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

(11) **EP 2 487 087 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.08.2012 Bulletin 2012/33

(51) Int Cl.:
B61F 5/22 *(2006.01)* ***B61F 5/14*** *(2006.01)*

(21) Application number: **12153685.8**

(22) Date of filing: **02.02.2012**

(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

(30) Priority: **09.02.2011 SE 1150099**

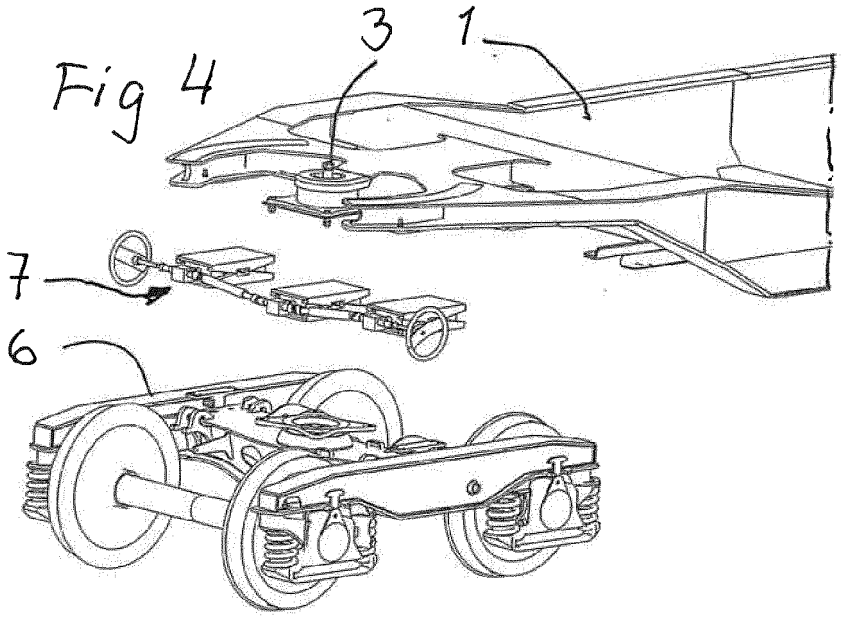
(71) Applicant: **K Technology AB**
211 19 Malmö (SE)

(72) Inventor: **Linde, Peter**
216 22 LIMHAMN (SE)

(74) Representative: **Ström & Gulliksson AB**
Box 4188
203 13 Malmö (SE)

(54) **An arrangement for height compensation of a railway wagon**

(57) An arrangement for height compensation of a railway wagon comprises a device (7) with variable thickness arranged between the underframe (1) and at least one bogie (6) of the railway wagon for adjusting the distance between said two members.



EP 2 487 087 A2

Description

Technical Field

[0001] The present invention relates to an arrangement for intermittent compensation of the height of a railway wagon for wheel wear, spring deflection under load, underframe deflection under load, and so on.

Background of the Invention

[0002] A specific loading gauge determines the outer cross-sectional dimensions of a railway vehicle running on a track, and no part of the vehicle is allowed to extend outside this loading gauge. Different rail systems have different loading gauges, and difficulties may occur, if a railway wagon is to move from system to system, normally from country to country.

[0003] The loading gauge not only sets a maximum height and width for the wagon but also gives specific limitations in its lower part or the region for the wheels and underframe of the wagon, where platforms and technical equipment, such as signals, are close to the travelling wagon.

[0004] When the height of the railway wagon is close to the limit set by the loading gauge, several seemingly subtle factors may determine whether the loading gauge will be passed or not. Examples of such factors are:

- how much the wheels are worn or turned down (max limit for allowed diameter)
- suspension or spring deflection under load
- underframe deflection under load.

[0005] At the determination of a maximal construction profile for the wagon the combination of all worst cases must be used.

[0006] This imposes a limitation to how low a wagon can be built. The height of the wagon itself is important for the possible maximal height of the load.

[0007] A typical example of the relevance of the above reasoning is the transport of semi-trailers on a railway wagon, such as disclosed in WO 2010/120236, as a semitrailer may have a height determined by the authorities.

[0008] The main obj ect of the invention is thus to allow for a maximal utilization of a certain loading gauge by compensating for such factors as wheel wear, turned wheels, spring deflection under load, and underframe deflection under load. By compensating for the normal height variation it would be possible to design the wagon with a lower height of the load surface and thus enable the loading of higher objects (for example semi-trailers) than would otherwise be allowed within the loading gauge.

The Invention

[0009] This may according to the invention be attained by a mechanical device arranged between the underframe and at least one bogie of the railway wagon, the thickness of the device being intermittently adjustable for adjusting the vertical distance between said underframe and said bogie.

[0010] The adjustment may be performed for all bogies of the railway wagon, but for an articulated wagon with an intermediate Jacobs bogie, it may suffice to perform the adjustment only for this bogie.

[0011] This device may preferably comprise three concurrently operated sub-devices centrally and at each side of the bogie.

[0012] The three sub-devices may be manually operated by a transverse shaft and a wheel at at least one side of the wagon.

[0013] Each sub-device may have a wedge mechanism operated by the shaft for adjusting its thickness or height.

Brief Description of the Drawings

[0014] The invention will be described in further detail below under reference to the accompanying drawings, in which

Fig 1 is an isometric view of an exemplary railway wagon, to which the invention may pertain,
Fig 2 is an illustration of a railway loading gauge,
Fig 3 is an exploded side view of the central part of the wagon shown in Fig 1 including a compensating device according to the invention,
Fig 4 is an isometric view of a bogie, a wagon part, and a compensating device according to the invention,
Fig 5 is an end view to a larger scale of the members shown in Fig 4,
Fig 6 is an isometric view of a compensating device according to the invention,
Fig 7 is an isometric, exploded view of a portion of the compensating device of Fig 6, and
Figs 8a and 8b are side views illustrating the function of the compensating device of Fig 6.

Detailed Description

[0015] Fig 1 shows a railway wagon described in WO 2010/120236 and intended for the transport of semi-trailers. This wagon comprises two wagon-halves 1 and 2, pivotally connected to each other at 3. In its ends it is provided with ordinary bogies 4 and 5 and under its pivot point 3 with a common bogie 6, called a Jacobs bogie. The description below of the invention is mainly related to a railway wagon of this type, but as will appear it may be applicable to any other rail vehicle, at least any railway vehicle having bogies.

[0016] Railway wagons travelling on a certain rail system must fit into a loading gauge determined for that system. Loading gauges may differ from country to country or system to system, which may make it difficult for railway wagons to move freely over country or system borders. A cross-sectional silhouette of a railway wagon in full lines within an exemplary loading gauge in dash-dotted lines is shown in Fig 2. It appears that the loading gauge not only applies limitations to the height and width of the railway wagon but also applies severe limitations in its lower part, which has to do with infrastructure (station platforms and the like) as well as signals and other ground equipment.

[0017] The invention has thus its background in the need to adopt a railway vehicle to a certain loading gauge, for example at the passing of a country border.

[0018] Fig 3 is an exploded side view of a central part of the railway wagon of Fig 1 with on one hand the two wagon-halves 1 and 2 and their pivot point 3 and on the other hand their Jacobs bogie 6. Inserted therebetween is a height compensating device 7 according to the invention.

[0019] Fig 4 is an exploded isometric view of the height compensating device 7 between an underframe or wagon-half 1 and the bogie 6.

[0020] Fig 5 is another exploded view - an end view - to a larger scale of the height compensating device 7 between an underframe or wagon-half 1 and the bogie 6. As the underframe or wagon-half 1 is supported by the bogie 6 centrally and at each side, the height compensating device 7 has three sub-devices 7' of the same construction.

[0021] The height compensating device 7 with its three sub-devices 7' is shown again in Fig 6. The three sub-devices 7' may be concurrently operated by means of a wheel 8 at the side of the wagon or preferably one at each side of the wagon for better accessibility. The wheel 8 is attached to a shaft 9, preferably provided with toggle joints 10 for allowing direction changes. At each sub-device 7' there is a gearbox 11, so that the rotation of the shaft 9 is transmitted to the sub-device 7'.

[0022] Fig 7 is an exploded view of a height compensating sub-device 7' with a wheel 8, a shaft 9, and a gear box 11. A threaded spindle 12 extends out of the gear box 11 and can be rotated by the shaft 9. Two double-sided wedges 13 engage the spindle 12 by threaded bores. The thread direction of the spindle 12 changes between the two wedges 13, so that the latter move towards each other or away from each other at rotation of the spindle 12 in either direction. The wedges 13 slidingly cooperate with two wedge plates 14, which are double-angled at their sides facing the wedges 13 and preferably flat at their opposite sides. The wedges 13 can be guided by the wedge plates 14 by means of tongues and grooves.

[0023] The operation of the sub-device 7' is illustrated in Figs 8a and 8b. In Fig 8a the wedges 13 are far apart on the spindle 12, which means that the wedge plates 14 are as close together as possible and that the height of the sub-device 7' is minimal. In Fig 8b the wedges 13 have been brought closer to each other by rotation of the spindle 12, so that the distance between the wedge plates 14 has increased, and so has the height of the sub-device 7'.

[0024] In principle, a height compensating device according to the invention shall be arranged at each bogie of the vehicle. However, the load distributing and deflection conditions for the shown and described articulated wagon may make it sufficient only to provide a height compensating device under the intermediate Jacobs bogie 6.

[0025] It has to be noted that the shown and described height compensating device is just one example of many practical embodiments. For example, the shown and described device may be pneumatically, hydraulically, or electrically operated. It may be practically modified in many ways. For example, the wedges 13 may be single-sided, so that one of the wedge plates 14 has a flat surface facing the wedges 13.

[0026] Also many other types of devices - manually, pneumatically, hydraulically, or electrically operated - may be employed, such as an eccentric mechanism, a scissors mechanism, or a screw mechanism.

[0027] Many modifications are possible within the scope of the appended claims.

Claims

1. An arrangement for intermittent compensation of the height of a railway wagon for wheel wear, spring deflection under load, underframe deflection under load, and so on, **characterized by** a mechanical device (7) arranged between the underframe (1) and at least one bogie (6) of the railway wagon, the thickness of the device (7) being intermittently adjustable for adjusting the vertical distance between said underframe (1) and said bogie (6).

2. An arrangement according to claim 1, wherein the device (7) is arranged in an intermediate bogie (6) (Jacobs bogie) of a wagon comprising two pivotally connected wagon halves (1, 2).

3. An arrangement according to claim 1 wherein the device (7) comprises three concurrently operated sub-devices (7') centrally and at each side of the bogie (6).

4. An arrangement according to claim 3, wherein the three sub-devices (7') are operated by a transverse shaft (9) and a wheel (8) at at least one side of the wagon.

5. An arrangement according to claim 4, wherein each sub-device (7') has a wedge mechanism (13, 14)

operated by the shaft (9) for adjusting its thickness or height.

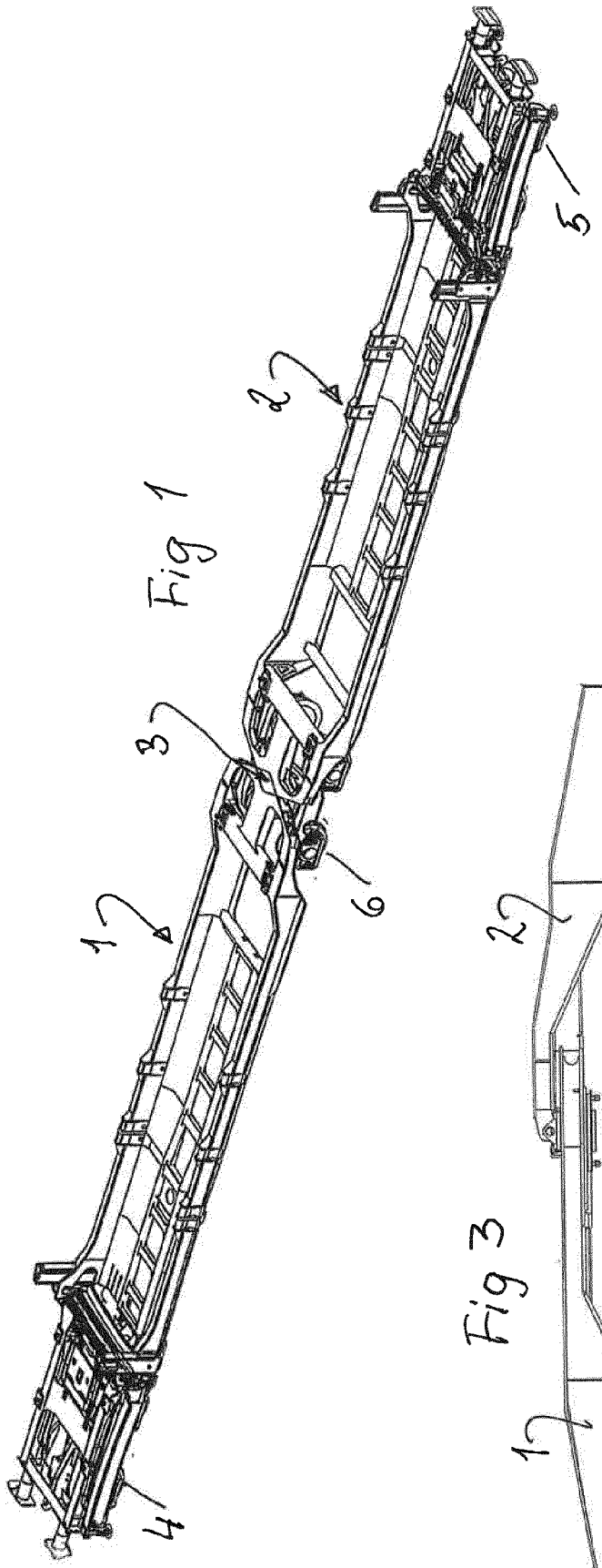


Fig 1

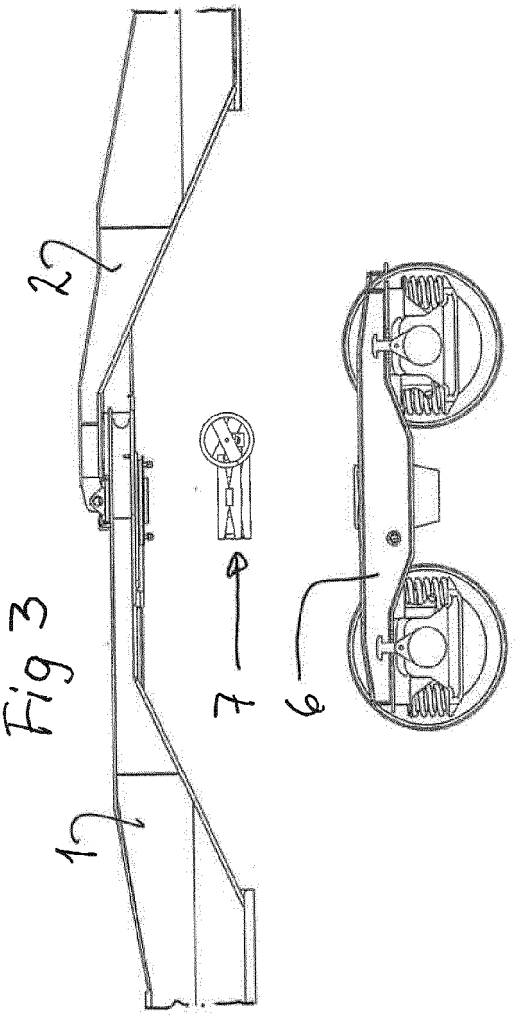


Fig 3

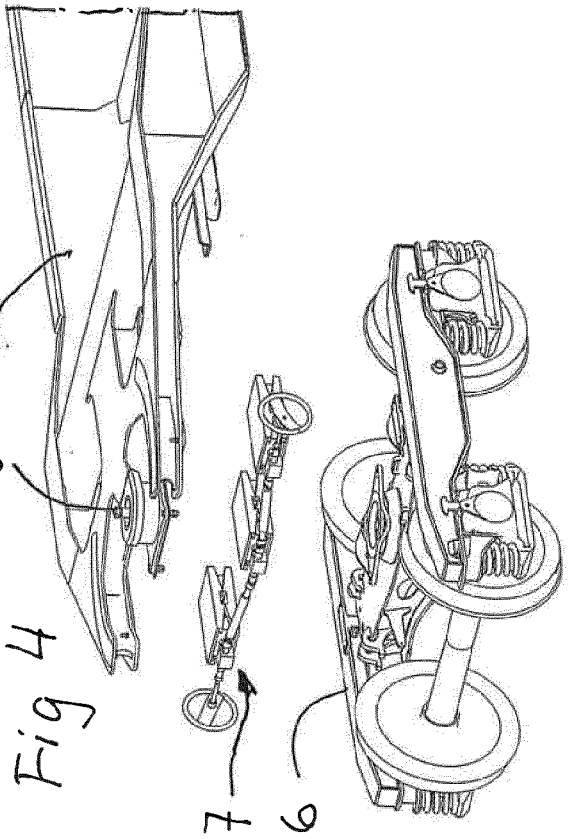


Fig 4

Fig 2

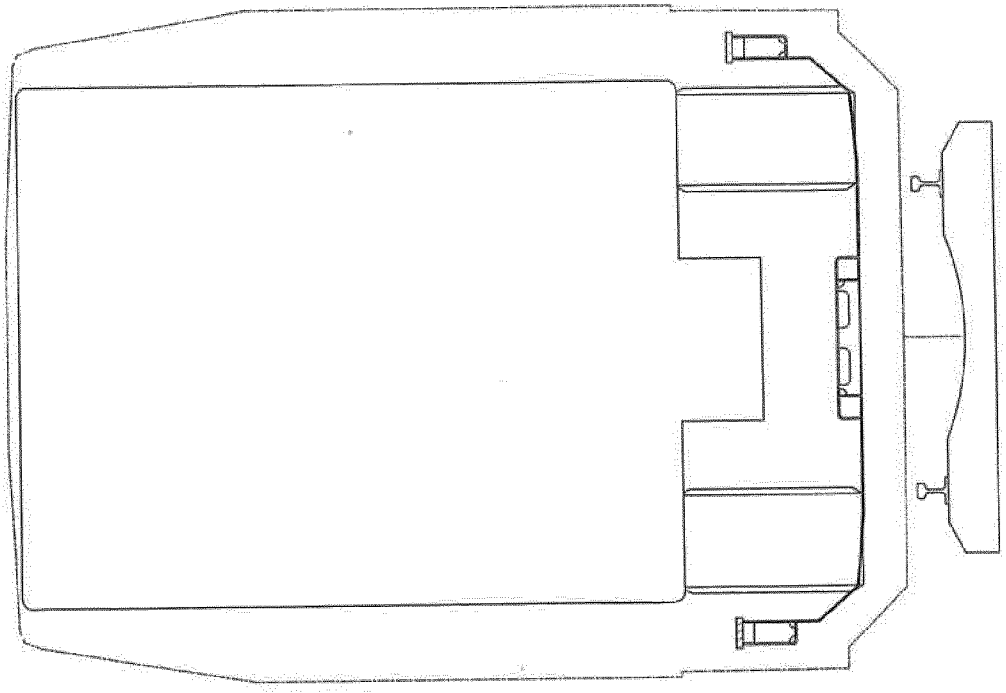
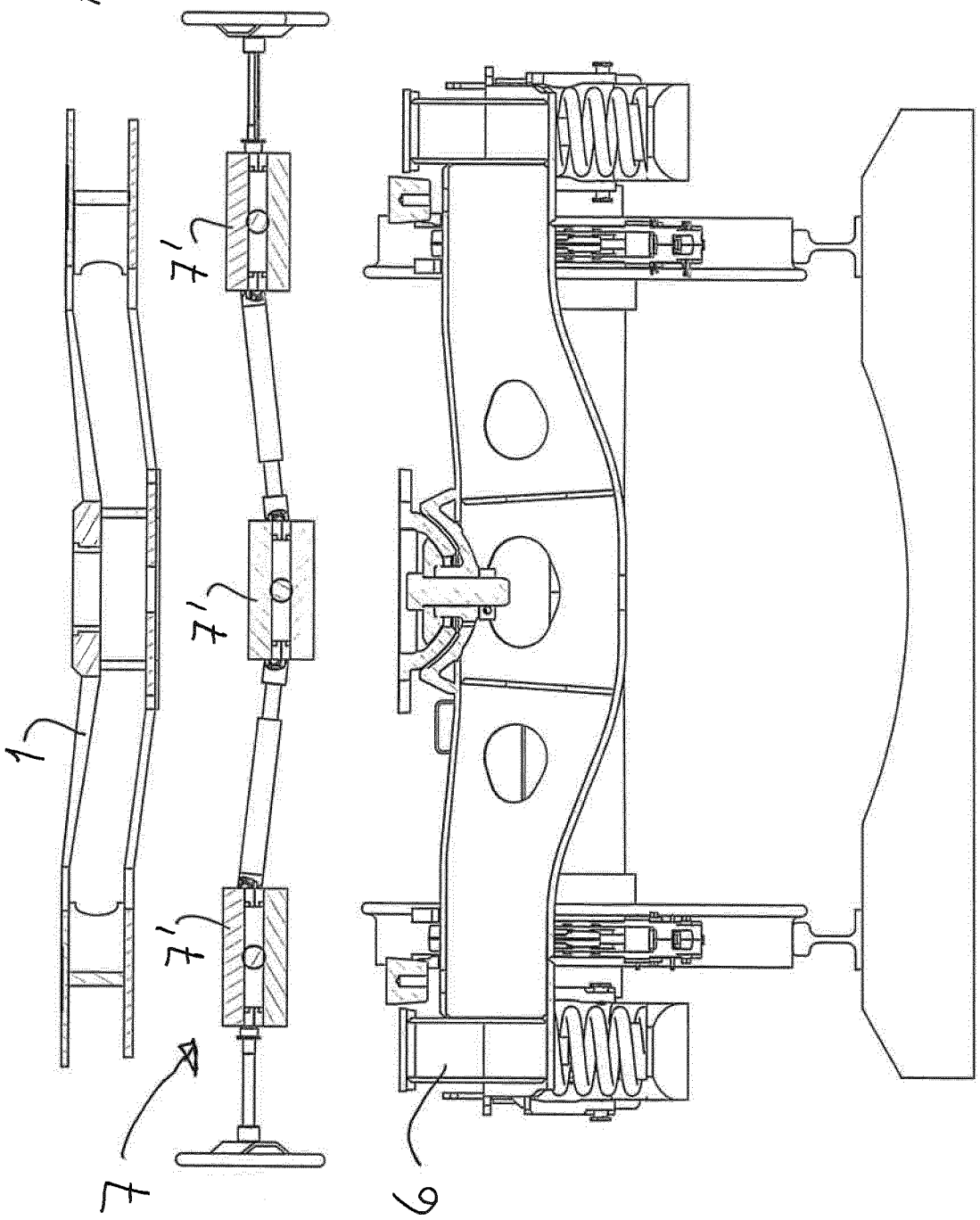


Fig 5



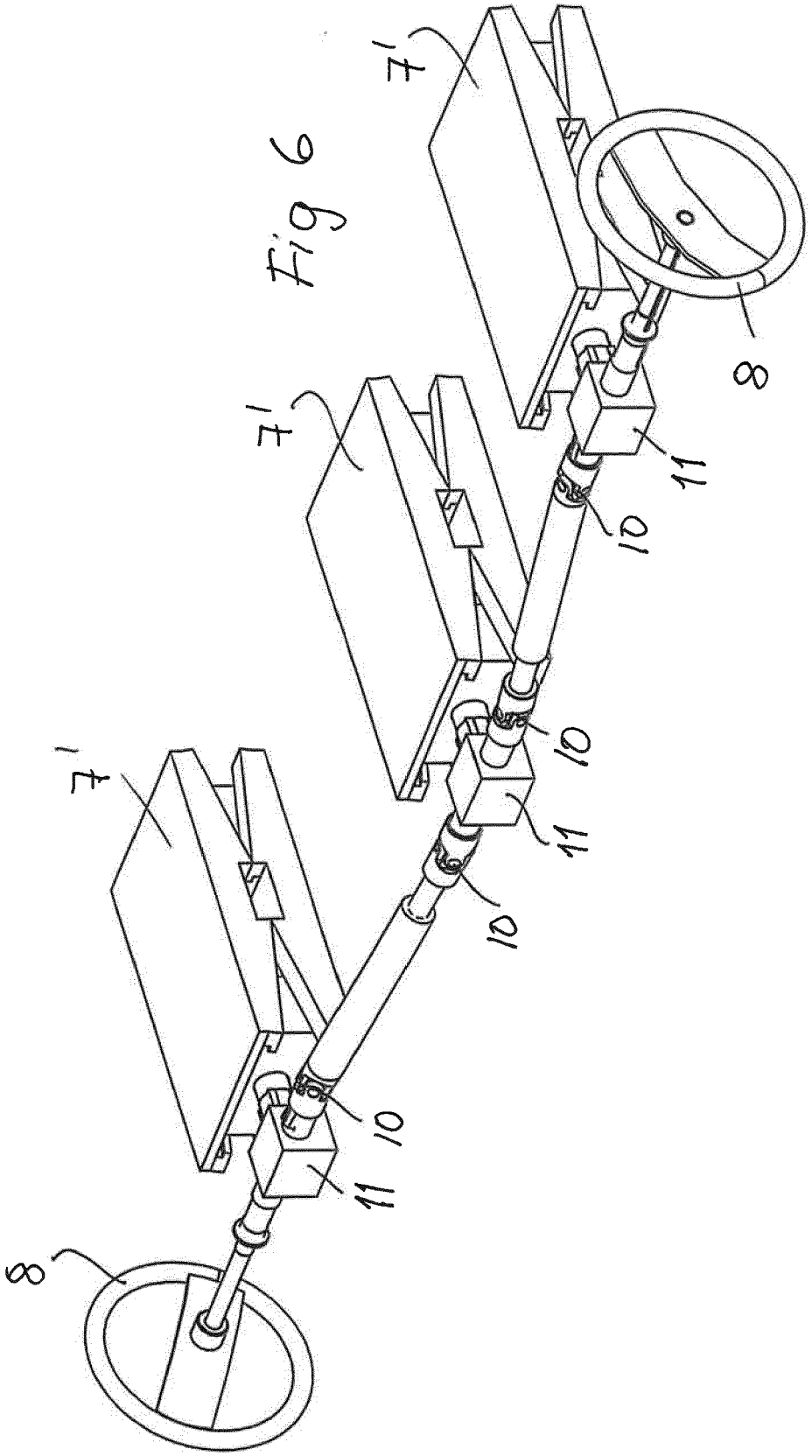


Fig 6

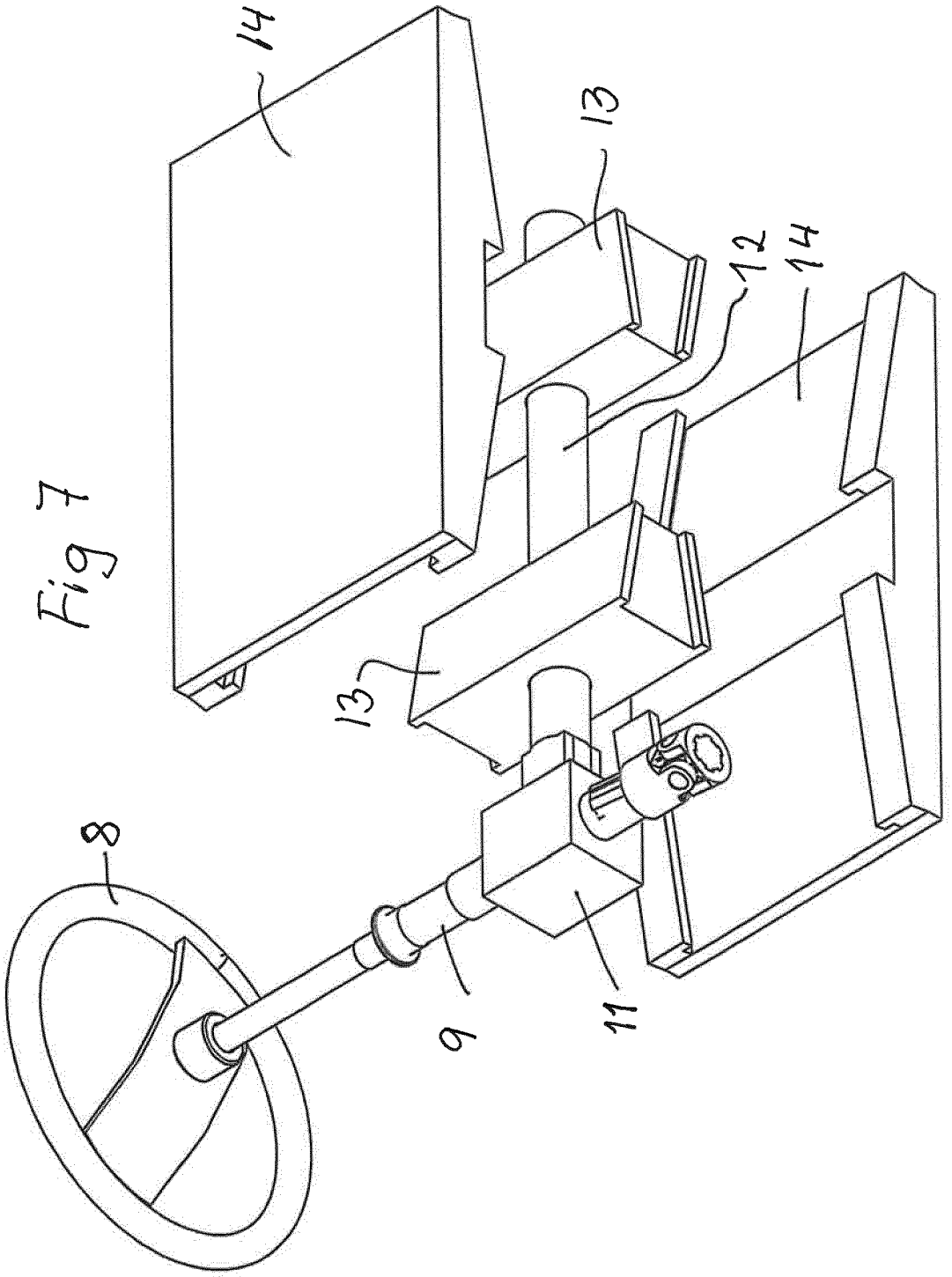


Fig 7

Fig 8a

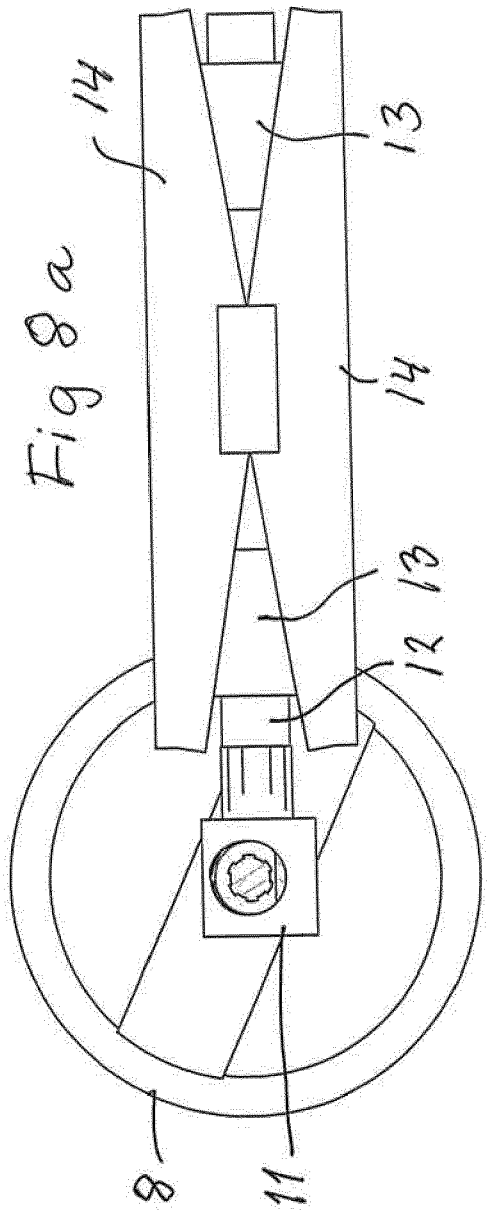
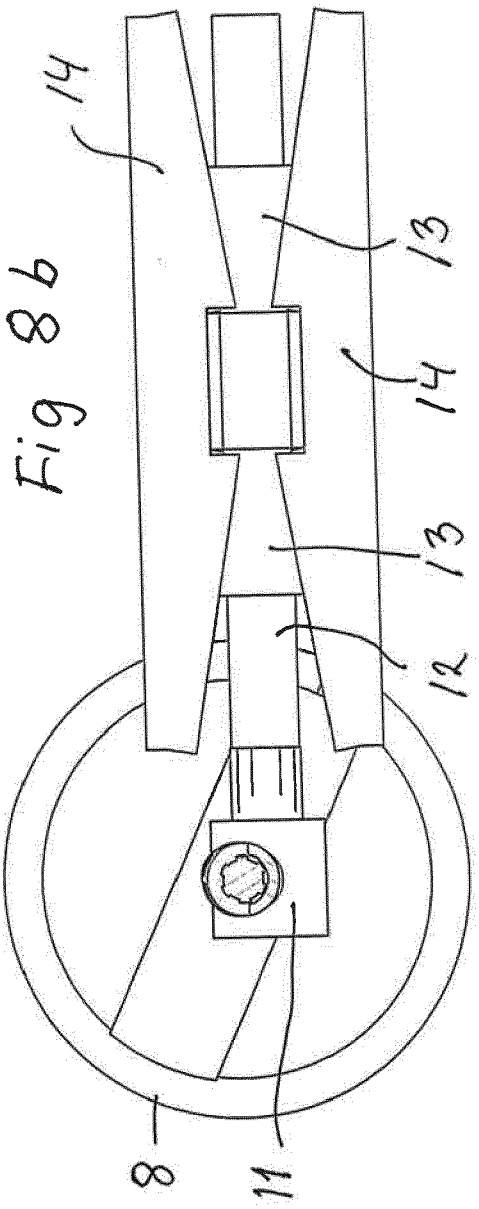


Fig 8b



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

- WO 2010120236 A **[0007] [0015]**