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(54) **STAIR LIFT**

TREPPENLIFT

MONTE-ESCALIER

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**GB-A- 2 322 450 GB-A- 2 484 709**

**EP 3 683 180 B1**

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## Description

**[0001]** The present invention relates to a stair lift, in particular chair stair lift.

**[0002]** These devices are known in the art, and serve to provide transportation of a person with impaired stair-climbing mobility up and down the stairs. Such stair lifts are for instance known from the international patent applications WO2014/098573, WO2014/098574 and WO2014/098575 in the name of the same applicant, but other, less refined equivalents exist too.

**[0003]** These particular stair lifts in general comprise a rail, which forms the track along a stair, which rail may in numerous situations be curved. The seat of the stair lift follows the curved rail, which may lead to some rocking or inclement of the seat during movement. The seat may therewith incline too, which causes the risk of a person sliding off the seat. In order to prevent such unwanted occasion, a provision may be present for balancing the seat. Such provision may be an automated balancing system, with electr(on)ic actuators. These systems are known in the art as well, and the European Patent EP 1037846 in the name of the present applicant gives a good overview of the state of the art.

**[0004]** However, these actuators may unexpectedly refuse or fail, which leads to dangerous situations. In particular the risk of failing is quite high in systems comprising a worm drive for leveling the seat. After years of operation the worm drive may be worn out, so that the worm may suddenly disengage the gear of the worm drive.

**[0005]** GB 2 322 450 A describes an annular ring inclinometer which can be implemented for use in a stairlift, wherein for safety reasons, a safety circuit actuating a brake depending on a preset amount of inclination may be implemented. GB 2 322 450 A discloses a stairlift according to the preamble of claim 1.

**[0006]** It is therefore an object of the present invention to provide a solution for the above mentioned disadvantages, or at least to provide a useful alternative to the known prior art. In particular, the object involves provision of a breaking mechanism allowing for advantageous interaction with a stairlift's worm drive.

**[0007]** The invention thereto proposes a stair lift, comprising at least one rail extending along a track, a frame, suspended on the at least one rail, and comprising a drive, for moving the frame along the rail, a support for a seat, movable, in particular pivotable with respect to the support, a balancing system, for keeping the seat in a predetermined orientation with respect to a fixed world and a lock for locking the movement of the seat with respect to the frame.

**[0008]** The locking system prevents the seat to get in undesired angles with respect to the frame, and thus indirectly with respect to the fixed world. It is to be understood that the lock may be a separate part of the stair lift, and not - for instance - just a software routine in the balancing system.

**[0009]** In an embodiment, the lock is configured to lock

the movement of the seat with respect to the frame when the seat is moved more than a predetermined angle. The lock may comprise detection means for detecting that the predetermined angle was reached. In particular these may be mechanical detection means, such as a hole or protrusion.

**[0010]** The predetermined angle may be defined with respect to the frame, or with respect to the fixed world, and may for instance be 5 or in particular 10 degrees.

**[0011]** According to the present invention, the lock comprises a brake, which is in particular a drum brake or a disk brake.

**[0012]** The lock may further be configured for disabling the balancing system when it is locked, or initiate an immediate correction of the balancing system when the predetermined angle was reached, in order to prevent a person positioned in the locked angle for a long time.

**[0013]** The lock may further be configured for disabling a drive, for moving the frame part along the rail when it is locked, so that no person is moved with the lift while sitting under an angle.

**[0014]** In a particular embodiment the balancing system comprises a worm drive, having a worm spindle and a worm gear engaging each other. The worm spindle is mounted at the support and driven by a motor. The worm gear is mounted to the seat.

**[0015]** The invention will now be elucidated into more detail with reference to the following figures, herein:

- Figure 1 shows a stair lift in a desired uninclined position;
- Figure 2 shows a stair lift in a undesired inclined position;
- Figure 3 shows a first embodiment of a brake for the stair lift of figures 1 and 2 in front view;
- Figure 4 shows a second embodiment of a brake for the stair lift of figures 1 and 2 in front view;

**[0016]** Figure 1 shows a stair lift in a desired uninclined position. The stair lift comprises a rail 1 extending along a track, a frame 2, suspended on the rail 1, and a drive (not visible), for moving the frame 2 along the rail; a support 7 for a seat 3, which is movable, in particular pivotable with respect to the frame 2. The stair lift 1 comprises a balancing system 4, for keeping the seat in a predetermined uninclined orientation with respect to a fixed world, provided with a lock for locking the movement of the seat with respect to the frame 2. Embodiments of the lock are depicted in figures 3 to 4.

**[0017]** Figure 2 shows a the stair lift from figure 1 in an undesired inclined position;

**[0018]** Figure 3 shows a first embodiment of a brake for the stair lift from figures 1 and 2, wherein the brake comprises a drum brake 5.

**[0019]** Figure 4 shows a second embodiment of a brake for the stair lift from figure 1 and 2, wherein the brake comprises a disk brake 6.

## List of reference signs

## [0020]

- 1 rail
- 2 frame
- 3 seat
- 4 balancing system
- 5 drum brake
- 6 disc brake
- 7 support

## Claims

## 1. Stairlift comprising:

- at least one rail (1) extending along a track
- a frame (2), suspended on the at least one rail, and comprising:
  - a drive, for moving the frame part along the rail;
  - a support (7) for a seat (3) rotatably mounted on the frame;
  - a seat (3), movable, in particular pivotable, with respect to the frame (2);
  - a balancing system, for keeping the seat (3) in a predetermined orientation with respect to a fixed world;
- wherein
- the balancing system is provided with a lock (5, 6) for locking the movement of the seat (3) with respect to the frame (2); and wherein the lock comprises a brake, **characterized in that** said brake is a drum brake (5) or disc brake (6), and **in that** the lock is configured for disabling the drive.

2. Stairlift according to claim 1, wherein the lock (5, 6) is configured to lock the movement of the seat (3) with respect to the frame (2) when the seat is moved more than a predetermined angle.

3. Stairlift according to claim 2,

- wherein the predetermined angle is defined with respect to the frame or wherein the predetermined angle is defined with respect to the fixed world,
- or wherein the predetermined angle is 5 degrees, in particular 10 degrees.

4. Stairlift according to any of the preceding claims, wherein the lock is configured for disabling the balancing system when it is locked.

5. Stairlift according to claim 2, wherein the lock comprises mechanical detection means for detecting that

a/the predetermined angle was reached.

## Patentansprüche

## 1. Treppenlift, aufweisend:

- mindestens eine sich entlang einer Bahn erstreckende Schiene (1);
- einen Rahmen (2), der an der mindestens einen Schiene aufgehängt ist, und aufweist:
  - einen Antrieb zum Bewegen des Rahmens entlang der Schiene;
  - einen Träger (7) für einen Sitz (3), drehbar montiert auf dem Rahmen;
  - einen Sitz (3), der in Bezug auf den Rahmen (2) beweglich, insbesondere schwenkbar ist;
  - ein Ausgleichssystem, das dazu geeignet ist, den Sitz (3) in einer vorgegebenen Ausrichtung in Bezug auf eine feste Umgebung zu halten, wobei
  - das Ausgleichssystem mit einer Blockiervorrichtung (5, 6) ausgebildet ist zum Blockieren der Bewegung des Sitzes (3) in Bezug auf den Rahmen (2); und
- wobei die Blockiervorrichtung eine Bremse aufweist, **dadurch gekennzeichnet, dass** die Bremse eine Trommelbremse (5) oder eine Scheibenbremse (6) ist; und **dadurch, dass** die Blockiervorrichtung dafür konfiguriert ist, den Antrieb zu deaktivieren.

2. Treppenlift nach Anspruch 1, wobei die Blockiervorrichtung (5, 6) dafür konfiguriert ist, die Bewegung des Sitzes (3) in Bezug auf den Rahmen (2) zu blockieren, wenn der Sitz um mehr als einen vorgegebenen Winkel bewegt wird.

3. Treppenlift nach Anspruch 2, wobei der vorgegebene Winkel in Bezug auf den Rahmen definiert ist, oder wobei der vorgegebene Winkel in Bezug auf die feste Umgebung definiert ist, oder wobei der vorgegebene Winkel 5 Grad, insbesondere 10 Grad, beträgt.

4. Treppenlift nach einem der vorhergehenden Ansprüche, wobei die Blockiervorrichtung dafür konfiguriert ist, das Ausgleichssystem zu deaktivieren, wenn sie blockiert ist.

5. Treppenlift nach Anspruch 2, wobei die Blockiervorrichtung mechanische Detektionsmittel aufweist, um zu erfassen, dass ein vorgegebener Winkel/der vorgegebene Winkel erreicht wurde.

## Revendications

### 1. Monte-escalier comprenant :

- au moins un rail (1) s'étendant le long d'un circuit 5
- un cadre (2), suspendu sur l'au moins un rail, et comprenant :
- un moteur, pour déplacer la partie de cadre le long du rail ; 10
- un support (7) pour un siège (3) monté en rotation sur le cadre ;
- un siège (3), pouvant être déplacé, en particulier pivoté, par rapport au cadre (2) ;
- un système d'équilibrage, pour garder le siège (3) dans une orientation prédéterminée par rapport à un monde fixe ; 15
- dans lequel
- le système d'équilibrage est pourvu d'un verrou (5, 6) pour verrouiller le mouvement du siège (3) par rapport au cadre (2) ; et 20
- dans lequel le verrou comprend un frein,

**caractérisé en ce que** ledit frein est un frein à tambour (5) ou un frein à disque (6), et **en ce que** le verrou est conçu pour désactiver le moteur. 25

2. Monte-escalier selon la revendication 1, dans lequel le verrou (5, 6) est conçu pour verrouiller le mouvement du siège (3) par rapport au cadre (2) lorsque le siège est déplacé de plus d'un angle prédéterminé. 30
3. Monte-escalier selon la revendication 2, dans lequel l'angle prédéterminé est défini par rapport au cadre ou dans lequel l'angle prédéterminé est défini par rapport au monde fixe, ou dans lequel l'angle prédéterminé est de 5 degrés, en particulier de 10 degrés. 35
4. Monte-escalier selon l'une quelconque des revendications précédentes, dans lequel le verrou est conçu pour désactiver le système d'équilibrage lorsqu'il est verrouillé. 40
5. Monte-escalier selon la revendication 2, dans lequel le verrou comprend des moyens de détection mécanique pour détecter qu'un/l'angle prédéterminé a été atteint. 45

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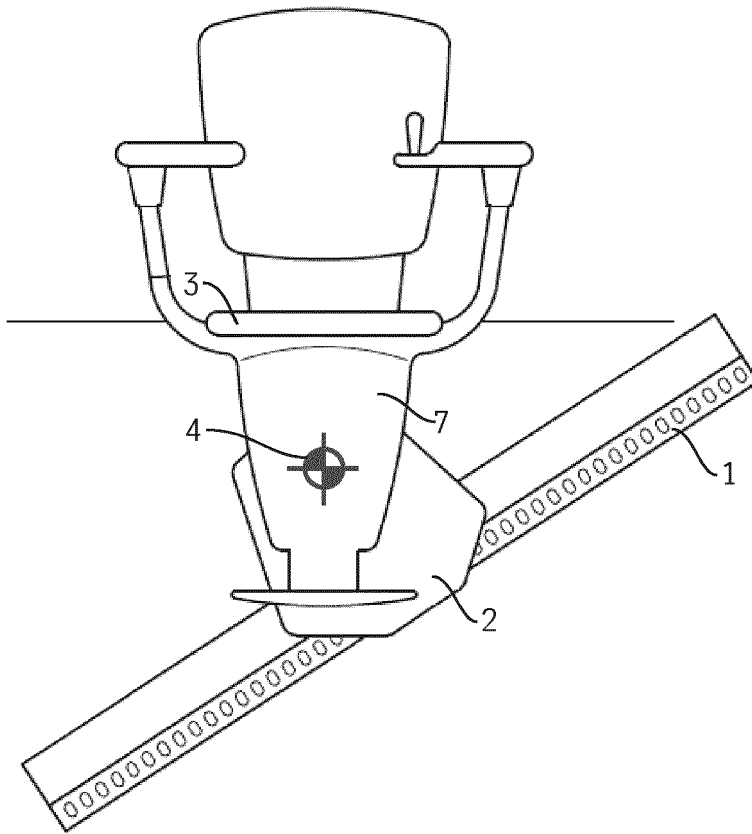


Fig. 1

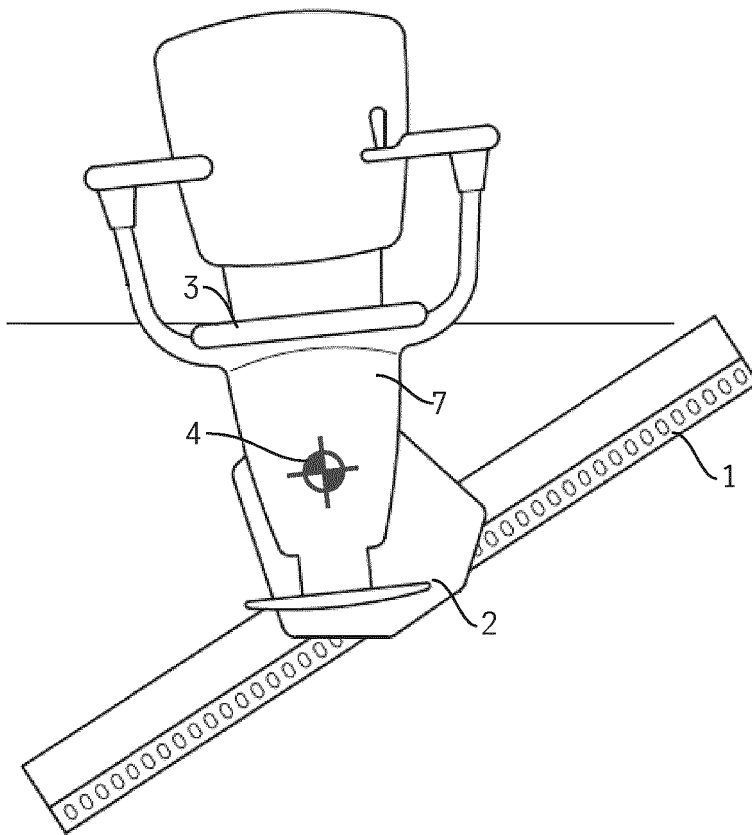


Fig. 2

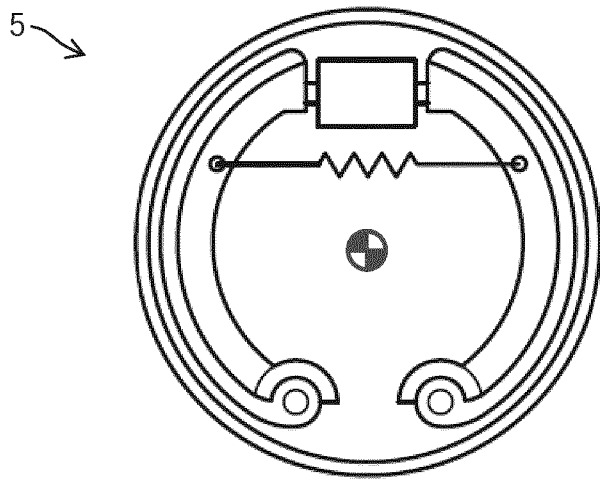


Fig. 3

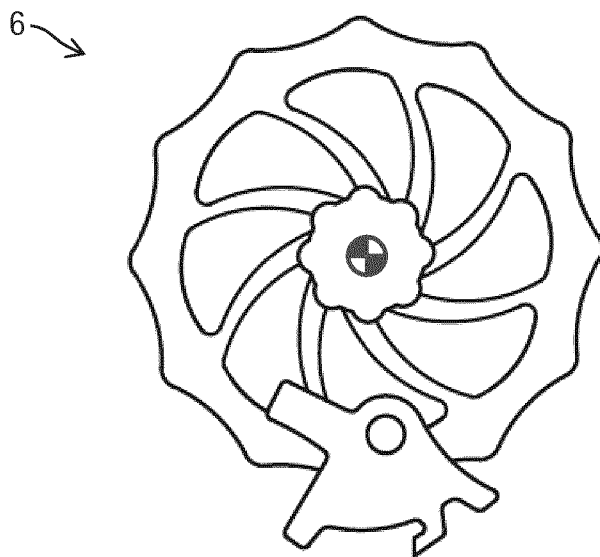


Fig. 4

**REFERENCES CITED IN THE DESCRIPTION**

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