

(12) **UK Patent Application** (19) **GB** (11) **2469093** (13) **A**

(43) Date of A Publication

06.10.2010

(21) Application No: **0905657.3**
(22) Date of Filing: **01.04.2009**

(51) INT CL:
B66B 9/08 (2006.01) **A47C 7/54** (2006.01)

(56) Documents Cited:
EP 1606207 A2 **EP 1180338 A1**
EP 0880921 A2 **CA 002229177 A1**
US 5533594 A **US 5393124 A**
US 4913264 A

(71) Applicant(s):
Stannah Stairlifts Limited
(Incorporated in the United Kingdom)
Watt Close, East Portway, ANDOVER, Hampshire,
SP10 3SD, United Kingdom

(58) Field of Search:
INT CL **A47C, B66B**
Other: **online: WPI, EPODOC**

(72) Inventor(s):
Max Daniel Woodhams
Alexander Henry Gage Wilson

(74) Agent and/or Address for Service:
IPCA Consulting Limited
Northpoint House, 52 High Street, KNAPHILL,
Surrey, GU21 2PY, United Kingdom

(54) Title of the Invention: **Improvements in or relating to stairlifts**
Abstract Title: **A STAIRLIFT CHAIR WITH INWARDLY FOLDING ARM SECTIONS**

(57) A stairlift chair 10 having a pair of spaced, parallel side edges of a seating surface 11 and a pair of spaced armrests 13, each armrest having a fixed element 18 adjacent a side edge and a moving element 19 displaceable about a vertical axis (20, figure 4). The fixed elements may be horizontal and the moving elements may be locked into position. The seating surface may have a folding part (23, figure 2), folding this actuating the moving portions of the arms by cables or linkages or, preferably a driven system comprising a motor and gears. A cam plate and follower may operate to displace a locking pin from a locking slot to allow folding (figure 6C). Operating controls 21 for the lift may be located on a moving portion of the arms. The arms may be locked in extended, folded (figure 3) or intermediate (figure 2) positions.

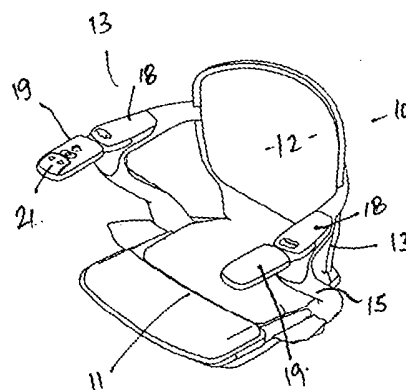


FIGURE 1

GB 2469093 A

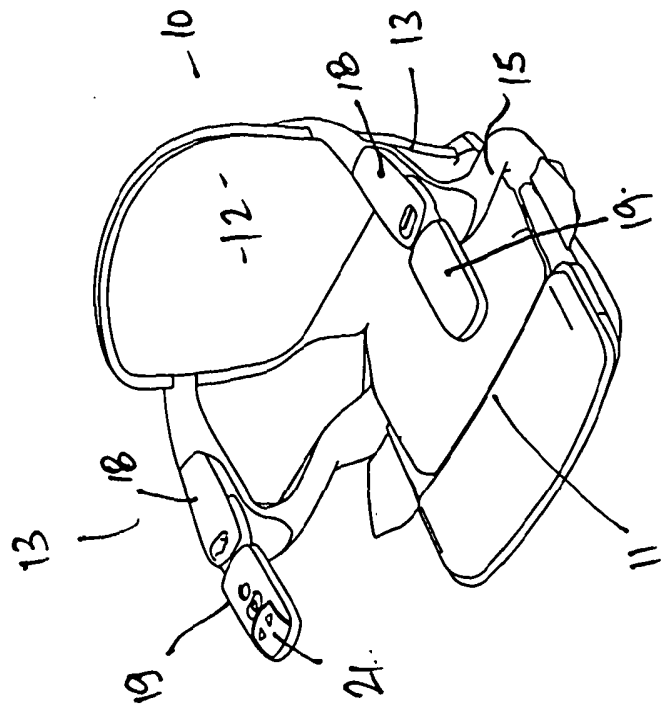


FIGURE 1

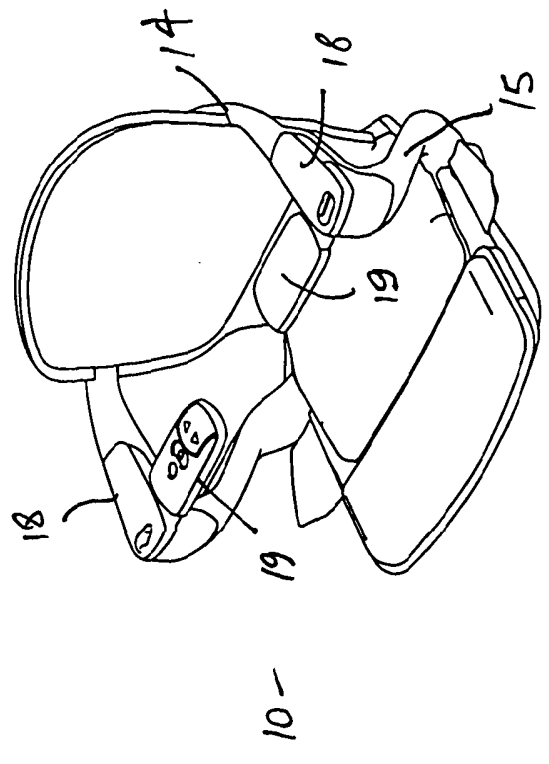


FIGURE 3

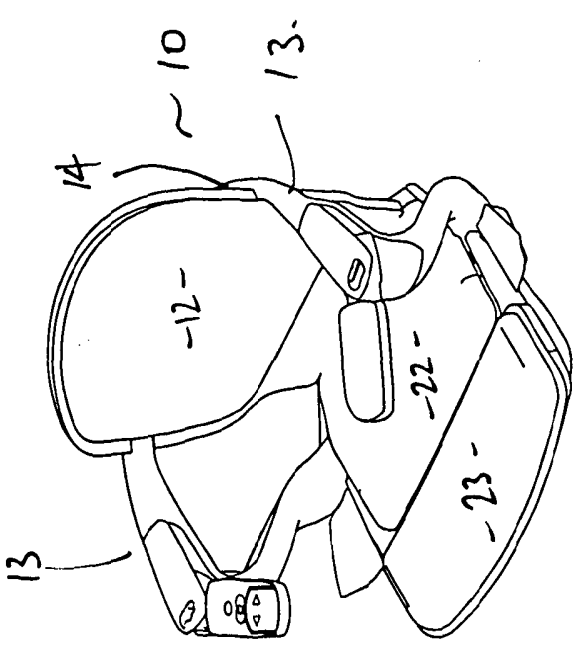


FIGURE 2

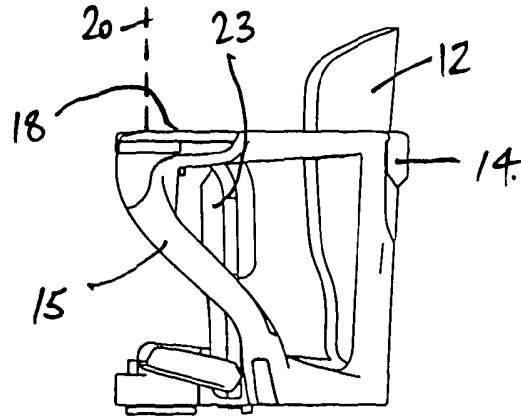


FIGURE 4

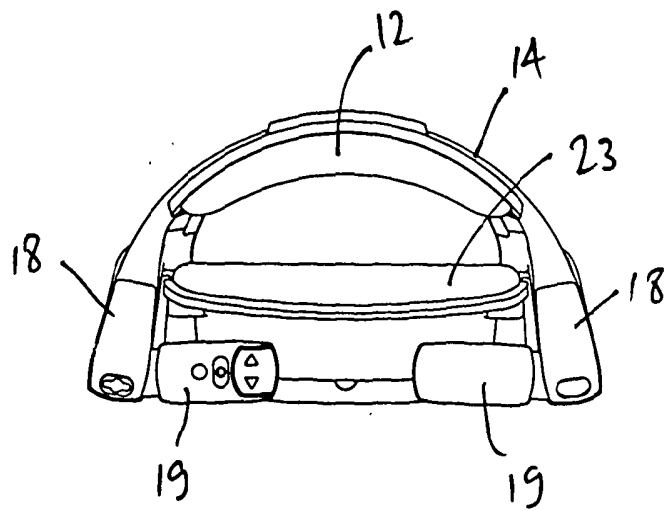
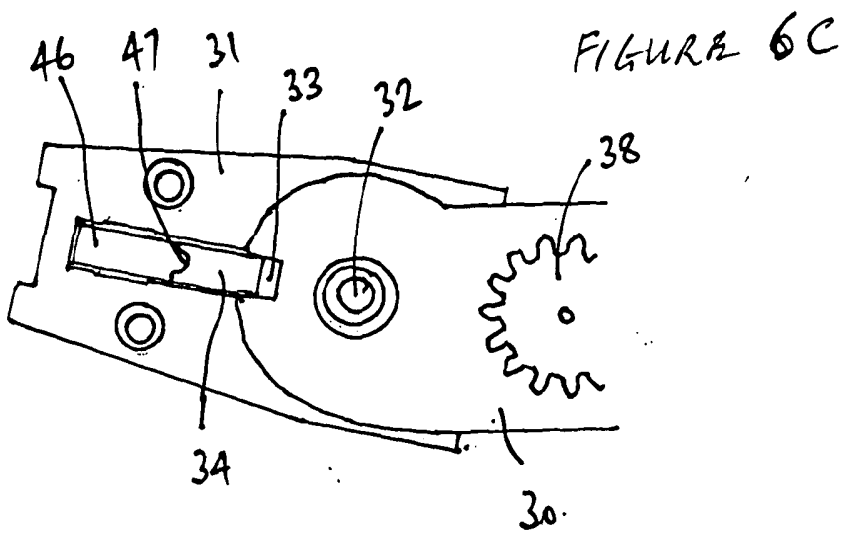
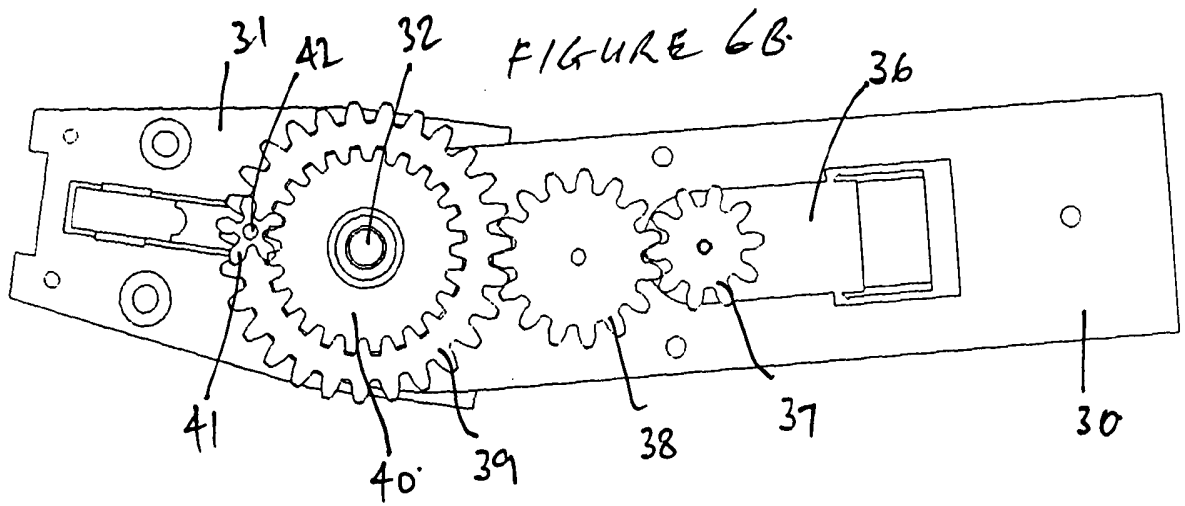
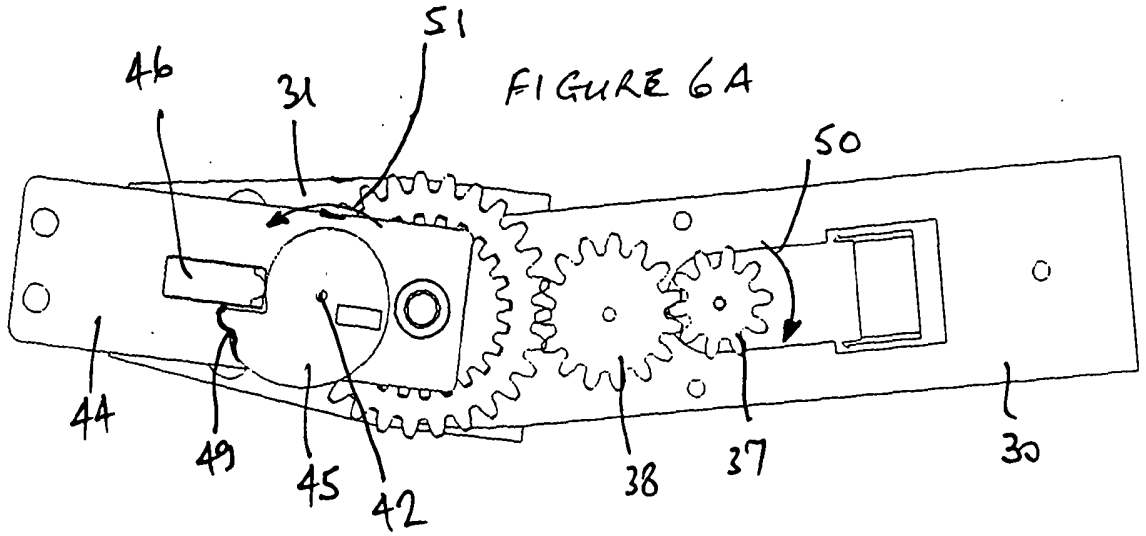


FIGURE 5



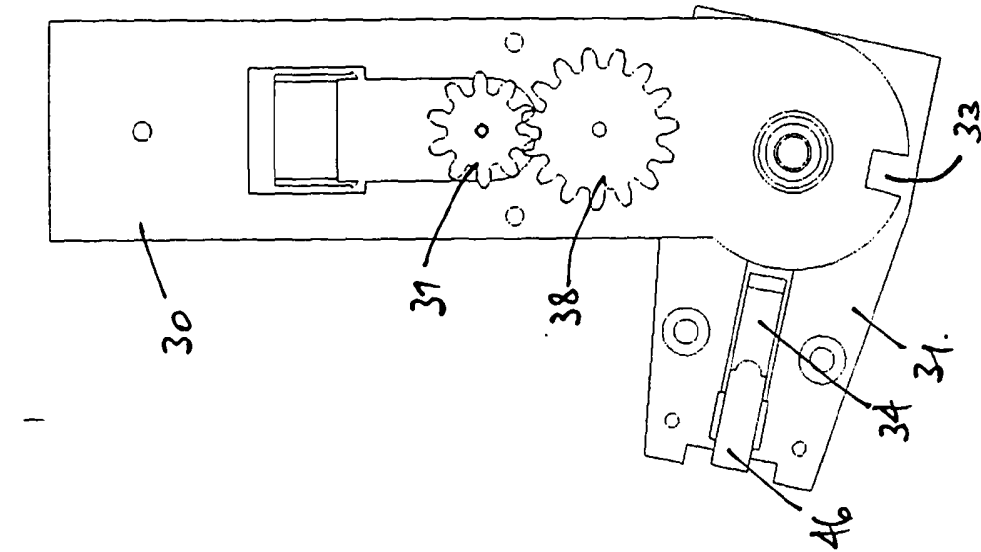


FIGURE 7A

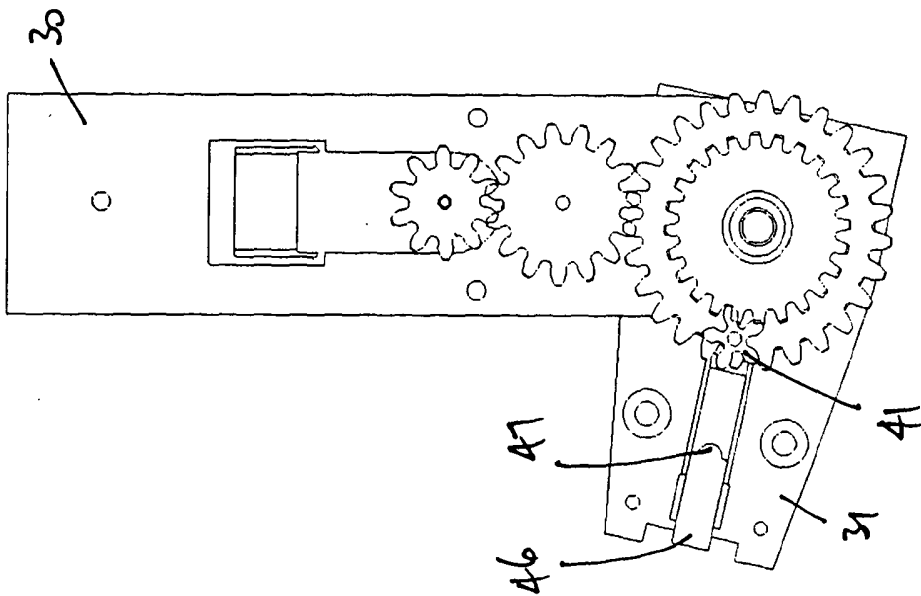


FIGURE 7B

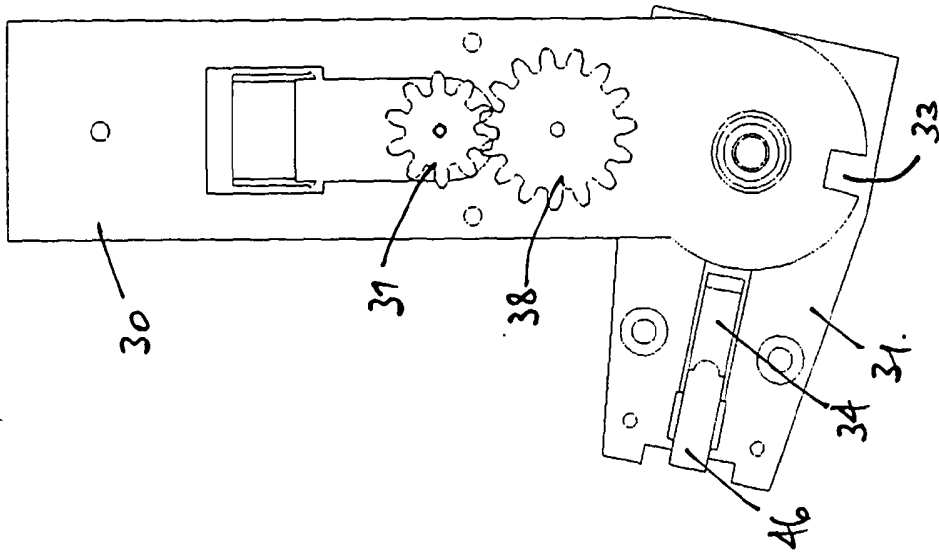


FIGURE 7C

IMPROVEMENTS IN OR RELATING TO STAIRLIFTS

Field of the Invention

This invention relates to stairlifts and, more particularly, to a stairlift chair.

Background to the Invention

Stairlifts are used by persons having a degree of disability, to travel up and down stairways. Typically a stairlift includes a rail extending along one edge of the stairway, between the upper and lower ends of the stairway, along which a carriage travels. A chair, to accommodate the user, is mounted on the carriage and includes a seating surface, a backrest, a pair of armrests, and a footrest.

When the stairlift is not in use, the armrests, footrest and at least part of the seating surface may be folded into substantially vertical positions to reduce the intrusion of the stairlift into the stairway and, thereby, reduce the obstruction caused to able-bodied persons using the stairway.

Existing chair designs, and particularly the arrangements of armrests on those chairs, have a number of drawbacks.

Firstly, if the chair has a swivelling function to enable the chair to be rotated about vertical axes at the top and/or bottom of the staircase, and the swivel axis is located on the chair centreline, the rear pivots of the armrests can interfere with the swivelling function in that they may, during swivelling, come into contact with the wall behind the stairlift unless the chair assembly is moved away from the wall. To avoid this problem the chair is moved forward

on the carriage and thus intrudes further into the stairway. This intrusion, in turn, can increase the spine to wall dimension to a point at which a user is unable to fit within the confines of the staircase.

A second problem is that, when the chair is folded, the user has to lean over, grasp an armrest, and fold that armrest down. During this time, if the seat base is folded, there is nothing against which the user can lean for support.

It is an object of this invention to provide a stairlift chair which goes at least some way in addressing the drawbacks described above; or which will at least offer a novel alternative.

Summary of the Invention

Accordingly the invention provides a stairlift chair having a seating surface; spaced, substantially parallel, side edges; and a pair of spaced armrests, said stairlift chair being characterised in that each armrest comprises a fixed element projecting adjacent to a side edge of said seating surface, and a moving element displaceable with respect to said fixed element about a substantially vertical axis.

Preferably said fixed elements are substantially horizontal.

Preferably said moving elements move between first positions in which they are substantially parallel and second positions in which they are substantially aligned.

Preferably a locking facility is provided to lock said moving elements in said first positions.

Preferably said chair further includes a displacement facility to displace said moving elements in response to movement of said seating surface between a substantially horizontal and a substantially vertical position.

Many variations in the way the invention may be performed will present themselves to those skilled in the art, upon reading the following description. The description should not be regarded as limiting but rather as an illustration, only, of one manner of performing the invention. Where appropriate any element or component should be taken as including any or all equivalents thereof whether or not specifically mentioned.

Brief Description of the Drawings

One working embodiment of the invention will now be described with reference to the accompanying drawings in which:

- Figure 1: shows an isometric view of a stairlift chair according to the invention with armrests in an extended configuration;
- Figure 2: shows a view similar to Figure 1 but with the armrests in an intermediate or partly folded configuration;
- Figure 3: shows a view similar to Figures 1 & 2 but with the armrests in a folded configuration;
- Figure 4: shows a side view of that which is shown in Figure 3 but with the seat base also folded;
- Figure 5: shows a plan view of that which is shown in Figure 4;

Figures 6A: show a transmission system, with varying levels of detail, for moving and locking the moving armrest parts; the views to 6C showing the moving armrest parts in their extended positions; and

Figures 7A: show views corresponding to Figures 6A to 6C, but with the to 7C moving armrest parts in their folded positions.

Detailed Description of Working Embodiment

Referring to Figures 1 to 5, a chair 10 for a stairlift is shown, the chair having a seat base 11, seat back 12, and two armrests 13. Conventionally the chair is fitted to a stairlift carriage (not shown) by way of a chair interface (not shown), the lower end of the interface having a footrest (not shown).

In the form shown, a part of each armrest is defined by a forward extension of a bracket 14 supporting the seat back, the forward ends of bracket 14 being supported from the seat base by angled braces 15. It can be seen from Figure 5 that the bracket 14 has an arcuate shape when viewed in plan and is so shaped to provide maximum wall clearance on those installations in which the chair is mounted on a centre pivot.

Each armrest 13 is comprises a fixed part 18, forming part of the bracket 14, and a moving part 19 which is mounted on the fixed part 18 and pivots with respect to the fixed part about a substantially vertical axis 20 (Figure 4). A locking facility, which will be described in greater detail below, enables the moving parts 19 to be locked in the normal operating configuration shown in Figure 1. The moving parts 19 may also assume an intermediate configuration as shown in Figure 2, this being an operating configuration for users who

desire the security of being partly enclosed by the armrests.

One of the moving parts 19 preferably includes the user operating controls 21 for the stairlift.

In the form shown the seat base 11 is formed from a fixed rear part 22 and a forward folding part 23. The folding part 23 can be folded up into a substantially vertical position as shown in Figures 4 & 5.

The chair preferably further includes a folding facility to displace the moving armrest sections 19 between the various configurations shown in the drawings. This folding facility preferably acts in response to manual displacement of the folding seat section 23 between its operating and folded positions and may be comprised by a system of cables and/or linkages. However, a motor-based system, as described below, is preferred.

Referring to Figures 6A to 6C, a suitable displacement facility, or transmission system, for driving the moving armrest parts 19 between their extended and folded positions includes a moving base plate 30 forming part of the moving armrest part 19, and a fixed base plate 31 forming part of the fixed armrest part 18. The base plate 30 is pivoted to the base plate 31 on axis 32, which axis corresponds to axis 20 in Figure 4. As can be seen in Figure 6C, the inner edge of the moving base plate 30 is curved and includes a locking slot 33. When the moving armrest part is in its extended or operating position, the slot 33 is aligned with a locking pin 34, slidably mounted on or with respect to the fixed base plate 31, and the pin 34 can then be displaced into the slot 33 in a manner which will be described in greater detail below.

To effect folding of the moving armrest part, the locking pin 34 must first be retracted from slot 33, and the moving base plate 30 then pivoted about axis

32. As will be understood from the description which follows, both actions are effected by a single electric motor.

Mounted on the moving base plate 30 is a slim electric motor 36, on the output of which is mounted a drive pinion 37. The drive pinion 37, in turn, engages an intermediate gear 38, also rotatably mounted on moving base plate 30, to reverse the direction of rotation. Intermediate gear 38 is engaged with a first, larger, gear 39 mounted on fixed base plate 31, and rotatable about axis 32. Concentric with the gear 39, and locked to rotate therewith, is a smaller gear 40, the gear 40 being meshed with a cam drive gear 41. Cam drive gear 41 is mounted on shaft 42, the shaft 42 passing through cover plate 44. Gear 41 is mounted on one end of shaft 42 and is positioned beneath plate 44. Cam plate 45 is mounted on the other end of shaft 42 and is positioned above the plate 44. Both the gear 41 and the cam plate 45 are locked to the shaft 42 and thus, rotation of the gear 41 effects rotation of the cam plate 45.

Cam follower 46 slides within cover plate 44 and has a rounded nose 47 which contacts the periphery of cam plate 45. The cam follower 46 is fixed to the locking pin 34 and thus, displacement of the cam follower 46 by the cam plate 45 effects movement of the locking pin 34 with respect to slot 33. Cam follower 46 is spring-biased into contact with the periphery of cam plate 45. When the cam follower 46 is engaged with the position of minimum radius of the cam plate 45, as shown in Figure 6A, the locking pin 34 is aligned with locking slot 33 and the spring bias on the follower thus displaces the locking pin 34 into locking slot 33.

When the folding armrest part 19 is to be folded, the motor 36 is powered to rotate drive pinion 37 in the direction of arrow 50 in Figure 6A. Rotation of the drive pinion 37 is transferred through the gears 38, 39, 40 and 41 so as to effect rotation of the cam plate 45 in the direction of arrow 51 in Figure 6A.

As the cam plate 45 rotates the cam follower 46 is displaced rearwardly which withdraws locking pin 34 from the slot 33. The cam plate 45 continues to rotate until the nose 47 on the cam follower engages indent 49 formed in the periphery of the cam plate. This effectively locks the cam plate 45 against further rotation which, in turn, also locks the gears 39, 40 & 41. However, because the drive motor 36 continues to operate the continuing rotation of intermediate gear 38 causes the gear 38 to 'walk' around the now static gear 39. This action, in turn, draws the moving base plate 30 about pivot 32 into the folded position shown in Figures 7A to 7C until the folding armrest part 19 engages a limit stop (not shown) to stop the motor.

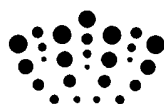
To extend the arm once again, the direction of motor 36 is reversed.

Whilst the above detailed description has been given only for one moving armrest, it will be appreciated that the same configuration will apply to the remaining moving armrest part.

It will thus be appreciated that the present invention provides an armrest folding arrangement which not only addresses the known problems of the prior art but also provides a novel displacement and locking arrangement for the moving armrest sections.

Claims

1. A stairlift chair having a seating surface; spaced, substantially parallel, side edges; and a pair of spaced armrests, said stairlift chair being characterised in that each armrest comprises a fixed element projecting adjacent to a side edge of said seating surface, and a moving element displaceable with respect to said fixed element about a substantially vertical axis.
2. A stairlift chair as claimed in claim 1 wherein said fixed elements are substantially horizontal.
3. A stairlift chair as claimed in claim 1 or claim 2 wherein said moving elements move between first positions in which they are substantially parallel and second positions in which they are substantially aligned.
4. A stairlift chair as claimed in claim 3 wherein a locking facility is provided to lock said moving elements in said first positions.
5. A stairlift chair as claimed in any one of the preceding claims wherein said chair further includes a displacement facility to displace said moving elements in response to movement of said seating surface between a substantially horizontal and a substantially vertical position.



Application No: GB0905657.3

Examiner: Sally Vinall

Claims searched: 1-5

Date of search: 28 July 2010

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
Y	1-4	EP1606207 A2 STANNAH STAIRLIFTS LTD, See whole document noting movable section 15.
Y	1-4	US4913264 A CHENEY COMPANY, See whole document noting pivotable sections 46 of arms
Y	1-4	US5533594 A CONCORD ELEVATOR INC, See whole document for example figures 1 and 2 noting pivotable sections 58.
Y	1-4	EP1180338 A1 KOKUYO KK, See whole document, for example figure 1.
Y	1-4	CA2229177 A1 NIGHTINGALE INC, See whole document, for example figure 1
Y	1-4	US5393124 A NEIL, See whole document, for example figure 5
Y	1-4	EP0880921 A2 PRO CORD SRL, See whole document for example figures 3a-d

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

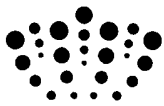
Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

A47C; B66B

The following online and other databases have been used in the preparation of this search report



WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
B66B	0009/08	01/01/2006
A47C	0007/54	01/01/2006