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Description

The invention relates to a vehicle lifting device as defined in the introductory part of claim 1.

A lifting device with two of such columns positioned opposite to one another is known from GB-A-2 045 204. Compared to the also known four-column lifting devices with a drive-on platform construction, a lifting device of this kind has the advantage of occupying less space and a better accessibility of the underside of the vehicle lifted with the lifting device.

Since stringent safety requirements must be fulfilled and the relatively great loads are taken up by only two columns, in the known lifting devices the columns are made from thick metal plate. As guide wheels highly accurate roller bearings are used. Other known lifting devices use columns of less thick metal plate but provided with separate rail profiles which are welded fixedly in the columns and with which accurately machined metal guide wheels on the carriage co-act. Owing to the heavy construction and the accuracy required, the construction of the known two-column vehicle lifting devices is expensive.

The invention now has for its object to provide a vehicle lifting device of the type described in the preamble which can be manufactured more simply and therefore more economically.

According to the invention this object is achieved with the characterizing measures of claim 1.

The height of the columns of the known vehicle lifting devices is limited to about 2.5 metres. Applicant has realised however that there is essentially no objection to making the columns considerably higher and that hereby the carriages can likewise be embodied considerably higher. This provides the advantage that the load of the guide wheels can be greatly limited, whereby the wheels can bear directly on the plate metal of the columns, which can be relatively thin plate metal, so that the manufacturing costs of the lifting device according to the invention are reduced without affecting the stability and security of the device.

It is noted in this respect that with the lifting devices according to the prior art a height must in any case also be available in the workshop such as to enable normal use of the lifting device. There is therefore no objection whatever to embodying the columns of the lifting device according to the invention with the intended height.

Owing to the great height of the carriage achieved with the invention and therefore the great distance from the guide wheels, the reaction forces exerted by the guide wheels as a result of the load of the bearing arms are so small that the wheels can run directly on the folded metal plate of the columns without special provisions, especially to the material of which the wheels are made.

For taking up the reaction forces in the direction

transversely of the wheels the step of claim 2 is preferably applied. Due to the invention these reaction forces are also so small that simple and thus inexpensive slide pieces can suffice.

A favourable embodiment is therein characterized in claim 3.

A very simple assembly is achieved when the wheels are axially slidable on the shaft stumps and the slide pieces have a collar axially enclosing the wheels. Since the slide pieces are themselves also enclosed in the columns, a simple securing or clamp fitting of the slide pieces in the shaft stumps or the wheels can be sufficient.

Partly due to the small loads, the step of claim 5 can be advantageously applied.

With regard to choice of material for the wheels and slide pieces, claims 6 and 7 are preferably applied.

The invention will be further elucidated in the following description in the light of the embodiment shown in the figures.

Fig. 1 shows a partially broken away perspective view of an embodiment of a vehicle lifting device according to the invention.

Fig. 2 shows on a larger scale a partially broken away view according to arrow II in fig. 1.

Fig. 3 shows a simplified section according to III in fig. 2.

The vehicle lifting device 1 according to the invention shown in fig. 1 comprises two hollow columns 2 of sturdy steel plate, which have a substantially C-profile as shown particularly in fig. 3. Each column 2 thus has a channel 4 on one side.

Each column 2 is fixedly welded onto a base plate 11 which is anchored in the ground using bolts 12.

Received into each hollow column 2 is a vertically movable carriage 3 which is provided at its bottom end and top end with guide wheels 5 and 6 respectively. The basic body of the carriage 3 consists of a U-profile. The construction is such that the body of the U-profile of the carriage 3 lies in the channel 4 of the column 2 such that it lies in one plane with the profile parts of the column 2 adjoining the channel 4.

On the bottom end each carriage 3 bears a support construction 7 which protrudes outside the column 2 and to which two bearing arms 8 are pivotally mounted. Integrated into the swivel bearings 10 is an arresting mechanism which can lock the relevant arm 8 in a chosen swivel position. Situated on the end of an extensible portion of each arm 8, which is not further shown in fig. 1, is a carrier 9, the top surface of which can grip a support on the bottom of a vehicle for lifting up. To lift a vehicle the arms 8 are swivelled into such a position and extended so far until all four carriers 9 of the lifting device 1 are situated under a relevant support of the vehicle so that the vehicle can be lifted by the simultaneous movement of the two carriages 3 in both columns 2.

For synchronous upward movement of the carriages 3 the lifting device 1 is provided with drive means. In the embodiment shown these drive means comprise a hydraulic jack 14 mounted in the left-hand column 2 in fig. 1. The cylinder 15 of this jack 14 is fixedly connected to the carriage 3 and the piston rod 16 is fixedly connected at its top end to the column 2. The piston rod 16 has a central bore 36 to the outer end of which is connected a hydraulic oil feed 17. For lifting, hydraulic oil under pressure is pressed via the feed 17 and the bore 36 above the piston into the cylinder 14 whereby the cylinder 14 and therefore the carriage 3 are moved upward.

For synchronous driving of the carriage 3 in the right-hand column 2 in fig. 1 a chain transmission is arranged. This chain transmission comprises a chain 19 which is fixedly mounted on a support 18 forming an entity with the carriage 3. The chain 19 extends downward from this support 18 and runs around a chain wheel 20 that is rotatable about a shaft connected to the column 2.

From the chain wheel 20 the chain extends upward via a chain wheel 21 at the top of the left-hand column 2 through a cross beam 13 mutually joining both columns 2 at their top ends, over a chain wheel 22 at the top of the right-hand column 2 to the right-hand carriage 3. The end of the chain 19 is fixedly connected to the carriage 3 by means of a safety construction 23 not further shown in fig. 2. This safety construction 23 is embodied such that if the chain 19 should break the rod 24 mounted fixedly in the column 2 is gripped immediately, thus preventing the right-hand carriage 3 from falling downward.

Integrated into the left-hand column is a safety device which, during normal use, also prevents undesired downward movement of the carriages 3, for example as a result of a leakage in the hydraulic jack 14. This safety device comprises a hole strip 27 mounted fixedly in the left-hand column with which a ratchet 28 co-acts that is connected pivotally to the left-hand carriage 3 by means of a shaft 29. The ratchet 28 is embodied such that it allows an upward movement but in the case of downward movement grips into a hole in the hole strip 27. To be disengaged from the hole strip 27 the ratchet 28 can be rotated round the shaft 29 in counter-clockwise direction as seen in fig. 2 by an electromagnet 30. This electromagnet 30 is activated when the control device, which is not described further here, receives a command to lower the lifting device.

The described chain transmission ensures that both carriages 3 run synchronously unless, as described, the chain breaks. The right-hand carriage 3 is then instantaneously locked on the rod 24. Chain breakage is moreover detected by a switch means, not further described here, and this switch means generates a signal to the control device whereby the lifting or lowering movement is immediately ended.

Thus is prevented that a car resting on the bearing arms comes to hang at an unacceptable slant and possibly falls from the arms.

The mentioned switch means likewise detects when the chain 19 becomes slack. This can occur when during lowering the right-hand carriage is obstructed by a support or the like accidentally left behind under the device. The lowering movement will in this case also be switched off immediately. These safety devices are otherwise generally per se known. Another per se known safety device is a sensor wire 37 arranged directly beneath the cross beam 13 which activates a switch as soon as the wire 37 is pressed upward, for example by the roof of a vehicle. To prevent damage through contact with the cross beam 13 the lifting movement is then immediately switched off.

As will be apparent from fig. 1, the columns 2 of the lifting device 1 according to the invention have a height such that an automobile can be lifted to a height such that for example a vehicle mechanic can stand upright under the lifted vehicle. This lifting height lies in the order of magnitude of 2 metres. The column height 2 is equal to the sum of this lifting height and the maximum height of a vehicle for lifting with the lifting device. In other words, each column has a height in the order of magnitude of 3.5 metres. As noted earlier, the carriages 3 can hereby have a height in the order of magnitude of 1.5 metres whereby the reaction forces of the wheels 5, 6 in the columns 2 remain very limited as a result of the load on the bearing arms 8.

As is shown particularly clearly in fig. 3, the wheels can hereby run directly on the plate material of the column profiles. As is also particularly clear from fig. 3, the profile of the column 2 in the embodiment shown has U-shaped parts 25, 26 connected on either side of the channel 4 with the open sides facing each other. These U-shaped parts 25, 26 form the wall parts in which the wheels can run.

In the embodiment shown here the wheels 6 are solid wheels of a polyamide type which has good running qualities. The solid wheels 6 are mounted on shaft stumps 32 welded fixedly to the U-profiles of the carriages 3. The wheels 6 are pushed onto the shaft stumps 32 and are each secured by a collar 34 of a slide piece 33 placed with a light grip fitting into a cylindrical recess in the head end of the shaft stumps 32. The slide pieces lie against the connecting wall of each of the U-shaped profile parts 25, 26, or against the oppositely lying wall parts of the column 2. The slide pieces 33 take up the reaction forces in the axial direction of the wheels 5, 6 and thus simultaneously secure the wheels 5, 6 on the relevant shaft stumps. The slide pieces 33 are preferably manufactured from a suitable wear-resistant plastic such as HD-polythene.

The invention is not limited to the embodiment

shown in the figures. In particular, another shape can for instance be chosen for the profile of the columns 2 and the construction of the carriage 3 and the running wheels and slide pieces can be embodied differently. For example a wheel can be made as one entity with a slide piece from a suitable material such as an oil-filled nylon. The drive means for the carriages also have many variation possibilities. Since the columns have a height such that they reach as far as the height of the top of a raised vehicle, it is favourable to employ a cross beam 13 in the manner shown through which for example a chain of the drive means can run. It is also possible however to accommodate a desired connection for the drive means in a threshold.

Claims

1. Vehicle lifting device (1) comprising at least one hollow column (2) folded from metal plate and provided with a lengthwise channel (4), in which a carriage (3) provided with guide wheels (5, 6) is vertically movable, to which carriage (3), via the channel (4), cantilever bearing arms (8) for supporting a vehicle are connected at the bottom end, extending sideways of the column (2), drive means for moving the carriage (3) upward in the column (2) to an uppermost position in which headroom is provided under a vehicle supported by the bearing arms, the column (2) having a profile comprising U-shaped parts (25, 26) connected on either side of the channel (4) with the open sides facing each other, wherein the guide wheels (5, 6) on the carriage (3) comprise a pair of wheels (6) close to the top end and a pair of wheels (5) close to the bottom end of the carriage and wherein the wheels of each pair each run directly in one of the U-shaped profile parts (25, 26), **characterized in that** the column (2) has a height reaching to the height of the highest point of the vehicle in the uppermost position, and the carriage (3) has a height corresponding to the vehicle height.
2. Lifting device as claimed in claim 1, **characterized in that** slide pieces (33) are arranged protruding outside the wheels (6) in axial direction and co-acting with the connecting wall of each of the U-shaped profile parts (25, 26).
3. Lifting device as claimed in claim 2, **characterized in that** the wheels are rotatably mounted onto shaft stumps (32) fixedly connected to the carriage (3) and that the slide pieces (33) are arranged on the head end of the shaft stumps (32).
4. Lifting device as claimed in claim 3, **characterized in that** the wheels (5, 6) are axially slidable

on the shaft stumps (32) and that the slide pieces (33) have a collar (34) axially securing the wheels (5, 6).

5. Lifting device as claimed in any of the foregoing claims, **characterized in that** the wheels (5, 6) are solid plastic wheels.
6. Lifting device as claimed in claim 5, **characterized in that** the material of the wheels is (5, 6) or contains a polyamide.
7. Lifting device as claimed in any of the claims 2-4, **characterized in that** the slide pieces (33) are of HD-polythene.

Patentansprüche

1. Fahrzeughubvorrichtung (1) mit wenigstens einer Hohlsäule (2), die aus Metallblech gebogen und mit einem Längskanal (4) versehen ist, in dem ein mit Führungsrädern (5, 6) versehener Wagen (3) vertikal bewegbar ist, an dessen unterem Ende Tragarme (8) zum Abstützen eines Fahrzeuges über den Kanal befestigt sind, die sich seitwärts zu der Säule (2) erstrecken, und mit Antriebsmitteln zum Aufwärtsbewegen des Wagens (3) in der Säule (2) zu einer oberen Hubposition, in welcher unter einem von den Tragarmen gehaltenen Fahrzeug Raumhöhe geschaffen ist, wobei die Säule (2) ein Profil mit U-förmigen Teilen (25, 26) aufweist, die auf jeder Seite des Kanals (4) mit den offenen Seiten einander zugewandt angeordnet sind, und wobei die Führungsräder (5, 6) am Wagen (3) ein Paar Räder (6) im Bereich des oberen Endes und ein Paar Räder (5) im Bereich des unteren Endes des Wagens umfassen und die Räder jedes Paares direkt in einem der U-förmigen Profiltteile (25, 26) laufen, dadurch **gekennzeichnet**, daß die Säule (2) eine Höhe hat, die bis zur Höhe des höchsten Punktes eines Fahrzeuges in Hubposition reicht, und daß der Wagen (3) eine Höhe entsprechend der Fahrzeughöhe hat.
2. Hubvorrichtung nach Anspruch 1, dadurch **gekennzeichnet**, daß Gleitstücke (33) vorgesehen sind, die außerhalb der Räder (6) in Axialrichtung vorstehen und mit der Verbindungswand jedes der U-förmigen Profiltteile (25, 26) zusammenwirken.
3. Hubvorrichtung nach Anspruch 2, dadurch **gekennzeichnet**, daß die Räder drehbar auf Wellenstümpfen (32) gelagert sind, die an dem Wagen (3) befestigt sind, und daß die Gleitstücke (33) am Kopfende der Wellenstümpfe (32) ange-

ordnet sind.

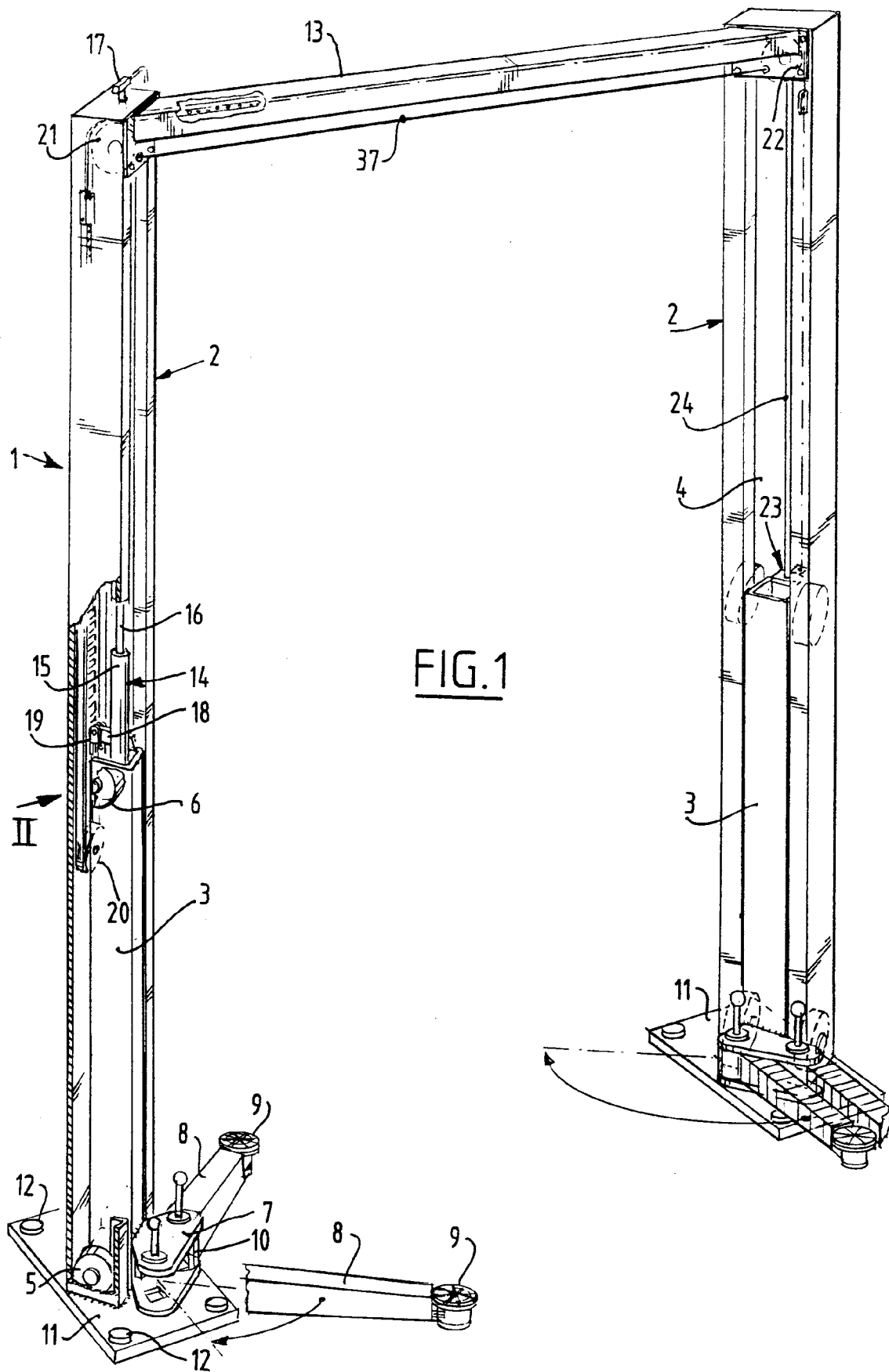
4. Hubvorrichtung nach Anspruch 3, dadurch **gekenn- zeichnet**, daß die Räder (5, 6) auf den Wellenstümpfen (32) axial verschiebbar sind, und daß die Gleitstücke (33) einen Kragen (34) aufweisen, der die Räder (5, 6) axial sichert. 5
5. Hubvorrichtung nach einem der vorstehenden Ansprüche, dadurch **gekennzeichnet**, daß die Räder (5, 6) massive Räder auf Kunststoff sind. 10
6. Hubvorrichtung nach Anspruch 5, dadurch **gekenn- zeichnet**, daß das Material der Räder (5, 6) Polyamid ist oder enthält. 15
7. Hubvorrichtung nach einem der Ansprüche 2 bis 4, dadurch **gekennzeichnet**, daß die Gleitstücke (33) aus HD-Polythen sind. 20

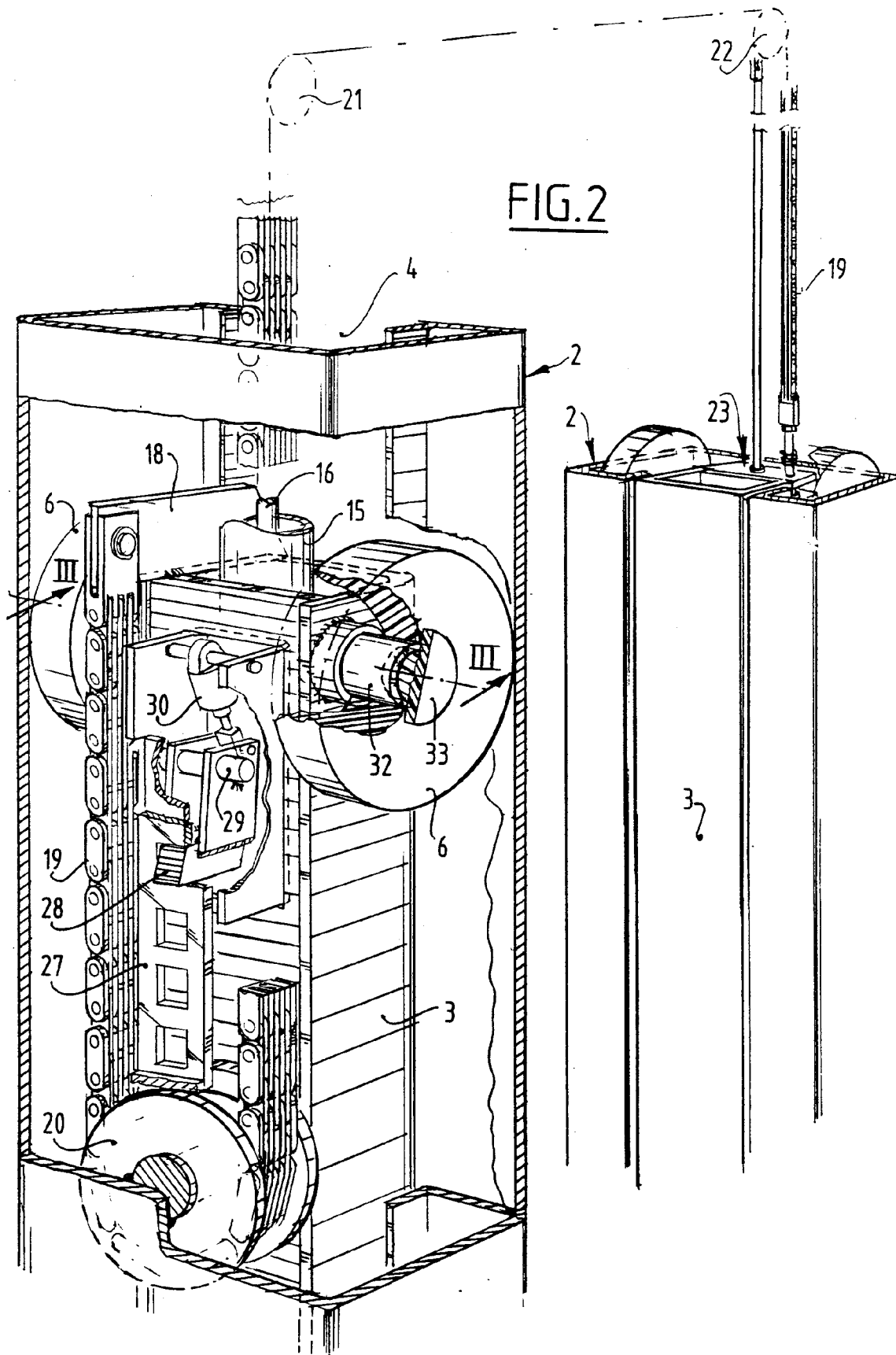
Revendications

1. Dispositif de levage de véhicule (1) comprenant au moins une colonne creuse (2) pliée à partir d'une plaque métallique et pourvue d'un canal longitudinal (4), dans lequel un chariot (3) pourvu de roues de guidage (5, 6) peut se déplacer verticalement, des bras de palier en porte à faux (8) pour supporter un véhicule sont reliés au chariot (3) via le canal (4), à son extrémité inférieure, s'étendant latéralement de la colonne (2), un moyen d'entraînement est prévu pour déplacer le chariot (3) vers le haut dans la colonne (2) vers une position la plus haute, dans laquelle une hauteur de construction est prévue au-dessous d'un véhicule supporté par les bras de palier, la colonne (2) présentant un profilé comprenant des parties en forme de U (25, 26) reliées, sur un côté du canal (4), aux côtés ouverts tournés l'un vers l'autre, dans lequel les roues de guidage (5, 6) situées sur le chariot (3) comprennent un couple de roues (6) à proximité de l'extrémité supérieure et un couple de roues (5) à proximité de l'extrémité inférieure du chariot et dans lequel les roues de chaque couple roulent, chacune, directement, dans l'une des parties à profilé en forme de U (25, 26), caractérisé en ce que la colonne (2) présente une hauteur qui atteint le point le plus élevé du véhicule se trouvant dans la position la plus haute et le chariot (3) présente une hauteur correspondant à la hauteur du véhicule. 25 30 35 40 45 50
2. Dispositif de levage selon la revendication 1, caractérisé en ce que des pièces coulissantes (33) sont agencées de manière à faire saillie vers l'extérieur des roues (6), dans une direction axiale et à coopérer avec la paroi de liaison de chacune 55

des parties à profilé en forme de U (25, 26).

3. Dispositif de levage selon la revendication 1, caractérisé en ce que les roues sont montées tournantes sur des tronçons d'arbre (32). 5
4. Dispositif de levage selon la revendication 3, caractérisé en ce que les roues (5, 6) peuvent coulisser axialement dans les tronçons d'arbre (32) et que les pièces coulissantes (33) présentent un collier (34) fixant axialement les roues (5, 6). 10
5. Dispositif de levage selon l'une quelconque des revendications précédentes, caractérisé en ce que les roues (5, 6) sont des roues rigides en matériau synthétique. 15
6. Dispositif de levage selon la revendication 5, caractérisé en ce que le matériau des roues (5, 6) est ou contient un polyamide. 20
7. Dispositif de levage selon l'une quelconque des revendications 2 à 4, caractérisé en ce que les pièces coulissantes (33) sont constituées de HD-polythène. 25





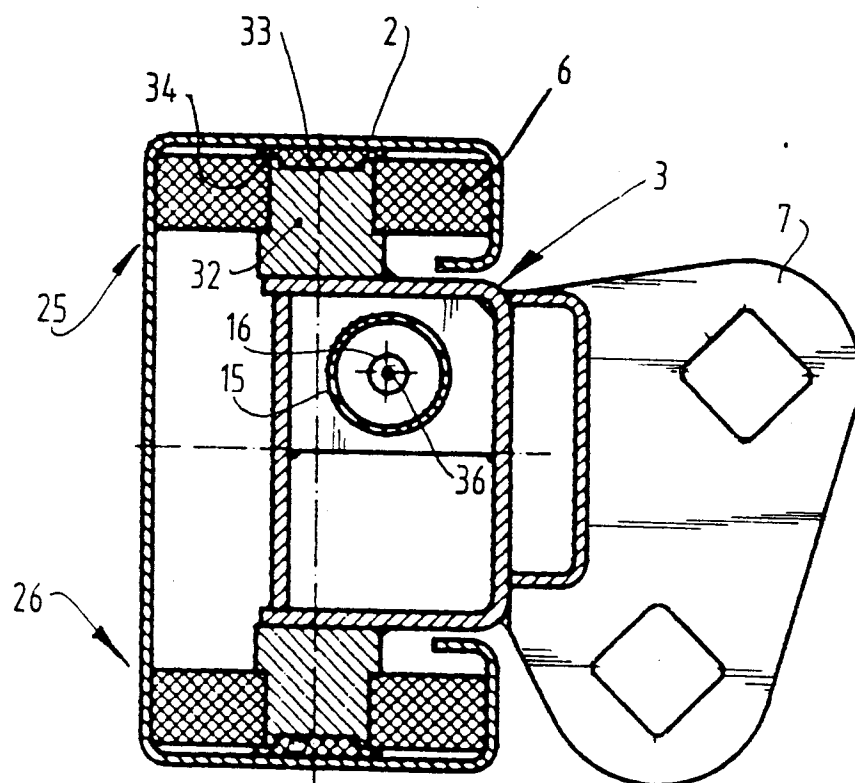


FIG.3