

(19)



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(11)

EP 1 148 019 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
01.10.2003 Bulletin 2003/40

(51) Int Cl.7: **B66B 9/08**

(21) Application number: **01107420.0**

(22) Date of filing: **27.03.2001**

(54) **Stairlift for disabled people**

Treppenaufzug für Invaliden

Ascenseur d'escalier pour personne invalide

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

(30) Priority: **17.04.2000 IT MI000864**

(43) Date of publication of application:
24.10.2001 Bulletin 2001/43

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EP 1 148 019 B1

Description

[0001] The present invention relates to an apparatus for transporting disabled people on stairs and the like according to the preamble of claim 1.

[0002] Such an apparatus is known from GB-A-1530715.

[0003] It is known that apparatuses for transporting disabled people on stairs and the like are generally constituted by a supporting frame slideable on guides which are associated with the fixed structure, to which a tilting platform is articulated.

[0004] There is also at least one safety bar, arranged on the descent side, which must be placed in a safety position when the apparatus is moving with a passenger and must be placed in a raised position in order to allow access and descent of the passenger.

[0005] The safety bar must further be arrangeable in a position of minimum space occupation when the apparatus travels without a passenger.

[0006] A prior patent in the name of this same Applicant (Patent IT 1279827), assumed included herein by reference, discloses an extremely practical and functional solution in which transition from the raised-bar position to the position of minimum space occupation is performed by way of a translation movement of the bar which, in practice, retracts into the volume of the frame, simply keeping the upper end spaced from the frame, so as to prevent any accidental crushing of anything interposed between the safety bar and the supporting frame.

[0007] The bar is connected to a truck slideable in two parallel guides which are formed by the frame and move mutually apart at the upper end so as to allow to tilt the safety bar toward the safety position.

[0008] Although this embodiment has proved to be valid from many points of view, it has been found to be susceptible of improvements, especially as regards the safety characteristics and the structural simplicity of its construction.

[0009] The aim of the present invention is to achieve the above-noted advantages by providing an apparatus in which it is possible to further reduce the overall dimensions of the bar arranged in the position of minimum space occupation without however entailing any risk.

[0010] Within this aim, a particular object of the invention is to provide an apparatus in which the means for guiding the sliding of the bar are considerably simplified yet remaining highly functional.

[0011] Another object of the present invention is to provide an apparatus in which it is possible to minimize the number of components, further achieving considerable constructive simplifications.

[0012] Another object of the present invention is to provide an apparatus which can be easily obtained starting from commonly commercially available elements and materials and is also competitive from a merely economic point of view.

[0013] This aim and these and other objects which will become better apparent hereinafter are achieved by an apparatus for transporting disabled people on stairs and the like, according to the invention, comprising a supporting frame which can slidably engage guides which are connected to a fixed structure, a tilting platform for supporting the passenger and at least one safety bar being connected to said frame, said bar being movable from a raised position to allow passenger access and descent to a position of minimum space occupation in which it is adjacent to said supporting frame, characterized in that it comprises crush-prevention means of the bar which are adapted to provide an elastic yielding of said at least one safety bar if there is an obstacle between said at least one safety bar and said supporting frame.

[0014] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of an apparatus for transporting disabled people on stairs and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic side elevation view of the apparatus with the safety bar in the position of minimum space occupation;

Figure 2 is a front view of the apparatus with the safety bar in the position of minimum space occupation;

Figure 3 is a side elevation view of the apparatus with the bar in the safety position;

Figure 4 is a side elevation view of the means for uncoupling the motor from the transmission chain for optional manual movement;

Figure 5 is a schematic view of the elastic yielding of the safety bar;

Figure 6 is a sectional view, taken along the line VI-VI of Figure 5;

Figure 7 is a sectional view, taken along the line VII-VII of Figure 5;

Figure 8 is a schematic view of a microswitch.

[0015] With reference to the figures, the apparatus for transporting disabled people on stairs and the like, according to the invention, comprises a supporting frame, generally designated by the reference numeral 1, which in a per se known manner can slidably engage guides which are connected to a fixed structure.

[0016] A tilting platform 2 on which the passenger is accommodated is associated with the frame 1.

[0017] There is also at least one safety bar 3 which is arranged on the descent side and can move with respect to the frame 1 so as to be arranged in a safety position, shown in Figures 3 and 4, in which the bar is arranged at the level of the passenger, and in a raised position, which frees the space to allow ascent and descent of the passenger.

[0018] During the travel of the apparatus without a passenger, the bar is arranged in a position of minimum space occupation, retracting in practice into the frame 1.

[0019] In greater detail, the bar 3 is slidingly guided in a vertical guide 10, formed by the side wall of the frame, by engagement with a first pivot 11 and a second pivot 12 which are mutually spaced and in practice allow the bar to retain its vertical position during its translation movement within the guide 10.

[0020] The upper portion of the guide 10, designated by the reference numeral 10a, is inclined approximately horizontally with respect to the vertical portion 10, so as to force the safety bar to rotate in order to be arranged in the safety position.

[0021] The bar is moved by means of an actuation chain 20 which runs between a lower pinion 21 and an upper pinion 22 and is actuated by an actuation pinion 23 driven by a motor 24 which is supported by a central plate 25 accommodated in the frame; the chain is coupled to the lower pivot 11.

[0022] The actuation pinion 23 engages the chain 20, moving it in both directions.

[0023] A particular characteristic of the invention is that there are crush prevention means of the bar, which in the position of minimum space occupation, can be arranged completely within the frame, further minimizing external space occupation.

[0024] The crush prevention means can provide an elastic yielding of the safety bar if an obstacle becomes interposed between the safety bar and the supporting frame.

[0025] The crush prevention means comprise a slider 30 which in practice joins the pivots 11 and 12 and which, in the lower portion of the vertical guide 10, engages an abutment constituted by a flexible bar 31.

[0026] The guide 10, at its lower end, is provided with a wider portion 10b which allows the pivots to oscillate, with consequent inclination of the safety bar, which moves away from the frame, preventing the occurrence of crushing or the like.

[0027] The abutment bar 31 is provided with elongated slots 32 in which fixed pivots can slide; there are also elastic elements 33 which elastically push the abutment bar 31 against the slider 30 and allow the elastic yielding of the bar, allowing it to tilt, when an obstacle becomes interposed.

[0028] In order to manage the movements of the bar in safety, there are three microswitches which control the corresponding positions. The microswitches must remain pressed in all the positions of the bar and must be released only in the position that they must control.

[0029] This concept is reversed with respect to the prior art, since usually microswitches are pressed by means of abutment elements which engage throughout the useful stroke and disengage only in the regions where the switch is to be operated, i.e., released.

[0030] Another innovative aspect of the invention is the fact that there are emergency release means being

constituted by an actuation rod or screw 41 which engages the supporting plate of the motor in order to allow its tilting, as shown in Figure 4, with consequent disengagement of the actuation pinion from the chain, allowing to complete the movement manually.

[0031] From the above description it is thus evident that the invention achieves the intended aim and objects, and in particular the fact is stressed that an apparatus is provided in which the safety bar is moved by means of a single guide which allows to produce retraction into the minimum space occupation condition in maximum safety, since crush-prevention means are provided which yield elastically if obstacles are interposed.

[0032] Moreover, in case of emergency the motor can be released with a very rapid operation.

[0033] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0034] All the details may further be replaced with other technically equivalent elements.

[0035] In practice, the materials employed, as well as the dimensions and the contingent shapes, may be any according to requirements.

[0036] The disclosures in Italian Patent Application No. MI2000A000864 from which this application claims priority are incorporated herein by reference.

[0037] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An apparatus for transporting disabled people on stairs and the like, comprising a supporting frame (1) which can slidingly engage guides which are connected to a fixed structure, a tilting platform (2) for supporting the passenger and at least one safety bar (3) being connected to said frame, said bar (3) being movable from a raised position to allow passenger access and descent to a position of minimum space occupation in which it is adjacent to said supporting frame (1) **characterized in that** it comprises crush-prevention means (30) of the bar which are adapted to provide an elastic yielding of said at least one safety bar (3) if there is an obstacle between said at least one safety bar and said supporting frame (1).
2. The apparatus according to claim 1, **characterized in that** it comprises a vertical guide (10) for the sliding of said at least one safety bar (3), said guide being formed on a side wall of said frame (1), a first

pivot (11) and a second pivot (12) being slideable in said vertical guide (10) and being mutually spaced, said vertical guide having an upper portion which is inclined for the rotation of said bar (3) and a lower portion for the elastic yielding of said bar.

3. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises an actuation chain (20) for the movement of said bar (3), said chain winding around a lower pinion (21) and an upper pinion (22) and engaging an actuation pinion driven by a motor which is supported in said frame (1), one of said pivots being connected to said actuation chain (20).
4. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises a slider (30) for joining said pivots which can engage, in the lower portion of said vertical guide (10), an elastically yielding abutment bar (31), said vertical guide forming, at the region where said elastically yielding bar (31) is arranged, a wider region allowing oscillation of said pivots with consequent inclination of said safety bar (3).
5. The apparatus according to claim 4, **characterized in that** said abutment bar (31) is provided with elongated slots (32) which are slidingly engaged by fixed pivots, elastic means being further provided which are adapted to push said abutment bar (31) elastically against said slider.
6. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises microswitches for driving said bar (3) which are normally pressed, actuation elements being further provided which act on the microswitch in order to release it in the various control positions.
7. The apparatus according to claim 3, **characterized in that** said motor is supported by a tilting central plate, on which an actuation rod or screw acts in order to tilt said plate with disengagement of said actuation pinion from said chain (20), for the manual or emergency actuation of said bar (3).

Patentansprüche

1. Vorrichtung zum Transportieren von behinderten Leuten auf Treppen und dergleichen mit einem Trägerrahmen (1), der verschiebbar mit Führungen in Eingriff stehen kann, die mit einer feststehenden Struktur verbunden sind, einer Neigungsplattform (2) zum Tragen des Fahrgasts und mindestens einer Sicherheitsstange (3), die mit dem Rahmen verbunden ist, wobei die Stange (3) von einer angehobenen Position, um einem Fahrgast das Einsteigen

und Aussteigen zu ermöglichen, in eine Position mit minimaler Platzbelegung, in der sie zum Trägerrahmen (1) benachbart ist, beweglich ist, **dadurch gekennzeichnet, daß** sie ein Quetschverhinderungsmittel (30) für die Stange umfaßt, das dazu ausgelegt ist, eine elastische Nachgiebigkeit der mindestens einen Sicherheitsstange (3) vorzusehen, wenn sich zwischen der mindestens einen Sicherheitsstange und dem Trägerrahmen (1) ein Hindernis befindet.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** sie eine vertikale Führung (10) für das Gleiten der mindestens einen Sicherheitsstange (3) umfaßt, wobei die Führung an einer Seitenwand des Rahmens (1) ausgebildet ist, wobei ein erster Drehzapfen (11) und ein zweiter Drehzapfen (12) in der vertikalen Führung (10) verschiebbar sind und voneinander beabstandet sind, wobei die vertikale Führung einen oberen Teil, der für die Drehung der Stange (3) geneigt ist, und einen unteren Teil für die elastische Nachgiebigkeit der Stange aufweist.
3. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** sie eine Betätigungskette (20) für die Bewegung der Stange (3) umfaßt, wobei sich die Kette um ein unteres Ritzel (21) und ein oberes Ritzel (22) windet und mit einem Betätigungsritzel in Eingriff steht, das durch einen Motor angetrieben wird, der in dem Rahmen (1) gelagert ist, wobei einer der Drehzapfen mit der Betätigungskette (20) verbunden ist.
4. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** sie einen Schieber (30) zum Verbinden der Drehzapfen umfaßt, der im unteren Teil der vertikalen Führung (10) mit einer elastisch nachgiebigen Widerlagerstange (31) in Eingriff stehen kann, wobei die vertikale Führung in dem Bereich, in dem die elastisch nachgiebige Stange (31) angeordnet ist, einen breiteren Bereich bildet, der eine Schwingung der Drehzapfen mit daraus folgender Neigung der Sicherheitsstange (3) ermöglicht.
5. Vorrichtung nach Anspruch 4, **dadurch gekennzeichnet, daß** die Widerlagerstange (31) mit langgestreckten Schlitzern (32) versehen ist, die mit feststehenden Drehzapfen verschiebbar in Eingriff stehen, wobei ferner ein elastisches Mittel vorgesehen ist, das dazu ausgelegt ist, die Widerlagerstange (31) elastisch gegen den Schieber zu schieben.
6. Vorrichtung nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** sie Mikroschalter zum Ansteuern der Stange

(3) umfaßt, die normalerweise gedrückt sind, wobei ferner Betätigungselemente vorgesehen sind, die auf den Mikroschalter einwirken, um ihn in die verschiedenen Steuerpositionen zu lösen.

7. Vorrichtung nach Anspruch 3, **dadurch gekennzeichnet, daß** der Motor durch eine sich neigende zentrale Platte gelagert ist, an der eine Betätigungsstange oder -schraube wirkt, um die Platte mit dem Auskuppeln des Betätigungsritzels aus der Kette (20) für die manuelle oder Notfallbetätigung der Stange (3) zu neigen.

Revendications

1. Dispositif destiné à transporter des personnes invalides sur des escaliers et équivalent, comprenant un cadre de support (1) qui peut mettre en prise de manière coulissante des guides qui sont raccordés à une structure fixe, une plate-forme basculante (2) destinée à supporter le passager et au moins une barre de sécurité (3) étant raccordée audit cadre, ladite barre (3) étant mobile à partir d'une position relevée pour permettre au passager d'accéder et descendre à une position d'encombrement minimum dans laquelle il est adjacent audit cadre de support (1), **caractérisé en ce qu'il** comprend des moyens de prévention de brisure (30) de la barre qui sont adaptés pour fournir un rendement élastique de ladite au moins une barre de sécurité (3) s'il existe un obstacle entre ladite au moins une barre de sécurité et ledit cadre de support (1).
2. Dispositif selon la revendication 1, **caractérisé en ce qu'il** comprend un guide vertical (10) pour le coulisement de ladite au moins une barre de sécurité (3), ledit guide étant formé sur une paroi dudit cadre (1), un premier pivot (11) et un second pivot (12) pouvant être coulisés dans ledit guide vertical (10) et étant espacés l'un de l'autre, ledit guide vertical ayant une partie supérieure qui est inclinée pour la rotation de ladite barre (3) et une partie inférieure pour le rendement élastique de ladite barre.
3. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comprend une chaîne d'actionnement (20) pour le mouvement de ladite barre (3), ladite chaîne s'enroulant autour d'un pignon inférieur (21) et un pignon supérieur (22) et mettant en prise un pignon d'actionnement commandé par un moteur qui est supporté dans ledit cadre (1), l'un desdits pivots étant raccordé à ladite chaîne d'actionnement (20).
4. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'il** comprend une glissière (30) pour joindre lesdits pivots

qui peuvent mettre en prise, dans la partie inférieure dudit guide vertical (10) une barre de butée de rendement élastique (31), ledit guide vertical formant, au niveau de la région où ladite barre de rendement élastique (31) est agencée, une région plus large permettant l'oscillation desdits pivots avec une inclinaison consécutive de ladite barre de sécurité (3).

5. Dispositif selon la revendication 4, **caractérisé en ce que** ladite barre de butée (31) est fournie avec des fentes allongées (32) qui sont mises en prise de manière coulissante par des pivots fixes, des moyens élastiques étant en outre prévus pour être adaptés pour pousser ladite barre de butée (31) de manière élastique contre ladite glissière.
6. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comprend des microrupteurs destinés à commander ladite barre (3) qui sont normalement enfoncés, des éléments d'actionnement étant en outre prévus pour agir sur le microrupteur afin de le relâcher dans les différentes positions de commande.
7. Dispositif selon la revendication 3, **caractérisé en ce que** ledit moteur est supporté par une plaque centrale basculante, sur laquelle une tige ou une vis d'actionnement agit pour faire basculer ladite plaque avec désengagement dudit pignon d'actionnement de ladite chaîne (20) pour l'actionnement manuel ou d'urgence de ladite barre (3).





