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DE-A- 2 936 002
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Description

The present invention relates to a vehicle lifting jack for raising and lowering a vehicle for changing a wheel of which the tire has become unusable.

Lifting jacks are known which are Y-shaped comprising a column with a foot for resting on the ground. To the column a lifting arm with a U-shaped stirrup or end support is hinged to support the lifted vehicle. For this purpose the vehicle is provided with corresponding flanges on the underside of the bodywork, which may partly come to rest in a channel of the stirrup. The column and the lifting arm of this type of lifting jack are associated with one another by way of a spindle screwed in a nut pivotably connected to the top of the column, while one end of the spindle is rotatably and pivotably connected to the end of the arm and the other end of the spindle has attached thereto a cranked handle, normally pivotably attached thereto, to operate the jack for lifting or lowering the vehicle. For this purpose the end of the spindle which is rotatably and pivotably connected to the end of the lifting arm is provided with a bearring. Obviously the relative position of the bearing and the nut which is disposed at the top end of the jack column could be reversed.

The base of the column of the known types of lifting jacks, which rests on the ground, moves or rocks relative thereto with the relative tilt of the column varying, since said base is fixedly attached to the column. The stability of the lifting jack is negatively effected, since the initial positioning of the jack to achieve a stable lifting motion and finally the positioning of the vehicle are critical.

There are also known leaf spring or articulated lifting jacks which are formed by arms hingedly connected together in a parallelogram form. The spindle is located on the substantially horizontal diagonal of this parallelogram with one end of the spindle being screwed to a nut which is attached to one of the apexes of the parallelogram and with the other end thereof rotatably attached to the opposite apex of the parallelogram. The spindle projects outwardly beyond one of said apexes for connection with the cranked handle. This type of lifting jack has one base member pivotably attached to the lower apex of the parallelogram to support the jack on the ground and another base member at the upper apex to support the underside of the vehicle bodywork.

In the initial lifting stage the cranked handle of this known lifting jack is located very close to the ground which makes handling difficult, both during the initial lifting and the final lowering phase of the vehicle, and may even cause injury of the hand of an user because of possible ground contact.

Likewise, with both known types of lifting jacks, the corresponding underside of the vehicle bodywork to be lifted is provided with one or more flanges which will be inserted in a groove or a channel of the liftable stirrup, support or base member of the jack, which is V-shaped in cross section. Nevertheless, this shape of the channel-shaped stirrup of the lifting jack does not - depending on the height to which the vehicle is lifted by the user and depending on the initial positioning of the jack relative to the vehicle body as selected by the user - prevent the lower flange of the vehicle body from coming to rest against the narrowest or closest part of the stirrup groove or channel. Therefore the flange of the vehicle may be deformed because of the relative rotation between this part of the vehicle and the stirrup by which it is supported, with a consequent damage to the flange itself and subsequent difficulties in lifting the vehicle on a future occasion with the same jack. Or worse, the flange may become useless or may even break.

From DE-U-89 01 680.7 a vehicle lifting jack according to the preamble of the patent claim is known.

It is the object of the present invention to propose a vehicle lifting jack which overcomes the disadvantages of the known prior art lifting jacks.

This object is achieved by a vehicle lifting jack showing the features as presented in the patent claim.

According to the invention the linking means between the stirrup and the end of the upper rear arm of the parallelogram consist of two respective parallel peripheral channels which are open in opposite directions. These channels are situated on the outer circular surface of the stirrup and form respective circular arcs. In these channels there are engaged respective inwardly folded flanges of the upper arm extension of the parallelogram, which are disposed facing each other and forming respective circular arcs mating with the arcs of said peripheral channels.

By the vehicle lifting jack of the invention the problems mentioned in connection with the known types of lifting jacks are obviated and, among others, the following advantages are provided: lower manufacturing cost for the same height; the possibility of making the stirrup as long as desired with respect to the axis of rotation, without limitations in view of the specific constitution of the relative linking means between the stirrup and the upper arm extension of the parallelogram; better distribution of the weight supported by the stirrup; and better support and guidance of the stirrup on the upper arm extension of the parallelogram.

The vehicle lifting jack of the invention affords the advantages described above, apart from others which will be readily appreciated from an example

of a preferred embodiment described in further detail hereinafter to facilitate the understanding of the features described, disclosing at the same time sundry details. Attached hereto are certain drawings of a preferred embodiment of such a lifting jack which is by no means a restricting example to the scope of the present invention.

Below a vehicle lifting jack according to the invention will be described by reference to the figures. Further advantages and features of the present invention will be disclosed. In the figures:

Figure 1 is a side elevational view of a lifting jack in its folded position with a cranked handle folded away; a jack spindle is shown shematically in phantom line;

Figure 2 is a side elevational view of the jack partly unfolded and engaging with the underside of a vehicle body of which the lower portion of a flange of the vehicle is illustrated in phantom line;

Figure 3 is a side elevational view of the jack in a raised position, corresponding in this case to the position of maximum height, with the vehicle lifted to a raised position, showing a portion of the spindle and a maximum lift stop member; and

Figure 4 is the sectional view A-A' of Figure 2 showing a detail of a pivoted connection of a stirrup to an end of a lifting arm of the jack.

According to the Figures, a vehicle lifting jack is provided with four arms 1, 2, 3 and 4, pivotably connected and forming a parallelogram. The lifting jack is provided with a spindle 5, schematically shown by a center line in Fig. 1 and 2, which is extended along a diagonal of said parallelogram. The angular position of this diagonal changes when the jack is operated as can easily be seen by comparing Figures 1, 2 and 3.

In this embodiment there is a cranked handle 6 connected inseparably and pivotably at a rear end of the spindle 5 and serving as a means by which the spindle 5 is rotated during a lifting or lowering action causing the jack to unfold or fold down, i.e. to lift or lower a stirrup 10 of the jack and the vehicle bodywork engaged therewith. Obviously the spindle 5 may be rotated by other means which may have a separable attachment located between the handle 6 which is suitably shaped and the rear end of the spindle 5 to facilitate easy storage in the vehicle when the jack is not used.

The lower rear arm 2 of said parallelogram has a lower extension 2a serving as support leg for the jack, spacing the parallelogram apart from the floor. Said extension 2a is pivotably connected to a foot 7. To restrict pivoting between the lower extension 2a and the foot 7, stop means may be provided consisting of additional members or members defined by the very shape of the lower edge of the lower extension 2a, as shown in Fig. 1, 2 and 3. Spring means may also be provided to retain the foot 7 in the position shown in Figure 1 when it is folded down. In this embodiment the spring means is a wire spring attached at one end to the lower extension 2a and supported at the other end on the foot 7, having one or more turns wound around the pivot shaft between the lower extension 2a and the foot 7.

The four arms 1 to 4 of the lifting jack may be formed by U-shaped sections connected by respective pivot pins or, in another embodiment, they may be formed by pairs of parallel flat bars spaced apart by respective cores acting as pivot shafts of the arms to form a parallelogram. Suited combinations of such sections may be used in one jack and furthermore the specific configuration of said arms could be any other, depending on manufacturing needs and under consideration of the stress to which they might be exposed.

The foot 7 is provided with two parallel wings, such as the wing 8, to the outside of which there are, in this embodiment, pivotably connected two side members which constitute the lower rear arm 2 with its lower extension 2a. It should be appreciated that each of these two side members is formed by a C-shaped section, although it may obviously be formed, as already mentioned, by any other type or form of sections and even by a single appropriate section.

The front end of the spindle 5 is supported by support or stop means which may consist of a bearing 9 or any other suitable means which, likewise, holds said spindle end in position and facilitates the rotation thereof relative to the front apex of the parallelogram. Said spindle 5 is screwed in threaded or nut means pivotably attached to the rear apex of the parallelogram, i.e., at the upper portion of the lower rear arm 2. This means allows the spindle 5 to move relative to said rear apex of the parallelogram depending on the direction of rotation of the handle 6. The relative position of the bearing 9 or the like and the nut could be reversed, i.e. the latter could be disposed at the front apex of the parallelogram and the bearing 9 at the rear apex thereof.

An upper rear arm 1 of the parallelogram has a short upper extension on which there is disposed the stirrup 10, which is rotatably attached to this arm 1. The stirrup 10 exhibits a cross section similiar to the Greek capital letter omega laying upside down or nearly upside down with respect to the underside of a vehicle bodywork which has to be lifted or lowered. Therefore the stirrup 10 is assembled such that it is able to rotate relative to the end of the upper extension of the upper rear arm 1. The axis of rotation extends in parallel to an ideal or nearly ideal transverse axis perpendicular

or almost perpendicular to the longitudinal axis of the upper rear arm 1.

The end of the upper rear arm 1 is provided with linking means by which it is associated or attached to respective means of the stirrup 10, to allow the latter to rotate around said transverse axis, but to prevent it from moving in a transverse direction. Said linking means between the stirrup 10 and the end of the upper rear arm 1 consist of respective mutually parallel and opppositely facing peripheral channels, such as the channel 11, which are located on the outer circular surface of the stirrup 10, forming respective circular arcs. As shown in Fig. 4 said channels 11 may be defined by a formed flat bar 12 firmly attached, for example by welding, to the circumference of the stirrup 10, most preferably at its central portion. The bar 12 is provided with respective deviations at the parallel end edges thereof which form the channels 11. The bar 12 could be replaced by two narrower, also formed bars 12 and, likewise, said channels 11 could be formed in the stirrup 10 itself by cutting and/or swaging.

Respective inwardly bent flanges 13 provided at the end of the upper rear arm 1 of the parallelogram are engaged with the channels 11 by insertion. Said flanges 13 are disposed facing each other and also forming circular arcs mating with the arcs of the channels 11 of the formed flat bar 12.

In the stirrup 10 there will be freely housed a lower flange 14 provided at the corresponding underside of the vehicle bodywork (shown in part in phantom lines in Figures 2 and 3) which is reinforced in this region to withstand the mechanical stress derived from the force of the stirrup 10 to lift the vehicle. Between the initial lifting position of the vehicle and its final or maximum height position above the ground, the stirrup 10 rotates relative to the end of the upper rear arm 1 in a counterclockwise direction as can be seen at Fig. 2 and 3. The flange 14 of the vehicle is loosely housed in the stirrup 10. Damage to the flange 14 of the vehicle is prevented and safe support of the flange 14 in the stirrup 10 is maintained. Because of the design and the attachment of the stirrup 10 balance of the lifting jack is maintained throughout the complete lifting or lowering operation and, of course, in the final vehicle lifting position during exchange of a faulty wheel.

The spindle 5 may be provided with a stop means such as a bushing 15 to limit the maximum height position of the lifting jack and, at the same time, facilitating easy handling by eliminating possible dead points or points close thereto in the parallelogram mechanism.

Finally, the foot 7 may also be provided with resilient blocks to improve its adherence to the floor or with lower projections in order to enhance its gripping characteristics.

It is easy to gather how the jack may be used, even for an unskilled person. In view of the drawings and the description other or additional features and advantages of the invention will become apparent.

It should be pointed out that in the embodiment of the vehicle lifting jack of the invention, all variations of detail that experience and practice may recommend with regard to forms and dimensions, both absolute and relative, number of component pieces and parts, materials used therein and other accessory details may be applied and also that modifications of constructive detail may be introduced, within the scope of the claims.

Claims

1. A vehicle lifting jack provided with four mutually pivotably attached arms (1 to 4) disposed in a parallelogram form, with a spindle (5) extending along a diagonal of the parallelogram with one end passing through a nut pivotably attached to an apex of the parallelogram and with the other end passing through a cross member which is pivotably attached to the opposite apex of the parallelogram, one end of the spindle (5) being supported by a stop member which rotatably bears against said cross member, preferably through a bearing (9), said spindle (5) being provided, at one of the two ends thereof, with a handle (6), preferably a cranked handle (6), or temporary connection means for a handle (6) for being caused to rotate by the user, one lower arm (2) of the parallelogram extending from one of said apexes and extending below the lower apex, forming a support leg (2a) for the jack, which is pivotably connected to a floor support foot (7), a stirrup (10) for supporting and retaining the vehicle being provided on and rotatably connected to a short upper extension of the upper arm (1) of the parallelogram to which said lower arm is connected, said stirrup (10) having a cross-sectional shape similar to an inverted Greek letter omega, with the ability to rotate relative to the end of the upper arm extension on which it is mounted about an axis perpendicular or nearly perpendicular to the plane of said parallelogram, said upper arm extension being provided with linking means (13) associating it with respective means (12) provided on the stirrup (10) allowing the latter to rotate about said axis but preventing it from moving transversely to said plane,
characterized in that
the linking means (12) of the stirrup (10) consist of two parallel peripheral channels (11),

open in opposite directions, situated on the outer circular surface of the stirrup (10) and forming respective circular arcs, in which channels (11) there are engaged respective inwardly folded flanges (13) of the end of the said upper arm extension (1) and which are disposed facing each other, also forming respective circular arcs mating with the arcs of the peripheral channels (11).

Patentansprüche

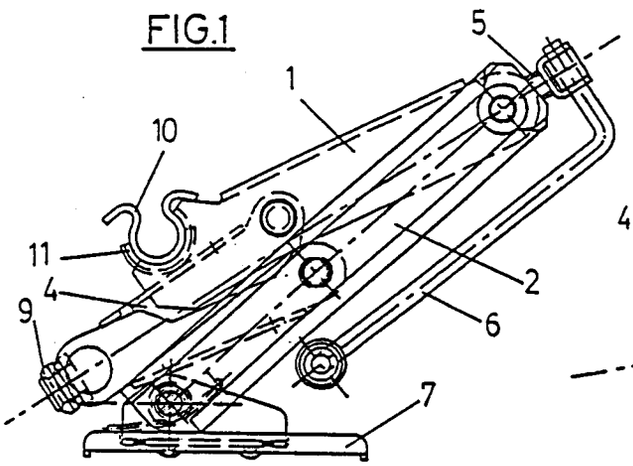
1. Wagenheber, versehen mit vier zueinander schwenkbar miteinander verbundenen Armen (1 - 4), die in der Form eines Parallelogramms angeordnet sind, mit einer Spindel (5), die sich entlang einer Diagonalen des Parallelogramms erstreckt, wobei ein Ende durch eine Mutter hindurchgeht, die schwenkbar an einem Scheitel des Parallelogramms befestigt ist, und wobei das andere Ende durch ein Kreuzbauteil hindurchgeht, welches schwenkbar am gegenüberliegenden Scheitel des Parallelogramms befestigt ist, wobei ein Ende der Spindel (5) durch ein Anschlagbauteil gestützt wird, welches drehbar an dem Kreuzbauteil anliegt, vorzugsweise durch ein Lager (9), wobei die Spindel (5) an einem ihrer beiden Enden mit einem Handgriff (6), vorzugsweise einem Kurbelhandgriff (6), oder Einrichtungen zur vorübergehenden Verbindung für einen Handgriff (6) versehen ist, um vom Benutzer in Drehung versetzt zu werden, wobei ein unterer Arm (2) des Parallelogramms sich von einem der Scheitel und unter den unteren Scheitel erstreckt, wobei ein Stützbein (2a) für den Heber ausgebildet wird, welches schwenkbar an einem Bodenstützfuß (7) befestigt ist, wobei ein Bügel (10) zum Tragen und Halten des Fahrzeugs an einer kurzen oberen Verlängerung des oberen Arms (1) des Parallelogramms vorgesehen und drehbar befestigt ist, mit welchem der untere Arm verbunden ist, wobei der Bügel (10) eine Querschnittsform hat, die derjenigen eines umgedrehten griechischen Buchstabens Omega entspricht, mit der Fähigkeit, sich relativ zum Ende der oberen Armverlängerung zu drehen, auf welcher er um eine Achse montiert ist, die senkrecht oder nahezu senkrecht zur Fläche des Parallelogramms ist, wobei die obere Armverlängerung mit Verbindungseinrichtungen (13) versehen ist, die sie entsprechenden Einrichtungen (12) zuordnen, die am Bügel (10) vorgesehen sind und es dem letzteren gestatten, sich um die Achse zu drehen, es aber verhindern, daß er sich quer zu der Fläche bewegt,
dadurch gekennzeichnet, daß die Verbindungseinrichtungen (12) des Bügels (10) aus zwei parallelen äußeren Kanälen (11) bestehen, die in entgegengesetzten Richtungen offen an der äußeren kreisförmigen Oberfläche des Bügels (10) gelegen sind und jeweilige kreisförmige Bögen ausbilden, wobei jeweils nach innen gefaltete Flansche (13) des Endes der oberen Armverlängerung (1) in diesen Kanälen (11) in Eingriff und einander zugewandt angeordnet sind, wobei ebenfalls jeweilige kreisförmige Bögen ausgebildet werden, die mit den Bögen der äußeren Kanäle (11) zusammenwirken bzw. zusammenpassen.

Revendications

1. Cric de levage pour les véhicules, comportant quatre bras (1 à 4) fixés de façon à pouvoir pivoter mutuellement et disposés en forme de parallélogramme, une tige (5) s'étendant selon une diagonale du parallélogramme et ayant une extrémité traversant un écrou fixé avec une aptitude de pivotement à l'un des sommets du parallélogramme, et une autre extrémité passant à travers un axe transversal fixé avec une aptitude de pivotement au sommet opposé dudit parallélogramme, une extrémité de la tige (5) étant supportée par un organe d'arrêt qui porte, avec une possibilité de rotation, contre ledit axe transversal, de préférence par l'intermédiaire d'un palier (9), ladite tige (5) étant munie, à l'une de ses deux extrémités, d'une poignée (6), de préférence une poignée à manivelle (6), ou de moyens de raccordement provisoire pour une poignée (6) destinée à permettre sa rotation par l'utilisateur, un bras inférieur (2) du parallélogramme s'étendant depuis l'un desdits sommets et se prolongeant sous le sommet inférieur, en formant une jambe d'appui (2a) pour le cric, laquelle est raccordée avec une aptitude de pivotement à un pied d'appui au sol (7), un étrier (10) devant supporter et retenir le véhicule étant monté avec une aptitude de rotation, sur une courte extension supérieure du bras supérieur (1) du parallélogramme, auquel ledit bras inférieur est raccordé, ledit étrier (10) étant de section transversale semblable à la lettre grecque oméga renversée, avec la posssibilité de tourner par rapport à l'extrémité de l'extension du bras supérieur sur laquelle il est monté, autour d'un axe perpendiculaire ou quasi perpendiculaire au plan dudit parallélogramme, ladite extension du bras supérieur étant munie de moyens de liaison (13) l'associant à des moyens respectifs (12) prévus sur l'étrier (10) et permettant à ce dernier de tourner autour dudit axe, mais l'empêchant de se mouvoir

transversalement audit plan, cric caractérisé en ce que les moyens de liaison (12) de l'étrier (10) sont constitués par deux gorges périphériques parallèles (11) ouvertes dans des directions opposées, situées sur la surface circulaire extérieure de l'étrier (10), et formant des arcs de cercle respectifs, gorges (11) dans lesquelles sont engagés des rebords (13) intérieurement repliés de l'extrémité de ladite extension du bras supérieur (1) et disposés en regard l'un de l'autre, en formant eux aussi des arcs de cercle respectifs coopérant avec les arcs des gorges périphériques (11).

FIG.1



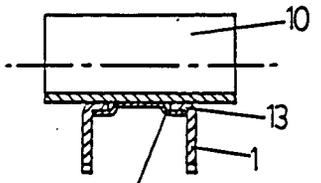


FIG.4

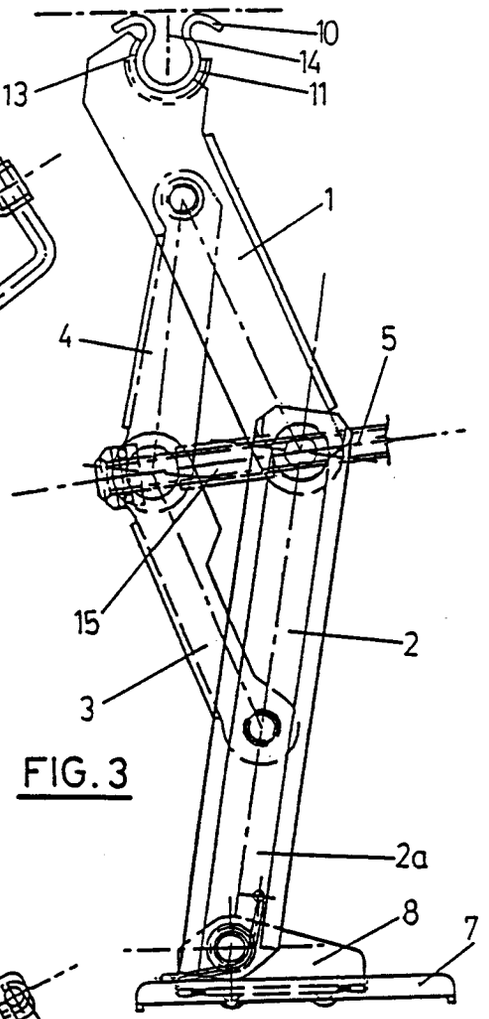


FIG.3

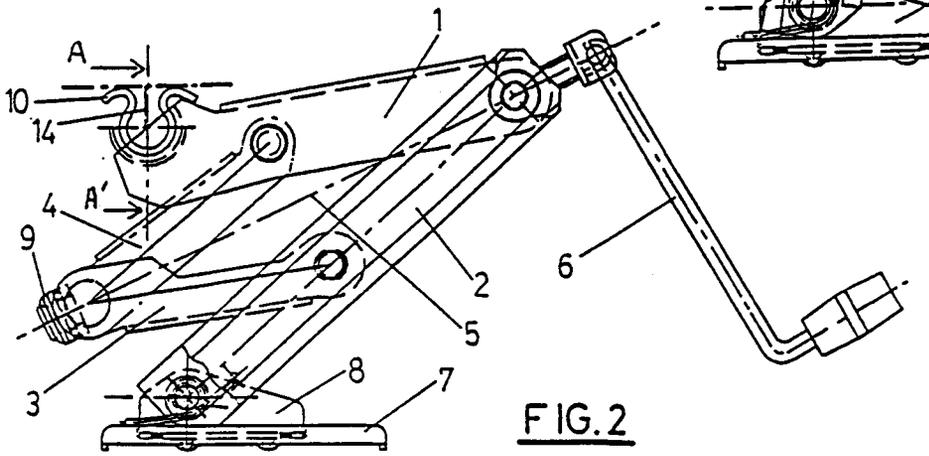


FIG.2