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Transporting means of a chair lift of a cableway system

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Abstract

A transporting means of a chair lift or of a cableway system has a safety bar (2), a device (13) for closing the safety bar (2), an energy store (8), a device (7) for charging the energy store (8) and a blocking device (13) which prevents the energy store (8) from being charged. The blocking device (13) can be activated and deactivated, opening of the safety bar (2) being prevented in the active state of the blocking device (13). The blocking device (13) prevents the safety bar (2) from being opened over at least part of the distance covered by the safety bar (2) between its fully open position and its fully closed position, in particular over the entire distance.

(Figure 3)

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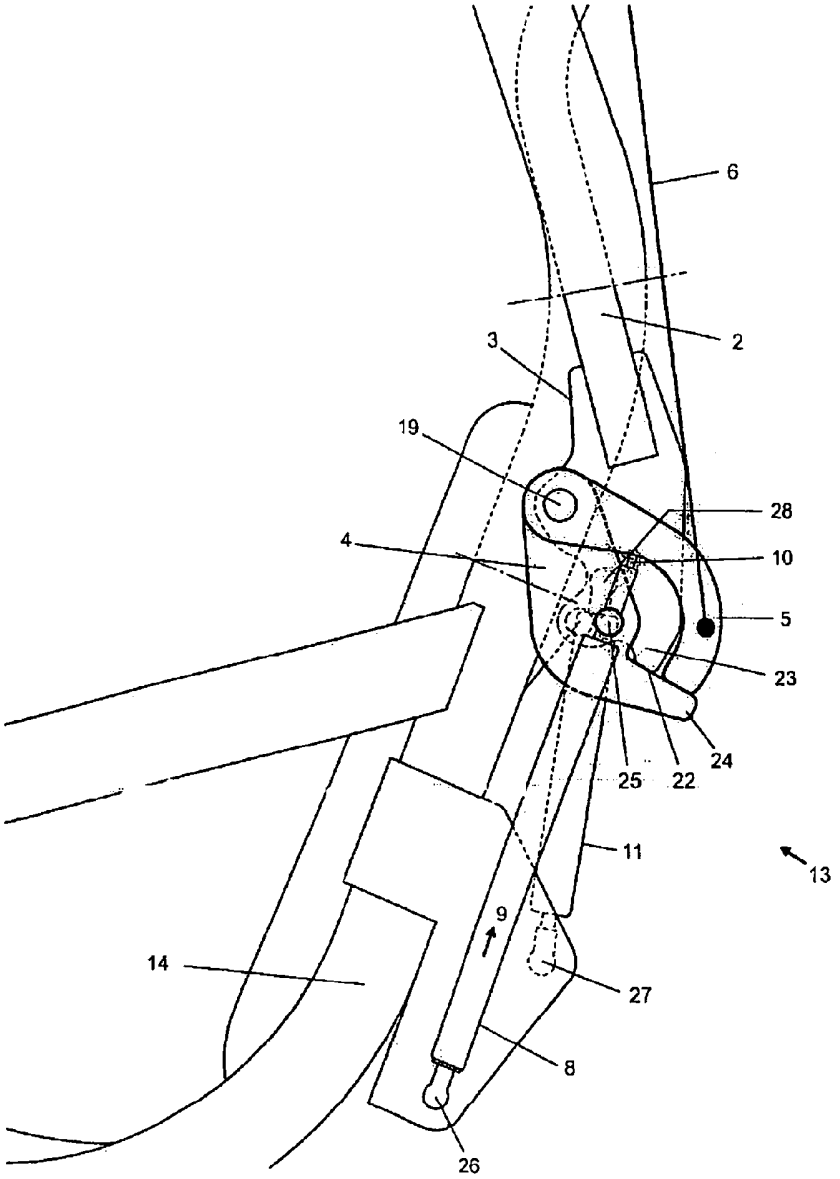
Fig. 3



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Transporting means of a chair lift or of a cableway system

The invention relates to a transporting means of a chair lift or of a cableway system, having a frame, which is connected to a load-bearing bar coupled to a conveying cable, having a safety bar, having a device for closing the safety bar, having an energy store, having a device for charging the energy store, and having a blocking device which prevents the energy store from being charged, it being possible for the blocking device to be activated and deactivated, opening of the safety bar being prevented in the active state of the blocking device.

In order to prevent the passengers from falling out of, or slipping off, transporting means of a chair lift or of a cableway system, these transporting means have closure or safety bars. The safety bars can be pivoted from a position in which they are located above the passengers into a position in which a crossmember extends in front of the passengers, over their thighs.

Safety bars which are not closed automatically upon departure from a station of the chair lift or of the cableway system and safety bars which are forcibly closed in the station by means of a rail and a cable pull are known. If, in the case of the latter safety bars, an overload safeguard is provided, in order to prevent passengers from being crushed or pinched, then, in the case of these embodiments, a correspondingly long travel path of the transporting means is required in order for the safety bar to be closed. The traveling speed of the transporting means cannot be too high over this travel path since, otherwise, the closing movement of the safety bar is executed too quickly and associated problems may arise.

The disadvantage with the abovementioned safety bars is that it is possible for passengers either not to close the safety bar upon departure from station or to open the safety bar en route from boarding station to disembarking station and thus to put themselves at risk.

The object of the invention is to provide a transporting means of the type mentioned in the introduction which rules out the risk mentioned above.

This object is achieved according to the invention by a transporting means which has the features of claim 1.

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Preferred and advantageous embodiments of the transporting means according to the invention form the subject matter of the subclaims.

The transporting means according to the invention is characterized in that the blocking device prevents the safety bar from being opened over at least part of the distance between its fully open position and its fully closed position. This ensures that the safety bar remains closed throughout travel from one station to the next station since, once the safety bar has been closed in, or just after, a station, it is not readily possible for the safety bar to be opened again. It is only at the next station that the safety bar can be opened again.

In order to protect the passengers, the closing operation of the safety bar can be halted, by a slight opposing force being applied, but the safety bar cannot be opened again.

In a particularly preferred embodiment of the transporting means according to the invention, the device for closing the safety bar and the blocking device are advantageously formed from the same group of interacting components. Within the context of the invention, however, it is also possible for the device for closing the safety bar and the blocking device to be formed from different groups of components.

Further details, features and advantages of the invention can be gathered from the following description, with reference to the accompanying drawings, which illustrate a preferred embodiment of the invention and in which:

Figure 1 shows a chair of a chair lift with the safety bar open,

Figure 2 shows the chair from figure 1 with the safety bar closed,

Figure 3 shows a detail from figure 1 on a larger scale, and

Figures 4 to 9 show the detail from figure 3 in individual steps during the closing and opening operations of the safety bar.

Figures 1 and 2 illustrate a chair 1 of the chair lift with a safety bar 2, having a device 7 for activating the closing operation of the safety bar 2 and also a device 13 for closing the safety bar 2 and blocking the opening operation thereof. The rest of

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the parts of the chair 1 may be configured in the manner conventional in the prior art. It will therefore only be mentioned in general terms that the safety bar 2 is arranged on a frame 14 which is connected, via a joint 15, to a load-bearing bar 16, at the top end of which is fitted a clamping device 17 for fastening the chair 1 on a conveying cable 18. It is likewise possible, however, for the invention to be used for other forms of chairs, in particular couplable chairs.

Above the chair 1, and preferably in the vicinity of the clamping device 17, the device 7 is fastened on the load-bearing bar 16. The device 7 has a guide roller 12 and is raised (figure 2) when the chair 1 passes through a region with a guide device, in particular guide rail, which is assigned to the guide roller 12 and is arranged in the exit region from a station. Arranged upstream of, or in, the entry region to the station is a further guide device, e.g. guide rail, which moves the guide roller 12 back into the position which is illustrated in figure 1.

The device 7 has a carrier 30 which is mounted in a pivotable manner on the load-bearing bar 16 via a bearing 31. At the opposite end, the roller 12 is mounted in a rotatable manner on the carrier 30. The device 7 also has a toggle comprising two levers 32 and 33, one lever 32 being mounted in a pivotable manner on the carrier 30, via a joint 34, and the other lever 33 being mounted in the pivotable manner on a holder of the load-bearing bar 16, via a joint 37. The two levers 32 and 33 are connected to one another via a joint 35. The device 7 can assume the two end positions which are illustrated in figures 1 and 2, and the function of which will be explained in more detail at a later stage in the text.

The construction according to the invention for a preferred embodiment of the device 13 can best be seen in figure 3. The safety bar 2 has a plate-like extension 3, by way of which it is mounted on the frame 14 via a joint 19. A first, bottom actuating lever 4 and a further, top actuating lever 5 are mounted at the same point. One end of the first rod 6 is mounted on the top actuating lever 5. The rod 6 is connected, via a Bowden cable 20, to a second rod 21, the end of which is mounted on the device 7, more specifically by way of the toggle joint 35. The bottom actuating lever 4, at its free end, has a nose 24 which forms an abutment surface 22 for one end 23 of the extension 3 of the safety bar 2. Furthermore, the bottom actuating lever 4 is connected, via a joint 25, to an energy store 8 in the form of a spring which, at its opposite end region, is mounted in a pivotable manner on the chair 1, for example on the frame 14 of the chair 1, by way of a joint 26. Within the context of the invention, the spring 8 may be, for example, a pneumatic

compression spring, as will be described hereinbelow, which is capable of being relieved of stressing, with its longitudinal extent being increased in the process, in arrow direction 9. According to the invention, the safety bar 2 is caused to close by virtue of the pneumatic compression spring 8 being relieved of stressing. If the pneumatic compression spring 8 is thus relieved of stressing in arrow direction 9, i.e. the energy store 8 is discharged, the safety bar 2 pivots downward since the bottom actuating lever 4 is pressed against the end 23 of the extension 3 on the safety bar 2 by way of the abutment surface 22.

In order for it to be possible to subject the pneumatic compression spring 8 to stressing, i.e. in order to decrease its longitudinal extent counter to the arrow direction 9, this spring has at its top end, which is directed toward the top actuating lever 5, a blocking means 10 in the form of a pin which, in the first instance, has to be depressed by the lever 5 since, otherwise, the pneumatic compression spring 8 is blocked against being subjected to stressing. This block, however, acts only against the stressing of the pneumatic compression spring 8, this only being the case when the pin 10 has not been depressed. If the pin 10, as shown in figure 3, is depressed by the top actuating lever 5, then the pneumatic compression spring 8 can be compressed, up to its fully stressed state, until the safety bar 2 is fully open (figure 1). According to the invention, the safety bar 2 can thus only be opened by virtue of the pneumatic compression spring 8 being subjected to stressing with the pin 10 depressed, i.e. by virtue of the energy store 8 being charged. Instead of the abovedescribed pneumatic compression spring 8 with the pin 10, it is also possible to use any other suitable form of energy store 8 with a blocking means 10 which subjects the safety bar 2 to loading in the closing direction and at least prevents the safety bar 2 from being opened when the blocking means 10 is active.

Also provided is a damper 11, which is mounted in a pivotable manner, on the one hand, on the chair 1, for example on the frame 14 of the chair 1, via a joint 27 and, on the other hand, on the extension 3 of the safety bar 2, via a further joint 28, and controls the speed of movement of the safety bar 2 during the opening and closing operations.

The time sequence of the safety bar 2 being pivoted from the open position into the closed position and then back into the open position will be described with reference to figures 4 to 9:

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Figure 4 shows the safety bar 2 in its open position according to figures 1 and 3. The safety bar 2 assumes this position as the chair 1 passes through a station, it being possible for passengers to get into the chair 1 and disembark therefrom. The pin 10 is depressed by the top actuating lever 5, which, for its part, is pushed downward by the device 7, via the rod 6, the Bowden cable 20 and the rod 21 (figure 1), and thus keeps the pneumatic compression spring 8 in the stressed state. The nose 24 of the bottom actuating lever 4 butts against the end 23 of the extension 3 of the safety bar 2. In this case, the device 7 is located in the position which is illustrated in figure 1, and in which the toggle joint 35 has been pivoted beneath the joint 37, via a dead center, and butts against an abutment surface 36 of the holder on the load-bearing bar 16. It is thus the case that it is no longer possible for the rod 21 to move upward even under the force of the stressed pneumatic compression spring 8.

In figure 5, the safety bar 2 is still partly open. The chair 1, however, as it exits from the station, is passing through a region with a guide rail which pivots in the upward direction the guide roller 12 of the device 7 on the carrier 30. Via the lever 33, the toggle joint 35 is rotated in the counterclockwise direction out of its dead-center position, in which case the rod 21 moves upward, along with the Bowden cable 20 and the rod 6, and the top actuating lever 5 is pivoted upward.

The rod 6 thus raises the free end of the top actuating lever 5 and keeps it in this position, in which case the top actuating lever 5 no longer pushes the bottom actuating lever 4 downward, and the pneumatic compression spring 8 can begin to be relieved of stressing. By virtue of the pneumatic compression spring 8 being relieved of stressing, the bottom actuating lever 4 pivots upward and presses, by way of its abutment surface 22, against the end 23 of the extension 3 of the safety bar 2, in which case the safety bar 2 is closed.

Even in this position of the safety bar 2, the effect according to the invention, although the closing movement of the closing bar 2 can be stopped, counter to the force of the pneumatic compression spring 8, by a passenger, it is no longer possible for the passenger, on account of the blocking device 13, to open the safety bar 2 again counter to the discharging action of the energy store 8, since it should only be possible to compress the pneumatic compression spring 8 if the pin 10 were depressed by the lever 5, is manifested.

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Figure 6 shows the safety bar 2 in its fully closed position according to figure 2. The bottom actuating lever 4 has been pivoted all the way upward and butts, by way of its nose 24, against the end 23 of the extension 3 of the safety bar 2. The top actuating lever 5, however, does not butt against the bottom actuating lever 4. In this position of the safety bar 2, en route from one station to another station of the chair-lift system, the pin 10 is not depressed by the top actuating lever 5, in which case the pneumatic compression spring 8 is not subjected to stressing and it is thus also the case that the safety bar 2 cannot be opened, since the extension 3 of the safety bar 2 is blocked against such movement by the bottom actuating lever 4.

In figure 7, the safety bar 2 is still closed, but the chair 1, as it enters into a station, is moving into a region in which the guide roller 12 of the device 7, and with it the rod 21, the Bowden cable 20 and the rod 6, is/are moved downward by a guide rail. The rod 6 thus pushes the free end of the top actuating lever 5 downward, in which case the top actuating lever 5 depresses the pin 10 and the pneumatic compression spring 8 can be subjected to stressing in order for the safety bar 2 to be opened. Figure 8 shows this position of the device 13 upon movement past the guide rail. The guide roller 12 and thus the rod 21, the Bowden cable 20 and the rod 6 are moved increasingly downward. This means that the top actuating lever 5 is also pushed increasingly downward, during which time the pin 10 remains depressed and the pneumatic compression spring 8 is compressed. It is thus possible for the safety bar 2 to be opened.

In order to provide mechanical assistance for opening the safety bar 2 into the position which is illustrated in figures 1 and 4, use can be made of means which are known from the prior art, for example a spring (not illustrated) which is subjected to stressing as the safety bar is closed.

Figure 9 shows the position of the device 13 during movement through a station once the guide rail has been passed. The rod 6, which interacts with the device 7 in order to subject the energy store 8 to stressing and to activate the closing operation of the safety bar 2, remains lowered and keeps the top actuating lever 5 in position. The top actuating lever 5 thus blocks a pivoting movement of the bottom actuating lever 4 in the upward direction, this preventing the situation where the pneumatic compression spring 8 is relieved of stressing and the safety bar 2 is closed accidentally. The safety bar 2, which in the embodiment shown, rather than being provided with any positively controlled or mechanical assistance, is opened manually by the user, is not yet fully open in figure 9.

It is clear from the time sequence described that, during the closing operation and also thereafter, the safety bar 2 is permanently blocked against executing an opening movement, until the pneumatic compression spring 8 is released by virtue of the pin 10 being depressed.

In summary, an exemplary embodiment of the invention may be described as follows:

A transporting means of a chair lift or of a cableway system has a safety bar 2, a device 13 for closing the safety bar 2, an energy store 8, a device 7 for charging the energy store 8 and a blocking device 13 which prevents the energy store 8 from being charged. The blocking device 13 can be activated and deactivated, opening of the safety bar 2 being prevented in the active state of the blocking device 13. The blocking device 13 prevents the safety bar 2 from being opened over at least part of the distance covered by the safety bar 2 between its fully open position and its fully closed position, in particular over the entire distance.

The claims defining the invention are as follows:

1. A transporting means of a chair lift or of a cableway system, having a frame, which is connected to a load-bearing bar coupled to a conveying cable, having a safety bar, having a device for closing the safety bar, having an energy store, having a device for charging the energy store, and having a blocking device which prevents the energy store from being charged, it being possible for the blocking device to be activated and deactivated, opening of the safety bar being prevented in the active state of the blocking device, and the blocking device prevents the safety bar from being opened over at least part of the distance covered between its fully open position and its fully closed position.

2. The transporting means as claimed in claim 1, wherein the blocking device prevents the safety bar from being opened over the entire distance covered between its fully open position and its fully closed position.

3. The transporting means as claimed in claim 1 or 2, wherein the blocking device and the device for closing the safety bar are formed from the same group of interacting components.

4. The transporting means as claimed in any one of claims 1 to 3, wherein the device for charging the energy store is arranged on the load-bearing bar.

5. The transporting means as claimed in any one of claims 1 to 4, wherein the device for charging the energy store has a pivotably mounted carrier.

6. The transporting means as claimed in any one of claims 1 to 5, wherein the device for charging the energy store can be pivoted via a dead center.

7. The transporting means as claimed in claim 6, wherein the device for charging the energy store has a toggle joint.

8. The transporting means as claimed in any one of claims 1 to 7, wherein the device for charging the energy store has a guide roller.

9. The transporting means as claimed in any one of claims 1 to 8, wherein the blocking device has a bottom lever and a top lever, in that the bottom lever, at its free end, has an abutment surface for an extension of the safety bar, and in that the top lever has an abutment surface for blocking means which prevents the energy store from being charged.

10. The transporting means as claimed in claim 9, wherein the bottom lever and the top lever are mounted on the extension of the safety bar.

11. The transporting means as claimed in claim 9 or 10, wherein the bottom lever is connected to the energy store.

12. The transporting means as claimed in any one of claims 1 to 11, wherein the energy store is mounted in a pivotable manner on the transporting means.

13. The transporting means as claimed in any one of claims 1 to 12, wherein the energy store is a spring, in particular a pneumatic compression spring.

14. The transporting means as claimed in any one of claims 1 to 13, wherein a mechanism connects the blocking device to the device for subjecting the energy store to stressing.

15. The transporting means as claimed in claim 14, wherein the mechanism has a first rod, a Bowden cable and a second rod.

16. The transporting means as claimed in claim 15 when appended to claim 7, wherein the first rod is connected to the toggle joint.

17. The transporting means as claimed in claim 15 or 16, wherein the second rod is connected to the top lever.

18. The transporting means as claimed in any one of claims 1 to 17, wherein a damper is arranged in a pivotable manner on the frame and on the safety bar.

19. The transporting means as claimed in any one of claims 1 to 18, wherein the device for subjecting the energy store to stressing is a device for activating the closure of the safety bar.

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Fig 1

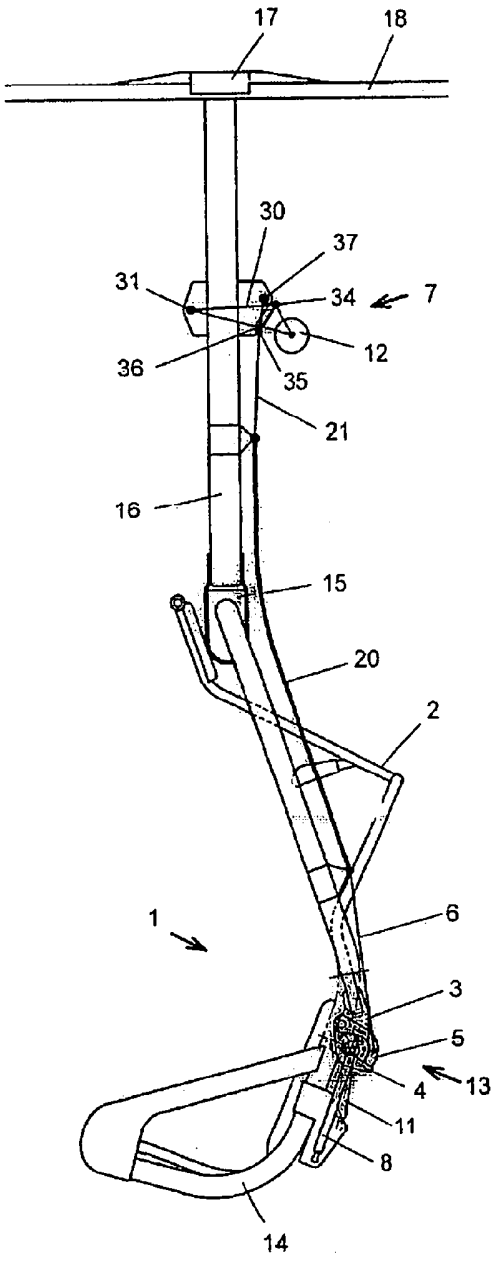


Fig 2

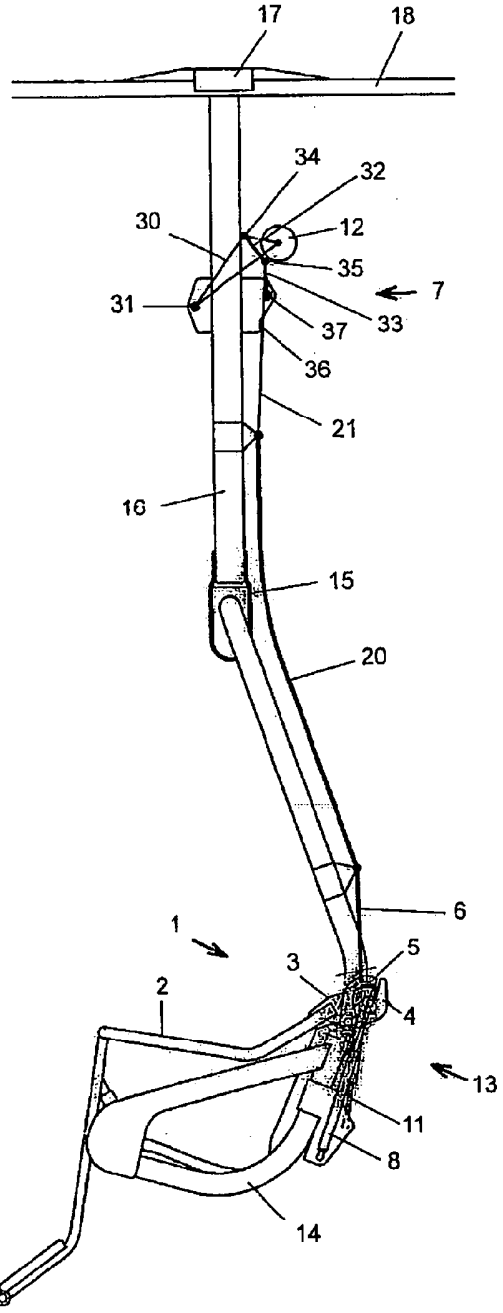
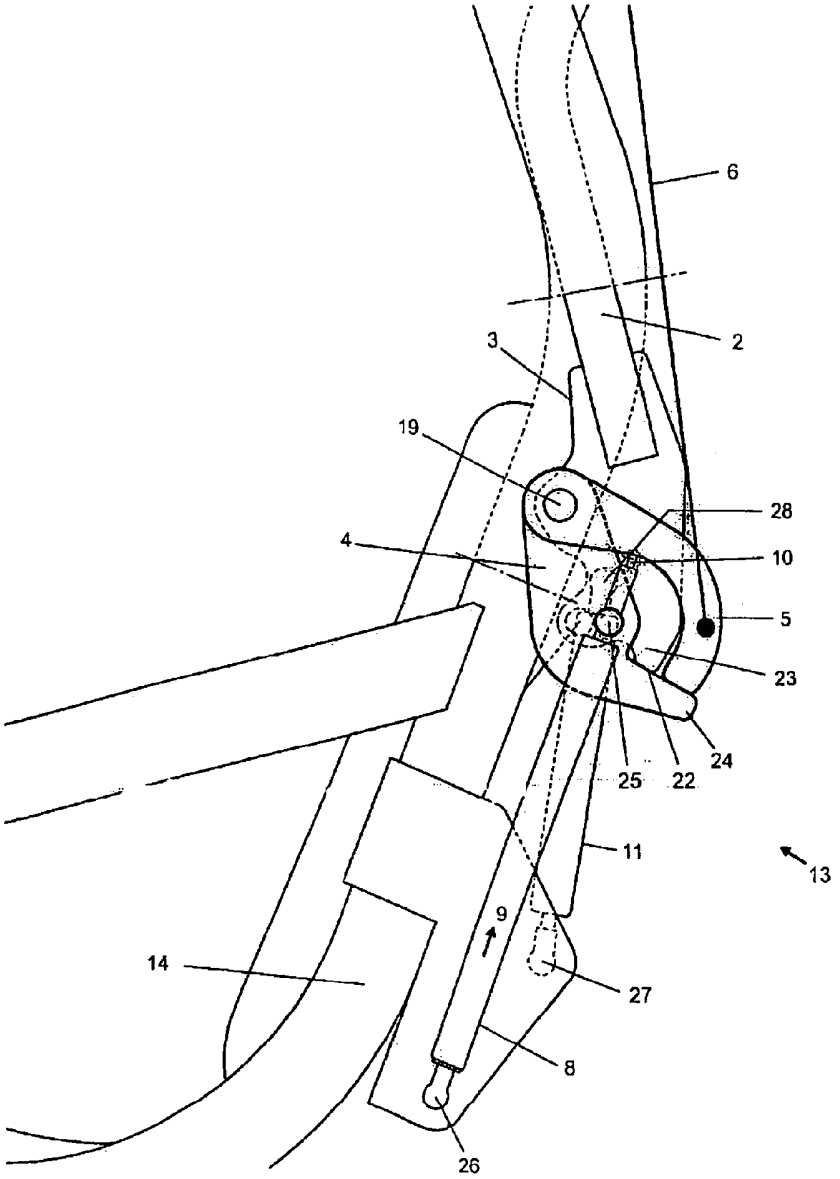


Fig. 3



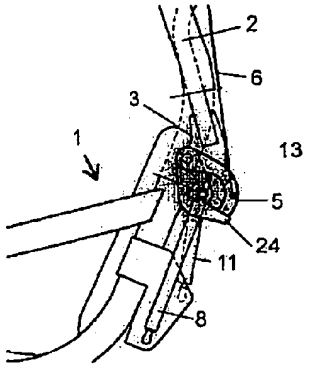


Fig. 4

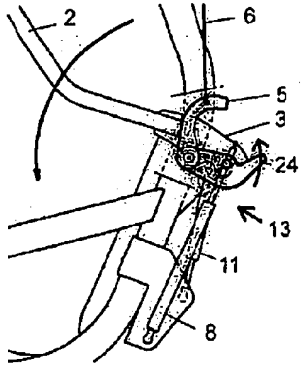


Fig. 5

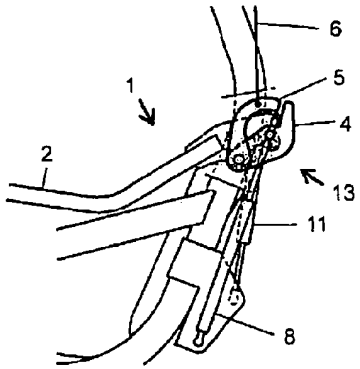


Fig. 6

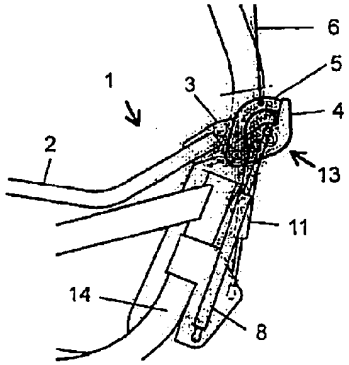


Fig. 7

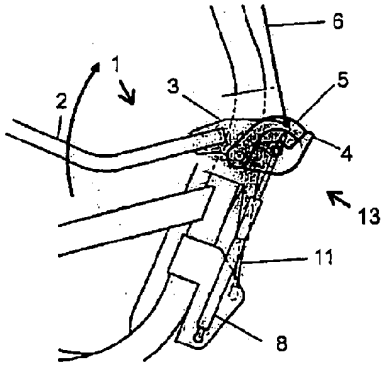


Fig. 8

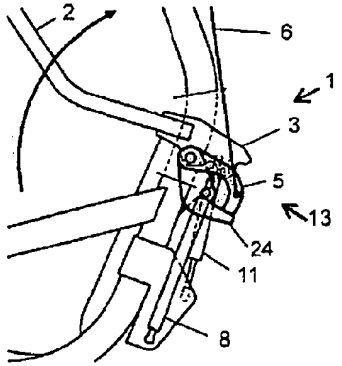


Fig. 9