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(71) Applicant: **BITRON S.p.A.**
10064 Pinerolo (Torino) (IT)

(72) Inventor: **Spada, Riccardo**
12022 Busca (CN) (IT)

(74) Representative:
Lotti, Giorgio et al
c/o Ing. Barzanò & Zanardo Milano S.p.A.
Corso Vittorio Emanuele II, 61
10128 Torino (IT)

(54) Power window control for motor vehicles

(57) Description of a separate control device to control electrical motors for the power windows of motor vehicles, comprising a control lever which is elastically kept in vertical position, and can be inclined into diametrically opposite unstable positions and can be rotated into at least six release positions, four of which are intended for the separate control of each one of the four motors, one is a neutral position and one is a position in which all the motors are simultaneously controlled.

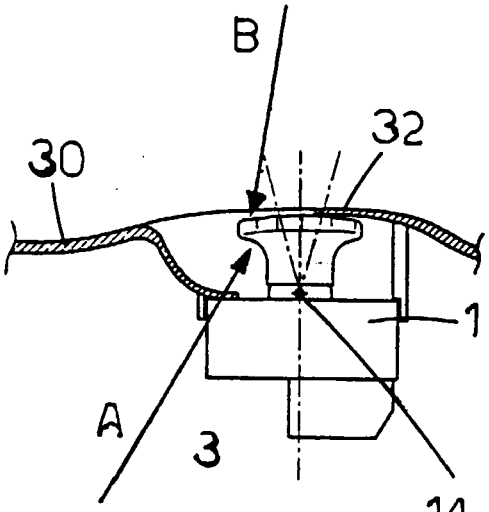

FIG.3

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Description

[0001] The present invention refers to a separate switch that controls all the motors for the power windows of the motor vehicle, either the front ones only or the rear ones with optional control functions for all the motors together or inhibition of the control of the back windows from the rear of the motor vehicle (safety measure for children).

[0002] The present motor vehicle devices present groups of motors for power windows located in different parts of the motor vehicle, for example on the door handles, on the central tunnel or on the dashboard, according to the stylistic/ergonomic choices of the manufacturers.

[0003] Said devices share the characteristic that each window is controlled by a switch for the up-and-down mode, both automatically and manually.

[0004] In some types of these devices the switches are gathered on a single metal support mounted on the door on the driver side or on the tunnel, being integrated by an additional switch to lock the controls of the rear part of the motor vehicle (safety measure for children). It becomes evident that the utilisation of so large a number of switches means high costs.

[0005] From German Patent n°3524439 it is also known, among the electrical controls of the devices of the motor vehicle, a device to adjust the position of the rearview mirrors of a motor vehicle, presenting a separate control consisting of a lever housed in a way such that it can be rotated and inclined in order to select and control the two electrical motors of each mirror.

[0006] It is an object of the present invention to gather all the controls for the power windows of the motor vehicle at a single point inside the passenger compartment so that all the controls can be centralised and the costs are lower.

[0007] Said object is achieved by means of the present invention which refers to a separate control for the power windows of a motor vehicle presenting the characteristics set forth in claim 1.

[0008] Additional characteristics and advantages will become clear from the following description with reference to the appended drawings provided as non-restrictive example, and in which:

figures 1 and 2 are top view of the separate control according to the invention and placed into a housing made in a part of the inside covering of the passenger compartment, with the knob rotated in two different selection positions;

figures 3 is a partially sectioned side view of the separate control in figures 1 and 2, mounted on the motor vehicle;

figure 4 is a partially sectioned front view of the separate control in figures 1 and 2, mounted on the motor vehicle;

figure 5 is a longitudinal sectioned view of the separate control according to the invention;

figure 6 is a section view taken along the line V-V in fig.5, and

figure 7 is a plan view of a component part of the separate control, visible in section in figure 5.

[0009] With reference to the figures, reference number 1 indicates the envelope of the separate control with a snap mounted bottom 3 and including electrical contacts 4. A control lever 5 resting on a fulcrum on the envelope 1, is adapted, when inclined on a side, to move a bond 7 with a pair of pin contacts 9. The lever 5 is kept in a vertical position because its lower edge is provided by a retractable rounded point 10 which is pushed by a pressure spring into a conic notch 11, made in the bottom 3 at the vertical axis of the envelope 1.

[0010] A side push on the knob 13 of the lever 5, allows the lever to be inclined in an unstable position, with a rotation around the point 14 located at the wall of the cover 1, and the point 10 to slide on the surface of the notch 11.

[0011] This inclination makes the contacts 9 of the bond 7 translate on a printed circuit 15, contained in the envelope 1 and close, accordingly, the electrical circuit corresponding to one of the motors of the power window (not shown). The inclination of the lever in the opposite direction makes the window move in the opposite direction. When the knob 13 is released, the lever 5 goes back to the vertical position, pushed by the point 10 which slides on the inclined wall 11, thus reopening the circuit closed by the previous displacement.

[0012] Besides, the lever 5 may be snap rotated into six selection positions, that is a neutral position, a position of simultaneous control of the four motors of the power windows, and a control position for each of the motors.

[0013] This is achieved by means of a release control integrally located rotatably to the lever 5 above the printed circuit 9. It is made of an arch support 16 provided with two diametrically opposite caps 17, stressed into diametral expansion by a spring 18. The caps 17 can slide on the inner surface of a ring guide 19, with a basically rectangular plan, the hole of which presents two recesses 21 and 22, at the main axis and four additional recesses, 23, 24, 25 and 26 at the diagonals. An action on the knob 13 causes the rotation of the support 16 that drags the caps 17. They end snap positioned into two of the facing recesses made on the inner wall of the ring. In this way at least six precise angular positions of the lever 5 in relationship to the printed circuit are realised, and one, none or more than one electrical circuits of the motors of the power windows are selected so that it is possible to act on them in order to lift or lower the respective window, by means of the inclination of the lever as it was previously described. The printed circuit will be made in a such a way that it is possible not only to act on the motors separately but to have a neu-

tral position and a position in which more than one motor, and preferably all of them, are controlled simultaneously.

[0014] Figures 1 to 4 show a possible location of the separate control on a part of the inner covering of the passenger compartment 30, more in particular on the dashboard or on the central tunnel between the seats.

[0015] The covering 30 forms a cup 31 in which the upper part of the lever 5 protrudes with the control knob 13. On the other hand the envelope 1 with the bottom 3 is hidden in the part under the cup 31. The wall of the covering 30 forms, on the edge of the cup 31, a radial projection 32 protruding towards the centre of the cup, till it covers part of the control knob 13. On the upper surface of the knob there are two position marks 33 and 34, of different design, which respectively indicate the portion of the knob in the rotation field of which either all the windows or the front windows only are selected, and the portion where the rear windows or the neutral position are selected.

[0016] References marks 35 are present also on the inner wall of the cup, in order to indicate the position of the main axis (neutral or all) and the two diagonals (right, left).

[0017] The utilisation of the separate control is as follows.

[0018] According to the window that is to be selected, the corresponding mark is placed on the reference indicated on the cup (for example front left in figure 1) and the knob 13 is pulled in the direction of arrow A in order to lift the window or is pushed in the direction of arrow B in order to lower it.

[0019] The projection 32 has been expressly made to prevent the knob to be accidentally pushed and moved to the right in figures 1, 2 and 3, in order to prevent the windows from being closed when it is not desired, for example to prevent children from doing that. It will be therefore recommended that the control be mounted in such a way that when the knob is moved to the right one or all the windows are lowered.

[0020] It is evident that in order to make up for variations of the functions of the knob, it will be enough to adjust the position of the projection 31.

Claims

1. Separate control device to control electrical motors for the power windows of motor vehicles, comprising a control lever (5) which is elastically kept in vertical position in the body o a switch which can be inclined into diametrically opposite unstable positions and can be snap rotated into several angular positions in order to select one, none or more than one motors to be controlled, characterised in that said lever (5) can be rotated into at least six snap positions (21, 22, 23, 24, 25, 26), four of which are intended to control separately each one of the four motors, one is a neutral position and one is a position in which all the motors are simultaneously controlled.

2. Device as claimed in claim 1, characterised in that the lever is provided with a control knob (13) arranged in a such a way that it axially protrudes from the bottom of a cup (31) made in the material (30) of the inner covering of the passenger compartment of the motor vehicle.

3. Device as claimed in claim 2 characterised in that the upper surface of the knob (13) and the inner wall of the cup (31) are provided with reference marks (33, 34, 35) for the angular position of the knob.

4. Device as claimed in claim 2 characterised in that the wall of covering (30) forms, on the edge of the cup (31), a radial projection (32) protruding towards the centre of said cup (31), till it covers part of the control knob (13).

5. Device as claimed in claim 1 in which said lever (5) is associated with a support for contacts (7) the contacts of which (9) are adapted to translate, as a consequence of the inclination of the lever (5), on a printed circuit (15) in order to control the contacts related to said electrical circuits, and to a device to control its position during the rotation, consisting of a support (16) for the elastic caps (17) which slide, due to the rotation of said lever (5), on the inner surface of a ring (19) the plan of which is basically rectangular and which is contained in said envelope (1); characterised in that said inner surface of the ring (19) is provided with at least six recesses (21, 22, 23, 24, 25, 26) facing two by two, arranged at the main axis and the diagonal of the ring, and shaped in a way adapted to constitute at least six snap lock positions of said caps (17).

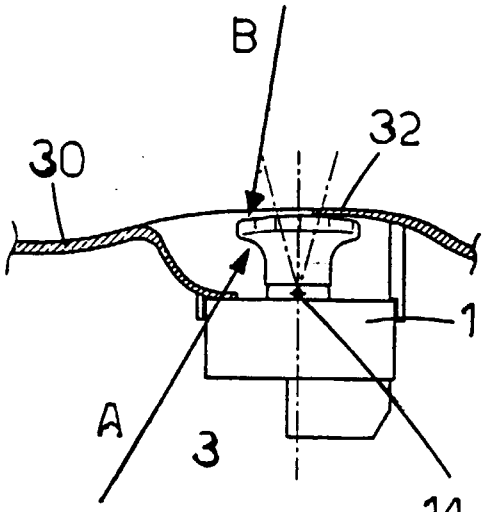


FIG.3

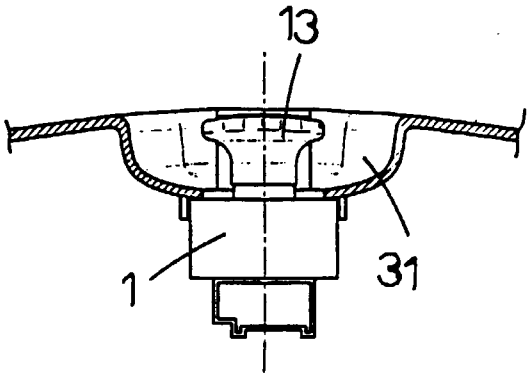


FIG.4

FIG.1

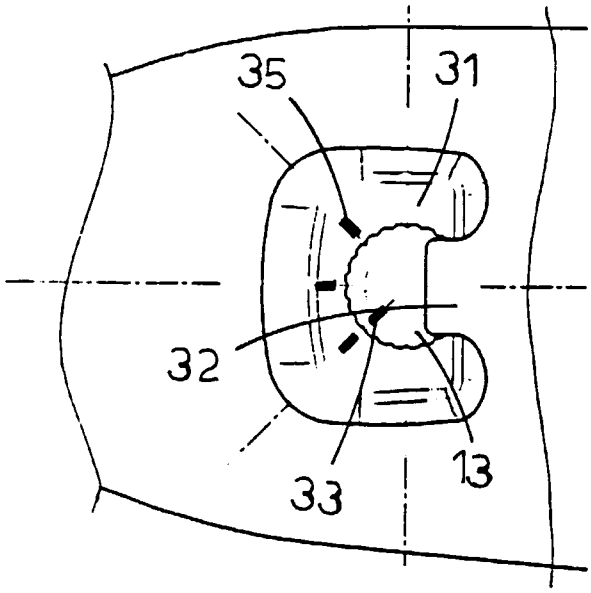
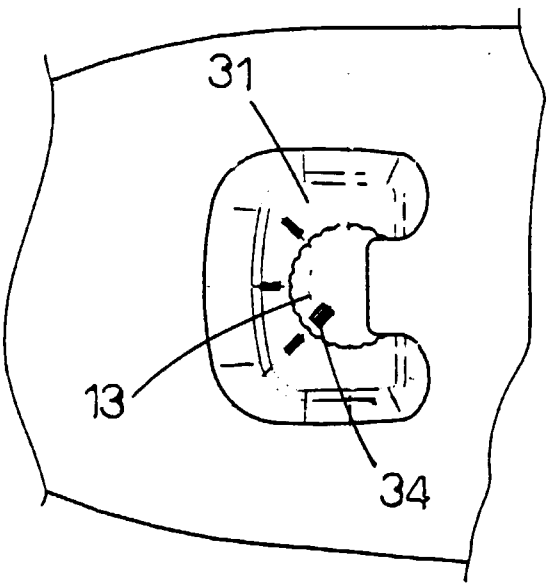


FIG.2



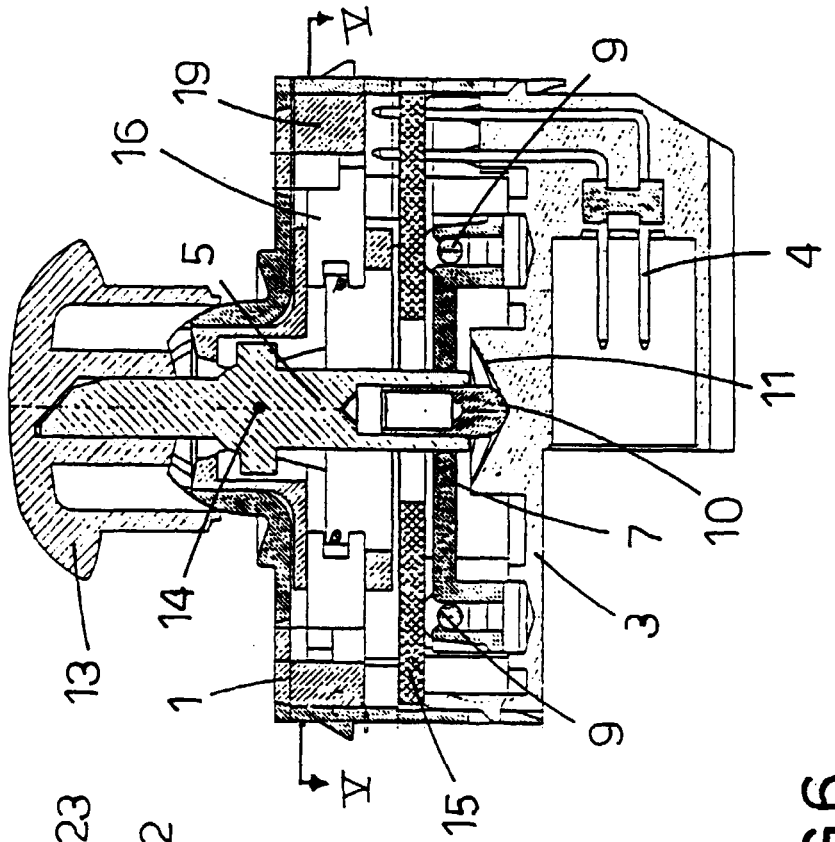


FIG.5

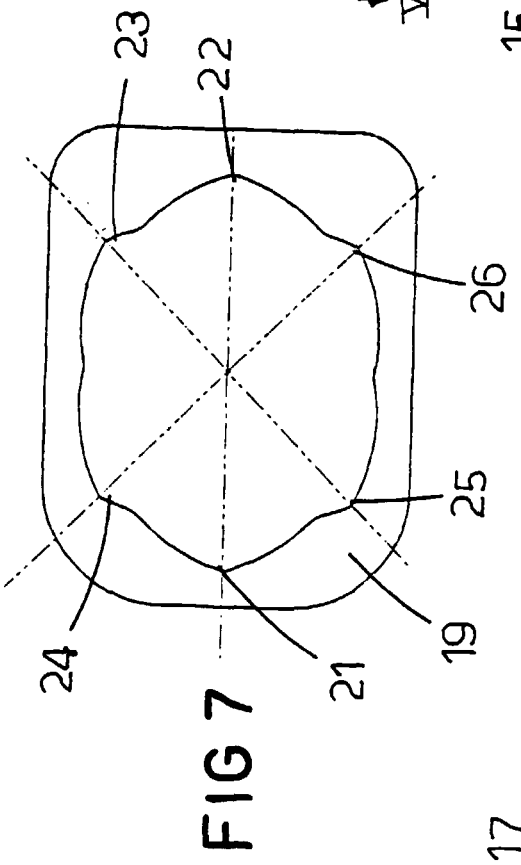


FIG 7

FIG.6