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(54) **Mobile lifting device**

Bewegliche Hebevorrichtung

Dispositif de levage mobile

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Description

[0001] The invention relates to a mobile lifting device for moving objects which are movable on wheels, wherein the device comprises:

- a frame, which is movable over a floor or other surface and has two drive wheels and one steering wheel,
- a steering rod, hingeably connected to the frame, comprising a handle, positioned transversely on one end of the steering rod, for operation and steering of the lifting device by an operator walking behind the device,
- an electric drive for turning the drive wheels, which drive can be operated from the handle,
- a lifting unit which is, in use, at a distance of between 5 cm and 50 cm away from the floor, the lifting unit being movable, in use, over a distance of between 10 cm and 50 cm in a vertical direction transverse to the floor.

[0002] Devices for moving relatively heavy objects, comprising a mobile frame and a lifting device mounted thereon, are known. The known devices frequently comprise an arm which can be introduced under an object to be moved, after which said arm is raised mechanically or hydraulically so that the object in its entirety comes away from the ground. The device, together with the object, is then moved to the desired position, during which operation the wheels of the lifted object are not effective. The disadvantage of the known devices is that these have to have a lifting device with a relatively long stroke in order to raise the objects to be moved off the ground. Furthermore, the lifting mechanism has to be of relatively powerful construction in order to raise the heavy objects in their entirety.

[0003] From Dutch patent application NL-A-9402165 a lifting device for moving hospital beds on wheels according to the preamble of claim 1 is known. The known device can be moved under the bed whereafter a spindle can be operated via an electromotor to partly lift the frontwheels of the bed off the ground. Next, the frame can be moved with the bed where actuating an electric drive motor via a steering rod with a transverse steering handle.

[0004] The known device has as disadvantage that it is relatively large and needs a high clearance to be fit under the bed. Furthermore, due to its relatively large size, the known lifting device is not very manoeuvrable. By the offset position of the lifting device from the driven wheels, these driven wheels may be lifted such that slip may occur and the braking force of the driven wheels is reduced.

One aim of the present invention is to provide a compact lifting device with which relatively heavy objects, such as beds on wheels, can be moved in a simple manner. A further aim of the invention is to provide a lifting device

which is relatively small and easy to operate and with which relatively heavy objects can be transported quietly with little effort, and which provides an improved grip of the driven wheels on the support surface and which has very good braking properties.

[0005] To this end, a mobile lifting device according to the invention is characterized in a, in use, vertical arm connected to two parallel drive arms, each of which is connected by a first end, at a hinge point, located on the vertical arm, to the vertical arm, wherein a second end of the upper drive arm is hingeably connected to a, in use, horizontally movable drive element, and wherein a second end of the lower drive arm is hingeably connected to the frame, the vertical arm being located in proximity to the drive wheel axle.

[0006] As a result of the relatively small stroke of the lifting unit, the parts of the object to be moved which are located close to the lifting unit can be raised over a relatively small distance, whilst the wheel or the wheels of the object which are located some distance away from the lifting unit remain in contact with the ground. In this way, the object to be moved is brought into a position where on one side it rests on the steerable lifting and pulling device, as a result of which the object can be moved in a simple manner and manoeuvred into a desired position. The object to be moved can be, for example, a hospital bed, which is mounted on four wheels. Beds of this type are heavy and in general difficult to manoeuvre, despite the fact that the beds are provided with swivel castors. By using the lifting device according to the invention, two wheels of the bed are raised from the ground and thus rendered inoperative. As a result, the bed can be moved in a simple manner by moving it on its rear wheels and it can be manoeuvred into the correct position without unnecessary effort. By making use of the lifting device according to the invention, it would be possible to dispense with two wheels per hospital bed. The parallelogram-shaped lifting device allows for a very compact construction in the vertical direction as the drive element for the lifting device is formed by a horizontally displaceable power unit. Furthermore, the proximity of the parallelogram arms over the drive wheel axle ensures that the driven wheels are bearing most of the weight resulting in good grip on the support surface and increased braking force.

[0007] The device according to the invention is also suitable for moving objects other than beds, such as, for example, containers, having two or more wheels.

[0008] By using the detachable carrier member the mobile lifting device according to the present invention can be moved beneath a chair, after which the lifting unit is made to engage on the underside of the seat. The chair is raised a number of centimetres from the floor, after which the chair and the person seated thereon can be moved in a simple manner. The lifting unit is preferably provided with a footrest to support the feet of a person seated on the lifted chair. This prevents the feet of the person coming into contact with the floor when the

chair is moved and the person can be moved with a small stroke of the lifting unit.

[0009] Preferably, the lifting and pulling device according to the invention comprises three wheels, the steering wheel being located on a perpendicular bisector of the axle of the drive wheels. The steering wheel can be operated by lateral movement of the steering rod. In this way a very small turning circle of the device can be obtained. Preferably, the steering wheel is pivotably connected to the frame and the steering rod is rigidly connected to the frame.

[0010] Preferably, the lifting device comprises a switch for interrupting the drive for the drive wheels. The switch is actuated when the steering arm is in a furthest vertical position. The steering arm is connected to the frame via a resilient element which pulls said steering arm into the vertical position as soon as the steering rod is released by an operator.

[0011] Furthermore, the handle of the steering rod can have a push-bar switch located close to the centre of the handle. It may happen that when the lifting device is in motion the steering rod becomes trapped below the waist of the operator and can no longer be switched off. In this case the lifting device is immediately deactivated by means of the push-bar switch on the handle of the steering rod. Preferably, both the drive for the wheels and the drive for the lifting unit are electric and the device is provided with a rechargeable battery, preferably 4 rechargeable batteries.

[0012] In a further embodiment of a mobile lifting device according to the invention, a number of attachments are provided which can be attached to the lifting unit to engage on different objects. No tools are needed to connect the attachments. By using the attachments, a large number of different objects, such as mobile beds, mobile containers, food trolleys, order trucks in warehouses, sterilisation trolleys, chairs, mobile pallets and the like, can be moved by a single lifting device according to the invention. By using an attachment with a support wheel it is also possible to move objects which themselves do not have any wheels.

[0013] A few embodiments of a lifting device according to the invention will be explained in more detail with reference to the appended drawing. In the drawing:

Figure 1 shows a side view of a lifting device according to the invention when moving a hospital bed,

Figure 2 shows a side view of a lifting device according to the invention,

Figure 3 shows a top view of the lifting device in Figure 2,

Figure 4 shows a side view of a lifting device comprising a lifting unit for lifting a person seated on a chair,

Figures 5 and 6 show an embodiment of an attachment which can be attached, without the use of tools, to the lifting unit of a lifting device according

to the invention to adapt the device to different geometries of the objects to be moved, and

Figure 7 shows an attachment with an additional support wheel.

[0014] Figure 1 shows a mobile lifting device 1 comprising a frame 3 having two drive wheels 4 and a steering wheel 6. A steering rod 7 is connected to the frame 3 and has a handle 11. A lifting unit 13 with, for example, a claw-shaped element 14 is located at the front of the lifting device 1. The claw-shaped element 14 can be brought into contact with, for example, the frame of a hospital bed 2 mounted on wheels 17, 17'. As shown in Figure 2, the lifting unit 13 comprises a lifting surface 15, a pulling surface 16 and a pushing surface 18. The lifting unit 13 can be moved up and down by operating the handle 11. The lifting device 1 is moved under the frame of the bed 2 with the lifting unit 13 in a lowest position, in which position said unit is at a distance of about at least 5 cm away from the floor 9. The lifting surface 15 is then brought into contact with the frame of the bed 2 and the frame is raised a few centimetres from the ground. As a result the front wheels 17' are raised from the floor 9, whilst the rear wheels 17 remain resting on the floor. The wheels of the lifting device are electrically driven to move forward or in reverse by operation of the handle 11 by an operator 10. This causes the pushing surface 18 or the pulling surface 16 to come into contact with the frame of the bed 2 and said bed is moved over the floor 9, easily steerable in the forward or reverse direction. The effort required on the part of the operator 10 for this operation is restricted to steering of the bed as it is pulled along, which steering can be effected by lateral movement of the steering rod 7.

[0015] Once the bed 2 has arrived at the desired position, the lifting unit 13 is moved downwards so that the frame of the bed comes free from the claw-shaped element 14. The lifting device is then moved away from under the bed. One embodiment of the lifting device 1 is approximately 70 cm long, 40 cm wide (the width direction is perpendicular to the plane of the drawing in Figure 1) and has a maximum height of about 30 cm. In a preferred embodiment, the stroke of the lifting unit 13 is about 11.5 cm. The drive wheels 4 of the lifting device 1 are driven by two electric motors, which are powered by a battery, with battery charger, incorporated in the lifting device. A maximum speed of about 5 km per hour can be reached, with a maximum pulling force of about 750 kg.

[0016] In place of a claw-shaped element 14, the lifting unit 13 can also have, for example, two vertical pins with a rectangular, circular or polygonal cross-section. Using these pins various attachments can be connected which are provided with sleeves which fit over the pins and which can be slid over the pins in a simple manner.

[0017] Preferably, the lifting unit 13 is likewise driven by an electrically powered drive unit with which a load of up to 400 kg can be lifted over a distance of between

10 cm and 50 cm. In many cases it is possible to move the objects mounted on wheels which have to be moved by moving the lifting unit 13 just a few centimetres.

[0018] Figure 2 shows a side view of an embodiment of the lifting device according to the invention. In this figure the steering rod 7 is shown in a shortened version. The lifting device 1 comprises two drive wheels 4 which are rotatable about an axle 26 which is located perpendicular to the plane of the drawing, which axle 26 is rotatably mounted in a bearing 19. A steering wheel 6 is located on the perpendicular bisector of the axle 26. The steering wheel 6 is connected to the frame 3 such that it is rotatable about a vertical shaft and can be operated by moving steering rod 7 in a direction which is perpendicular to the plane of the drawing in Figure 2. Each of the wheels 4 and 5 is driven by an electric motor 36, 36'. The motors 36, 36' are 24 V DC motors which are continuously variable and move the lifting device at a maximum speed of 5 km/h. Each motor 36, 36' is equipped with a planetary reduction mechanism, so that the speed can be adjusted to a low speed range for manoeuvring the lifting device by the operator and can be adjusted to the high speed range for moving the lifting device.

[0019] The motors 36, 36' are powered by a battery set 45. The battery set 45 comprises four 12 V batteries rated at 18 A hours. Motors 36, 36' drive the wheels 4 and 5 in a forward or reverse direction over the floor 9 in response to rotation of a handle 11 by the operator in a direction away from the operator or towards the operator.

[0020] The claw-shaped element 14 of the lifting unit 13 comprises a vertical arm 31 which is connected at two hinge points 34, 34' to an upper drive arm 33 and a lower drive arm 32. Instead of being constructed with a claw-shaped element 14, the lifting unit 13 can be constructed as one or more flattened vertical tubes over which a separate attachment, such as a claw-shaped element, can be placed. This is shown diagrammatically in Figure 6.

[0021] One end of the upper drive arm 33 is hingeably connected at a hinge point 30' to electric lifting motor 40. The lower drive arm 32 is connected to the frame 3 at hinge point 30. By sliding out a rod 46, the claw-shaped element 14 is moved downward into a position which is indicated by a broken line. A rear of the lifting motor 40 is connected at a hinge point 47 so that the position of the lifting motor can vary when the rod 46 slides out. In this way a powerful vertical lifting movement can be obtained with a relatively short horizontal stroke of the lifting motor 40. A suitable lifting motor 40 is a 24 V DC motor with a permanent magnet, such as is manufactured by LINAK under model number Model LA28.

[0022] One end of the steering rod 7 is connected to a gas spring 38 so that the steering rod is pulled into a vertical position by the gas spring. When it reaches this position the steering rod 7 actuates a switch 37 which interrupts the power supply to the motors 36, 36'. As a

result, the lifting device 1 is not able to move on its own after the steering rod 7 has been released by an operator.

[0023] A control panel 8 is located on the handle 11 of the steering rod 7. Control buttons for moving the lifting unit 13 are accommodated on this panel. A push-bar switch 39 is accommodated on an operator side of the control panel 8, which push-bar switch 39 extends over virtually the entire width, located transverse to the plane of the drawing, of the control panel 8 (about 20 cm). Pressing push-bar switch 39 interrupts the power supply from the battery 45 to the motors 36, 36'. This prevents the operator from becoming trapped by the control rod 7 of the moving lifting device when the lifting device 1 is reversing.

[0024] The lifting device 1 is covered by a plastic protective cover 20, for example a cover made of ABS-AP-DF material.

[0025] Figure 3 shows a top view of the lifting device 1 in Figure 2. The motors 36, 36' are connected via a chain to the axle 26. A battery charger 29 and a control box 49 are accommodated on either side of the lifting motor 40. The control box 49 contains a 24 V electronic voltage control, a 30 A thermal fuse for each motor 36, 36' and a 5 A thermal fuse for the lifting motor 40.

[0026] Figure 4 shows a mobile lifting device in which a detachable attachment 52 has been placed in the claw-shaped elements 14 of the lifting unit 13. The attachment 52 comprises two parallel arms 54, only one arm of which is visible in the side view in Figure 4, which arms can be brought into contact with an underside of a chair. In this way a chair and the person seated thereon can be lifted from the ground and transported. During transportation, the feet of the person seated on the chair rest on the footrest 25 of the attachment 52.

[0027] Figures 5 and 6 show a separate attachment 52, which can have a number of different shapes, for attachment to the lifting unit 13, without tools being required for this. By using attachments such as those shown in Figures 5 and 6, the lifting device can be adapted to different geometries of objects to be moved, which objects can be mobile pallets, food trolleys, linen trolleys, waste containers, sterilisation trolleys, order trucks in warehouses, etc.

[0028] Figure 7 shows an attachment 52 which has an extendable support wheel 55. The support wheel 55 allows relatively heavy objects to be transported on two arms 54, only one arm of which is visible in the side view in Figure 7, which objects do not have any wheels permanently attached to such an object. The support wheel 55 acts as a running wheel for the objects and prevents the lifting device from tipping forwards when lifting and moving the objects. As is shown in Figure 7, the wheel 55 is mounted in a sleeve 56 and can slide therein in the vertical direction. A steel cable 58 is attached to a top of the wheel suspension 57 and drops down in a vertical channel which extends over the entire length of the sleeve 56.

[0029] The cable 58 is fed via a guide 61 to a bracket 59 which is attached to a front of the frame 3. The cable end 60 is attached to the arms 54. When the attachment 52 is lifted by the lifting unit 13, the cable 58 is tensioned and the support wheel 55 is pressed onto the floor 9. By this means relatively heavy objects can be lifted and moved using an arm which is relatively long compared with the lifting unit 13.

Claims

1. Mobile lifting device (1) for moving objects (2) which are movable on wheels, comprising:

- a frame (3), which is movable over a floor or other surface and which has two drive wheels (4, 5) rotatable around a drive wheel axle (26) and one steering wheel (6),
- a steering rod (7), hingeably connected to the frame (3), comprising a handle (11), positioned transversely on one end of the steering rod (7), for operation and steering of the lifting device by an operator walking behind the device,
- an electric drive (36, 36') for turning the drive wheels (4, 5), which drive can be operated from the handle (11),
- a lifting unit (13) which is, in use, at a distance of between 5 cm and 50 cm away from the floor (9), the lifting unit (13) being movable, in use, over a distance of between 10 cm and 50 cm in a vertical direction transverse to the floor, **characterized in a**, in use, vertical arm (31) connected to two parallel drive arms (32, 33), each of which is connected by a first end, at a hinge point (34, 34'), located on the vertical arm (31), to the vertical arm, wherein a second end of the upper drive arm (33) is hingeably connected to a, in use, horizontally movable drive element (40, 46), and wherein a second end of the lower drive arm (32) is hingeably connected to the frame (3), the vertical arm (31) being located in proximity to the drive wheel axle (26).

2. Mobile lifting device (1) according to claim 1, **characterized in that** the device has at least one attachment (52) which can be detachably attached, without the use of tools, to the lifting unit (13), for lifting different objects.

3. Mobile lifting device (1) according to claim 1 or 2, wherein the lifting unit comprises a coupling element firmly connected to the lifting device and an attachment (52) which is detachable from the coupling element and can be detachably coupled, without the use of tools, to the coupling element for the lifting different objects.

4. Mobile lifting device (1) according to any of the preceding claims for moving a person seated on a chair, wherein the lifting unit (13) comprises two arms (54) located parallel to the floor (9), which arms (54) extends above the frame to engage on a seat of a chair.

5. Mobile lifting device (1) according to claim 4, **characterized in that** the lifting unit (13) is provided with a footrest (25) for supporting the feet of a person seated on a lifted chair.

6. Mobile lifting device (1) according to one of the preceding claims, **characterized in that** the lifting device has three wheels (4, 5, 6), wherein the steering wheel (6) is located on a perpendicular bisector of the axles (26) of the drive wheels (4, 5), is rotatable about a shaft oriented transversely to the floor and can be swivelled by lateral movement of the control rod (7).

7. Mobile lifting device (1) according to one of the preceding claims, **characterized in that** the lifting device has the at least one vertical arm (31) which is provided at one end with a claw-shaped element (14) comprising a lifting surface (15), a pulling surface (16), positioned transversely to the lifting surface, and a pushing surface (18), for engaging on an object to be moved.

8. Mobile lifting device (1) according to one of the preceding claims, **characterized in that** the device has a switch (37) for interrupting the drive to the drive wheels (4, 5), and wherein the steering arm (7) is connected via a resilient element (39) to the frame (3) so that, when it is released, the steering arm (7) is in a virtually vertical position and actuates the switch (37).

9. Mobile lifting device (1) according to one of the preceding claims, **characterized in that** the handle (11) has a push-bar switch (39), located close to the centre of the handle, for interrupting the drive to the drive wheels when said switch comes into contact with the body of the operator.

10. Mobile lifting device (1) according to one of the preceding claims, **characterized in that** the lifting device is connected to an electric lifting motor (40).

Patentansprüche

1. Mobile Hebevorrichtung (1) zum Bewegen von Objekten (2), die auf Rädern verfahrbar sind, wobei die Hebevorrichtung folgendes aufweist:

- einen Rahmen (3), der über einen Boden oder

eine andere Oberfläche bewegbar ist und der zwei Antriebsräder (4, 5), die um eine Antriebsradachse (26) herum drehbar sind, sowie ein Lenkrad (6) besitzt,

- eine Lenkstange (7), die mit dem Rahmen (3) gelenkig verbunden ist und einen Griff (11) aufweist, der an dem einen Ende der Lenkstange (7) quer positioniert ist, zum Betätigen und Lenken der Hebevorrichtung durch einen hinter der Vorrichtung gehenden Bediener, 5
- einen Elektroantrieb (36, 36') zum Drehen der Antriebsräder (4, 5), wobei der Antrieb von dem Griff (11) aus betätigbar ist, 10
- eine Hebeeinheit (13), die im Gebrauch um eine Strecke zwischen 5 cm und 50 cm von dem Boden (9) entfernt ist, wobei die Hebeeinheit (13) im Gebrauch über eine Strecke zwischen 10 cm und 50 cm in einer Vertikalrichtung quer zu dem Boden bewegbar ist, **gekennzeichnet** durch einen im Gebrauch vertikalen Arm (31), 15
der mit zwei parallelen Antriebsarmen (32, 33) verbunden ist, von denen jeder an einem ersten Ende an einem an dem Arm (31) angeordneten Schwenkpunkt (34, 34') mit dem vertikalen Arm verbunden ist, 20
25

wobei ein zweites Ende des oberen Antriebsarms (33) mit einem im Gebrauch horizontal bewegbaren Antriebselement (40, 46) gelenkig verbunden ist und wobei ein zweites Ende des unteren Antriebsarms (32) mit dem Rahmen (3) gelenkig verbunden ist, wobei der vertikale Arm (31) in der Nähe der Antriebsradachse (26) angeordnet ist. 30

2. Mobile Hebevorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet**, 35
daß die Vorrichtung mindestens eine Halterung (52) hat, die ohne Verwendung von Werkzeugen an der Hebeeinheit (13) zum Heben verschiedener Objekte abnehmbar anbringbar ist. 40
3. Mobile Hebevorrichtung (1) nach Anspruch 1 oder 2, 45
wobei die Hebeeinheit ein Kupplungselement, das mit der Hebevorrichtung fest verbunden ist, und eine Halterung (52) aufweist, die von dem Kupplungselement abnehmbar und ohne Verwendung von Werkzeugen mit dem Kupplungselement zum Heben verschiedener Objekte abnehmbar koppelbar ist. 50
4. Mobile Hebevorrichtung (1) nach einem der vorhergehenden Ansprüche zum Bewegen einer auf einem Stuhl sitzenden Person, 55
wobei die Hebeeinheit (13) zwei Arme (54) aufweist, die parallel zu dem Boden (9) angeordnet sind, wobei sich die Arme (54) oberhalb des Rahmens erstrecken, um mit einem Sitz eines Stuhls in

Eingriff zu gelangen.

5. Mobile Hebevorrichtung (1) nach Anspruch 4, **dadurch gekennzeichnet**,
daß die Hebeeinheit (13) mit einer Fußstütze (25) zum Abstützen der Füße einer auf einem angeordneten Stuhl sitzenden Person versehen ist.
6. Mobile Hebevorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**,
daß die Hebevorrichtung drei Räder (4, 5, 6) hat, wobei das Lenkrad (6) auf einer senkrechten Symmetrielinie der Achsen (26) der Antriebsräder (4, 5) angeordnet ist, um eine quer zu dem Boden orientierte Achse drehbar ist und durch eine seitliche Bewegung der Steuerstange (7) schwenkbar ist.
7. Mobile Hebevorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**,
daß die Hebevorrichtung den mindestens einen vertikalen Arm (31) aufweist, der an dem einen Ende mit einem klauenförmigen Element (14) versehen ist, das eine Hebeoberfläche (15), eine Ziehoberfläche (16), die quer zu der Hebeoberfläche positioniert ist, und eine Schieboberfläche (18) zum Eingriff mit einem zu bewegenden Objekt aufweist.
8. Mobile Hebevorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**,
daß die Vorrichtung einen Schalter (37) zum Unterbrechen des Antriebs der Antriebsräder (4, 5) hat und wobei der Lenkarm (7) über ein elastisches Element (38) mit dem Rahmen (3) verbunden ist, so daß dann, wenn es gelöst wird, der Lenkarm (7) in einer praktisch vertikalen Position ist und den Schalter (37) betätigt.
9. Mobile Hebevorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**,
daß der Griff (11) einen Druckstangenschalter (39) hat, der in der Nähe der Mitte des Griffs angeordnet ist, zum Unterbrechen des Antriebs der Antriebsräder, wenn der Schalter mit dem Körper des Bedieners in Berührung kommt.
10. Mobile Hebevorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**,
daß die Hebevorrichtung mit einem elektrischen Hebemotor (40) verbunden ist.

Revendications

1. Dispositif élévateur mobile (1) pour déplacer des objets (2) qui sont mobiles sur des roues, comprenant :

un châssis (3) qui est mobile sur un sol ou une autre surface et qui possède deux roues motrices (4, 5) pouvant tourner autour d'un essieu de roue motrice (26) et une roue directrice (6), une bielle de direction (7) reliée de manière articulée au châssis (3), comprenant un manche (11) positionné transversalement à une extrémité de la bielle de direction (7), pour l'actionnement et la direction du dispositif élévateur par un opérateur marchant derrière le dispositif, un entraînement électrique (36, 36') pour faire tourner les roues motrices (4, 5), lequel entraînement peut être actionné depuis le manche (11),

une unité élévatrice (13) qui est, en utilisation, à une distance comprise entre 5 cm et 50 cm du sol (9), l'unité élévatrice (13) étant mobile, en utilisation, sur une distance comprise entre 10 cm et 50 cm dans une direction verticale transversale au sol, **caractérisé par**, en utilisation, un bras vertical (31) relié à deux bras d'entraînement parallèles (32, 33), dont chacun est relié par une première extrémité, au niveau d'un point d'articulation (34, 34'), situé sur le bras vertical (31), au bras vertical, dans lequel une seconde extrémité du bras d'entraînement supérieur (33) est reliée de manière articulée à un élément d'entraînement horizontalement mobile (40, 46), en utilisation, et dans lequel une seconde extrémité du bras d'entraînement inférieur (32) est reliée de manière articulée au châssis (3), le bras vertical (31) étant situé à proximité de l'essieu de roue motrice (26).

2. Dispositif élévateur mobile (1) selon la revendication 1, **caractérisé en ce que** le dispositif possède au moins une fixation (52) qui peut être fixée de manière amovible, sans avoir à utiliser d'outils, à l'unité élévatrice (13), pour soulever différents objets.

3. Dispositif élévateur mobile (1) selon la revendication 1 ou 2, dans lequel l'unité élévatrice comprend un élément d'accouplement solidement relié au dispositif élévateur et une fixation (52) qui peut être séparée de l'élément d'accouplement et peut être accouplée de manière amovible, sans avoir à utiliser d'outils, à l'élément d'accouplement pour soulever différents objets.

4. Dispositif élévateur mobile (1) selon l'une quelconque des revendications précédentes, destiné à déplacer une personne assise sur une chaise, dans

lequel l'unité élévatrice (13) comprend deux bras (54) situés parallèlement au sol (9), lesquels bras (54) s'étendent au-dessus du châssis pour venir en prise avec une assise de chaise.

5. Dispositif élévateur mobile (1) selon la revendication 4, **caractérisé en ce que** l'unité élévatrice (13) est munie d'un repose-pied (25) pour soutenir les pieds d'une personne assise sur une chaise soulevée.

6. Dispositif élévateur mobile (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le dispositif élévateur possède trois roues (4, 5, 6), dans lequel la roue directrice (6) est située sur une bissectrice perpendiculaire des essieux (26) des roues motrices (4, 5), peut tourner autour d'un arbre orienté transversalement au sol et peut être pivoté par le déplacement latéral de la tige de commande (7).

7. Dispositif élévateur mobile (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le dispositif élévateur possède l'au moins un bras vertical (31) qui est muni, à une extrémité, d'un élément en forme de griffe (14) comprenant une surface élévatrice (15), une surface de traction (16), placée transversalement à la surface élévatrice, et une surface de poussée (18), pour venir en prise sur un objet à déplacer.

8. Dispositif élévateur mobile (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le dispositif possède un commutateur (37) pour interrompre l'entraînement transmis aux roues motrices (4, 5), et dans lequel le bras de direction (7) est relié, par l'intermédiaire d'un élément résilient (39), au châssis (3), de telle sorte que, lorsqu'il est libéré, le bras de direction (7) soit dans une position pratiquement verticale et actionne le commutateur (37).

9. Dispositif élévateur mobile (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le manche (11) possède un commutateur à barre de poussée (39), situé à proximité du centre du manche, pour interrompre l'entraînement transmis aux roues motrices lorsque ledit commutateur entre en contact avec le corps de l'opérateur.

10. Dispositif élévateur mobile (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le dispositif élévateur est relié à un moteur électrique d'élévation (40).

fig -1

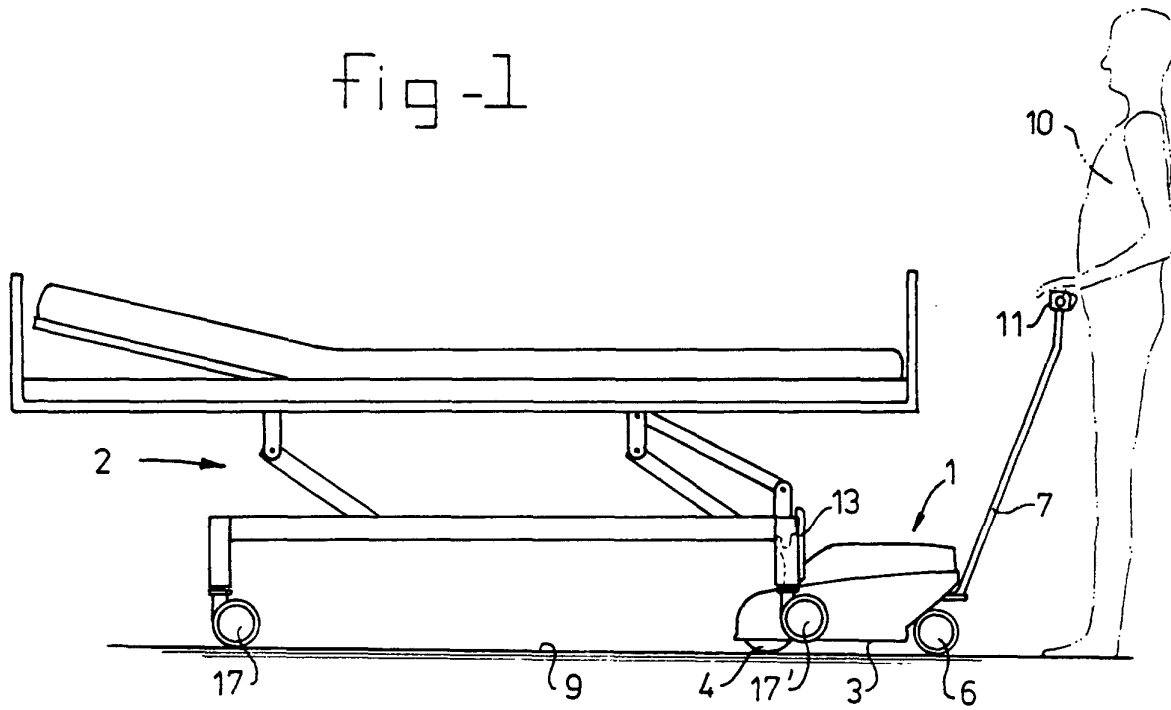


fig -2

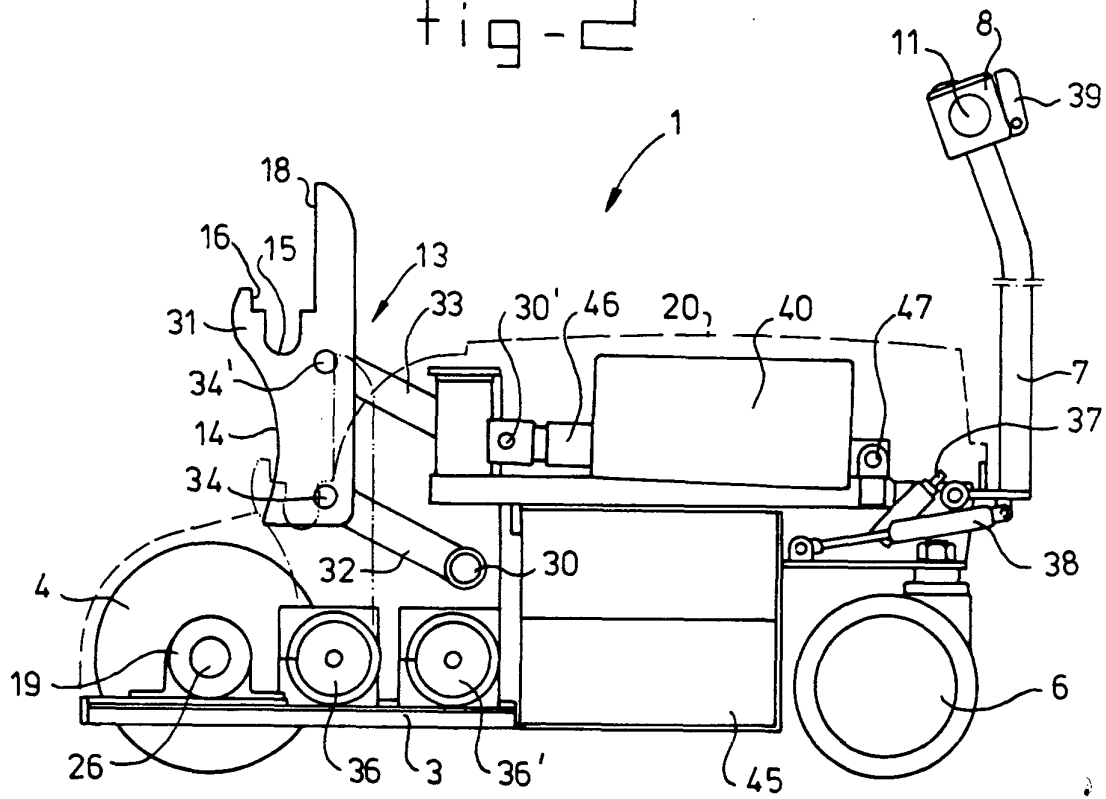


fig - 3

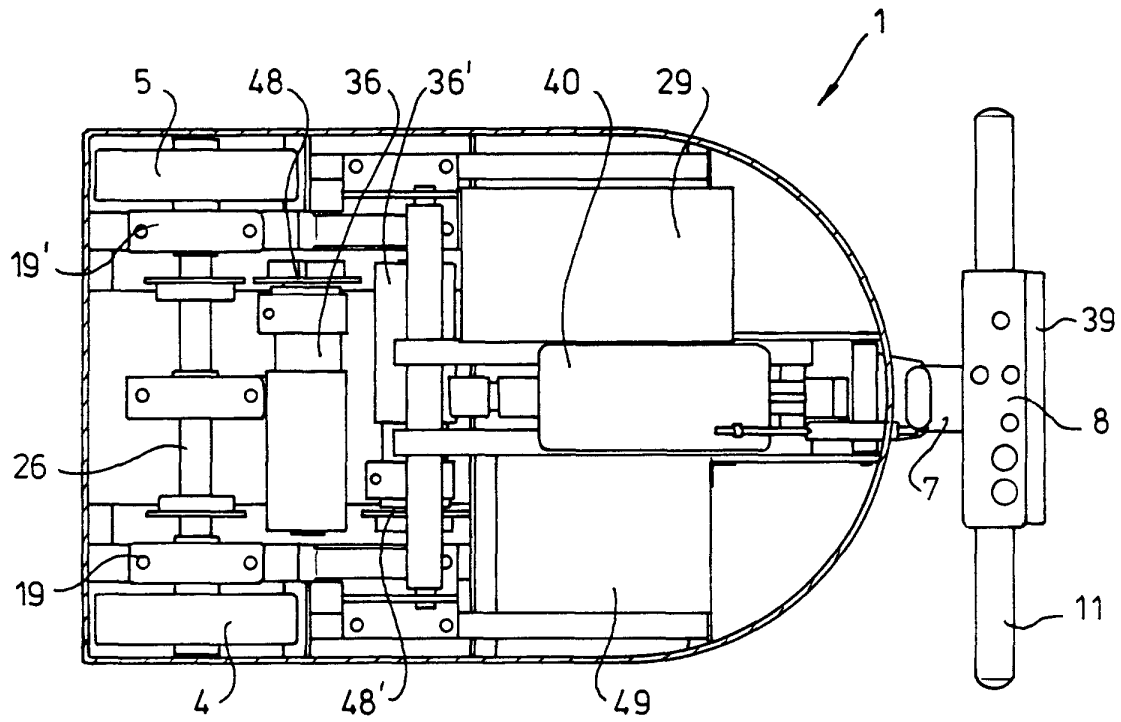


fig - 4

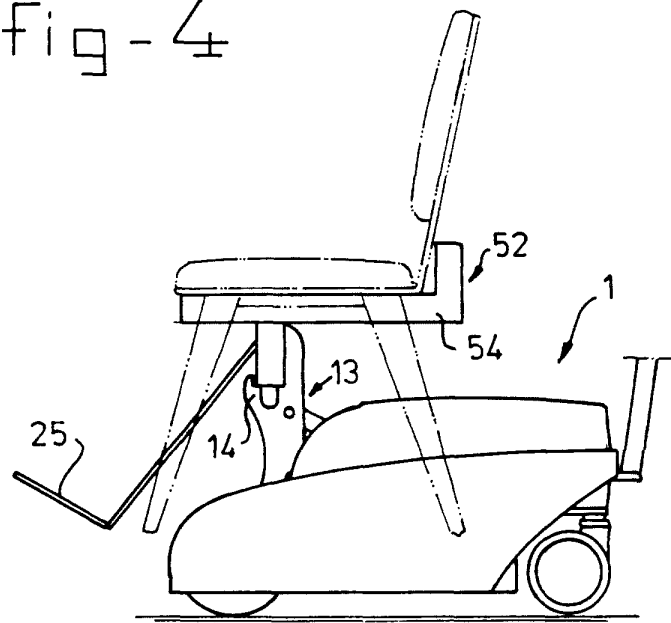


fig-5

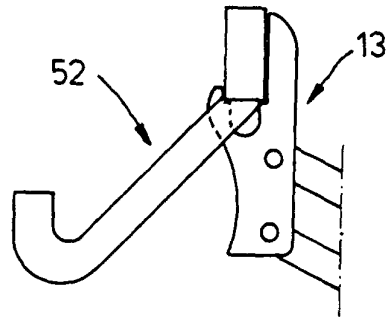


fig-6

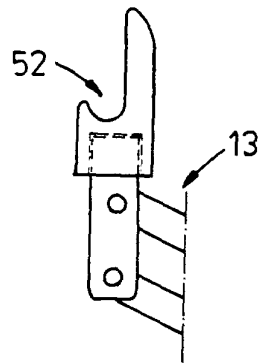


fig-7

