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(54) **LIFTING PLATFORM FOR VEHICLES, OF THE PANTOGRAPH TYPE**

HEBEBÜHNE FÜR STROMABNEHMERFAHRZEUGE

PLATE-FORME DE LEVAGE DE VÉHICULE DE TYPE PANTOGRAPHE

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Description

[0001] The present finding concerns a lifting platform for vehicles, of the pantograph type, according to claim 1.

[0002] Among the various types of lifting machines for vehicles, the use of so-called "lifting platforms" is widespread, that can substantially have two configurations:

- lifting platforms of the so-called "column" type, in which the vehicle is deposited on support arms that can be lifted by means of a trolley that slides vertically on a column that is fixed to the ground;
- lifting platforms of the so-called "pantograph" type, in which the vehicle is arranged and lifted by means of a device consisting of a single or double scissor mechanism, which is actuated by one or more hydraulic jacks.

[0003] More specifically, at the state of the art, the different devices that are suitable for lifting vehicles up to a height that is sufficient so as to allow maintenance operations, can be substantially classified in the following types:

- lifting platforms with two columns, in which the supporting columns are arranged at the front at a certain distance and in which the guides are obtained for just as many trolleys that support a pair of arms; said trolleys, by means of hydraulic cylinders or screw and nutscrew mechanisms, provide for lifting the arms that support the vehicle by means of rubber buffers that rest below the bodywork;
- lifting platforms with four columns, in which the columns themselves are arranged on the vertices of a rectangle and that provide for lifting by means of a hydraulic jack that is arranged horizontally in one of the two support boards on which the vehicle rests with its wheels;
- single or double scissor-type lifting platforms, in which the lifting mechanisms consist of pairs of articulated levers that provide for lifting two support boards on which the vehicle rests by means of one or more hydraulic jacks.

[0004] Operatively, it is required for the vehicle lifting machines to be easy to use and to allow the worker to safely and easily access below the bodywork so as to be able to carry out normal maintenance operations on the mechanical members of the vehicle with maximum freedom of movement.

[0005] In practice, the lifting devices listed above have operation drawbacks that when carrying out certain operations make them very impractical to use.

[0006] As an example, lifting platforms with four columns with vehicles resting on a pair of support boards, take up a considerable amount of space in the workshop even when they are not in use due to the columns, and when they are in use, due to the presence of the support boards, they limit the work that can be carried out under the vehicle. Again as an example, double scissor lifting platforms, with the bodywork of the vehicle resting on a pair of support boards, take up a considerable amount of space in the workshop when they are not in use, whereas when they are in use they have limitations due to the small distance existing between the horizontal plane of the support boards and beneath the bodywork of the vehicles; moreover, on this type of double scissor platform only a small amount of vehicle models can be lifted due to the small dimensions of the support boards.

[0007] As examples of the state of the art we cite the patent documents DE 9208790 U1 and JP H09255292 A.

[0008] The purpose of the present finding is to make a lifting platform that does not have the drawbacks of similar devices of the known type.

[0009] Specifically, the purpose of the finding is that of making a lifting platform that makes it possible for there to be a substantial range of work to be carried out on the vehicle members, total capability of holding the vehicles thanks to the presence of adjustable supporting arms, small bulk in the workshop when the entire structure is not in use and lowers to the ground and moreover, a fundamental condition, allowing it to be used in absolutely safe conditions.

[0010] Such purposes are achieved by making a lifting platform that uses a pantograph mechanism, as the lifting device, which has, on the upper part, a structure that is arranged longitudinally, with small dimensions and where said structure acts as a support for two arms that can be oriented on the horizontal plane, by means of just as many hinge supports, which are fixed outside the structure itself, which make it possible to adjust the aforementioned arms in length, so as to obtain a size that is necessary for supporting the vehicle and allowing there to be, simultaneously, considerable operative space below the bodywork.

[0011] Advantageously, the horizontal structure ,in which said supports are obtained, has small dimensions in the transversal direction, since the supports of the arms that can be oriented are arranged outside the vehicle, so that the fact that there are no actual resting support boards, with a structure consequently having small bulk, ensures that, when the platform is lifted, there is considerable freedom of operation, which makes it possible to comfortably position and lift all types of car models currently existing on the market, while at the same time, requiring minimum bulk when the platform is not in use, due to the fact that there are no supporting columns.

[0012] Moreover, the lifting platform for vehicles made according to the finding is like a pair of lifting platforms, each of which is made up of a base block on which the pairs of lower levers of a pantograph lifting mechanism which is different from common and known pantograph mechanisms in that it is made up, on the upper part, by just as many pairs of levers that, however, are asymmetric, having only the levers facing the external part of the pair of supporting bases on which the supporting arms

are hinged for gripping the vehicle, whereas there are no levers facing the inside part. Moreover, the arms have a slot in the longitudinal direction, which makes it possible in such a way to vary the distance between the point in which each arm is hinged and the centre of the supporting buffer.

[0013] Moreover, the shape of the supports on which the arms are articulated, also allows adjust in the horizontal plane, which is obtained by rotating the arm with respect to the axis of the support; in such a way it is possible to obtain four gripping points, which are arranged at the vertices of a rectangle that is identified by the sides joining the centres of the four supporting buffers.

[0014] Basically, the structure of the arms and of their connections makes it possible, by acting both varying the length along the longitudinal axis, and rotating horizontally the centres of the supporting buffers, to obtain a considerable amount of load bearing rectangles.

[0015] As an example, when there is a vehicle with a wheel base (distance between the axes in the longitudinal direction) and a track (distance in the transversal direction between the centre of the wheels) with small dimensions and therefore with a supporting rectangle that is very small, the gripping is obtained by reducing the distance between the centre of the rubber buffer and the articulation hinge and by orienting the arms in the horizontal plane by the amount necessary so as to form the desired rectangle.

[0016] On the other hand, if it is necessary to operate with a wheel base and a track with greater dimensions and thus with a large supporting rectangle, the gripping is obtained again by acting on the distance between the centre of the buffer and by orienting the arms in the horizontal plane by the amount necessary in order to obtain the desired rectangle.

[0017] The finding shall become clearer and defined with the description of a possible embodiment thereof, given only as a non-limiting example, in which:

- fig. 1 (table I) represents a schematic construction of a pair of lifting platforms according to the finding, which are lifted and arranged in the work step;
- figs. 2 and 3 (table II) represent the front view of two lifting platforms during operation with identical position of the gripping buffers below the bodywork of the vehicle and where, respectively, figure 2 indicates the working condition of an operator located below a lifting platform of the pantograph type configured according to the finding, whereas figure 3 indicates the working condition of an operator located below a lifting platform equipped with a pantograph of the conventional type.

[0018] As visible in figure 1, each lifting platform, wholly indicated with reference numeral 100, consists of a base block 11 on which the supports of the hinges 10 and the guides of the sliding supports 9 are fixed, matched with lower levers 8, which are in turn hinged, at the top, to the corresponding upper levers 5 and 13.

[0019] The lifting mechanism or pantograph is driven by a motor member consisting of one (see in the figure) or more hydraulic jacks 6, which are hinged, at the bottom, on a pin and, at the top, to the pair of upper levers 5 and 13, by means of a shaft 7 or through another device for transmitting the force that is suitable for the purpose of lifting said mechanism.

[0020] In particular, the upper levers 13 arranged outside of each platform are connected through the hinges 4 and the sliding supports 3 to a structure 2 that acts as a support for the load supporting arms 1, whereas the upper levers 5 that are arranged inside of each platform are not connected to the upper part, since the upper levers 5 do not project above the central articulation hinge 20 of the pantograph, so as to leave a wide space available to operate between the structures 2 that support the arms 1.

[0021] The supporting arms 1 are provided with a longitudinal groove 12, which allows each arm to rotate on the horizontal plane, so as to be able to move away or bring closer the centre of support of the bodywork, which is arranged at the load supporting buffers 15, at the centre of the respective hinges arranged on the pair of structures 2. The movement of the arm is obtained by a pair of pins 14, which are provided, on one of the ends, at the top in the case of the figure, with a blocking system that makes it possible to fix each arm to the structure 2.

[0022] In particular the pins 14 are fixed in suitable supports that are obtained outside the structure 2, so as to allow the supporting arms to rotate on the horizontal plane.

[0023] As can be understood from figure 1, the construction, which has inner upper levers 5 with small dimensions in length, makes it possible to obtain a considerable amount of space below the bodywork of the vehicle, since the transverse bulk on the upper part is limited only by the contact with the outer upper levers 13 and the structures 2 that support the arms 1.

[0024] As it can again be understood from figure 1, the particular construction of the structures 2, which each have outside a pair of articulation supports for the load-bearing arms 1, being provided with a groove 12 in the longitudinal direction, makes it possible for there to be a wide possibility of gripping the vehicles, being able to obtain, by means of the two movements, the linear movement and the rotation in the horizontal plane of the centres of the buffers 15, a nearly endless combination of supporting rectangles. In one adjustment modality, by arranging the centre of support of the arms towards the centre of the vehicle, the load rectangle with smallest dimensions is obtained, necessary for gripping vehicles with smaller dimensions, like economy cars; on the contrary, in a different adjustment modality, by arranging the buffers 15 away from the centre of the vehicle, the load rectangle with maximum dimensions is obtained, which is necessary for gripping the largest type of vehicles, like

SUVs, large sedans and long light industrial vans.

[0025] The special characteristics of the lifting platform, according to the finding, which allows considerable accessibility to the members of the vehicle, can be better understood by comparing figures 2 and 3, in which the position of the buffers under the bodywork of the vehicle is identical.

[0026] Figure 2 represents one example of a lifting platform corresponding to the finding 100 and figure 3 represents a conventional lifting platform 101.

[0027] By comparing figures 2 and 3 it is clear in figure 3 that there is limited access to the vehicle with respect to the platform in figure 2 where, on the other hand, the operator can carry out a complete movement of his upper limbs, said movement being indeed allowed by the reduced extension of the inner levers 5.

[0028] The finding thus conceived can undergo modifications and variants and the details can be replaced by technically equivalent elements, providing that these are within the scope of the invention as defined by the claims.

Claims

1. LIFTING PLATFORM FOR VEHICLES (100), OF THE PANTOGRAPH TYPE, in which the lifting mechanisms consist of pairs of articulated levers, of the single scissor or double scissor type, which lifts two pads (15), on which the vehicle sits, by means of one or more drive members (6), such as oil-hydraulic jacks and where both of the lower ends of the levers of the mechanism rest on the structure of a base block (11), said lifting platform (100) being **characterised in that** the upper levers (13) of the pantograph arranged towards the outside are hinged onto a structure (2), which acts as a support for the support arms (1), while the upper levers (5) of the pantograph arranged towards the inside do not project above the central articulation hinge (20) of the pantograph.

2. LIFTING PLATFORM FOR VEHICLES (100), according to claim 1, **characterised in that** on the support structure (2) it has a pair of arms (1) equipped with a groove or slit (12), which allows the distance between the hinge of the arm on the support structure (2) and the centre of the load support pad (15) to be adjusted.

3. LIFTING PLATFORM FOR VEHICLES (100), according to one or more of the previous claims, **characterised in that** it has a support structure (2), in which the guide of the sliding support (3) of the pair of upper outer levers (13) and the supports with the hinges of the adjustable arms (1) are formed.

Patentansprüche

1. HEBEBÜHNE FÜR KRAFTFAHRZEUGE (100) DES SCHEREN-TYPS, wobei die Hebemechanismen aus Paaren von gelenkigen Hebeln des Einfachscheren- oder Doppelscheren-Typs bestehen, welche zwei Flächen (15), auf denen das Fahrzeug aufliegt, mittels eines oder mehrerer Antriebsorgane (6), beispielsweise ölhydraulischer Heber, hebt an, und wobei beide unteren Enden der Hebel des Mechanismus auf der Struktur eines Basisblocks (11) aufliegen, wobei die Hebebühne (100) **dadurch gekennzeichnet ist, dass** die oberen Hebel (13) der Schere, die nach außen angeordnet sind, an einer Struktur (2) angelenkt sind, die als Träger für die Trägerarme (1) dient, während die oberen Hebel (5) der Schere, die nach innen angeordnet sind, nicht über das mittlere Gelenkscharnier (20) der Schere auskragen.

2. HEBEBÜHNE FÜR KRAFTFAHRZEUGE (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** sie auf der Trägerstruktur (2) ein Paar von Armen (1) aufweist, die mit einer Rille oder einem Schlitz (12) versehen sind, die/der die Einstellung des Abstands zwischen dem Scharnier des Armes auf der Trägerstruktur (2) und der Mitte der Lastträgerfläche (15) erlaubt.

3. HEBEBÜHNE FÜR KRAFTFAHRZEUGE (100) nach einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** sie eine Trägerstruktur (2) aufweist, in der die Führung des gleitbeweglichen Trägers (3) des Paares von oberen, äußeren Hebeln (13) und die Träger mit den Scharnieren der einstellbaren Arme (1) gebildet sind.

Revendications

1. PLATE-FORME ELEVATRICE POUR VEHICULES (100), DU TYPE PANTOGRAPHE, dans laquelle les mécanismes élévateurs comprennent des paires de leviers articulés, du type à ciseau unique ou à double ciseau, qui soulèvent deux blocs (15), sur lesquels repose le véhicule, au moyen d'un ou plusieurs éléments d'entraînement (6), tels que des vérins hydrauliques, et où les deux extrémités inférieures des leviers du mécanisme reposent sur la structure d'un bloc de base (11), ladite plate-forme élévatrice (100) étant **caractérisée en ce que** les leviers supérieurs (13) du pantographe agencés vers l'extérieur sont articulés sur une structure (2), qui agit comme un support pour les bras de support (1), alors que les leviers supérieurs (5) du pantographe agencés vers l'intérieur ne font pas saillie au-dessus de la charnière d'articulation centrale (20) du pantographe.

2. PLATE-FORME ELEVATRICE POUR VEHICULES (100), selon la revendication 1, **caractérisée en ce que**, sur la structure de support (2), elle comprend une paire de bras (1) équipés d'une rainure ou fente (12), qui permet de régler la distance entre l'articulation du bras sur la structure de support (2) et le centre du bloc de support de charge (15).

3. PLATE-FORME ELEVATRICE POUR VEHICULES (100), selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'**elle comprend une structure de support (2), dans laquelle le guide du support coulissant (3) de la paire de leviers extérieurs supérieurs (13) et les supports avec les articulations des bras réglables (1) sont formés.

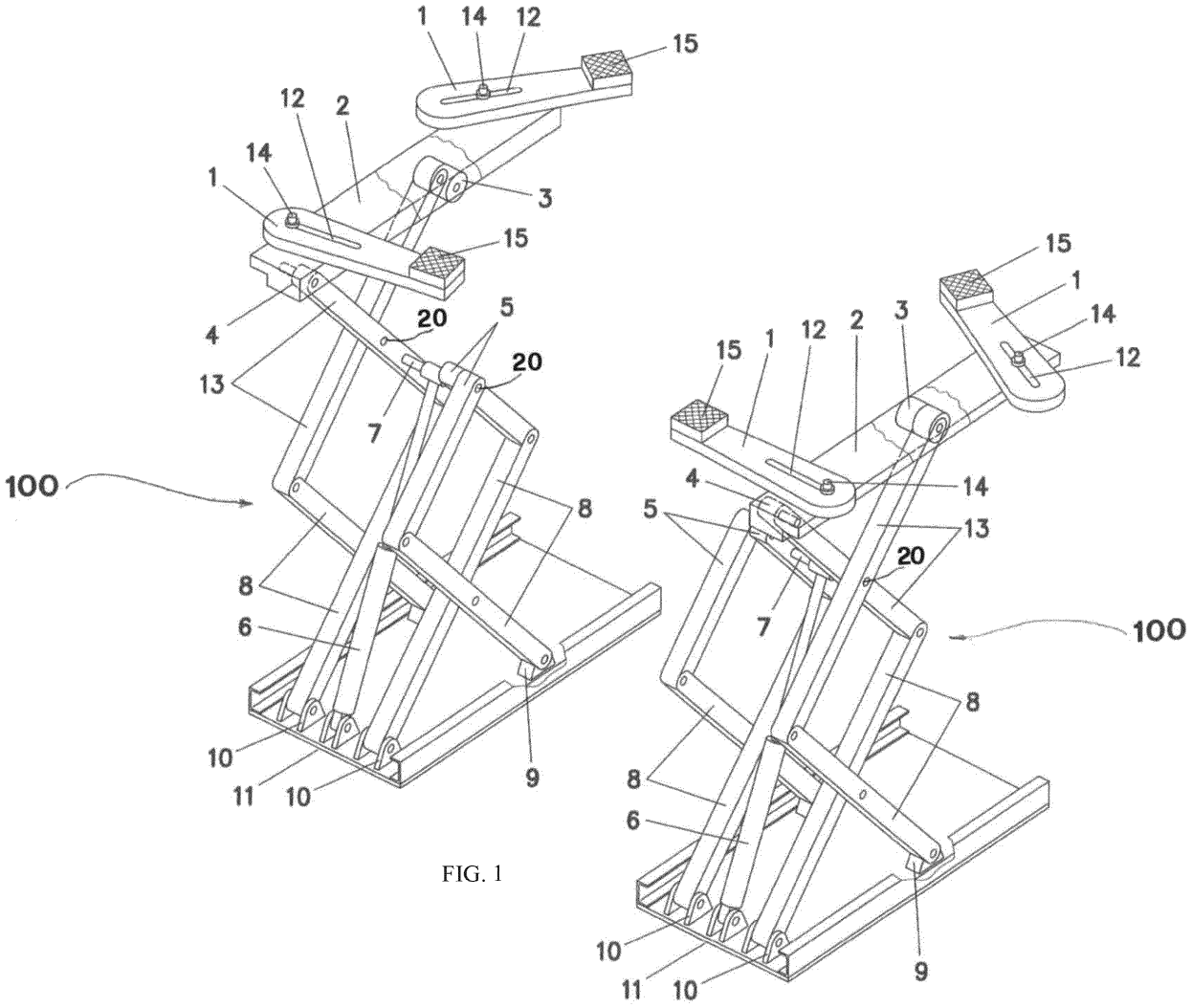
1
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FIG. 1

FIG. 2

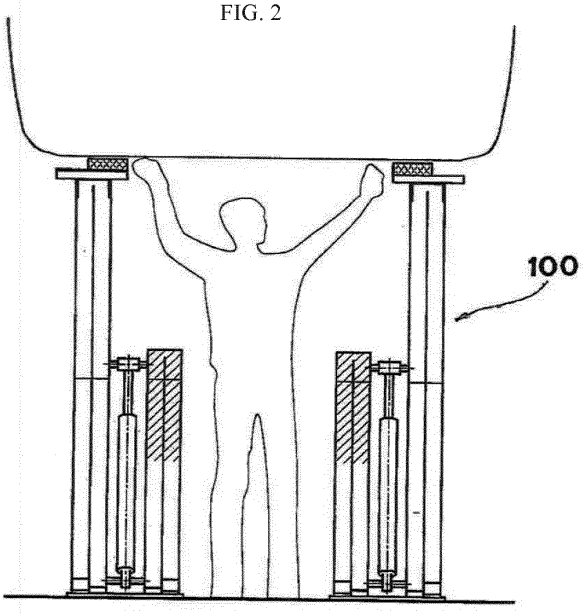
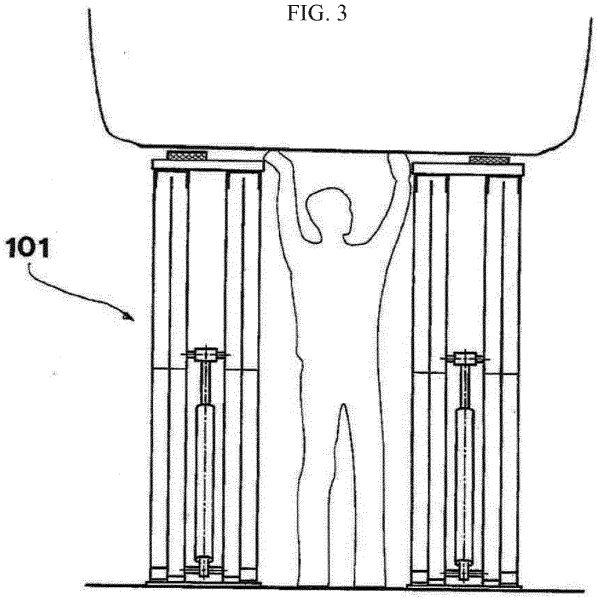


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

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- DE 9208790 U1 **[0007]**
- JP H09255292 A **[0007]**