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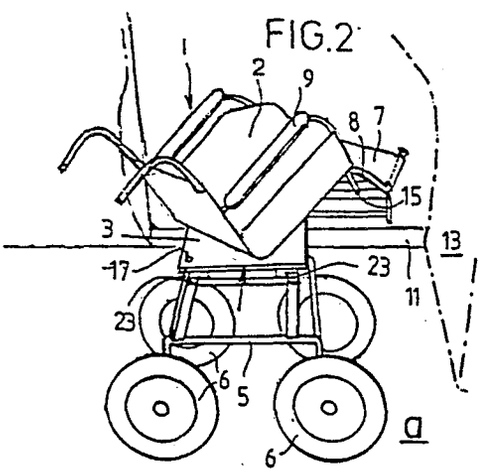
(54) Wheel chair for invalids with releasable seat mounting as well as system for transferring an invalid seated in the chair in and out of a vehicle.

(57) Wheelchair for invalids of which the seat mounting (2) and bottom mounting can be released and the seat mounting (2) can be placed into a vehicle (10) through mounted connection pieces (4, 22), the seat mounting (2) being connected rotatably as well as tiltably in relation to the upper plate (3) in that an angular point of the seat mounting (2) is fixed to the upper plate (3) by means of a pen with hinge (19) enabling a rotatable as well as a tiltable movement, a second angular point (20) being movable on the upper plate (3) in the surface thereof, whereas the other two angular points are releasably mounted to the upper plate (3), as illustrated in Figure 2a.

FIG.2



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Wheelchair for invalids with releasable seat mounting as well as system for transferring an invalid seated in the chair in and out of a vehicle.

The present invention relates to a wheelchair for invalids with releasable seat mounting as well as a system to transfer in and out of the vehicle an invalid seated in the wheelchair by means of the releasable seat mounting.

Dutch Patent Application 7117676 discloses a similar wheelchair for invalids wherein a lifting device is used which on the one hand can be connected to the releasable seat mounting and on the other hand is rotatable about and movable upwards and downwards along a vertical guide positioned in the vehicle. Although this device enables transferring the invalid into and out of the vehicle without the need to leave the chair for invalids, the objection remains that a rather elaborate lifting system has to be fixed to the vehicle and relatively many steps have to be carried out.

It is the main object of the present invention to provide a wheel chair for invalids, as well as a system for transferring into and out of a vehicle an invalid seated in the chair for invalids by means of the releasable seat mounting, wherein the constructions to be introduced in the chair of invalids as well as the vehicle give the least possible objections. Furthermore it is the object to minimize the number of steps necessary to transfer the invalid from the chair for invalids in the vehicle.

To reach this goal the invention provides a chair for invalids so constructed that the releasable seat mounting of the chair for invalids is not only able to slide linearly to the vehicle but may also so pivot and rotate that the legs of the invalid are lifted upwards over the threshold of the vehicle. The invention thus relates to a chair for invalids of which the seat mounting and base after unlocking can be separated from each other and wherein in the vehicle means are provided for locking the seating part transferred into the vehicle, which is characterised in that the seat mounting is connected to an upper plate and is made to be able to rotate as well as tiltablein relation to said upper plate, which upper plate is provided with guiding means which are movable in guides on the base, which guides can be made to mesh into fitting guides positioned in the vehicle by means of intermediary

guides, the upper plate with seating part being movable along the guiding system formed in and out of the vehicle and lockable in the vehicle. The guides preferably consist of profiles or rails and the upper plate is preferably provided with rollers or wheels which move in said guides.

Thus in a preferred embodiment the chair for invalids according to the invention consists of a base part provided with wheels and an upper plate, on which the seat mounting is lockably mounted and the seat mounting is rotatable as well as tiltable in relation to the upper plate by having one angular point of the seat mounting fixedly connected to the upper plate by means of a pen with hinge or similar equivalent connection, enabling a rotatable as well as tiltable movement and a second angular point being movable on the upper plate in the surface thereof, the remaining angular points being releasably mounted to the upper part. Thus the seat mounting is rotatable about the first mentioned point which is stationary in relation to the upper plate, the said second point carrying out a movement in the surface of the upper plate or only mainly in the upper surface and the other remaining points after unlocking being free from the upper plate. The first point thus is made in such a way that it permits a rotatable as well as a tiltable movement of the seat mounting which is possible with a hinged pen construction. Other constructions which enable the said combination of movements are also applicable but the simple construction like the said pen construction is preferred. At the second angular point preferably a stop means is arranged to prevent the seating when returning to shoot through. In the vehicle also a stop is arranged to indicate when the upper plate has reached the proper position in the vehicle.

The point moving in the upper plate may run in a circular track arranged on the upper plate, preferably by means of a connected wheel. Since in use a relatively heavy weight is pressing on this point it is not strictly necessary to arrange for an added guide in the upper plate to maintain the wheel on the surface of the upper plate, because that point anyway is pressed on the upper plate by the load present. Moreover, during regular use a certain guide track will be made in the surface of the upper plate.

The seat mounting further is constructed in such a way that the

point of gravity in resting condition is lying as closely as possible before the line of connection of the two angular points of the seating at the backrailing to facilitate the upwardly directed rotatable movement of the seat mounting with invalid. The same holds for the base part which seen in itself has such a weight distribution that it does not roll away during the said steps. The expert is able to make the construction in such a way that the point of gravity will be situated in the desired area.

The invention also comprises the combined system of a chair for invalids with accessory parts which is characterised by a guide with locking means fixed in the vehicle, a loose intermediary guide arranged to be connected to the upper plate of the chair for invalids in such a way that the upper plate of the chair for invalids together with the seat mounting can be transported in and out of the vehicle.

When moving the invalid from the chair of invalids into the vehicle the attendant just after unlocking of the seating part and the upper plate, thereby the two angular points at the front of the seating, i.e. the side of the seating where the legs of the invalid are freely hanging, when the seat is moved upwards will be released, the seat will tilt backwards and impart at the same time a rotating movement to the seat over the upper plate by means of the movable angular point and move the seat through the connection bars to the vehicle. The tilting and rotating movement enables the legs of the invalid to be lifted over the theshold during further movement of the seating, whereafter the seating may again be brought back in its starting position. The seating which is moved into the vehicle through the intermediary guiding means will now be locked in the guiding system present in the vehicle. The base of the chair for invalids as well as the intermediary part will then be demounted and put into the trunk of the vehicle. When moving the invalid from the vehicle the reverse sequence is used. After connecting of the auxiliary guides with the guide in the vehicle and the base of the chair of invalids the seat mounting is after unlocking moved out of the vehicle with a rotating as well as tilting movement and again fixed on the base of the chair.

The invention will now be illustrated by means of the attached drawings, wherein

figures 1a, 1b and 1c sequentially represent a perspective view of

the chair of invalids placed before a vehicle, an upper view of the part in the vehicle and an upper view of the base with wheels, wherein the arrow indicates the direction of rotation of the seat mounting;

figure 2a in perspective shows the moment at which the seat mounting is unlocked and is moved in the vehicle with a tilting and rotating movement, whereas figure 2b shows the same situation in upper view, the arrows indicating the combined movement of the seat mounting, which is represented by broken lines;

figure 3 shows in perspective the situation that the chair of invalids is moved into the vehicle and as represented by the two arrows is further moved to the front and is locked into means arranged therefor.

In figure 1a 1 generally denotes a chair of invalids which comprises a seating part 2, which is solidly fixed to the upper plate 3, which below will be further illustrated, which plate in his turn is fixed to the frame 5 of the chair, of which further the wheels 6 as well as the foot hold 7 with bars 8 and railing 9 are indicated. With reference 11 schematically the threshold of the vehicle is indicated. Plate 3 is movable between transverse guides 4 which can be connected to the intermediary guides 22 which are placed between the chair of invalids 1 and the vehicle 10. During normal practice seat mounting 2 and plate 3 as movable parts are additionally locked, for instance by means of clamps, schematically indicated by 21 through which each arbitrary movement is blocked.

In figure 1b the part in the vehicle is shown consisting of two guides 12, on which the transverse guides 14 are arranged which serve for connection with the chair for invalids. With 16 pens are schematically shown which are fitting with pens 15 present in the seat mounting to lock the seat mounting in the vehicle.

In figure 1c schematically the base is shown with transverse guides 4, which are able to mesh into corresponding guides 14 in the vehicle by means of auxiliary conductors 22. Arrow 18 shows the rotation of the seat mounting while 19 and 20 schematically represent a pen-hinge connection and a roller connection. The seat mounting is rotatable about the fixed pen-hinge connection 19, point 20 being able to rotate in the surface of the upper plate 3 over plate 4. With 21 schematically clamps are indicated which block any undesirable movement of seat

mounting 2 in the upper plate, for instance if one drives up the trottoir, in which case the front wheels have to be lifted as well as rotated. In this figure 17 schematically indicates a stop means which restricts the movement of point 20 and thus the movement of point 20 outside the upper plate 3. Furthermore running wheels 23 (bearings) are visible, with which the upper plate 3 can be moved along the guide profiles which are bent like rails towards the vehicle and can be moved into the vehicle (see also figure 1a).

The seating further contains pens 15, preferably formed as hollow bars, which fit into corresponding pens 16 arranged in the vehicle, through which the seating with upper plate, when this has been moved into the car, is fixed before the combination is locked. The open door of the vehicle is indicated with a dash-dotline (13).

In figure 2b the connection between the base of the chair of invalids and the vehicle is indicated through the transverse guides 14 and intermediary guides 22. The broken line in figure 2a indicates the seat mounting which is rotated as well as tilted and moved towards the vehicle, of which the pen-hinge connection 19 is able to move over guide 22 in the direction of the vehicle while the roller connection 20 already has been rotated. In the drawn broken position the seat mounting is moved in tilted and rotated condition into the vehicle till the legs of the patient are brought into the vehicle, whereafter the seat mounting again is rotated back into its normal seating position.

In figure 2b three arrows are drawn (26, 27, 38) which respectively indicate the movements which are carried out by the seating in the face of the upper plate, i.e. a rotating movement, arrow 26 through wheels 20; a movement towards the car, arrow 27; and a movement along the car forwards, arrow 28, through guide 29 when finally the seat with plate is brought into the vehicle, by which last movement the pens 15 and 16 (see above) are fitted together whereafter the combination is locked, such as by clamps. The fourth movement in figure 2b is not indicated, it is the upwardly directed tilting movement necessary to pass over theshold 11.

Finally figure 3 shows the condition wherein the seat mounting of the chair of invalids, thus the seating 2 shifted with plates 3, is placed into the car. The arrows 24 and 25 indicate the last movements

of the seating in relation to plate 3 during transfer into the car, namely a proceeding movement according to arrow 22 till the pens 14 present in the seating part are fitting with the corresponding pens 16, with which the seating part in the car is fixed. With this last movement the seating mostly is somewhat upturned to make movements more easy. With 30 schematically a stop is indicated which marks the extreme position of the seat, while as well clamps not indicated are present which bolt the seating with the plate and secure it.

With the drawings it has been shown how one has to deal during movement of an invalid in a chair of invalids into and out of a vehicle. From the figures it appears that one needs only arrange for a relatively small alteration to the vehicle in the shape of guides 12 and transverse guides 14 and part 24. By this construction it is also possible to maintain a seating in the car if no use is made of the chair of invalids without this being disturbing for the other passengers.

An important aspect of the chair of invalids is the provision of the rotatable and tiltable point 19, which preferably is made in the form of a pen which fits into an opening of plate 3 with hinge. The movable connection 20 preferably consists of a wheel which is able to move over the upper plate and which can be moved over plates 3 in free condition as well in a guide.

The other two angular points are provided with releasable connections of the usual type.

The number of steps which has to be taken is restricted and relates to the provision of intermediary guides 22, the unlocking of the seat mounting, as well as the removal of the intermediary guide and the base of the chair of invalids when the invalid is already in the car. The putting in the car can be made as one continuous movement in the form of a succession of tilting , rotating and progressing movements. Since the base mainly consists of wheels and bars it is easily transportable and can be placed into the trunk of the vehicle. It is a further advantage that by means of the rails in the car part a front and backward movement in the car itself is possible by which the locking can be simply carried out.

CLAIMS.

1. Chair for invalids of which the seat mounting and the base after unlocking can be released from each other and the seat mounting can be moved into a vehicle, characterised in that a seat mounting is connected to an upper plate and is made to be able to rotate as well as tilt in relation to said upper plate, which upper plate is provided with guiding means which are movable in guides in the base, which guides can be made to mesh into fitting guides positioned in the vehicle by means of intermediary guides, the upper plate with seat mounting being movable along the guiding system formed in and out of the vehicle and is lockable in the vehicle.

2. Chair for invalids according to claim 1, characterised in that the seat mounting is fixedly but rotatably as well as tiltably connected to one angular point of the back side to the upper plate, one angular point of the back side in the face of the upper plate being rotatable and the other two angular points of the upper face at the front of the seat mounting being releasable, preferably by pens which fit into each other.

3. Chair for invalids according to claims 1 and 2, characterised in that the angular point, which is able to carry out a rotating as well as tilting movement, forms a pen and hinge connection with the upper plate.

4. Chair for invalids according to claims 1-2, characterised in that the rotatable angular point is provided with a wheel which is able to carry out a circular movement on the upper plate, a stop being present at the back side.

5. Chair for invalids according to claims 1-4, characterised in that the upper plate with wheels is movable along guide profiles.

6. Chair for invalids according to claims 1-4, comprising on top of a frame (5) with wheels (6) a seat mounting (2), an upper plate (3), which seat mounting is provided with a pen-hinge point (19), a point (20) which is rotatable in the face of the upper plate (31), two releasable fixing points which by means of pens (15) are locked into corresponding pens, which upper plate is provided with a stop (17) for the horizontal movement of point (20), as well as wheels (23) which fit into guide profiles (4) arranged on the frame (5) of the chair, there being also clamps (21) to lock the combination in its normal use

condition.

7. System for a chair for invalids with accessory parts to move an invalid in and out of a vehicle,characterised by a combination of a chair for invalids according to claims 1-6, transverse guides which are fixed to the bars of the base and a guiding system in the vehicle which is fixed to the transverse guides and is provided with stop, connecting and locking means.

FIG.1

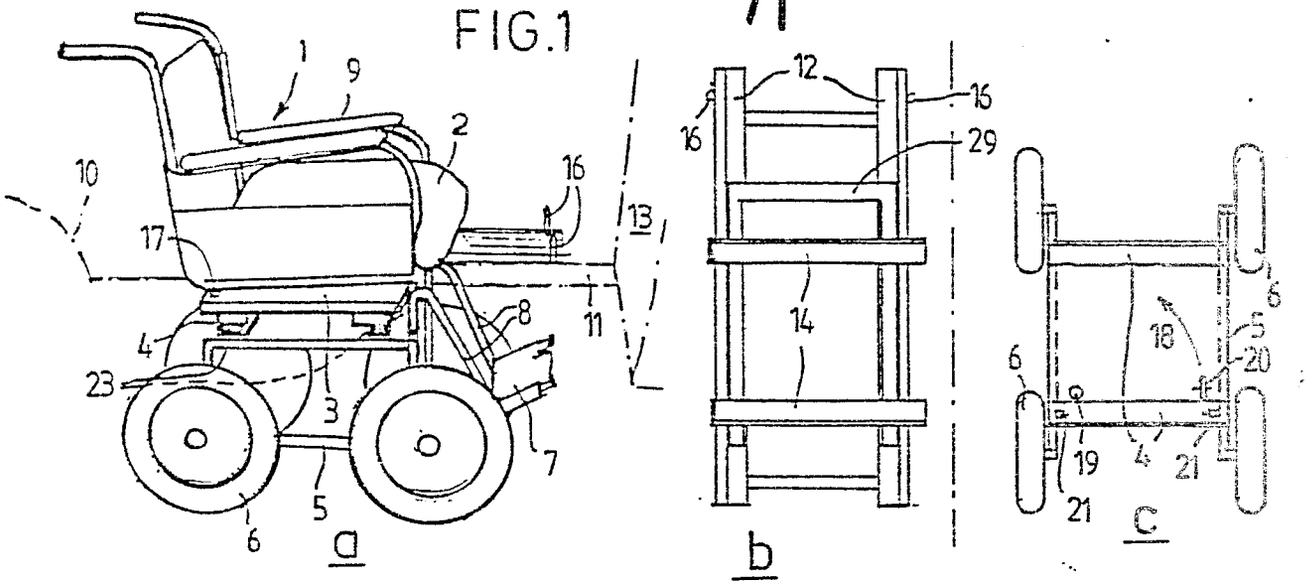

FIG.2

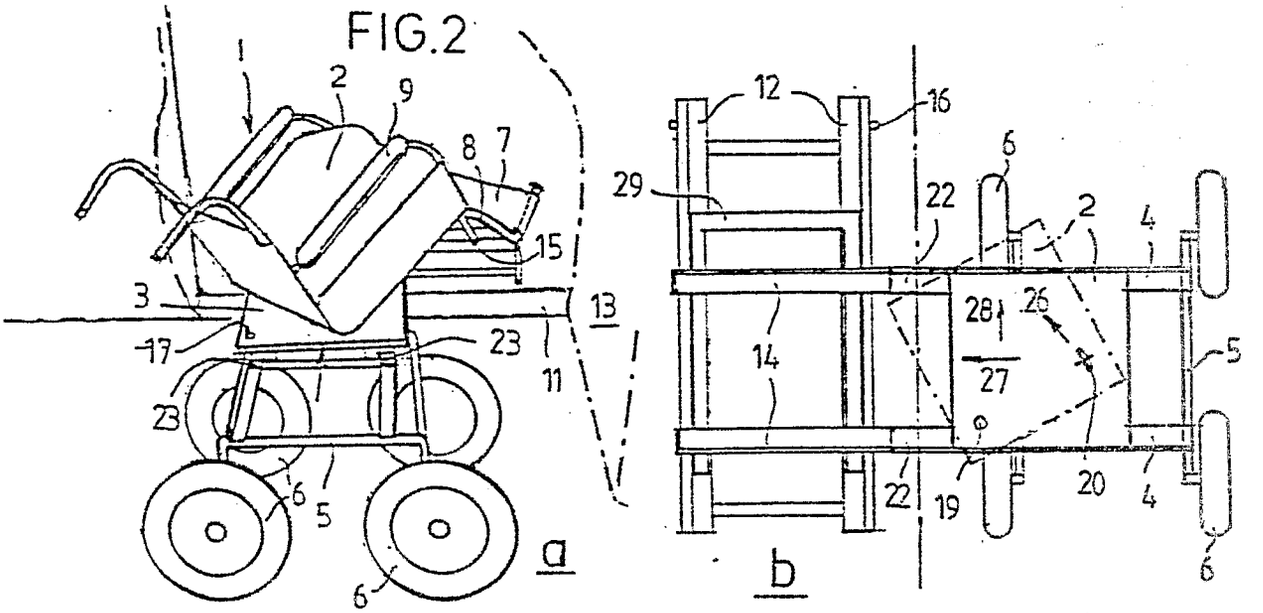

FIG.3