(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 328 221 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **89200295.7**

(51) Int. Cl.[4]: **A61G 7/10 , A61G 5/00**

(22) Date of filing: **09.02.89**

(30) Priority: **10.02.88 NL 8800326**

(43) Date of publication of application:
16.08.89 Bulletin 89/33

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

(71) Applicant: **UNITECH CONSTRUCTIE B.V.**
De Kronkels 16
NL-3752 LM Bunschoten(NL)

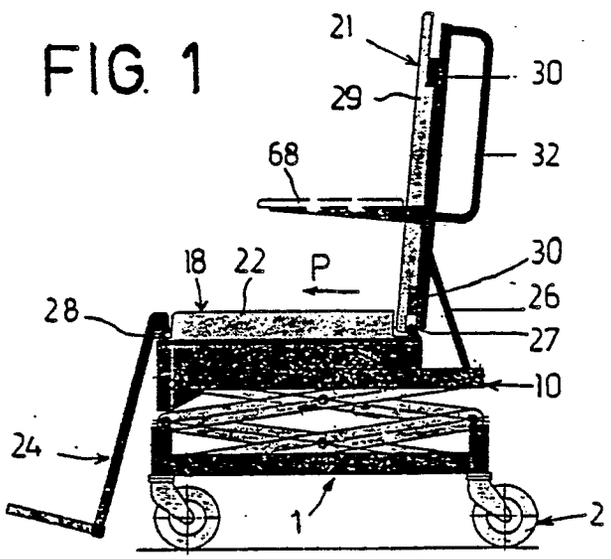
(72) Inventor: **van Dammen, Frank**
Bremstraat 5
NL-3742 RD Baarn(NL)

(74) Representative: **Lips, Hendrik Jan George, Ir. et al**
HAAGSCH OCTROOIBUREAU Breitnerlaan 146
NL-2596 HG Den Haag(NL)

(54) Device for moving an invalid person.

(57) A device for moving an invalid person, said device comprising a wheeled carriage (1), means (3-9) on said carriage (1) to take up a frame (10) which is adjustable in height for supporting a seat-lying place (18) comprising a backrest (21), a seat (22) and a seat element (23) which can be brought sideways beside the seat (22) and in one plane with this for bridging the distance between another seat-lying place and said seat (22), which seat element (23) comprises a slide portion (33) being movable in respect of the seat (22), a hinged portion (34) being pivotally connected to that edge of the slide portion (33) which in the extended position is at the greatest distance from the seat (22), and one endless conveyor belt (57) running over the upwardly directed surfaces (39,36,40) of the seat (22) and of both portions of the seat element (33,34).

FIG. 1



EP 0 328 221 A1

Device for moving an invalid person

The invention relates to a device for moving an invalid person, said device comprising a carriage provided with a number of wheels, means being provided on said carriage to take up a frame which is adjustable in height for supporting a seat-lying place comprising a backrest, a seat and a seat element which can be brought sideways beside the seat and in one plane with this for bridging the distance between another seat-lying place and said seat.

Such a device is known from EP-A-0 067 069. This known device is used such that the seat, together with the seat element extending from it can be brought simultaneously below a patient. After this, however, the patient has to be rotated over 90° around a vertical axis to be able to sit down in the chair. So such a device is only limited usable.

Now the invention provides a device of the type described above which is characterized in that said seat element comprises a slide portion being movable in respect of the seat such that in the retracted position the slide portion and the seat will be substantially positioned one above the other, and a hinged portion being pivotally connected to that edge of the slide portion which in the extended position is at the greatest distance from the seat, which hinged portion can be pivoted to a vertical position, one endless conveyor belt which can be motor-driven, running over the in the position of use upwardly directed surfaces of the seat and of both portions of the seat element.

In this way not only a substantial distance between the device and another seat-lying place can be bridged, but the patient can directly be brought on the seat in the right position after only a limited portion of the seat element is slid below the patient and the conveyor belt is put into operation. For nursing personnel this means that they have less to lift while it also may safe pain for the patient himself.

Further it can be pointed to NL-A-70 10301 by which it is known to use an endless conveyor belt for the transport of patients. In this case it relates, however, to a stretcher, the upper surface of which is formed by a conveyor belt running in longitudinal direction of the stretcher so that a lying patient can be shifted in longitudinal direction onto the stretcher.

According to a further elaboration of the invention the slide portion of the seat element is present below the seat in the retracted position, a tensioning roller being provided below the slide portion over which the conveyor belt extends over substantially 180°, said tensioning roller being rotatable around a shaft which is movable in a direction perpendicular to its center line to maintain the endless belt tensioned when the slide portion is slid below the seat and the conveyor belt is released from the upper surface of the slide portion.

Because of this it is prevented that the conveyor belt lying on the upper surface of the seat element is taken along till below the surface of the seat when the slide portion is slid inwardly. By this the conveyor belt might be damaged and disturbances might occur.

According to a preferred embodiment of the invention for moving the seat element use is made of a rotatably provided, axially not movable, screwed spindle over which a nut is movable which is fixedly connected to the slide portion, a sleeve being provided on said nut and being movable on said nut in a direction parallel to the screwed spindle, said sleeve being stopped by an abutment provided on the screwed spindle when the nut and by this the slide portion is moved outwardly and after the slide portion has nearly reached its extended position, said sleeve being moved in respect of the nut for longitudinal moving a tension rod coupled with the sleeve in respect of the slide portion, said tension rod pivoting the hinged portion from the vertical to the horizontal position during further moving outwardly the slide portion.

So in this way it is obtained that only the screwed spindle has to be rotated to make possible as well the outwardly sliding movement of the slide portion as well as the pivoting movement of the hinged portion.

According to a further elaboration of the invention it can be provided that at least the support surface of the backrest is sideways slidable in its plane such that it can be brought at the position of the slide portion of the seat element which is slid outwardly.

By this it is possible to slid the support surface of the backrest e.g. against the backrest of a chair on which the patient is sitting. When now the patient is moved by means of the endless conveyor belt it is only necessary that he is released for a moment of the backrest of the chair and after this he can recline against the support surface of the backrest of the device according to the present invention. The support surface then moves to the position above the seat together with the patient.

To make the device suitable for a lying patient it can be provided that the backrest is pivotable around a hinged shaft running parallel to the rear edge of the seat, the backrest being adjustable till a position in which it is nearly lying in one plane with the seat, a leg support being hingedly con-

nected near the front edge of the seat such that it can be brought into a position in which it is nearly lying in one plane with the seat, at least the support surface of the leg support being sidewards movable in its plane such that it can be brought at the position of the outwardly moved slide portion of the seat element.

By this an elongated mainly flat surface can be obtained with a length being larger than the length of a patient. This surface can be brought onto or against e.g. a treatment table or bed, the hinged portion of the seat element connected to the slide portion extending outside said surface. By rotating the patient somewhat the hinged portion can be slid under him over a given distance after which he can be brought totally on the surface formed by seat, backrest and leg support by means of the conveyor belt.

To be able to use the device also as wheel chair the backrest is provided with arm rests which are pivotally so that they substantially can come to lie in the plane of the backrest.

In particular the arm rest being positioned at the same side as the slide portion of the seat element will be positioned behind the support surface of the backrest and will not move outwardly with this support surface. Then the armrest cannot form an obstruction when transferring a patient from a seat-lying place onto the device according to the present invention or vice versa.

It will be obvious that the center of gravity of the lying patient is positioned at another place than that of a sitting patient. To make the risk that the device will tilt as small as possible the carriage must have a considerable length. By this, however, it is difficult to manoeuvre with the whole device.

Because of this according to the invention it is provided that the seat-lying place is slidable in longitudinal direction of a person lying on the device in respect of the frame and within certain limits.

It is obvious that when the device is used as wheel chair and so the patient is in a sitting position, the seat will be further rearwards in respect of the carriage than when the patient is in lying position.

To take care for it that the center of gravity of a patient nearly automatically will come to lie at the desired place it can be provided, that the backrest is pivotally connected to a rod in a point spaced from the hinge axis of it, the other end of said rod being pivotally connected with the frame in a point that, in the about vertical position of the backrest is positioned behind the backrest.

When now the backrest is brought to a more horizontal position the lower edge of the backrest automatically will slide forwardly together with the seat so that the center of gravity of a patient will be positioned at the desired place in respect of the frame. By this the danger is removed that the device will tilt forwardly or backwardly.

According to a preferred embodiment of the invention between the carriage and the frame a double expanding brace construction is present in which two free ends of the braces which are vertically lying above each other are pivotally connected to fixed places of the carriage and the frame respectively while the other free ends are movable in horizontal direction in respect of the carriage and the frame. In particular the height adjustment of the frame will take place by means of a spindle-motor taking care for longitudinal movement of a mainly vertical running rod which by means of pivoting tension rods is connected to portions of the brace construction.

This provides a sturdy and reliable support of the frame by the carriage.

In particular all wheels of the carriage will be swivel wheels and means will be provided to brake said wheels from a central point and for locking at least one pair of swivel wheels in such a position that the rotating axes of said wheels will be aligned.

By providing four swivel wheels the device can be easily brought in the right position near an other seat-lying place and can be fixed in this position because each wheel can be fixed by means of a brake member.

When the device is driven it can be favourable when e.g. the two swivel wheels positioned near the front edge of the seat are locked against swiveling, to wit in such a way that the rotating axes of the wheels are aligned. By maintaining the rear wheels swivable it is easy to manoeuvre with the device.

To obtain the above mentioned object it can be provided that a swivel wheel comprises a push rod which is movable in substantially vertical direction and the center line of which is aligned with the swivel axis of the swivel wheel, said push rod at its lower end being provided with a brake shoe and being movable downwardly from a neutral position to brake the wheel by means of the brake shoe and is movable upwardly to cooperate with an element connected to the fork of the swivel wheel to lock the fork in a given position.

So near each swivel wheel only one push rod need to be present which is movable in vertical direction to brake the wheel as well as to lock the fork of the swivel wheel.

In particular the push rod can be controlled by means of a cam the rotating axis of which is running transverse to the longitudinal direction of the push rod, said push rod being biased against the cam by means of a spring.

Because the push rod is aligned with the center line of the swivel axis of the swivel wheel, the

cams of two swivel wheels positioned at both sides of the carriage are present at a fixed place and can be connected to each other e.g. by means of one axis. This axis e.g. can be rotated by means of a foot pedal to bring the cam in the desired position. The two parallel running axes each carrying two cams can be coupled in such a way that when rotating the one axis to a position in which the wheels are braked the other axis is automatically rotated to the same position. When rotating the axis in opposite direction the other axis is not taken along.

The invention is further described by means of an embodiment, shown in the drawing, in which:

Fig. 1 shows a side view of a device according to the present invention;

Fig. 2 shows a front view of the device of Fig. 1 but with omitting certain parts;

Fig. 3 shows a view corresponding to Fig. 1 but with the frame and the seat in a higher position;

Fig. 4 shows a rear view of the device of Fig. 1;

Fig. 5 shows a side view of the device with the parts in the position for the transport of a lying patient;

Fig. 6 schematically shows a view and a partly section over the seat and the seat element mainly according to the line VI-VI of Fig. 3;

Fig. 7 shows a portion of Fig. 6 but with the seat element in the outwardly moved and extended position;

Fig. 8 shows a side view of a swivel wheel with the control mechanism for it in the neutral position;

Fig. 9 shows a side view corresponding to Fig. 8 but with the wheel in the braked position; and

Fig. 10 shows a side view corresponding to Fig. 8 but with the fork of the swivel wheel in the locked position.

The device which is particularly shown in the Figs. 1-5 comprises a carriage 1 provided with four swivel wheels 2. The carriage 1 supports an expanding brace construction 3 which at both sides of the carriage comprises a system 4 of braces 5. The braces 5 are connected to each other in the points 6. Of each system of braces 4 the one lowest brace 5 is pivotally connected with the carriage 1 in the point 7 while the other brace is provided with a roller 8 which in a not shown way is taken up in a profile of the carriage 1 in such a way that the roller 8 can only move in the direction of the arrow P, see Fig. 3.

Of the systems 4 two upper braces 5 are pivotally connected to a frame 10 in the points 9, the ends of the other braces 5 being provided with a roiler 11, see Fig. 6, which is taken up in a profile 12 of the frame 10.

In this way it is obtained that the frame 10 remains parallel to the plane of the carriage 1 when it is brought upwardly from the position shown in Fig. 1 to the position shown in Fig. 3.

To bring the frame 1 upwardly a spindle-motor 13 is provided, being mounted on the carriage 1 and taking care for moving a rod 14 in vertical direction. To the upper end of the rod 14 two strips 15 are pivotally connected, said strips running obliquely downwardly along the rod. The lower ends of both strips 15 are pivotally connected to two legs 16 being fixed to a hinge pin 17 extending between the two brace systems 4 as appears from Fig. 2. By providing two strips 15 at both sides of the rod 14 and by pivotally mounting the spindle-motor 13 nearly no bending moment will be exerted on the rod 14. Also the mounting height of the motor 13 can be small by applying the downwardly extending strips while nevertheless the frame 10 can be adjusted in height over a considerable distance.

By the frame 10 a seat-lying place 18 is supported in such a way that it is adjustable in the direction of the arrow P, see Fig. 1, in respect of the frame 10 and so in respect of the carriage 1.

As schematically shown in Fig. 6 the seat-lying place 18 e.g. can comprise profiles 19 being slidable over rollers 20 connected to the frame 10.

The seat-lying place comprises a backrest 21, a seat 22, a seat element 23 and a leg support 24.

Fig. 1 shows the backrest and the leg support in a position in which the device is forming a wheel chair. Fig. 5 shows the backrest 21 and the leg support 24 in one plane with the seat 22 so that a patient can be transported in lying position. If necessary a head cushion can be mounted on the backrest 21.

The backrest 21 is connected to the frame 10 by means of pivotable rods 26, the backrest being pivotally connected to the seat 22 in the point 27. The leg support 24 also is pivotally connected to the seat 22 in the point 28.

When now the seat 22 is moved in the direction of the arrow P from the position shown in Fig. 1 the backrest 21 automatically will move to a more horizontal position and the seat 22 will move forwardly in respect of the carriage 1 so that the center of gravity of a patient present of the device will remain nearly above the middle of the carriage 1.

To bring the leg support 24 in a desired position,between this leg support and the seat 22 either the frame 10, control means will be provided which can be of a known type and need not be further discussed. It might be desirable that e.g. in case of a vertical position of the backrest 21 the leg support 24 is extending horizontally.

The backrest 21 comprises a support surface 29 which is mounted shiftable as shown in Fig. 4, e.g. by means of the double guiding rail 30, shown in Fig. 1. So the further portion of the backrest remains at its place.

In a corresponding way the leg support 24 can be provided with a support surface 31, which is sidewards movable to transfer a patient easier from one seat-lying place on another one. The support surface 31 then will come to lie in line with the support surface 29 which is shown in Fig. 4.

It can be remarked that the backrest 21 can be provided with rods 32 which can be used for driving the device in particular when this is used as wheel chair.

The Figs. 6 and 7 show in particular the seat element 23 which can be moved outwardly in respect of the seat 22 from the position shown in Fig. 6 to the position which is shown in Fig. 4 by means of dashed lines.

To this end the seat element comprises the slide portion 33 and a hinged portion 34, said portions being connected to each other in the hinge point 35.

The slide portion 33 consists of the upper plate 36 and the lower plate 37 being connected to each other by means of some vertical plate portion 38. The slide portion 33 is shiftable supported by means of not shown rollers being connected to the seat 22 in such a way that the upper plate 36 of the slide portion 33 is lying against the lower side of the upper plate 39 of the seat 22.

The hinged portion 34 consists of the upper plate 40 and the lower plate 41 being connected to each other by means of vertical plate portions 42.

For controlling the slide portion 33 and the hinged portion 34 a screwed spindle 43 is present which by means of a thrust bearing 44 is rotatable but axially not movable supported by a part 45 fixedly connected to the seat 22.

On the screwed spindle 43 a gear wheel 46 is fixedly connected and over this gear wheel a geared belt 47 is running which in a not further shown way can be driven by means of the electric motor 48.

On the screwed spindle 43 the sleeve 49 is present which is provided with inner screw thread, said sleeve being not rotatable in respect of the slide portion 33 and by means of a shoulder 50 is engaging an abutment 51 which is fixedly connected to the slide portion 33.

On the sleeve 49 further a slide sleeve 52 is movable and this slide sleeve is connected to the hinged portion 34 by means of at least one rod 53, to wit in the hinge point 54 which is spaced apart from the hinge point 35 between the slide portion 33 and the hinge portion 34.

At its other end the screwed spindle 43 is provided with a thrust bearing 55 being enclosed by means of a nut 56.

When now the slide portion 33 and the hinged portion 34 are in the position as shown in Fig. 6, the screwed spindle 53 can be rotated during which the sleeve 49 will be moved to the left, the slide portion 33 moving to the left by means of the shoulder 50 and the abutment 51. After a given movement of the sleeve 49 and so moving the slide portion 33 outwardly over a given distance the slide sleeve 52 is engaging the thrust bearing 55. When the spindle 43 is rotated further the shoulder 50 of the sleeve 49 is moving towards the slide sleeve 52 so that the hinge point 35 will move further to the left in respect of the hinge point 54 between the slide portion 33 and the hinged portion 34. By this the hinged portion 34 will be pivoted to the horizontal position as this is shown in Fig. 7. When the screwed spindle 43 is turned in opposite direction the parts 33 and 34 again will be brought in the position as this is shown in Fig. 6. To switch off the motor 48 in time known limit switches can be applied.

While in the position of the slide portion 33 and the hinged portion 34, as shown in Fig. 7, it is already much easier to bring a patient from another seat-lying place onto the seat 22, further a conveyor belt 57 is provided which may extend over the upper surface of the upper plate 39 of the seat 22, of the upper plate 36 of the slide portion 33 and of the upper plate 40 of the hinged portion 34. This is the case in the position of the parts as shown in Fig. 7. To this end the conveyor belt further is running over two reversing rolls 58, at least one of these may be driven from the motor 59 by means not further indicated. Further the conveyor belt 57 is running over the guiding rolls 60 positioned at a fixed place in respect of the seat 22, over a movable reversing roll 61, over guiding rolls 62 in the hinged portion 24, a reserving roll 63 near the end of the hinged portion 34 and along a further guiding roll 64, if any, which is only working when the hinged portion is in its horizontal position shown in Fig. 7.

The reversing roll 61 is rotatable around a shaft 65 which near its ends is supported by means of not further indicated slide blocks being movably comprised in slots 66, provided in two vertical plate sections 67 forming part of the seat 22.

In the position of the parts shown in Fig. 6 the reversing roll 61 will be in the most right position. When now the screwed spindle 43 is rotated and the slide portion 33 is going to move to the left, the reserving roll 61 will be drawn to the left against the force of not indicated springs so that the conveyor belt 57 always will remain tensioned and can be driven in the end position of the parts shown in Fig. 7 to bring a patient present on it onto the seat

22 when the conveyor belt 57 is moved in the direction of the arrow R, indicated in Fig. 7. When the conveyor belt 57 is moved in opposite direction obviously a patient can be brought from the seat 22 onto another seat-lying place.

In particular when the device is used as wheel chair it is desirable that the patient has arm rests at his disposal. These arm rests are indicated by 68 in the Figs. 1 and 2. The arm rests 68 are foldable in the plane of the backrest 21 as shown in the right portion of Fig. 4. By this there are no difficulties when bringing a patient onto the seat 22. When the device is used as stretcher, as shown in Fig. 5, generally speaking both arm rests will be folded away.

To bring in all cases the device near another seat-lying place in a way as easy as possible, the device is provided with swivel wheels 2, the construction of which is schematically shown in the Figs. 8-10. Each swivel wheel 2 comprises a wheel 69 which by means of a shaft 70 is rotatably supported in the fork 71. The fork comprises an upper plate 72 and a sleeve 73 extending from this, said sleeve being rotatable but axially not movable received in a sleeve 74 which can be fixedly connected to the carriage 1 of the device. The support plate 75 also can be connected to the carriage 1 against which the upper plate 72 is lying e.g. by means of a not shown thrust bearing.

The push rod 76 is extending through the sleeve 73 and is movably guided in vertical direction and is provided at its lower end with the brake shoe 77. Near its upper end the push rod 76 is provided with the abutment surface 78, which by means of a not shown spring is biased against a cam 79 mounted on a shaft 80, which e.g. extends between the two cams 79 present at both sides of the carriage 1. By rotating the shaft 80 the cam 79 can be brought into three positions. A first position is shown in Fig. 8. In case of this the push rod 76 is present in the middle position and the brake shoe 77 is free of the wheel 69. When the sahft 80 is rotated anti-clockwise, as seen in Fig. 8, the cam 79 is moved to the position shown in Fig. 9. In case of this the push rod 76 is pressed downwardly and the brake shoe 77 is engaging the wheel 69.

From the position shown in Fig. 8 the shaft 80 also can be rotated in opposite direction so that then the push rod 76 is engaging a portion of the cam 79 with a smaller diameter, so that the push rod 76 is pressed upwardly. By this a pawl 81 connected to the fork 71 can be received in a slot 82 provided in a part 83 being connected to the carriage 1. So then the fork 71 is locked against rotating so that the swivel wheels 2 principally are now fixed wheels.

The two ends of the shaft 80 each can be connected to a pawl 81 so that when rotating the shaft 80, e.g. by means of a foot pedal, both cams 79 simultaneously will be rotated to a given position. The shaft 80 will extend transverse to the normal direction of driving of the device and so transverse to the plane in which the device is projected in the Figs. 1, 3 and 5. The shaft 80, present near the most left pair of wheels as shown in Fig. 1, might be controlled by a foot pedal by means of a rod, said foot pedal being provided near the shaft 80 present near the most right pair of wheels. Then the controlling of the two shafts 80 can take place from a central point.

The controlling of the shaft 80 also can be done by means of a motor in a not further shown way. For controlling these motors, if any, and of the motors 13, 48 and 59 use can be made of a single control panel which is connected to the carriage by means of a cable so that the controlling of the various motors can take place from a single, variable place near the device.

It will be obvious that only one possible embodiment of the invention is shown in the drawing and is described above and that many modifications can be applied without departing from the spirit of the invention.

Claims

1. Device for moving an invalid person, said device comprising a carriage (1) provided with a number of wheels (2), means (3-9) being provided on said carriage (1) to take up a frame (10) which is adjustable in height for supporting a seat-lying place (18) comprising a backrest (21), a seat (22) and a seat element (23) which can be brought sideways beside the seat (22) and in one plane with this for bridging the distance between another seat-lying place and said seat (22),
characterized in
that said seat element (23) comprises a slide portion (33) being movable in respect of the seat (22) such that in the retracted position the slide portion (33) and the seat (22) will be substantially positioned one above the other, and a hinged portion (34) being pivotally connected to that edge of the slide portion (33) which in the extended position is at the greatest distance from the seat (22), which hinged portion (34) can be pivoted to a vertical position, one endless conveyor belt (57) which can be motor-driven, running over the in the position of use upwardly directed surfaces (39,36,40) of the seat (22) and of both portions of the seat element (33,34).

2. A device according to claim 1,
characterized in
that the slide portion (33) of the seat element (23) is present below the seat (22) in the retracted

position, a tensioning roller (63) being provided below the slide portion (33) over which the conveyor belt (57) extends over substantially 180°, said tensioning roller (63) being rotatable around a shaft (65) which is movable in a direction perpendicular to its center line to maintain the endless belt (57) tensioned when the slide portion (33) is slid below the seat (22) and the conveyor belt (57) is released from the upper surface (36) of the slide portion (33).

3. Device according to claim 1 or 2,
characterized in
that for moving the seat element (23) use is made of a rotatably provided, axially not movable, screwed spindle (43) over which a nut (49) is movable which is fixedly connected to the slide portion (33), a sleeve (52) being provided on said nut (49) and being movable on said nut in a direction parallel to the screwed spindle (43), said sleeve (52) being stopped by an abutment (55) provided on the screwed spindle (43) when the nut (49) and by this the slide portion (33) is moved outwardly and after the slide portion (33) has nearly reached its extended position, said sleeve being moved in respect of the nut (49) for longitudinal moving a tension rod (53) coupled with the sleeve (52) in respect of the slide portion (33), said tension rod pivoting the hinged portion (34) from the vertical to the horizontal position during further moving outwardly the slide portion (33).

4. Device according to one of the preceding claims,
characterized in
that at least the support surface (29) of the backrest (21) is sideways slidable in its plane such that it can be brought at the position of the slide portion (33) of the seat element (23) which is slid outwardly.

5. Device according to one of the preceding claims,
characterized in
that the backrest (21) is pivotable around a hinged shaft (27) running parallel to the rear edge of the seat (22), the backrest being adjustable till a position in which it is nearly lying in one plane with the seat (22), a leg support (24) being hingledly connected near the front edge (28) of the seat (22) such that it can be brought into a position in which it is nearly lying in one plane with the seat (22), at least the support surface (31) of the leg support (24) being sidewards movable in its plane such that it can be brought at the position of the outwardly moved slide portion (33) of the seat element (23).

6. Device according to one of the preceding claims,
characterized in
that the backrest (21) is provided with arm rests (68) which are pivotally so that they substantially can come to lie in the plane of the backrest (21).

7. Device according to claim 6,
characterized in
that at least the arm rest (68) being positioned at the same side as the slide portion (33) of the seat element (23), will be positioned behind the support surface (29) of the backrest (21) and will not move outwardly with this support surface (29).

8. Device according to one of the preceding claims,
characterized in
that the seat-lying place (18) is slidable in longitudinal direction of a person lying on the device in respect of the frame (10) and within certain limits.

9. Device according to claim 8,
characterized in
that the backrest (21) is pivotally connected to a rod (26) in a point spaced from the hinge axis (27) of it, the other end of said rod being pivotally connected with the frame (10) in a point that, in the about vertical position of the backrest (21) is positioned behind the backrest (21).

10. Device according to one of the preceding claims,
characterized in
that between the carriage (1) and the frame (10) a double expanding brace construction (3) is present in which two free ends (7,9) of the braces (5) which are vertically lying above each other are pivotally connected to fixed places of the carriage (1) and the frame (10) respectively while the other free ends (8) are movable in horizontal direction in respect of the carriage (1) and the frame (10).

11. Device according to claim 10,
characterized in
that the height adjustment of the frame (10) takes place by means of a spindle-motor (13) taking care for longitudinal movement of a mainly vertical running rod (14) which by means of pivoting tension rods (15) is connected to portions of the brace construction (3).

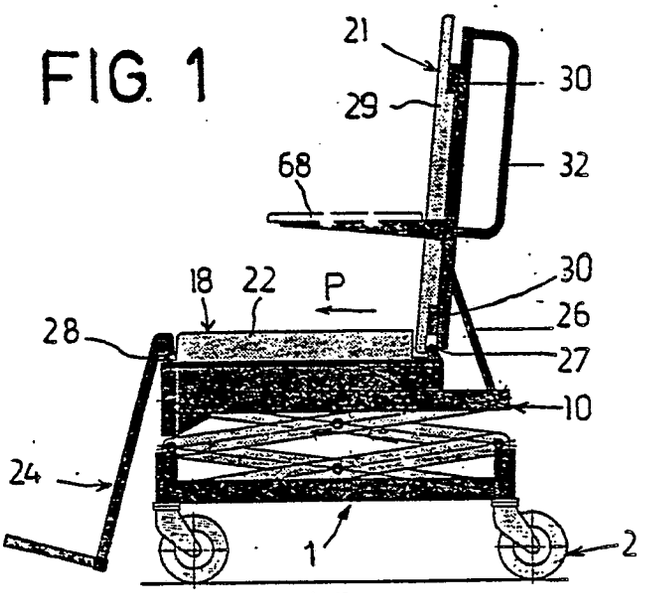
12. Device according to one of the preceding claims,
characterized in
that all wheels of the carriage are swivel wheels (2), means (72-83) being provided to brake said wheels (69) from a central point and for locking at least one pair of swivel wheels (2) in such a position that the rotating axes (70) of said wheels (69) will be aligned.

13. Device according to claim 12,
characterized in
that a swivel wheel (2) comprises a push rod (76) which is movable in substantially vertical direction and the center line of which is aligned with the swivel axis of the swivel wheel (2), said push rod

(76) at its lower end being provided with a brake shoe (77) and being movable downwardly from a neutral position to brake the wheel (69) by means of the brake shoe (77) and is movable upwardly to cooperate with an element (81) connected to the fork (71) of the swivel wheel (2) to lock the fork in a given position.

14. Device according to claim 13, characterized in that the push rod (76) is controlled by means of a cam (79) the rotating axis (80) of which is running transverse to the longitudinal direction of the push rod (76), said push rod (76) being biased against the cam (79) by means of a spring.

FIG. 1



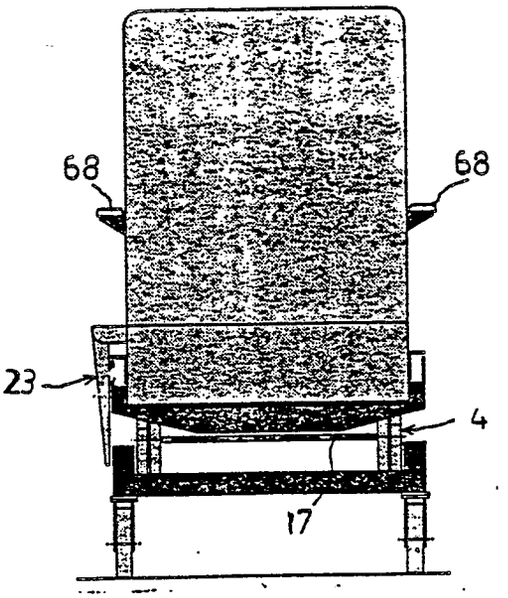


FIG. 2

FIG. 3

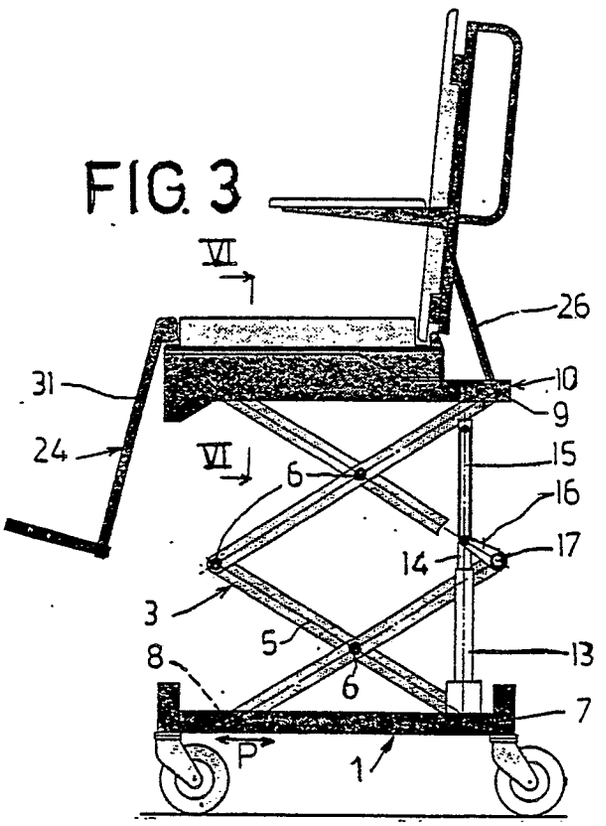
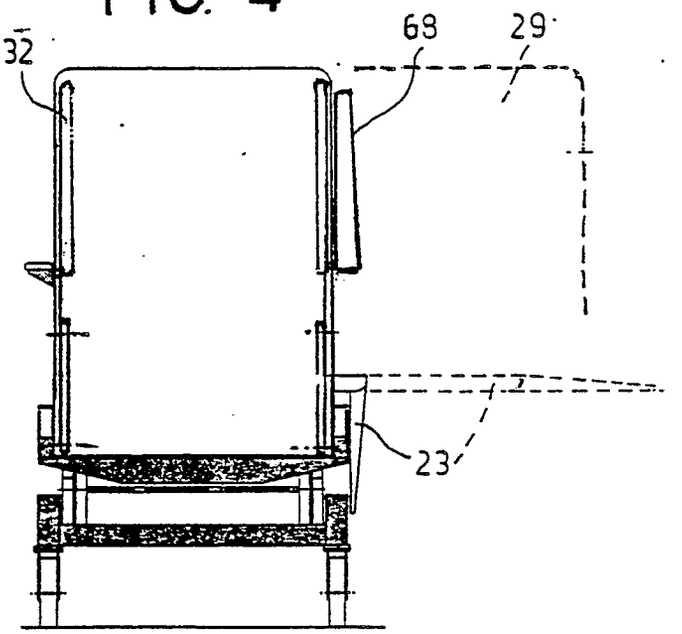


FIG. 4



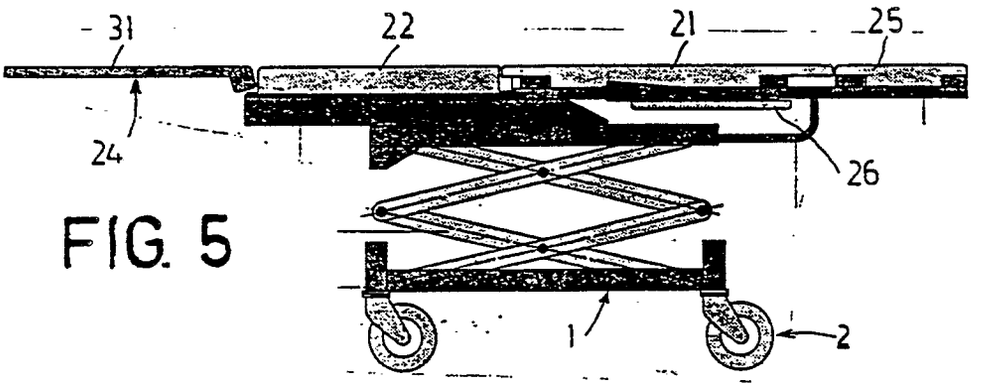


FIG. 5

Frank van Dammen, Baarn.

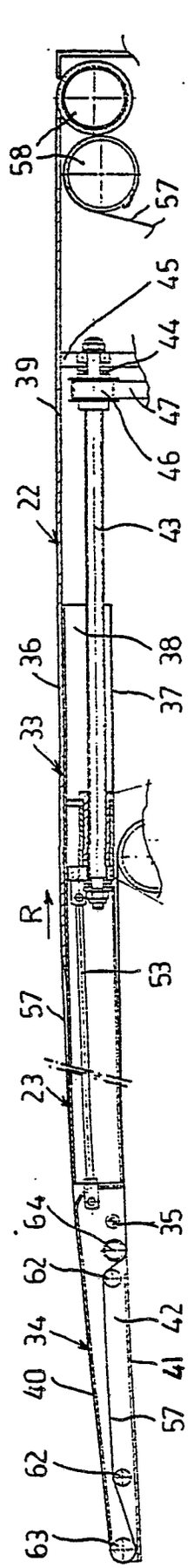


FIG.7

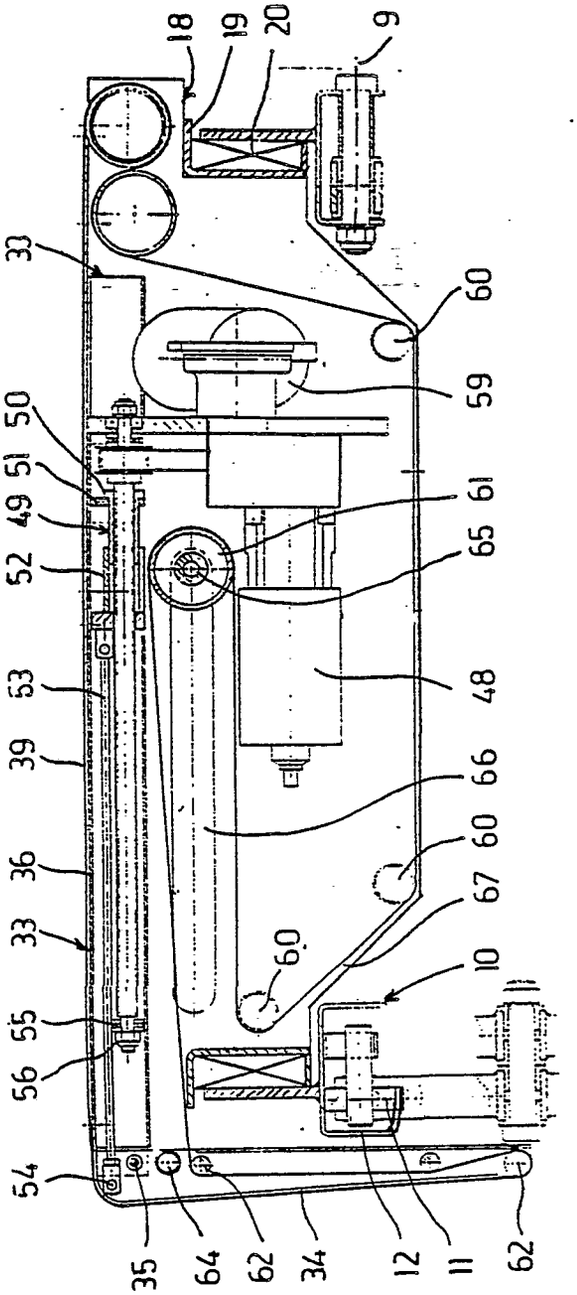


FIG.6

Frank van Dammen, Baarn.

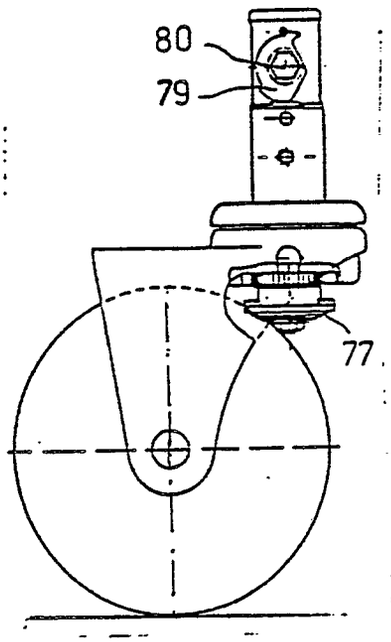


FIG 9

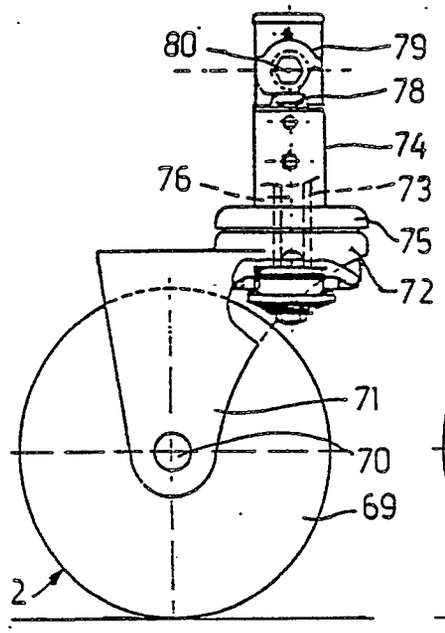


FIG 8

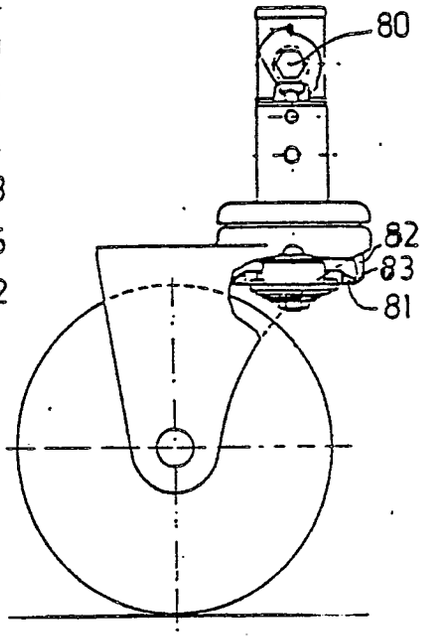


FIG 10

Frank van Dammen, Baarn.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 20 0295

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 967 328 (E.V. COX) * Whole document *	1,4,5	A 61 G 7/10 A 61 G 5/00
A	US-A-4 101 143 (W.J. SIEBER) * Column 14, line 22 - column 15, line 37; figure 14 *	1,6	
A	US-A-4 155 588 (U. DANZIGER et al.) * Column 2, lines 15-35; figures 3-5 *	1,6	
A	US-A-2 146 191 (PETERS) * Page 3, lines 1-7 *	8	
A	US-A-2 982 336 (MINICI) * Column 3, line 40 - column 4, line 59; figures 1,6 *	10	
A	GB-A- 523 114 (MAWBY) * Claim 1; figures 1-5 *	12-14	
A	US-A-3 057 638 (FLOYD) * Column 2, lines 26-33; figure 5 *	12-14	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	WO-A-8 701 583 (BEKKELUND) * Claims; figures *	1	A 61 G
A,D	NL-A-7 010 301 (PHILIPS) * Whole document *	1	
A,D	EP-A-0 067 069 (SWALLOW) * Whole document *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16-05-1989	BAERT F.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)