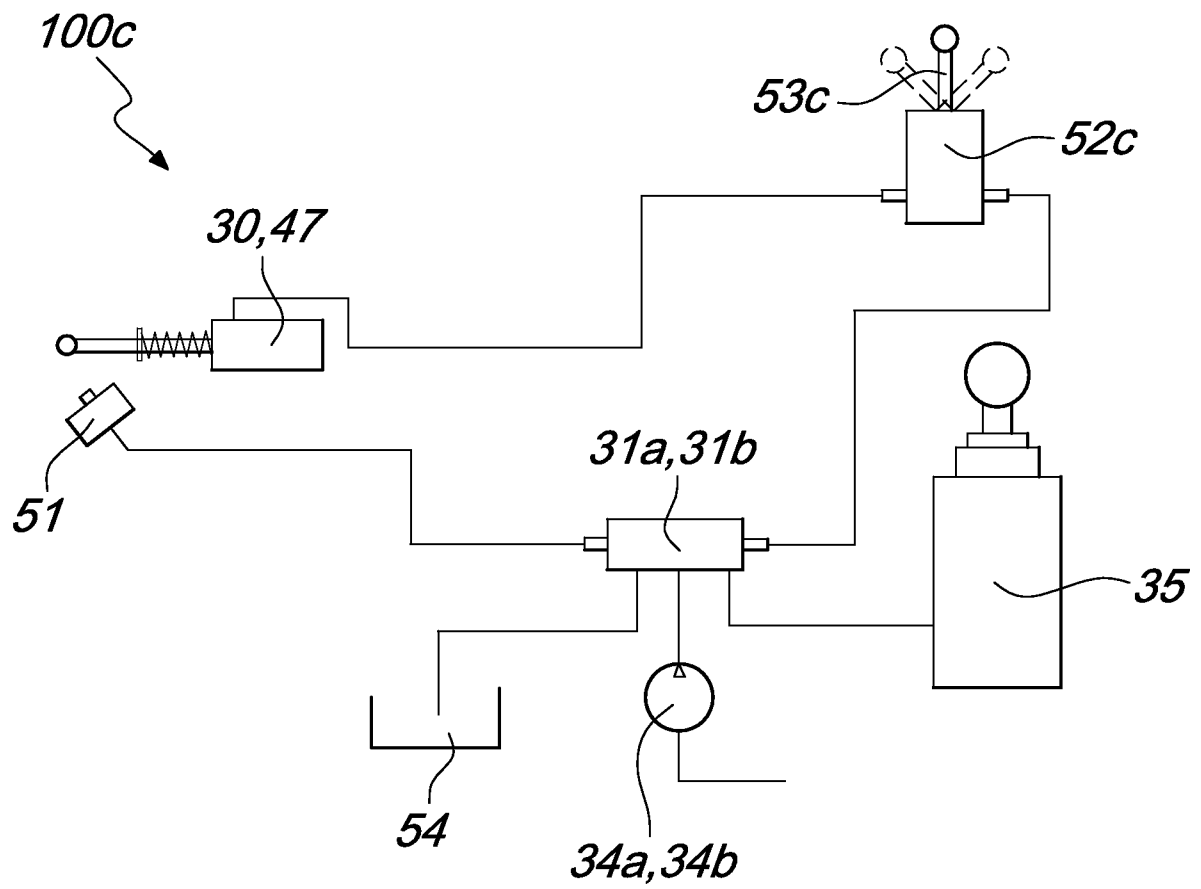


Fig. 13



*Fig. 16*

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2011/052991

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60P1/28
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B60P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 858 274 A1 (ACTM [FR]) 4 February 2005 (2005-02-04)	1-3 ,5-10
Y	abstract; claims; figures -----	4 , 11
Y	DE 21 28 645 A1 (STEFFENS) 28 December 1972 (1972-12-28) page 2, line 21 - line 29; figures 4,5 -----	4
Y	FR 1 279 862 A (METZELER GUMMIWERKE AG) 22 December 1961 (1961-12-22) figures -----	11
X	DE 11 52 314 B (TOUSSAINT & HESS GMBH) 1 August 1963 (1963-08-01) the whole document -----	1



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

28 September 2011

Date of mailing of the international search report

07/10/2011

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2011/052991

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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