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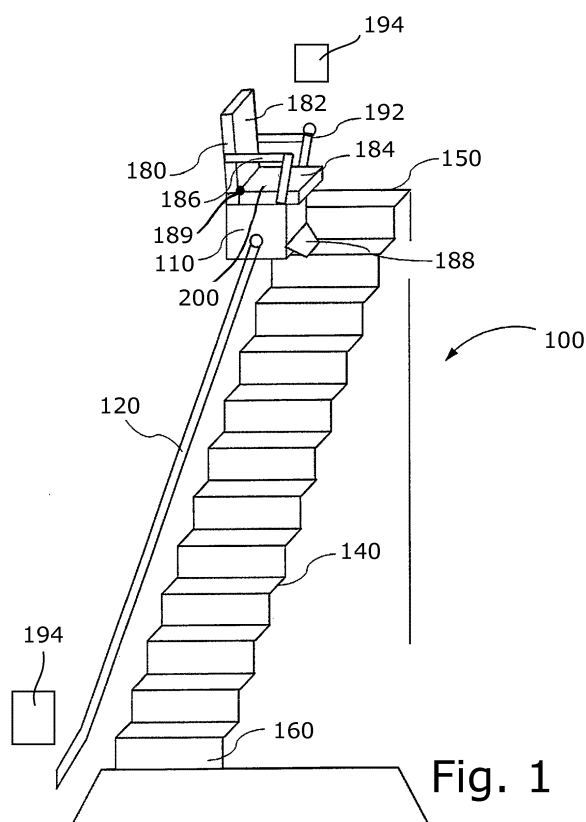
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(54) **STAIRLIFT SYSTEM**

(57) The invention relates to a stairlift system comprising a stairlift carriage (110) adapted to travel along a defined path, the stairlift carriage comprising a drive means (130) for driving the stairlift carriage to travel along the defined path, control means (190) being provided for controlling the drive means (130), wherein the control means (190) are adapted to control a travelling speed with which the stairlift carriage (110) travels along the defined path in dependence on at least one sensor signal provided by sensing means (200, 201) adapted to determine whether a passenger is present on the stairlift carriage (110) or not.



Description

Field of the invention

[0001] The present invention relates to stairlift systems and a method for controlling their operation. The term stairlift system or stairlift shall comprise all kinds of stairlifts, such as for a seated or a standing passenger, or a platform lift for wheelchairs.

[0002] Prior art stairlifts are adapted to travel along a defined path, usually along a flight of stairs. Typical speeds, at which stairlift carriages travel are about 10 to 15 cm/sec, based on prescriptions as given in European norm NEN-EN81-40. Furthermore, the speed of a stairlift carriage usually has a certain profile, depending on levelling and swivelling angles. The stairlift carriage will only be allowed to travel at a lower speed, for example, when it runs through corners or when the chair is swivelling about a vertical axis.

[0003] It is also known to provide stairlift systems with at least two control devices for actuating a control unit. Typically, a first control device is provided on the stairlift, so that it can easily be actuated by a passenger e.g. when seated on a chair of the stairlift. Also, a remote control device can be provided, typically at the bottom or top end of the flight of stairs over which the stairlift carriage travels.

[0004] The present invention seeks to provide a more flexible control for stairlift systems, which enables a faster operation of the stairlift system, wherein at the same time safety requirements are adequately observed.

[0005] The invention suggests a stairlift system comprising the features of claim 1 and a method of controlling operation of the stairlift system comprising the features of claim 9.

[0006] The stairlift system according to the invention comprises a stairlift carriage adapted to travel along a defined path, comprising a drive means for driving the stairlift carriage to travel along the defined path, control means being provided for controlling the drive means, wherein the control means are adapted to control a traveling speed with which the stairlift carriage travels along the defined path in dependence on at least one sensor signal provided by sensing means adapted to determine whether a passenger is present on the stairlift carriage or not. The control means can be provided on the stairlift carriage or remotely therefrom.

[0007] According to the invention, it is thus possible to, for example, set a first (higher) traveling speed profile in case it is determined that no passenger is present on the stairlift carriage. Also, it can be ensured that a second (lower) traveling speed profile will not exceed a predetermined threshold, in case it is determined that a passenger is present on the stairlift carriage. This is an especially important comfort and/or safety measure, taking into account that typical stairlift passengers will be of a frail constitution, and a too high traveling speed may feel uncomfortable for the passenger or may be dangerous..

[0008] Advantageous embodiments of the inventions are the subject matter of the dependent claims.

[0009] According to a preferred embodiment, the sensing means comprise a weight sensor adapted to provide a signal determining whether a passenger is present on the stairlift carriage or not. Such a sensor can be provided in any expedient location on the stairlift carriage, for example on the stairlift chair.

[0010] Advantageously, the stairlift carriage comprises a chair provided with a seat, and the sensing means are adapted to determine whether or not a passenger is sitting on the seat. The weight sensor can, for example, be provided as a load sensor within the seat, comprising for example a pressure detecting spring and/or a capacitor, the capacitance of which varies in accordance with a weight-induced load caused by a passenger sitting on the seat. In case it is determined that there is no passenger sitting on the seat, the stairlift carriage can travel at a higher speed, as explained above. This is especially advantageous for example in case a passenger is at the bottom of a flight of stairs and wishes to use the stairlift system for traveling up the flight of stairs, in a situation where the stairlift is initially positioned at the top of the flight of stairs, or vice versa.

[0011] Advantageously, the seat is pivotable between a horizontal seat position and a vertical or folded up seat position, wherein the sensing means are adapted to determine whether the seat is in its horizontal or folded up position. This provides an especially simple way of determining whether a passenger is present on the stairlift carriage or not.

[0012] According to a preferred embodiment, the control means is adapted to set a first traveling speed profile in case it is determined that no passenger is present on the stairlift carriage, and a second speed traveling profile, the average speed and/or maximum speed of which is lower than the average speed and/or maximum speed of the first speed profile, if it is determined that a passenger is present on the stairlift carriage. It is especially preferred that the average speed of the second travelling speed profile is lower than the average speed of the first travelling speed profile.

[0013] According to a preferred embodiment, the control means comprise a first control device provided on the stairlift carriage, and a second control device provided remotely from the stairlift carriage, especially in the vicinity of an upper and/or lower end of the travel path of the stairlift carriage.

[0014] Advantageously, the control means are adapted such that by actuation of the first control device provided on the stairlift carriage only the second traveling speed profile can be set.

[0015] According to a further preferred embodiment, by actuating the second (remote) control device, either the first or the second traveling speed profile can be set. It is advantageous if traveling speeds above zero and below potential maximum travelling speeds can be chosen at any time.

[0016] According to the method of controlling operation of a stairlift system according to the invention, a traveling speed profile with which a stairlift carriage travels along a defined path is controlled in dependence on at least one sensor signal provided by sensing means determining whether a passenger is present on the stairlift carriage or not.

[0017] The invention also provides a method for installing a stairlift system, comprising installing and adjusting at least one sensor for detecting whether a user is present on the stairlift carriage or not.

[0018] A preferred embodiment of the invention will now be described with reference to the drawings, in which

[0019] Figure 1 shows a schematic perspective view of a stairlift according to a first embodiment of the present invention and,

[0020] Figure 2 shows a more detailed perspective view of the stairlift carriage as shown in figure 1.

[0021] A stairlift system according to a preferred embodiment of the present invention is generally designated 100. It includes a stairlift carriage 110 which is moveable along a defined path. The path is defined by a stairlift rail 120, which is provided on a staircase 140. The carriage comprises a drive means provided as a drive motor 130, schematically shown in figure 2. The stairlift carriage 110 is provided with a chair 180, and can travel along rail 120 between an upper end 150 and a lower end 160 of the staircase 140. The chair 180 is provided with a backrest 182, a seat 184, two armrests 186 and a footrest 188.

[0022] Seat 184 is pivotable about an axis 189 between a unfolded position, shown in Figures 1 and 2, and a folded up position, in which it extends essentially parallel to back 182.

[0023] The stairlift carriage 110 is provided with a first sensor 200 for detecting, whether or not a passenger is present on the stairlift, especially sitting on seat 184. Sensor 200 can be provided as a load sensor provided within seat 184 for detecting whether or not a passenger is seated on seat 184. For example, sensor 200 can compare the detected weight with a predetermined threshold value, and, depending on whether the detected weight is higher or lower than this threshold value, generate a sensor signal indicating that a passenger is present on the stairlift carriage or not. Additionally or alternatively, a second sensor 201 can be provided for detecting the position of seat 184. The seat 184 can preferably be moved from an unfolded, especially horizontal, position into a folded up, especially vertical position. In case it is determined that seat 184 is in its folded up position this can be taken to mean that no passenger is present on the stairlift carriage 110.

[0024] The stairlift system 100 is provided with a manually operable control means 190, comprising a first control device 192 provided on the stairlift carriage 110, especially on an armrest 186 as indicated in figure 2. Also, the control means 190 is provided with a remote control device 194 in the vicinity of the bottom end and the top end 150 of staircase 140. Control means 190 are adapted

to receive signals from sensors 200 and/or 201 indicating whether or not a passenger is present on carriage 110.

[0025] In case of activation of the control means 190 using remote control device 194, it is ascertained whether a passenger is present on the stairlift carriage. If this is the case, the control means sets a second traveling speed profile, in which the average travel speed is set to a second, lower value, for example of 10 to 15 cm/sec. Taking into account this average travel speed, the control device 194 can be actuated to vary the traveling speed as desired. It is additionally or alternatively possible to set a second maximum travel speed, for example of 15 to 20 cm/sec.

[0026] If, on the other hand, it is ascertained that no passenger is present on the stairlift carriage, the control means set a first traveling speed profile with a first average speed, which is higher than the second average speed, for example 25 cm/sec or even 35 cm/sec. Thus, if desired, the stairlift carriage 110 can be brought into a desired position, for example from the top end of the staircase to the bottom end of the staircase, in a shorter space of time, thus, for example, enhancing the user experience for a passenger waiting for the stairlift carriage 110 at the bottom end of the staircase. Again, additionally or alternatively, a first maximum travel speed can be set, for example 25cm/sec, 35 cm/sec or even 40cm/sec.

[0027] Furthermore, the control means are adapted such that if control device 192 on the stairlift carriage is actuated, only travel with the second traveling speed profile i.e. with the lower average and/or maximum speed, is permitted, in order to guarantee the comfort and safety of a passenger using the stairlift carriage.

[0028] Expediently, an acoustic and/or optical warning device 220 is provided. Device 220 can issue a corresponding optical or acoustical warning in case it is determined that an actual speed of the elevator carriage 110 has exceeded a set average or maximum speed. Especially, an automatic halting device can be provided to further enhance safety.

Claims

1. Stairlift system comprising a stairlift carriage (110) adapted to travel along a defined path, the stairlift carriage comprising a drive means (130) for driving the stairlift carriage to travel along the defined path, control means (190) being provided for controlling the drive means (130), wherein the control means (190) are adapted to control a travelling speed with which the stairlift carriage (110) travels along the defined path in dependence on at least one sensor signal provided by sensing means (200, 201) adapted to determine whether a passenger is present on the stairlift carriage (110) or not.
2. Stairlift system according to claim 1, wherein the sensing means (200, 201) comprise a weight sensor

adapted to provide a signal determining whether a passenger is present on the stairlift carriage or not.

3. Stairlift system according to claim 1 or claim 2, wherein the stairlift carriage comprises a chair (180) provided with a seat (184), and the sensing means (200, 201) are adapted to determine whether or not a passenger is sitting on the seat (184). 5

4. Stairlift system according to claim 3, wherein the seat (184) is pivotable between an unfolded, in particular horizontal, seat position and a folded, in particular vertical, seat position, wherein the sensing means (190) are adapted to determine whether the seat (184) is in its unfolded or folded up position. 10
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5. Stairlift system according to any one of the preceding claims, wherein the control means is adapted to set a first travelling speed profile of the stairlift carriage (110) in case it is determined that no passenger is present on the stairlift carriage, and a second travelling speed profile, the average speed and/or maximum speed of which is lower than the average and/or maximum speed of the first travelling speed profile, if it is determined that a passenger is present on the stairlift carriage. 20
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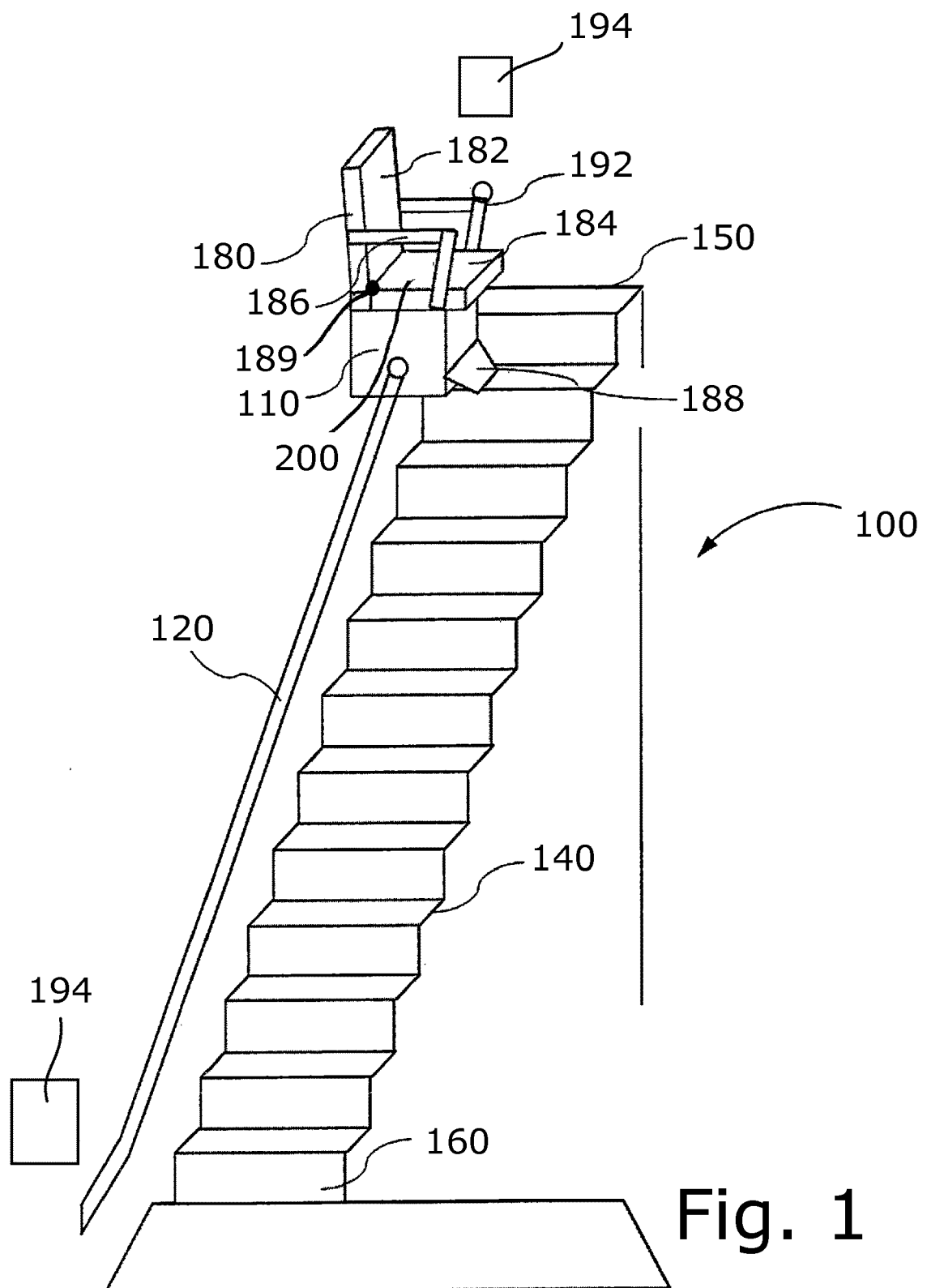
6. Stairlift system according to any one of the preceding claims, wherein the control means (190) comprise a first control device (192) provided on the stairlift carriage (110), and a second control device provided remotely from the stairlift carriage, especially in the vicinity of an upper and/or lower and of the travel path of the stairlift carriage (110). 30
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7. Stairlift system according to claim 6, wherein the control means (190) are adapted such that by actuation of the first control device (192) provided on the stairlift carriage (110) only the second travelling speed profile can be set. 40

8. Stairlift system according to claim 6 or 7, wherein the remote control device (194) is adapted such that by actuating it either the first or the second travelling speed profile can be set. 45

9. Method for controlling operation of a stairlift system, wherein a travelling speed with which a stairlift carriage travels along a defined path is controlled in dependence on at least one sensor signal provided by sensing means determining whether a passenger is present on the stairlift carriage or not. 50

10. Method for installing a stairlift system, comprising installing and adjusting at least one sensor for detecting whether a user is present on the stairlift carriage or not. 55



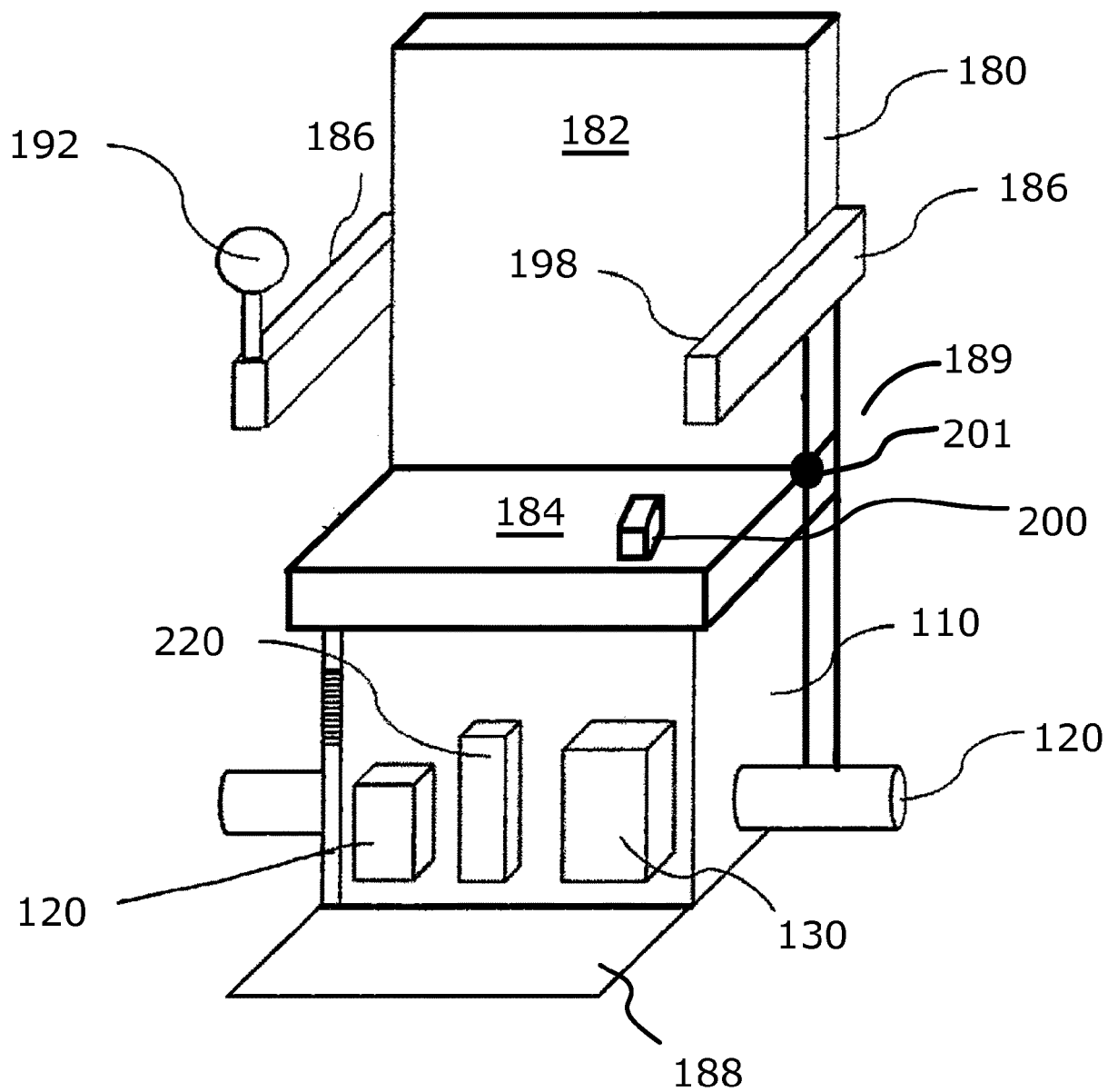


Fig. 2



EUROPEAN SEARCH REPORT

 Application Number
 EP 15 19 8239

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X	EP 1 772 412 A1 (VIMEC SRL [IT]; ISKRA AVTOELEK KA D D [SI]) 11 April 2007 (2007-04-11) * paragraph [0027] - paragraph [0030]; figure 1 *	1-4,6-10	TECHNICAL FIELDS SEARCHED (IPC) B66B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 June 2016	Examiner Nelis, Yves
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 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 19 8239

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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