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(54) SUPPORTING FIXTURE FOR ASSEMBLING/DISASSEMBLING THE GEARBOX OF VEHICLES WITH INCREASED OPERATING FLEXIBILITY

STÜTZVORRICHTUNG ZUR MONTAGE/DEMONTAGE DES GETRIEBES VON FAHRZEUGEN MIT ERHÖHTER BETRIEBSFLEXIBILITÄT

DISPOSITIF DE SUPPORT POUR L'ASSEMBLAGE/DÉSASSEMBLAGE DE LA BOÎTE DE VITESSES DE VÉHICULES À FLEXIBILITÉ DE FONCTIONNEMENT ACCRUE

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EP 4 173 760 B1

Description

[0001] The present invention relates to a supporting fixture for assembling/disassembling the gearbox of vehicles with increased operating flexibility.

[0002] In the sector of equipment for vehicle workshops, gearbox supports are known which are used to support the gearbox during the execution of operations that require it to be dismounted and removed from its seat under the vehicle, in order to then remount it once the required maintenance is complete. Such supporting fixtures are typically mounted on the shank of a hydraulic handler provided inside the inspection pit where the operator works, or underneath the vehicle lift on which the vehicle undergoing maintenance is loaded.

[0003] Considering that every model of vehicle has a particular gearbox, the outer housing of which has specific shapes and dimensions with predefined points for resting on the supporting fixture, vehicle workshops need to have different types of such fixtures available, selecting the most suitable one to use as a function of the model of vehicle undergoing maintenance.

[0004] In order to limit the number of fixtures to keep in the workshop, so as to reduce the investment required to purchase them and the space necessary to store them when not in use, adjustable fixtures have been developed for supporting the gearbox of vehicles. Examples of support devices are known from US1556882A, US2006/231696A1, US4809963A, US2004/169167A1, US3218056A, EP3081342A1, EP2719505A1 or US4787600A.

[0005] The preamble of claim 1 is known from WO2011/095283A1.

[0006] For example Italian Patent Application no. MN2002A00033 describes an adjustable fixture that comprises, substantially, a longitudinal bar that can be associated with the shank of the hydraulic handler, on which a pair of crossmembers are slideably mounted which have respective pins for supporting the gearbox at a settable height, which are adapted to contact the housing of the gearbox from below, at its resting points. The pins of one of the crossmembers are arranged in a fixed position with respect to the longitudinal bar, while the pins of the other crossmember are mounted slideably thereupon. Furthermore, the longitudinal bar is associated so that it can oscillate with a mounting assembly on the shank of the hydraulic handler, so as to be able to modify its arrangement within a certain angle, together with that of the crossmembers and of the respective supporting pins.

[0007] Finally, such fixture features a safety band connected to the longitudinal bar, which is adapted to be secured around the gearbox in order to prevent accidental shifts thereof.

[0008] Even these conventional adjustable fixtures are not devoid of drawbacks, among which is the fact that, if work needs to be done on vehicles in which the outer housing of the gearbox is shaped in a particular way or is highly asymmetrical with respect to the corresponding longitudinal axis, they cannot be adjusted so as to ensure a stable support of the gearbox being worked on, with consequent complications of the operations required to the operators, and consequent risks of unwanted shifts in position and even accidental falls of the gearbox resting on the fixture.

[0009] The aim of the present invention is to eliminate the above mentioned drawbacks in the prior art by providing a supporting fixture for assembling/disassembling the gearbox of vehicles with increased operating flexibility that is versatile in use and more or less universal irrespective of the model of vehicle undergoing maintenance.

[0010] Within this aim, an object of the present invention is to provide a supporting fixture for assembling/disassembling the gearbox of vehicles that can be easily and rapidly used, thus simplifying the activities required to adapt the configuration of use of the fixture itself depending on the type of gearbox being worked on.

[0011] Another object of the present invention is to provide a stable and reliable support of the gearbox, so as to prevent unwanted shifts in position thereof or even falls, with consequent risk of damage as well as of injury to the operators.

[0012] Last but not least, another object of the present invention is to provide a supporting fixture for assembling/disassembling the gearbox of vehicles that has a simple structure and that is easy and practical to implement, safe in use and effective in operation, and of low cost.

[0013] This aim and these and other objects the will become more appearent hereinafter are all achieved by a supporting fixture for assembling/disassembling the gearbox of vehicles with increased operating flexibility, which presents the characteristics according to claim 1 below and is optionally provided with one or more of the characteristics in the subsequent dependent claims.

[0014] Further characteristics and advantages of the present invention will become better apparent from the detailed description of a preferred, but not exclusive, embodiment of a supporting fixture for assembling/disassembling the gearbox of vehicles with increased operating flexibility, which is illustrated for the purposes of non-limiting example in the accompanying drawings wherein:

Figure 1 is a perspective view of a supporting fixture for assembling/disassembling the gearbox of vehicles with increased operating flexibility according to the invention;

Figure 2 is a view like Figure 1 in which the various possibilities for adjusting the fixture according to the invention are shown;

Figure 3 is a partially exploded perspective view of the fixture according to the invention;

Figure 4 is a front elevation view of the fixture according to the invention;

Figure 5 is a side view of the fixture according to the

invention;

Figure 6 is a cross-sectional view taken along the line VI-VI in Figure 5.

[0015] With reference to the figures, the reference numeral 1 generally designates a supporting fixture for assembling/disassembling the gearbox of vehicles with increased operating flexibility.

[0016] The fixture 1 comprises a load-bearing element 2 which extends along a longitudinal axis A and a pair of crossmembers 3 and 4 which are associated with the load-bearing element, each one of which is associated with respective supporting means 5 and 6 for supporting from below the gearbox of a vehicle undergoing maintenance (not shown).

[0017] Each crossmember 3 and 4 is arranged substantially perpendicular to the load-bearing element 2. The load-bearing element 2 is arranged below the crossmembers 3 and 4 at their midpoint.

[0018] In the present description the term "substantially" means "except for the usual production tolerances and tolerances in the assembly of the component parts".

[0019] In use, the fixture 1 is intended to be coupled to the movable shank of a conventional lifting device positioned inside an inspection pit or under a vehicle lift, so that it can be placed below the gearbox of the vehicle undergoing maintenance that needs to be dismounted from its seat and then remounted once work is complete.

[0020] In the embodiment shown, the load-bearing element 2 is constituted by a tubular bar that is substantially quadrangular in cross-section, with a first end 2a open and a second end 2b closed by a plug 7.

[0021] The load-bearing element 2 is associated with connecting means 8 which are intended to be mounted on the movable shank of the lifting device and which are associated with that load-bearing element by virtue of means for hinged coupling 9 about an oscillation axis O that is substantially perpendicular to the longitudinal axis A and substantially horizontal in use.

[0022] The connecting means 8 comprise a beaker-like element 10 which is open downward and protrudes below the load-bearing element 2 which will be fitted over the tip of the movable shank of the handler, on which there is a bracket 11 which carries a first collar 12 through which the load-bearing element 2 is inserted so that it can slide along the longitudinal axis A. In addition there is a first locking screw 13 to lock the relative sliding between the load-bearing element 2 and the first collar 12.

[0023] The first locking screw 13 has a shank that passes through the first collar 12 and bites into the load-bearing element 2, and a tightening head that can be turned by the operator.

[0024] Furthermore there is a locking screw 16 of the beaker-like element 10 on the movable shank of the handler.

[0025] The fixture 1 can be fitted with one or more reduction bushings, which are adapted to be accommodated inside the beaker-like element 10 in order to permit coupling with lifting devices with different diameters of the movable shank.

[0026] In use, the fixture 1 can also be coupled, again by way of the beaker-like element 10, to lifting platforms for mechanical elements such as movable vehicle lifts.

[0027] The means for hinged coupling 9 comprise a pivot 14 that lies along the oscillation axis O for articulating the bracket 11 with respect to the beaker-like element 10, and a handle 15 for locking the relative rotation.

[0028] The handle for locking 15 has a shank that passes through a curved slot defined on the bracket 11 and bites into the beaker-like element 10, and a clamping lever on the bracket itself.

[0029] The crossmembers 3 and 4 are also constituted by respective tubular bars that are substantially quadrangular in cross-section, and are closed at the mutually opposite ends by corresponding plugs.

[0030] According to the invention, the supporting means 5 of at least one of the crossmembers 3 are provided with at least one tilting support 17 which is associated with that crossmember so that it can rotate about a respective angular position adjustment axis R. In this manner the at least one tilting support 17 is adapted to assume different angular positions around the corresponding adjustment axis R as a function of the type of gearbox to be supported.

[0031] In use, the at least one tilting support 17 spontaneously adapts its angular position about the adjustment axis R under the action of the weight of the gearbox to be supported, without needing to perform preliminary adjustments of the configuration of the fixture 1.

[0032] Advantageously, the at least one tilting support 17 is shaped so as to define a substantially concave contact surface 18 with the gearbox of the vehicle undergoing maintenance. The concave shape of such contact surface 18 makes it possible to ensure a hold and a stable support of the gearbox undergoing maintenance.

[0033] The at least one tilting support 17 can have its contact surface 18 covered with a heat-shrunk protective sheath, for example made of crosslinked polyolefin.

[0034] In addition, the adjustment axis R of the at least one tilting support 17 is substantially parallel to the longitudinal axis A.

[0035] Also, the at least one tilting support 17 is slideably associated along the corresponding crossmember 3 in order to be able to adapt its position as a function of the shape structure of the gearbox undergoing maintenance. In more detail, there is a second collar 19 which is slideably coupled along the crossmember 3, to which the at least one tilting support 17 is pivoted about the corresponding adjustment axis R, and there is a second screw 21 for locking the sliding thereof.

[0036] In the embodiment, the at least one tilting support 17 is constituted by a substantially C-shaped element of substantially uniform thickness. The intrados of such tilting support 17 defines the contact surface 18. By virtue of this shape structure, the at least one tilting support 17 is adapted to support gearboxes that have

different geometries and dimensions of their outer housings.

[0037] In any case alternative embodiments are not ruled out.

[0038] Furthermore, there are adjustable stroke-limiting means 22 which are adapted to limit the rotation angle of the at least one tilting support 17 about the corresponding adjustment axis R in at least one direction of rotation, and are associated with the crossmember 3.

[0039] Such adjustable stroke-limiting means 22 comprise a threaded shank 23 that protrudes from a third collar 24 which can move along the crossmember 3, a movable head 25, on which to rest the tilting support 17, coupled along the shank itself and a third screw 26 for locking the sliding of the third collar 24 along the crossmember 3.

[0040] In this manner, the adjustable stroke-limiting means 22 can be positioned along the crossmember 3 as a function of the longitudinal position of the tilting support 17.

[0041] By screwing or unscrewing the movable head 25 onto/from the threaded shank 23, it is possible to position it in contact with the tilting support 17, after having placed the gearbox being worked on upon it.

[0042] Usefully, the adjustable stroke-limiting means 22 are arranged along the crossmember 3 externally to the tilting support 17 in order to prevent accidental rotations thereof that could cause unexpected shifts in position or even falls of the gearbox resting upon it.

[0043] In fact such adjustable stroke-limiting means 22 make it possible to block the tilting of the tilting support 17 once the gearbox undergoing maintenance is resting upon it, so as to prevent accidental shifts in position thereof or falls.

[0044] Preferably the supporting means 5 of the crossmember 3 have two tilting supports 17 which tilt about respective adjustment axes R of the type described above.

[0045] Preferably the two tilting supports 17 are arranged with the respective contact surfaces 18 facing so as to define a cradle for the containment of the gearbox of the vehicle undergoing maintenance.

[0046] Furthermore the adjustment axes R of the two tilting supports 17 are arranged substantially parallel to the longitudinal axis A.

[0047] In this manner, when the gearbox of the vehicle undergoing maintenance is placed on the fixture 1, based on the weight and shape of the gearbox, the tilting supports 17 perform a counter-rotation about the respective adjustment axes R, thus clamping the gearbox in order to ensure a stable hold thereof.

[0048] Usefully each one of the tilting supports 17 has respective adjustable stroke-limiting means 22 arranged externally along the crossmember 3, so as to prevent the accidental release of the gearbox of the vehicle undergoing maintenance.

[0049] In order to obtain an additional option for adjusting the fixture 1 the crossmember 3 is associated with the load-bearing element 2 so as to be able to oscillate about the longitudinal axis A. In this case the crossmember 3 is associated with a pivot 27 which is inserted so that it can rotate into the open end 2a of the load-bearing element 2.

[0050] In use, the crossmember 3 spontaneously adapts its angular position about the longitudinal axis A under the action of the weight of the gearbox to be supported, without needing to perform preliminary adjustments of the configuration of the fixture 1.

[0051] Furthermore, an element 28 for locking the rotation of the crossmember 3 with respect to the structural element 2 is provided, which passes through an elongated slot 29 that extends on a plane that is perpendicular to the longitudinal axis A and is defined underneath the structural element 2 and is engaged in a dead hole 30 provided on the pivot 27.

[0052] Furthermore, it should be noted that there are two stroke limiting elements 41 which protrude from the crossmember 3 at the mutually opposite ends, in order to prevent the extraction of the third collars 24.

[0053] In a possible embodiment of the invention, the supporting means 6 of the other crossmember 4 could also have one or, more preferably, two tilting supports 17 as described above, with optional adjustable stroke-limiting means 22. Furthermore, the crossmember 4 could also be associated with the load-bearing element 2 so that it can rotate about the longitudinal axis A.

[0054] In the embodiment shown, however, the supporting means 6 of the other crossmember 4 comprise at least two supporting elements 31 with fixed orientation, which are associated so that they can slide along that crossmember and are shaped so as to define respective substantially concave and mutually facing contact surfaces 32 with the gearbox of the vehicle undergoing maintenance.

[0055] Preferably each one of the supporting elements 31 is also substantially C-shaped and the intrados thereof defines the corresponding contact surface 32.

[0056] The supporting elements 31 can also have their contact surfaces 32 covered with a heat-shrunk protective sheath, for example made of crosslinked polyolefin.

[0057] Each supporting element 31 is connected to a corresponding fourth collar 34, which is associated so that it can slide along the crossmember 4 and is coupled to a fourth screw 35 for locking the relative sliding.

[0058] Furthermore, the crossmember 4 is mounted so that it can slide along the load-bearing element 2. In fact there is a fifth collar 39 which can slide along the load-bearing element 2 and is connected to the crossmember 4, and a fifth screw 40 for locking the relative sliding.

[0059] It should be noted that there is a stroke limiting element 42 protruding from the load-bearing element 2 proximate to the second end 2b in order to prevent the extraction of the fifth collar 39.

[0060] A spacer 36 can be advantageously provided between the fifth collar 39 and the crossmember 4 so as to position the latter at a different working height with respect to the crossmember 3.

[0061] The spacer 36 makes it possible to adapt the geometry of the fixture 1 to that of the gearbox being worked on, which typically is larger at the point of attachment to the engine and is narrower at the other end, where it is attached to the transmission shaft.

[0062] Finally the fixture 1 can comprise a flexible safety element 37, such as a band, a strap or the like, which is adapted to be secured around the gearbox of the vehicle undergoing maintenance. Such flexible element 37 is associated with the load-bearing element 2 and passes through a pair of loops 38 which are integral with the first collar 12.

[0063] It should be noted that the crossmembers 3 and 4 are arranged substantially perpendicular to the load-bearing element 2 and above it. Furthermore, the associated supporting elements 17 and 31 protrude above the crossmembers 3 and 4 to receive the gearbox of the vehicle undergoing maintenance. The crossmember 4 generally has a shorter extension than the crossmember 3.

[0064] The operation of the present invention is the following.

[0065] After attaching the fixture 1 to the lifting device, adjusting its inclination about the oscillation axis O and the longitudinal position of the load-bearing element 2 with respect to the first collar 12 if necessary, the supporting elements 17 and 31 are positioned along the respective crossmembers 3 and 4 as a function of the type of gearbox being worked on, and the fixture 1 is positioned underneath and in contact with the gearbox so that it can support it.

[0066] Once the gearbox has been disengaged from its seat it is kept resting on the supporting elements 17 and 31 and can be taken out of its seat.

[0067] It should be noted that the tilting supports 17, if necessary, modify their angular position with respect to the corresponding adjustment axes R as a function of the geometry and weight of the gearbox being worked on, by clamping around it. Furthermore, the operator screws the movable heads 25 until they come into contact with the tilting supports 17, then blocks their rotation and winds the flexible element 37 around the gearbox being worked on.

[0068] After the required maintenance has been carried out, the gearbox is repositioned under the vehicle to be remounted in its seat. At the end of the operation, the shank of the lifting device is retracted so as to lower the fixture 1, after having disengaged the flexible element 37 from the gearbox.

[0069] If necessary, the movable heads 25 can be lowered in order to allow the tilting supports 17 to be opened and facilitate the disconnection of the fixture 1 from the gearbox being worked on.

[0070] In practice it has been found that the invention as described achieves the intended aim and objects and, in particular, attention is drawn to the fact that the fixture according to the invention considerably increases the possibilities for adjusting and adapting the configuration of use as a function of the model of vehicle undergoing maintenance, rendering the use thereof more or less universal.

[0071] Furthermore, the fixture according to the invention is practical and rapid in use and makes it possible to work in complete safety.

[0072] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0073] This application claims priority of Italian Patent Application No. 102021000026750.

[0074] 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 element identified by way of example by such reference signs.

Claims

1. A supporting fixture (1) for assembling/disassembling the gearbox of vehicles with increased operating flexibility, which comprises a load-bearing element (2) which extends along a longitudinal axis (A) and a pair of crossmembers (3, 4) which are associated with said supporting element (2), each one of which is associated with respective supporting means (5, 6) for supporting the gearbox of a vehicle undergoing maintenance from below, said supporting means (5) of at least one of said crossmembers (3) comprising at least one tilting support (17) which is associated with said crossmember so that it can rotate about a respective angular position adjustment axis (R) thereby to be adapted to assume different angular positions around the corresponding adjustment axis (R) as a function of the type of gearbox to be supported, **characterized in that** said at least one crossmember (3) is associated with said load-bearing element (2) so that it can oscillate about said longitudinal axis (A).

2. The fixture (1) according to claim 1, **characterized in that** said at least one tilting support (17) is shaped so as to define a substantially concave contact surface (18) with the gearbox of the vehicle undergoing maintenance.

3. The fixture (1) according to claim 1 and 2, **characterized in that** the adjustment axis (R) of said at least one tilting support is substantially parallel to said longitudinal axis (A).

4. The fixture (1) according to at least one of claims 1-3, **characterized in that** said at least one tilting support (17) is slideably associated along said crossmember (3).

5. The fixture (1) according to at least one of claims 1-4, **characterized in that** it comprises adjustable stroke-limiting means (22), which are adapted to limit the rotation angle of said at least one tilting support (17) about the corresponding adjustment axis (R) in at least one direction, and are associated with said at least one crossmember (3).

6. The fixture (1) according to at least one of claims 1-5, **characterized in that** the supporting means (5) of said crossmember (3) comprise two of said tilting supports (17) which tilt about respective adjustment axes (R).

7. The fixture (1) according to claim 6, **characterized in that** said two tilting supports (17) of said at least one crossmember (3) are arranged so that the respective contact surfaces (18) face each other so as to define a cradle for the containment of the gearbox of the vehicle undergoing maintenance.

8. The fixture (1) according to claim 6, **characterized in that** the adjustment axes (R) of said two tilting supports (17) are arranged substantially parallel to said longitudinal axis (A).

9. The fixture (1) according to claim 1, **characterized in that** the supporting means (6) of the other one of said crossmembers (4) comprise at least two supporting elements (31) which are associated so that they can slide along said crossmember and are shaped so as to define respective substantially concave and mutually facing contact surfaces (32) with the gearbox of the vehicle undergoing maintenance.

10. The fixture (1) according to claim 1, **characterized in that** it comprises a flexible safety element (37) which is adapted to be secured around the gearbox of the vehicle undergoing maintenance and is associated with said load-bearing element (2).

11. The fixture according to claim 1, **characterized in that** it comprises connecting means (8) which can be associated with the movable shank of a lifting device and are associated with said load-bearing element (2) by virtue of means for hinged coupling (9) about an oscillation axis (O) that is substantially perpendicular to said longitudinal axis (A).

Patentansprüche

1. Eine Stützvorrichtung (1) zur Montage/Demontage des Getriebes von Fahrzeugen mit erhöhter Betriebsflexibilität, die ein Last tragendes Element (2) umfasst, welches sich entlang einer Längsachse (A) erstreckt, und ein Paar von Querträgern (3, 4), die mit dem Last tragenden Element (2) verbunden sind und von denen jeder mit entsprechenden Lagerungsmitteln (5, 6) zur Lagerung des Getriebes eines Fahrzeugs, das gewartet wird, von unten verbunden ist; wobei die Lagerungsmittel (5) mindestens eines der Querträger (3) mindestens eine Kipphalterung (17) umfassen, die mit dem Querträger so verbunden ist, dass er sich um eine entsprechende Winkelpositions-Einstellachse (R) drehen kann, ausgebildet, um so verschiedene Winkelpositionen um die entsprechende Einstellachse (R) in Abhängigkeit von der Art des zu lagernden Getriebes einzunehmen; **dadurch gekennzeichnet, dass** der mindestens eine Querträger (3) so mit dem Last tragenden Element (2) verbunden ist, dass er um die Längsachse (A) oszillieren kann.

2. Die Vorrichtung (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die mindestens eine Kipphalterung (17) geformt ist, um eine im Wesentlichen konkave Kontaktfläche (18) mit dem Getriebe des zu wartenden Fahrzeugs zu bestimmen.

3. Die Vorrichtung (1) gemäß Anspruch 1 und 2, **dadurch gekennzeichnet, dass** die Einstellachse (R) der mindestens einen Kipphalterung im Wesentlichen parallel zu der Längsachse (A) ist.

4. Die Vorrichtung (1) gemäß mindestens einem der Ansprüche 1-3, **dadurch gekennzeichnet, dass** die mindestens eine Kipphalterung (17) entlang dem Querträger (3) verschiebbar angeschlossen ist.

5. Die Vorrichtung (1) gemäß mindestens einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** sie verstellbare Hubbegrenzungsmittel (22) umfasst, die ausgebildet sind, um den Rotationswinkel der mindestens einen Kipphalterung (17) um die entsprechende Einstellachse (R) in mindestens einer Richtung zu begrenzen, und mit dem mindestens einen Querträger (3) verbunden sind.

6. Die Vorrichtung (1) gemäß mindestens einem der Ansprüche 1-5, **dadurch gekennzeichnet, dass** die Lagerungsmittel (5) des Querträgers (3) zwei der Kipphalterungen (17) umfassen, die um jeweilige Einstellachsen (R) herum kippen.

7. Die Vorrichtung (1) gemäß Anspruch 6, **dadurch gekennzeichnet, dass** die zwei Kipphalterungen (17) des mindestens einen Querträgers (3) so angeordnet sind, dass die jeweiligen Kontaktflächen (18) einander zugewandt sind, um einen Schlitten zur Aufnahme des Getriebes des zu wartenden Fahrzeugs zu bestimmen.

8. Die Vorrichtung (1) gemäß Anspruch 6, **dadurch gekennzeichnet, dass** die Einstellachsen (R) der zwei Kipphalterungen (17) im Wesentlichen parallel

zu der Längsachse (A) angeordnet sind.

9. Die Vorrichtung (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Lagerungsmittel (6) des anderen der Querträger (4) mindestens zwei Halterungselemente (31) umfassen, die verschiebbar entlang dem Querträger angebracht und geformt sind, um entsprechende im Wesentlichen konkave und einander zugewandte Kontaktflächen (32) mit dem Getriebe des zu wartenden Fahrzeugs zu bestimmen.

10. Die Vorrichtung (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sie ein biegsames Sicherheitselement (37) umfasst, das ausgebildet ist, um um das Getriebe des zu wartenden Fahrzeugs herum gesichert zu werden, und mit dem Last tragenden Element (2) verbunden ist.

11. Die Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sie Verbindungsmittel (8) umfasst, die mit dem beweglichen Schaft einer Hubvorrichtung verbunden werden können und mit dem Last tragenden Element (2) über Mittel zur schwenkbaren Kopplung (9) um eine Oszillationsachse (O) verbunden sind, die im Wesentlichen senkrecht zu der Längsachse (A) ist.

Revendications

1. Dispositif de support (1) pour l'assemblage/désassemblage de la boîte de vitesses de véhicules à flexibilité de fonctionnement accrue, qui comprend un élément porteur (2) qui s'étend le long d'un axe longitudinal (A) et une paire de traverses (3, 4) qui sont associées audit élément porteur (2), chacune d'elles étant associée à des moyens de support respectifs (5, 6) pour supporter la boîte de vitesses d'un véhicule faisant l'objet d'un entretien par le bas, lesdits moyens de support (5) d'au moins une desdites traverses (3) comprenant au moins un support basculant (17) qui est associé à ladite traverse de manière à pouvoir tourner autour d'un axe de réglage de position angulaire (R) respectif et être ainsi adapté pour prendre différentes positions angulaires autour de l'axe de réglage (R) correspondant en fonction du type de boîte de vitesses à supporter, **caractérisé par le fait que** ladite au moins une traverse (3) est associée audit élément de support (2) de manière à pouvoir osciller autour dudit axe longitudinal (A).

2. Le dispositif (1) selon la revendication 1, **caractérisé par le fait que** ledit au moins un support basculant (17) est façonné de manière à définir une surface de contact (18) essentiellement concave avec la boîte de vitesses du véhicule faisant l'objet de l'entretien.

3. Le dispositif (1) selon les revendications 1 et 2, **caractérisé en ce que** l'axe de réglage (R) dudit au moins un support basculant est essentiellement parallèle audit axe longitudinal (A).

4. Le dispositif (1) selon au moins une des revendications 1 à 3, **caractérisé en ce que** ledit au moins un support basculant (17) est associé de manière coulissante le long de ladite traverse (3).

5. Le dispositif (1) selon au moins une des revendications 1 à 4, **caractérisé en ce qu'**il comprend des moyens réglables de limitation de course (22), qui sont adaptés pour limiter l'angle de rotation dudit au moins un support basculant (17) autour de l'axe de réglage (R) correspondant dans au moins une direction, et qui sont associés à ladite au moins une traverse (3).

6. Le dispositif (1) selon au moins une des revendications 1-5, **caractérisé en ce que** les moyens de support (5) de ladite traverse (3) comprennent deux desdits supports basculants (17) qui basculent autour d'axes de réglage (R) respectifs.

7. Le dispositif (1) selon la revendication 6, **caractérisé en ce que** lesdits deux supports basculants (17) de ladite au moins une traverse (3) sont disposés de manière à ce que les surfaces de contact respectives (18) se fassent face afin de définir un berceau pour le confinement de la boîte de vitesses du véhicule en cours d'entretien.

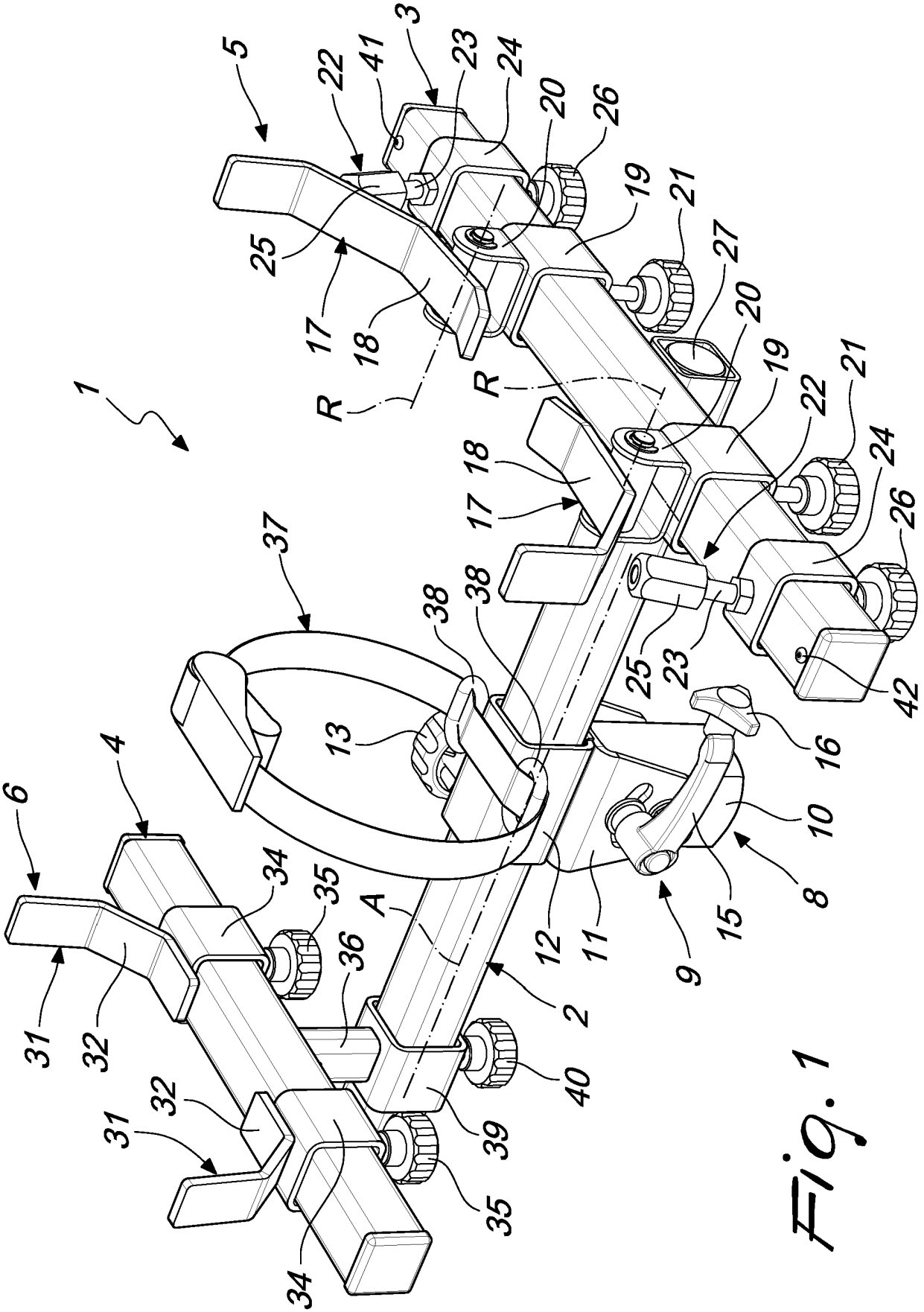
8. Le dispositif (1) selon la revendication 6, **caractérisé par le fait que** les axes de réglage (R) desdits deux supports basculants (17) sont disposés essentiellement parallèlement audit axe longitudinal (A).

9. Le dispositif (1) selon la revendication 1, **caractérisé en ce que** les moyens de support (6) de l'autre desdites traverses (4) comprennent au moins deux éléments de support (31) qui sont associés de manière à pouvoir glisser le long de ladite traverse et sont façonnés de manière à définir des surfaces de contact (32) respectives essentiellement concaves et se faisant face mutuellement avec la boîte de vitesses du véhicule faisant l'objet de l'entretien.

10. Le dispositif (1) selon la revendication 1, **caractérisé en ce qu'**il comprend un élément de sécurité flexible (37) qui est adapté pour être fixé autour de la boîte de vitesses du véhicule faisant l'objet de l'entretien et qui est associé audit élément porteur (2).

11. Le dispositif selon la revendication 1, **caractérisé en ce qu'**il comprend des moyens de liaison (8) qui peuvent être associés à la tige mobile d'un appareil de levage et sont associés audit élément porteur (2)

en vertu de moyens d'accouplement articulés (9) autour d'un axe d'oscillation (0) qui est essentiellement perpendiculaire audit axe longitudinal (A).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A
R

Fig. 1

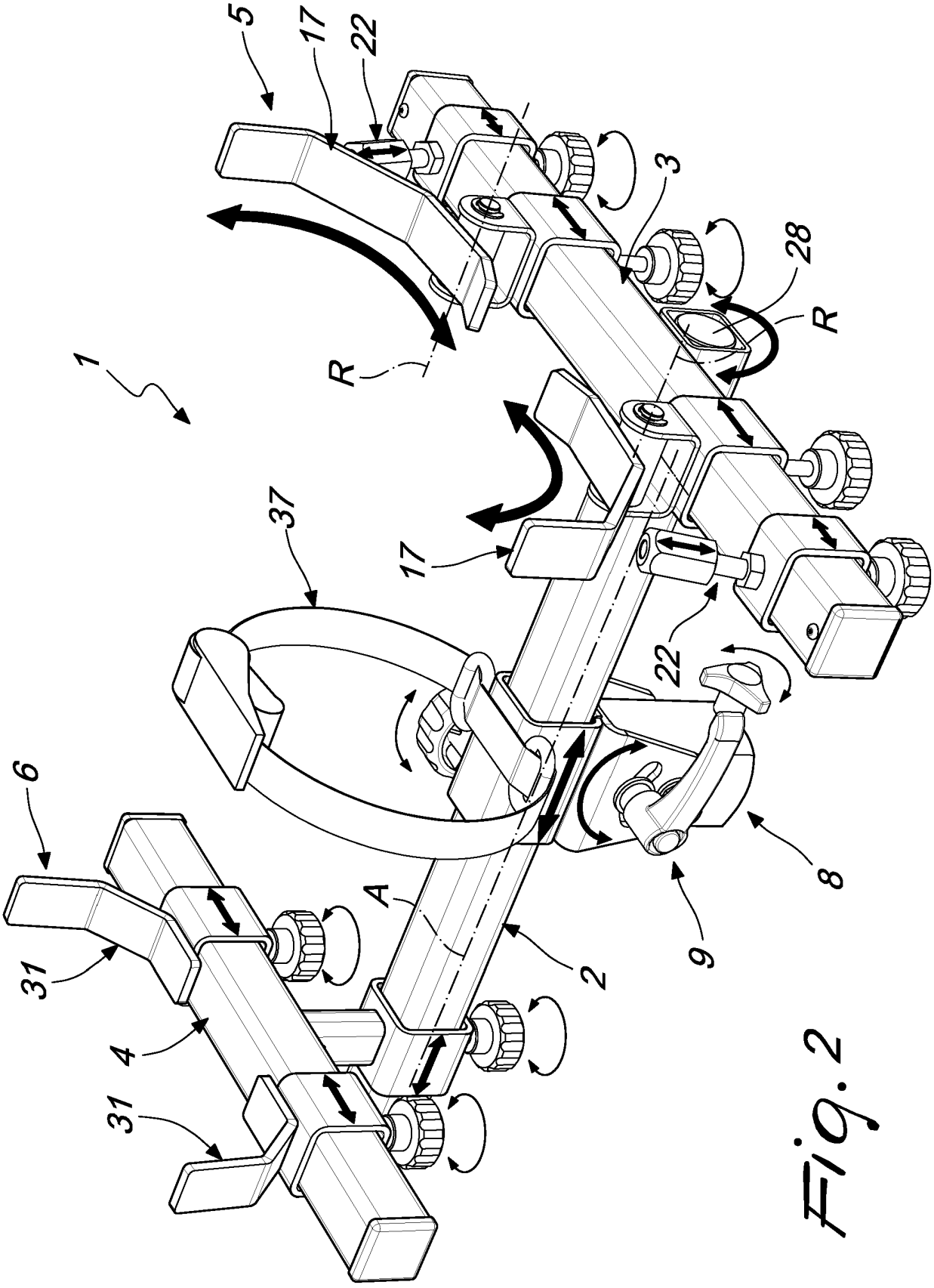
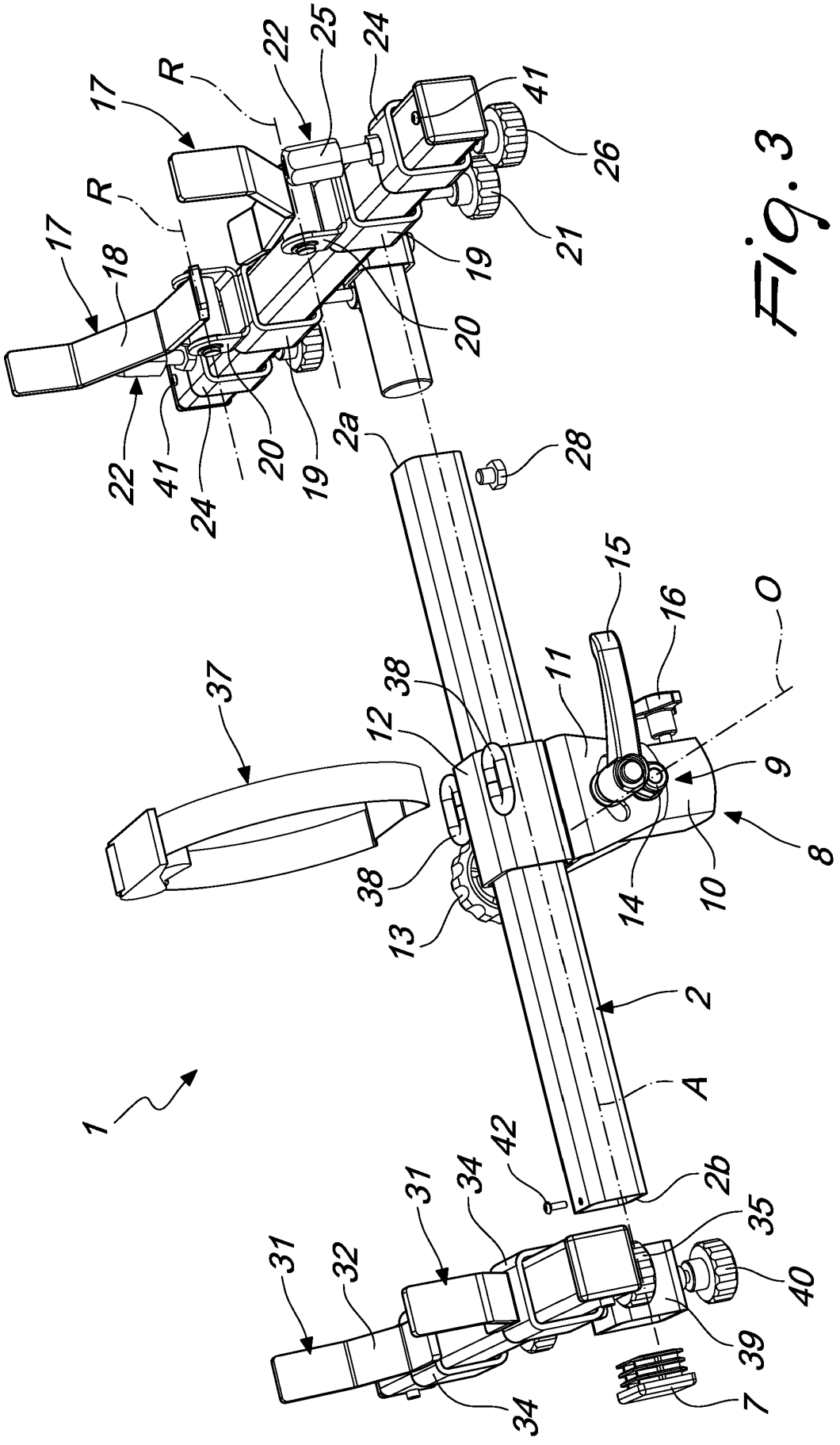


Fig. 2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A
O
R

Fig. 3

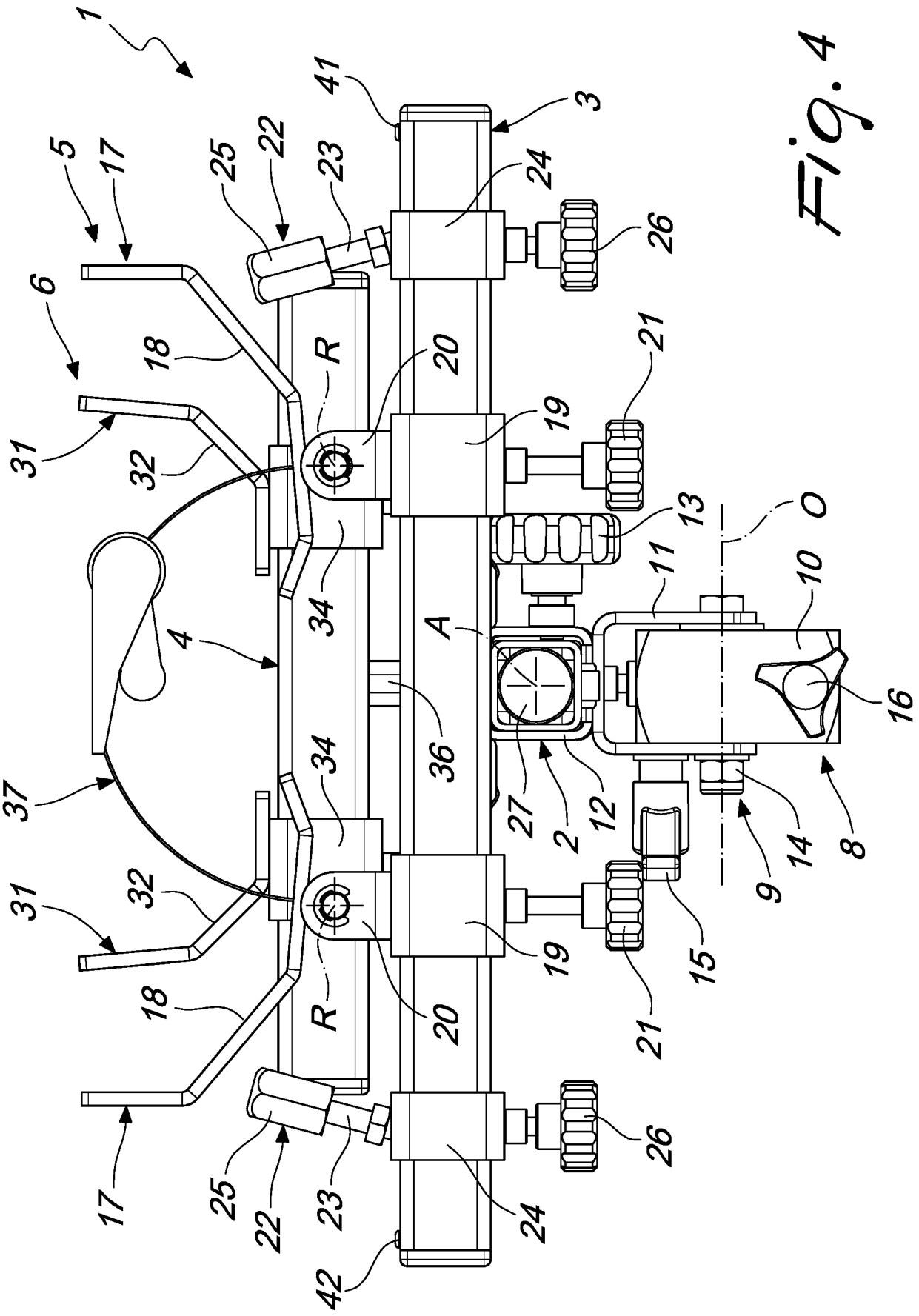
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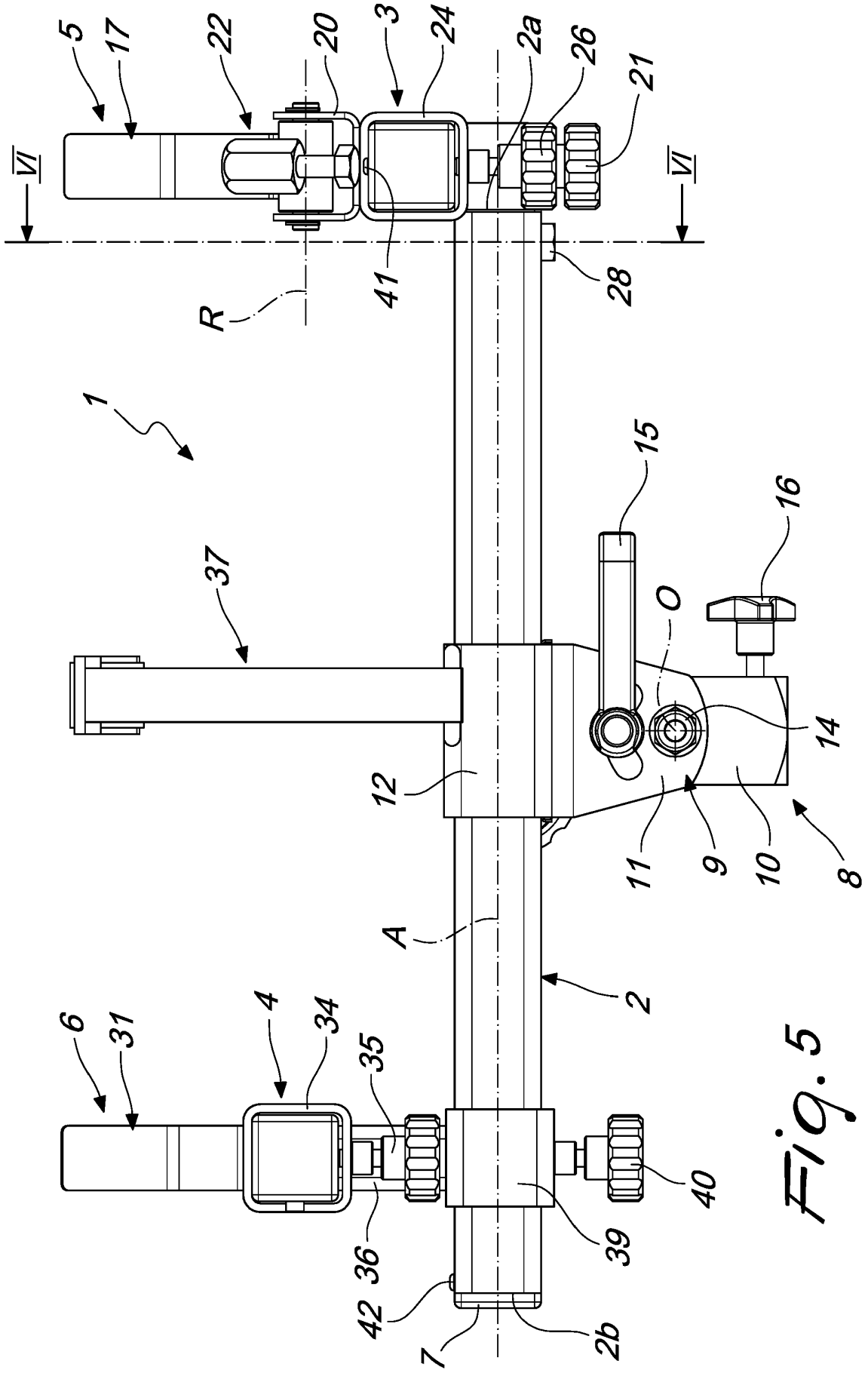
Fig. 4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VII
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2b

Fig. 5

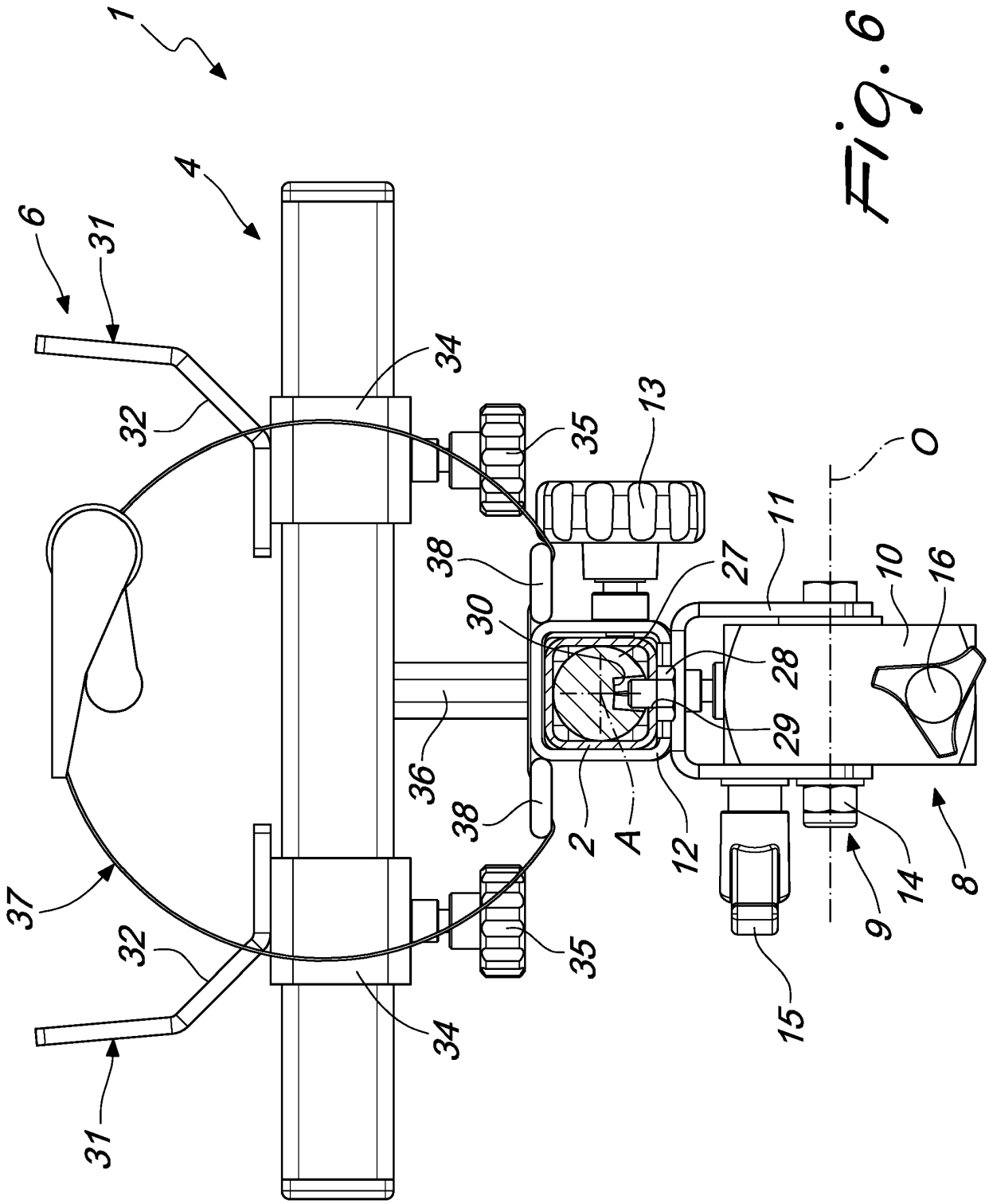

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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