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(54) SAFETY DEVICE FOR APPLICATION WITH WHEELCHAIRS

SICHERHEITSVORRICHTUNG ZUR ANWENDUNG MIT ROLLSTÜHLEN

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(73) Proprietor: **Hansen, Carl Emil
9870 Sindal (DK)**

(72) Inventor: **Hansen, Carl Emil
9870 Sindal (DK)**

(74) Representative: **Larsen, Hans Ole et al
Larsen & Birkeholm A/S,
Banegårdspladsen 1,
P.O. Box 362
1570 Copenhagen V (DK)**

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Description

[0001] The present invention relates a safety device for application with lifts for wheelchairs, of the kind that includes a lift mounting base, mounted on the floor of a vehicle near one of the open entrances of the vehicle. The lift mounting base bears movable raise- and lowerable frame parts, on which a lift platform is placed, whose one side includes an unfoldable wheelchair ramp.

[0002] The mentioned lifts are often applied in relation with disability vehicles, where the user, who sits in a wheelchair, must place himself in the vehicle, either as the driver or as passenger. Moreover the mentioned lifts are also applied in the transportation of several wheelchair users, either in a panel van or busses designed for this purpose. The lift is used as an aid to overcome the difference in height, which exists between the bottom of the vehicle and the base, on which the vehicle is placed, e.g. with a handicapped person sitting in the vehicle and/or wheelchair.

[0003] In relation with transport of several wheelchair users in the same panel van, it is obvious that the lift is used for loading and unloading one single handicapped individual at a time. Unloading a wheelchair is carried out by lowering the lift platform to a horizontally level position, whereafter the wheelchair user manoeuvres the wheelchair from the floor of the van via the wheelchair ramp to the lift platform, whereafter the wheelchair ramp is pushed upwards in order to create a safety feature against undesired backwards movement of the wheelchair towards and over the edge of the lifting ramp, when the lifting ramp is subsequently lowered towards the base, on which the vehicle is placed, by activating the lift frame parts, which are lowered during this operation and moved backwards in relation to the side boundary of the entrance opening.

[0004] The lowering of the lifting ramp means that the wheelchair ramp is moved away from the entrance opening of the vehicle and thereby a free opening is made between the floor of the vehicle and the even lower located base, on which the vehicle is situated, which can pose a danger to idle wheelchair users who are in the vehicle near the entrance opening, whom by misuse of the functions of the wheel-chair (whether this is manually powered or electronically powered and controlled by a control device/unit) can accidentally suddenly activate the wheelchair, so that it runs out through the entrance opening, while the lift platform and the wheelchair are on the ground in the same level as the wheels of the vehicle. Such an incident can be quite dangerous, especially for the user of the wheelchair, who might be injured from the fall, and is possibly stuck between the lifting frame parts and the wheelchair. Handicap assistants close to the vehicle can likewise, quite possibly be hit by the wheelchair user and his/her wheelchair.

[0005] From US 4353436 a wheelchair ramp is known which includes a safety device and as further defined in the preamble of claim 1.

[0006] It is the purpose of the present invention to describe a safety device, which to a further extent ensures that aforementioned accidents cannot occur in connection with the use of a wheelchair lift of the specified type.

5 **[0007]** This purpose is achieved by a wheelchair ramp with safety device according to the characterising part of claim 1.

[0008] By the use of the automatic manoeuvrable ramp stop, an automatic safety of awaiting wheelchair users at the entrance of the vehicle is hereby achieved, so that it is ensured that they do not suddenly roll over the edge of the entrance opening of the vehicle and crash onto e. g. the pavement below them, on which the vehicle is also parked. The wheelchair ramp will namely, when moving the wheelchair from the floor of the vehicle to the lift platform, be placed above the lowered ramp stop, which will raise itself automatically to the vertical outer position, in rate with that the wheelchair ramp is tilted upwards and moved away from the entrance opening's limit, which makes passage of a wheelchair impossible,

20 **[0009]** Without relinquishing other forms of embodiment it can be mentioned that an appropriate form of embodiment of the ramp stop can be comprised of a, on the vehicle, in a relevant entrance opening bottom, and across the entrance opening oriented, mountable mechanical base, to which by a hinge connection, there is embed at least one, preferably two mutually connected, raise/lowerable frame parts, whose free ends in the lowered position, are oriented towards the space of the vehicle, and the frame parts additionally contain stop parts for fixation of the frame parts in the raised position, where the frame parts are vertically raised and upright placed in a mostly right angle from the entrance opening's bottom.

35 **[0010]** The stop parts can in a particular embodiment be integrated in the ramp stop, in that the frame parts can include bended bars, which stretches to a level under the hinge connection, and in a extent, which results in that the sides of the bars, which face the mechanical base; in the raised position is blocked by contact with the mechanical base. Hereby a possibility is achieved for a very compact construction of the ramp stop according to the invention, which is preferred, in that there is seldom much space available in connection with entrance openings in vehicles, which are used for transporting wheelchair users.

40 **[0011]** The location of the safety device, between the lift mounting base and the entrance opening results in that wheelchairs, which have to pass over the unfoldable wheelchair ramp on the way to the lift platform, will also have to pass over the frame parts, and in order to permit this traffic without any obstacles, the frame parts can be covered with a plate, whose free end extends through the ends of the frame parts, and where the external part can have a break, in the direction of the vehicle's spatial area or the bottom of the entrance opening. The possibility is hereby achieved, that the safety device can be used as a supplement for the wheelchair ramp, and that

the safety device in no circumstances acts to function as an impeding or inconvenient element during traffic with the wheelchair on the wheelchair ramp.

[0012] With the intention to ensure that the frame parts in the unloaded state (where the wheelchair ramp is not in contact with this), will be situated in the raised position, the frame parts can be affected with mechanical means, so that these in an unloaded state will be situated in the upright position. This shall be understood in the way that the frame parts in pace with that the wheelchair ramp is carried away from the entrance opening, by the aid of mechanical means, and turning around the hinge connection, will gradually raise itself to the upright position; where the stop parts impede a further rotation of the frame parts around the hinge connection, and where the frame parts are upright, in a in most cases right angle, in relation to the bottom of the entrance opening.

[0013] Without relinquishing the right to other embodiments it can be stated that the mechanical means with advantage can be composed of two torsion springs. Hereby an effectively working lifting of the frame parts is achieved as well as the torsion springs are relatively cheap to purchase and relatively easy to replace as a result of wear.

[0014] In another embodiment of the safety device according to the invention, the mechanical means can be composed of one or more gas pistons, whose ends are connected with respectively the frame segments in a distance from their hinge connection with the mechanical base and the mechanical base or the bottom of the vehicle.

[0015] The invention will now be explained more fully with reference to the drawing, in which

Fig. 1 is a side view of a safety device for application with lifts for wheelchairs, according to the invention, where the safety device is described,

Fig. 2 is a side view of the in fig 1 shown safety device, during lifting of the ramp stop,

Fig. 3 is a side view of the in fig 1 shown safety device, fully raised ramp stop,

Fig. 4 is a front view of the in fig. 1 shown safety device, where the ramp stop is raised,

Fig. 5 is a photo of the area around an entrance opening to a vehicle, seen from the space of the vehicle, including a lift for wheelchairs, a safety device with the ramp stop completely raised and

Fig. 6 shows the same as fig 5, but seen from the external side of the vehicle, where a wheelchair is being stopped by the safety device.

[0016] In fig. 1 is shown a side view of an embodiment of a safety device 2, for application with lifts 4 (fig. 5) for wheelchairs 6 (fig. 5 and fig. 6) mounted on a relevant vehicle. Such lifts typically include a lift mounting base 8, mounted on the floor of the vehicle 10, near a relevant entrance opening to the vehicle's space 7, where the lift mounting base 8 contains raise- and lowerable frame

parts 12, on which is placed a lift platform 14, whose one side includes a wheelchair ramp 16, which can be folded up and down.

[0017] The safety device 2, which is placed between the lift mounting base and the outer limit of the entrance opening 22, includes a, by technical means 18 (fig. 4), which as shown in fig. 4 can be composed of torsion springs 18, automatic liftable frame 26, which by a hinge connection 24 is connected with a mechanical base 22, which is anchored to the floor 10 on a vehicle (not shown in full size) by known means of anchoring.

[0018] The frame 26 includes, as it is shown in fig 1, fig 2, fig 3 and fig 4 on the one side a plate cover 36, whose free ends 38 reach outside the frame parts 26 and contains a bend 40 near the limit of the frame parts.

[0019] The frame 26 includes stop parts 30, which in the shown embodiment are composed of bended bars 32 of the frame parts 26, which stretches itself to a level under the hinge connection 24, and in an extent that results in that the bars' sides 34 against the mechanical base 22, in the fully raised position of the frame parts 26 are blocked by contact with the console 22, whereby a ramp stop (17) is formed (Fig. 3, fig. 5 and fig. 6).

[0020] The ramp stop (17) is automatically functioning, so that the plate covered frame 26, from the in fig. 1 shown, lowered starting position, during gradual movement of the wheelchair lift's wheelchair ramp 16, as it is seen in fig. 2 and fig. 3, will gradually be raised, in pace with the wheelchair lift's wheelchair ramp 16 being moved away from the ramp stop 17, whereby the frame 26 will finally end in a raised position by the stop parts 30, 32 as it is seen in fig. 3, fig. 5 and fig. 6.

[0021] Hereby it is achieved, as it is shown in fig. 5 and especially in fig. 6, to have an automatic safety for awaiting wheelchair users at the entrance of the vehicle, against unintentionally rolling over the edge 22 of the vehicle's entrance opening and crash onto the base, which the vehicle is parked on, in that the ramp stop 17 blocks the passage of the wheelchair's wheels 42.

[0022] The ramp stop 17 can according to the invention have a random height for an effective adaptation of the invention to a specific practical application. In many applications, the ramp stop 17 will therefore be higher than e.g. shown in fig. 6.

[0023] By raising the lift platform 14, and thereby the wheelchair ramp 16 to it's initial position, the wheelchair ramp 16 will during it's backwards movement towards the initial position be put in contact with the plate 36 on the frame part 26, which will give in, at the torsion springs 18, and be lowered to the initial position (fig. 1), by turning around the hinge connection 24, The wheelchair ramp 16, will in this way, by moving the wheelchair 6, from the floor of the vehicle 10 and to the lift platform 14 be placed above the lowered ramp stop 17. The extended part 38 of the plate 36 on the frame part 26 will also function as a small transfer ramp, between the vehicle's floor 10 and the unfoldable wheelchair ramp 16.

Claims

1. A safety device (2) for lifts (4) for loading or unloading wheelchairs (6) into/out of a vehicle, the lift (4) comprising a lift mounting base adapted to be mounted on the floor of a vehicle (10) near one of the vehicle entrance openings, which lift mounting base includes raise- and lowerable frame parts whose free ends in the lowered position are oriented towards the space of the vehicle, a lift platform (14), whose one side includes a foldable wheelchair ramp (16), and further includes a safety device with a ramp stop (17), the ramp stop comprising a mechanical base (22), to which by a hinge connection (24), there is mounted the raise/lowerable frame (26), whose free ends in the lowered position, are oriented towards the space of the vehicle, the frame (26) additionally containing stop parts for positioning of the frame (26) in the raised, upright position **characterized in that** the stop parts are composed of a part of the frame (26), which include a series of bended bars (32) extending to a level under the hinge connection (24), whereby the bended bars (32) face against the mechanical base (22) in the upright position thus forming the stop parts for the ramp stop (17), and wherein the frame (26) is connected to mechanical means (18), which will automatically raise the ramp stop (17) to an upright position.
2. A safety device according to claim 1, **characterized in that** the mechanical means (18) are composed of torsion springs.
3. A safety device according to claim 9, **characterized in that** the mechanical means (18) are composed of one or more gas pistons, whose ends are connected with respectively the frame segments (26) in a distance from their hinge connection (24) with the mechanical base (22) or the bottom of the vehicle (10).
4. Safety device according to any of the claims 1-3, **characterized in that** the ramp stop (17) comprises two mutually connected frames (26).
5. A safety device according to any of claims 1-4, **characterized in that** the frame (26) is covered with a plate (36), whose free end (38) extends beyond the frame (26), and where an externally projecting free end of the plate has a bend (40) directed towards the mechanical base (22) when seen in relation to the plane defined by the ramp stop (17),
2. Sicherungsvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die mechanischen Mittel (18) von Torsionsfedern gebildet sind.
3. Sicherungsvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die mechanischen Mittel (18) von einer oder mehreren Gasdruckfedern gebildet sind, deren Enden mit den Rahmensegmenten (26) in einem Abstand von derer Gelenkverbindung (24) mit der mechanischen Basis (22) bzw. dem Boden des Fahrzeugs (10) verbunden sind.
4. Sicherungsvorrichtung gemäß irgendeinem der Ansprüche 1-3, **dadurch gekennzeichnet, dass** der Rampenstopp (17) zwei miteinander verbundene Rahmen (26) aufweist.
5. Sicherheitsvorrichtung gemäß irgendeinem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** der Rahmen (26) mit einer Platte (36) abgedeckt ist, deren freies Ende (38) sich über den Rahmen (26) hinauserstreckt, und wobei ein nach außen vorstehendes freies Ende der Platte eine Biegung (40) hat, welche zu der mechanischen Basis (22) hin gerichtet ist, wenn in Bezug auf die von dem Rampenstopp (17) definierte Ebene gesehen.

Patentansprüche

1. Sicherungsvorrichtung (2) für Lifte (4) zum Laden oder Entladen von Rollstühlen (6) in ein/aus einem Fahrzeug, wobei der Lift (4) aufweist eine Liftmon-

Revendications

rampe (17).

1. Dispositif de sécurité (2) pour des élévateurs (4) pour charger ou décharger des fauteuils roulants (6) dans/hors d'un véhicule, l'élévateur (4) comprenant une base de montage d'élévateur adaptée pour être montée sur le plancher d'un véhicule (10) près de l'une des ouvertures d'entrée de véhicule, laquelle base de montage d'élévateur inclut des parties de châssis aptes à être levées et abaissées dont les extrémités libres dans la position abaissée sont orientées vers l'espace du véhicule, une plate-forme d'élévateur (14), dont un côté inclut une rampe de fauteuil roulant pliable (16), et inclut en outre un dispositif de sécurité avec une butée de rampe (17), la butée de rampe (17) comprenant une base mécanique (22), sur laquelle est monté, par une liaison articulée (24), le châssis apte à être levé/abaissé (26), dont les extrémités libres dans la position abaissée, sont orientées vers l'espace du véhicule, le châssis (26) contenant de plus des parties de butée pour un positionnement du châssis (26) dans la position droite, levée, **caractérisé en ce que** les parties de butée sont composées d'une partie du châssis (26), qui incluant une série de barres coudées (32) s'étendant jusqu'à un niveau sous la liaison articulée (24), en sorte que les barres coudées (32) sont dirigées contre la base mécanique (22) dans la position droite en formant ainsi les parties de butée pour la butée de rampe (17), et dans lequel le châssis (26) est relié à des moyens mécaniques (18), qui lèveront automatiquement la butée de rampe (17) jusqu'à une position droite.

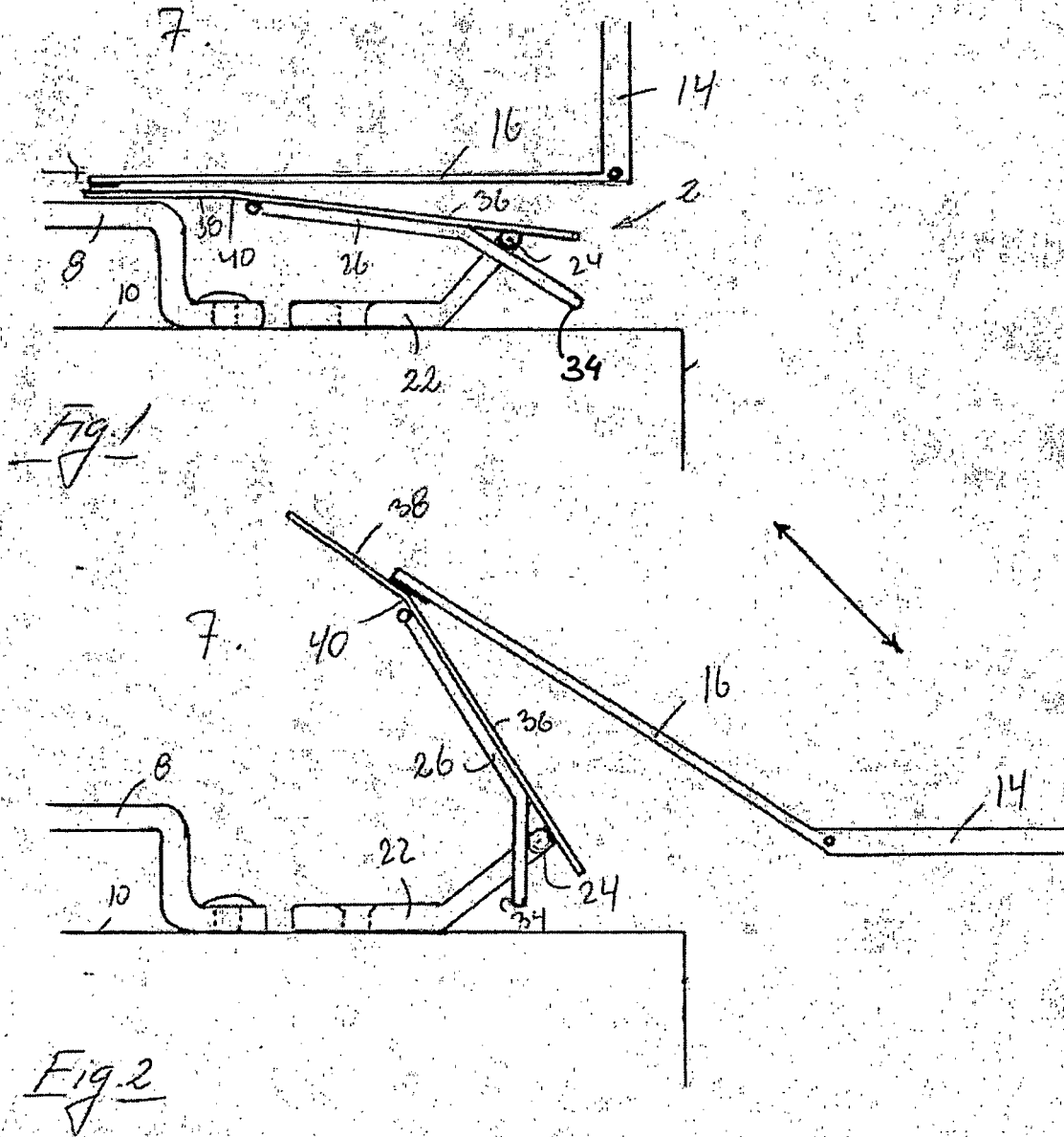
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2. Dispositif de sécurité selon la revendication 1, **caractérisé en ce que** les moyens mécaniques (18) sont composés de ressorts de torsion.

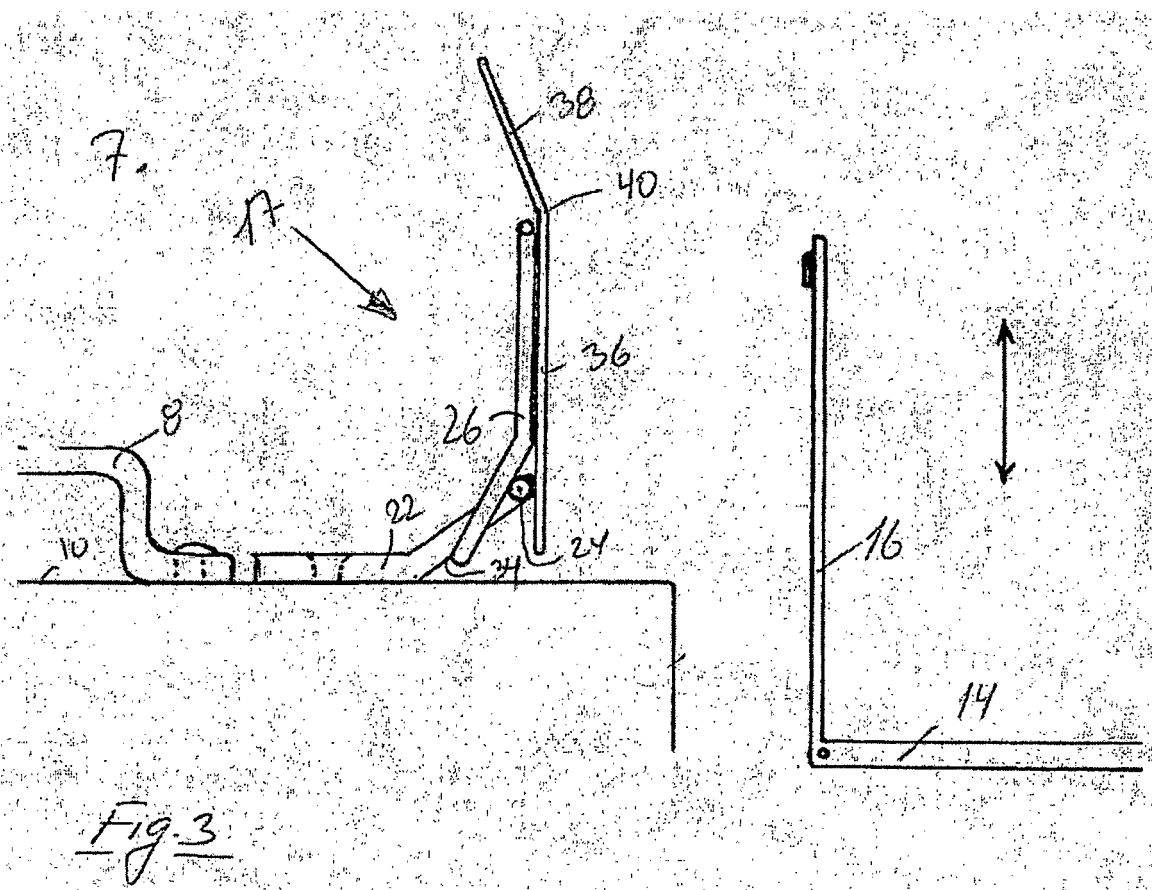
35
3. Dispositif de sécurité selon la revendication 1, **caractérisé en ce que** les moyens mécaniques (18) sont composés d'un ou plusieurs pistons à gaz, dont les extrémités sont respectivement reliées aux segments de châssis (26) à une certaine distance de leur liaison articulée (24) avec la base mécanique (22) ou le bas du véhicule (10).

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4. Dispositif de sécurité selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** la butée de rampe (17) comprend deux châssis mutuellement reliés (26).

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5. Dispositif de sécurité selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** le châssis (26) est recouvert d'une plaque (36), dont l'extrémité libre (38) s'étend au-delà du châssis (26), et où une extrémité libre faisant saillie à l'extérieur de la plaque a un coude (40) dirigé vers la base mécanique (22) lorsque vu par rapport au plan défini par la butée de

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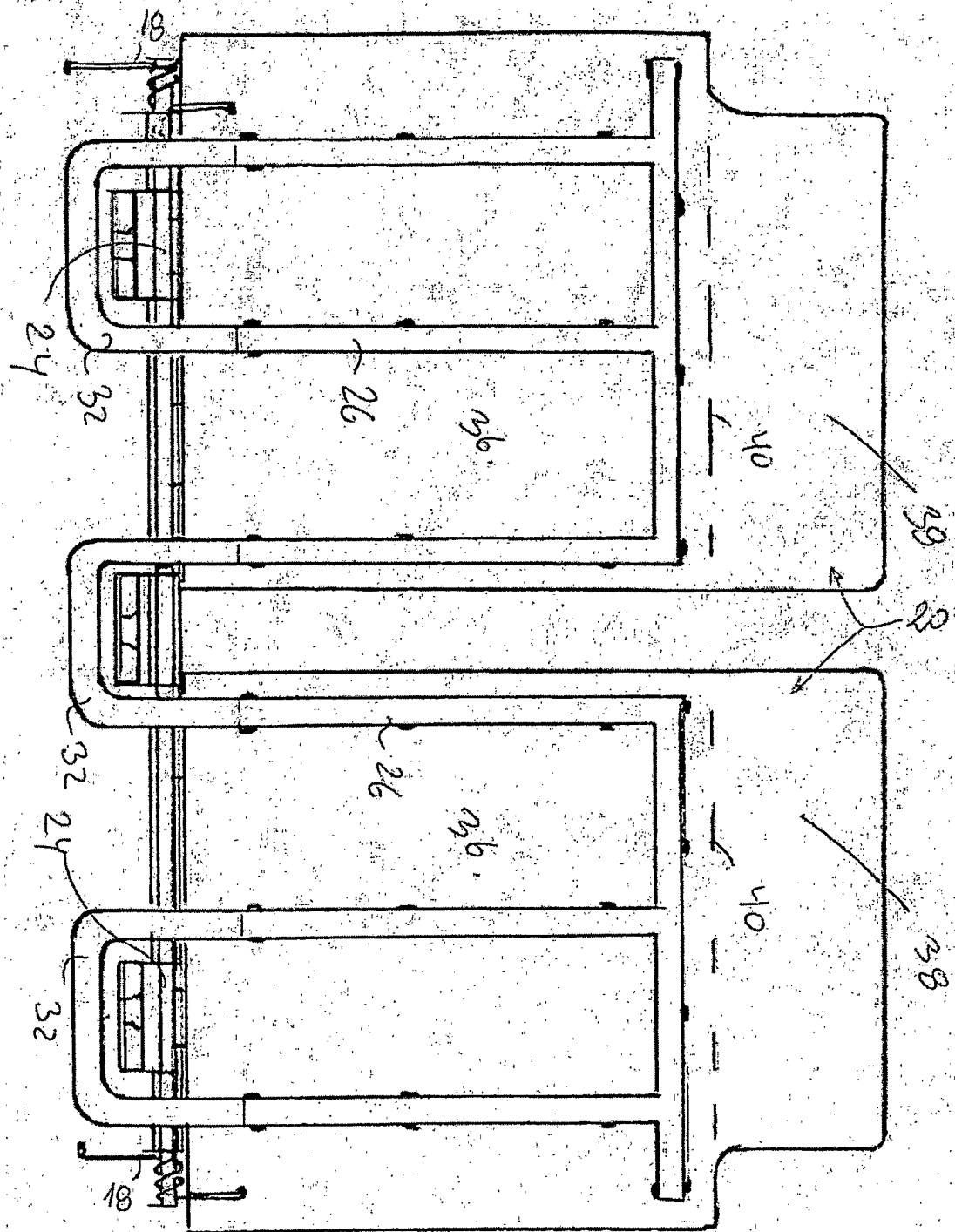


Fig. 4

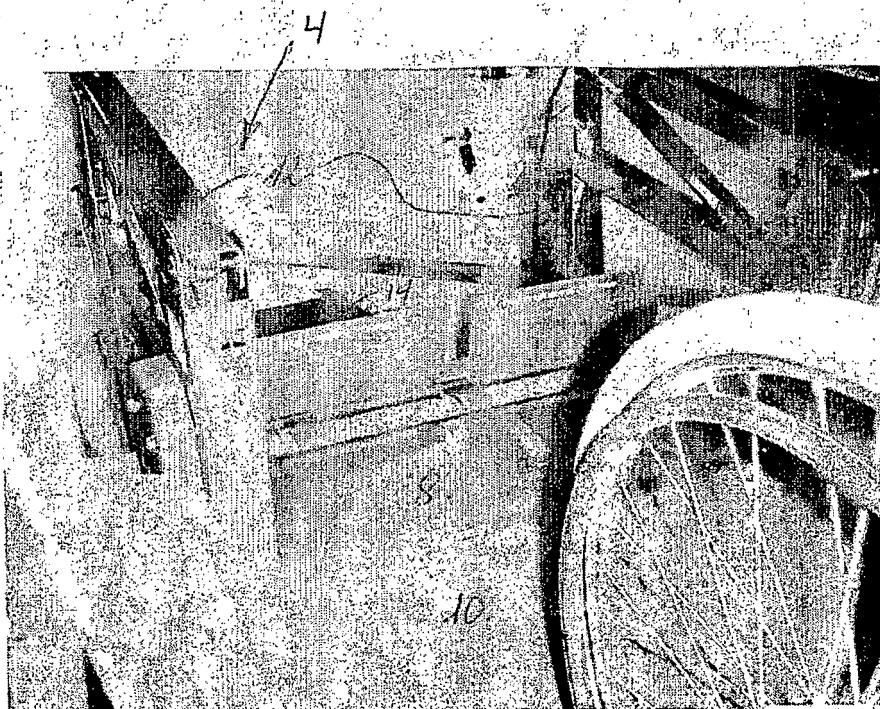


Fig. 5

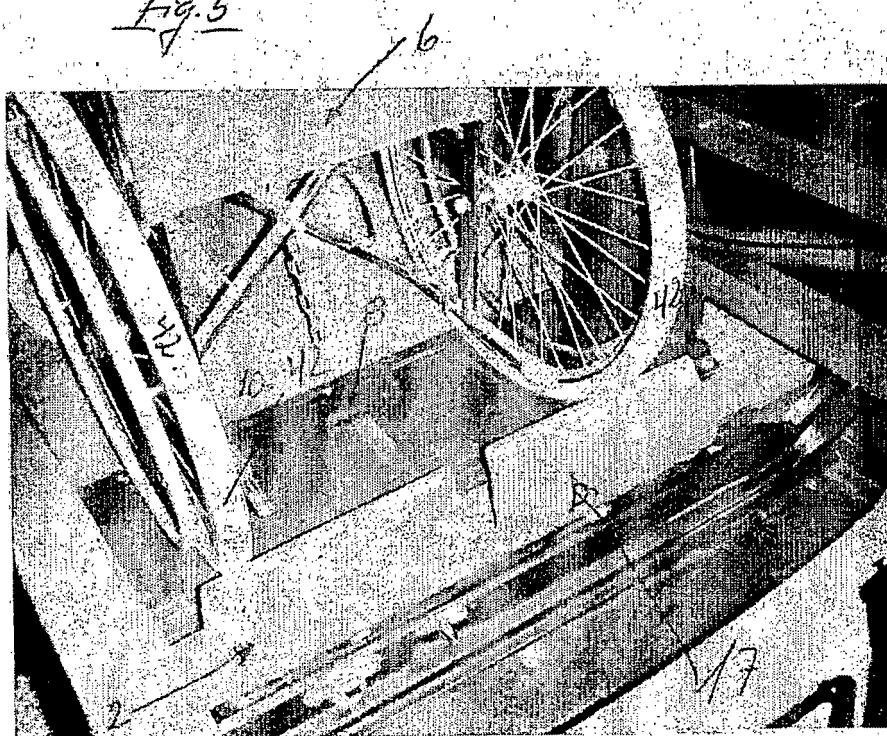


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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