



(12) **EUROPEAN PATENT APPLICATION**

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

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

(21) Application number: **01107420.0**

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

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
 Designated Extension States:
AL LT LV MK RO SI

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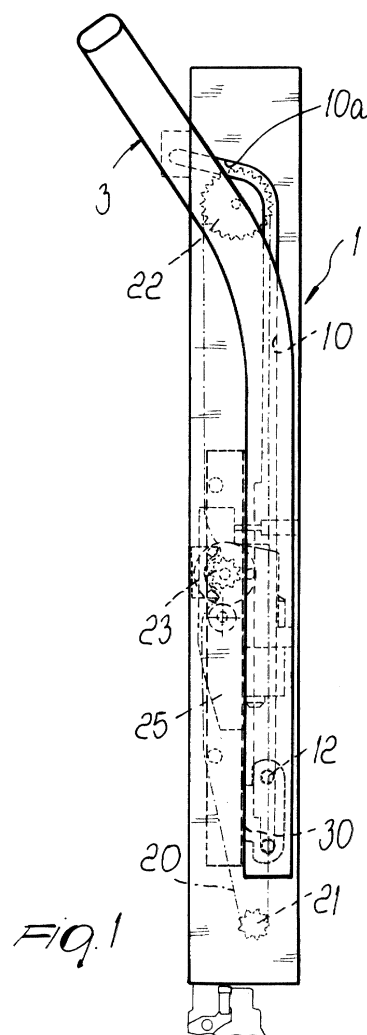
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(30) Priority: **17.04.2000 IT MI000864**

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(54) **Stairlift for disabled people**

(57) An apparatus for transporting disabled people on stairs and the like, comprising a supporting frame 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) are connected to the supporting frame; the bar is movable from a raised position to allow passenger access and descent to a position of minimum space occupation in which it is adjacent to the supporting frame. The apparatus further comprises crush-prevention means (30) of the bar (3) which are adapted to provide an elastic yielding of the at least one safety bar (3) if there is an obstacle between the at least one safety bar and the supporting frame.



Description

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

[0002] 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.

[0003] 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.

[0004] The safety bar must further be arrangeable in a position of minimum space occupation when the apparatus travels without a passenger.

[0005] 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.

[0006] 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.

[0007] 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.

[0008] 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.

[0009] 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.

[0010] 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.

[0011] 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.

[0012] 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.

[0013] 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.

[0014] 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.

[0015] A tilting platform 2 on which the passenger is accommodated is associated with the frame 1.

[0016] 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.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] 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.

[0021] The actuation pinion 23 engages the chain 20, moving it in both directions.

[0022] 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.

[0023] 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.

[0024] 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.

[0025] 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.

[0026] 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.

[0027] 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.

[0028] 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.

[0029] 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 disen-

gement of the actuation pinion from the chain, allowing to complete the movement manually.

[0030] 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.

[0031] Moreover, in case of emergency the motor can be released with a very rapid operation.

[0032] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0033] All the details may further be replaced with other technically equivalent elements.

[0034] In practice, the materials employed, as well as the dimensions and the contingent shapes, may be any according to requirements.

[0035] The disclosures in Italian Patent Application No. MI2000A000864 from which this application claims priority are incorporated herein by reference.

[0036] 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 which can slidingly 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.
2. The apparatus according to claim 1, **characterized in that** it comprises a vertical guide for the sliding of said at least one safety bar, said guide being formed on a side wall of said frame, a first pivot and a second pivot being slideable in said vertical guide and being mutually spaced, said vertical guide having an upper portion which is inclined for the rotation of said bar and a lower portion for the elastic yielding

of said bar.

3. The apparatus according to the preceding claims, **characterized in that** it comprises an actuation chain for the movement of said bar, said chain winding around a lower pinion and an upper pinion and engaging an actuation pinion driven by a motor which is supported in said frame, one of said pivots being connected to said actuation chain. 5
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4. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises a slider for joining said pivots which can engage, in the lower portion of said vertical guide, an elastically yielding abutment bar, said vertical guide forming, at the region where said elastically yielding bar is arranged, a wider region allowing oscillation of said pivots with consequent inclination of said safety bar. 15
5. The apparatus according to one or more of the preceding claims, **characterized in that** said abutment bar is provided with elongated slots which are slidingly engaged by fixed pivots, elastic means being further provided which are adapted to push said abutment bar elastically against said slider. 20
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6. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises microswitches for driving said bar which are normally pressed, actuation elements being further provided which act on the microswitch in order to release it in the various control positions. 30
7. The apparatus according to one or more of the preceding claims, **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, for the manual or emergency actuation of said bar. 35
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