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INT CL **B60K, B62D, F16H**
Other: **Online: EPODOC & WPI**

(54) Title of the Invention: **Vehicle steering device having vehicle steering wheel**
Abstract Title: **Display control consoles corotating with steering wheel**

(57) An arrangement is provided which comprises a vehicle steering device 1 having a rotatable vehicle steering wheel 4 and at least one fixed display console (6 see fig 3b) in the field of vision of the driver. Control and display means are situated on the display console (6). A corotating right console 8 and a corotating left actuating console 9 for selecting and operating the control and display means (6) from the vehicle steering wheel 4 are situated on the vehicle steering wheel 4. At least one button 16, 17 of one of the consoles 8, 9 may provide a selection function associated with symbols (13 see fig 3b) on the display (6). The invention is aimed at avoiding visual contact with the steering wheel and the unnecessary removal of hands from the steering wheel.

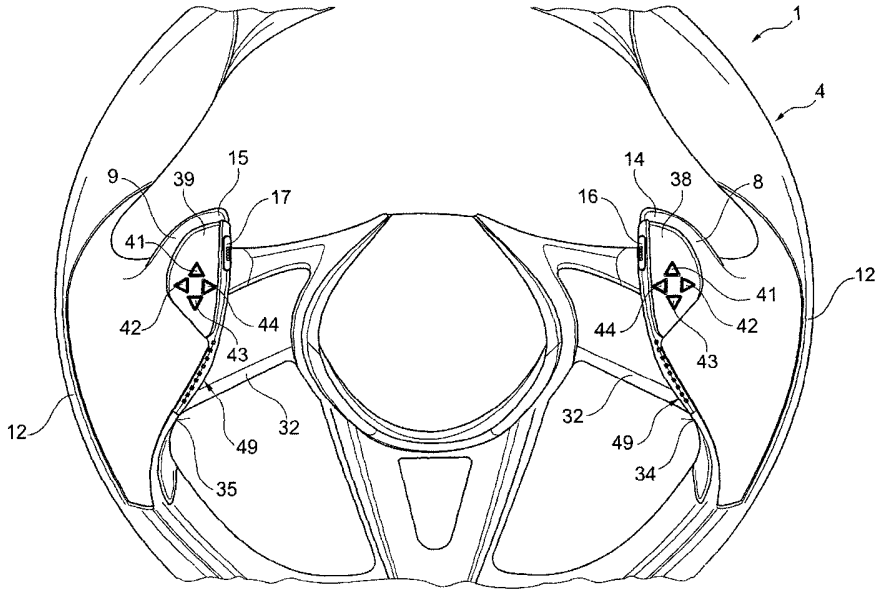


Fig. 2

GB 2483138 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

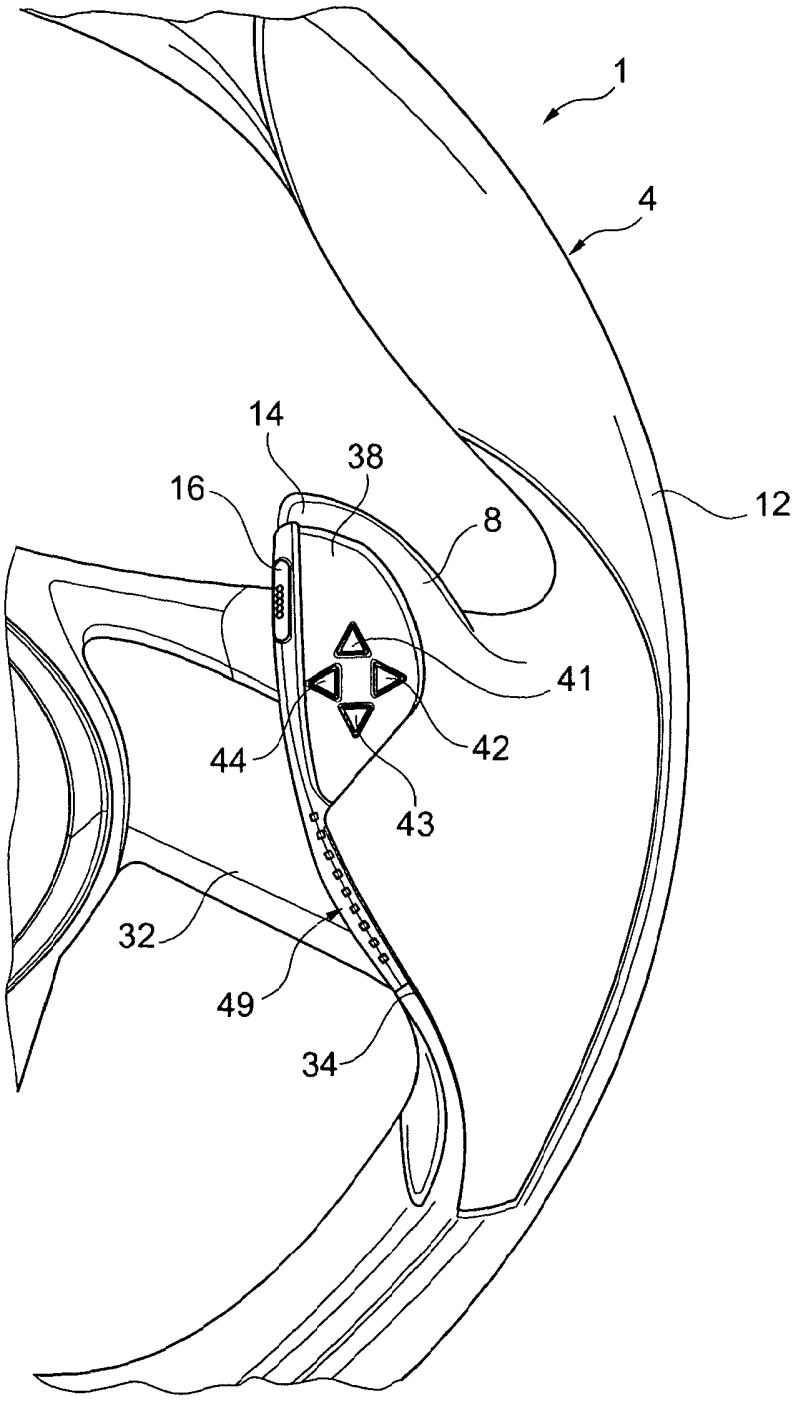


Fig. 1

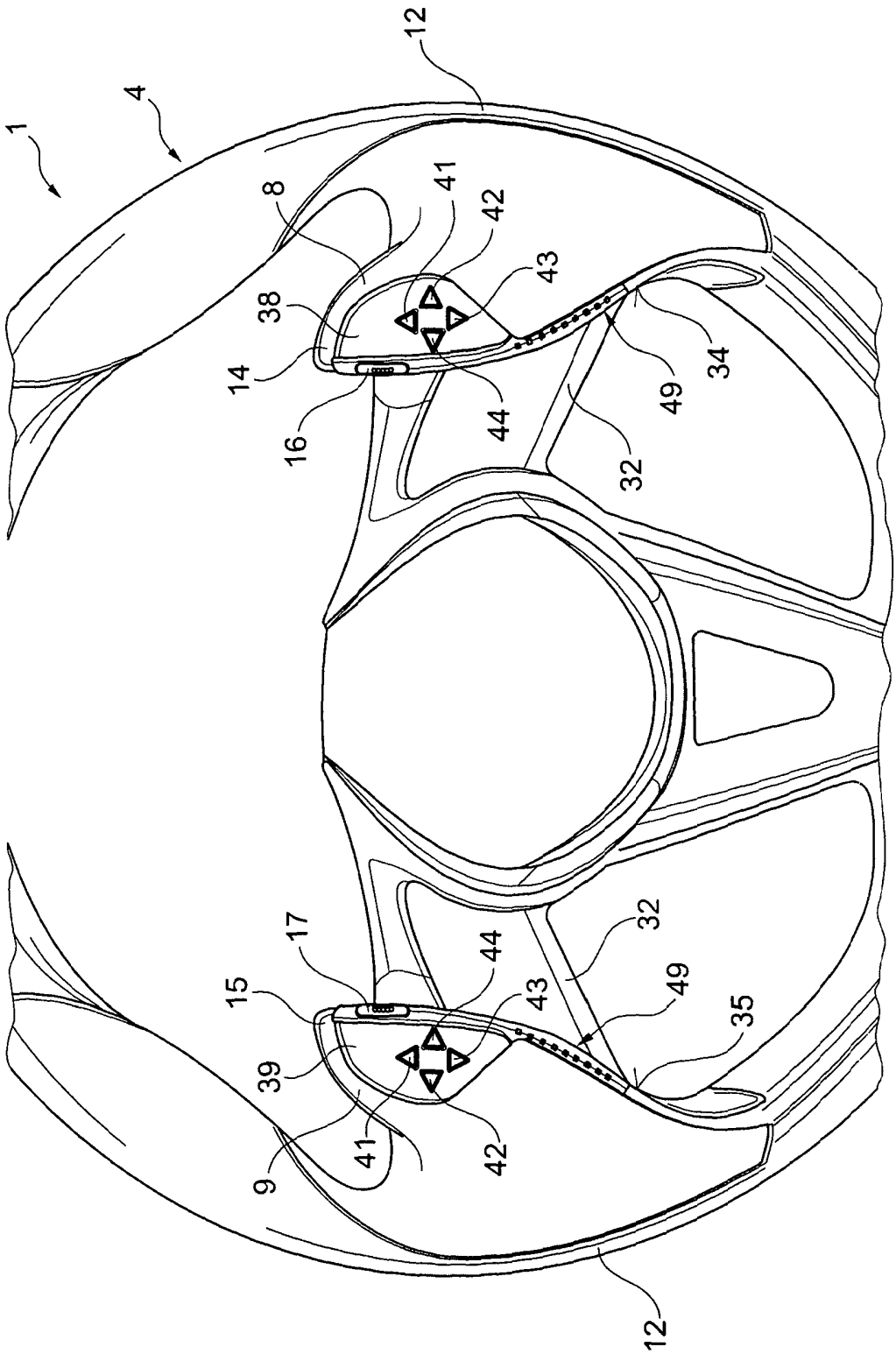


Fig. 2

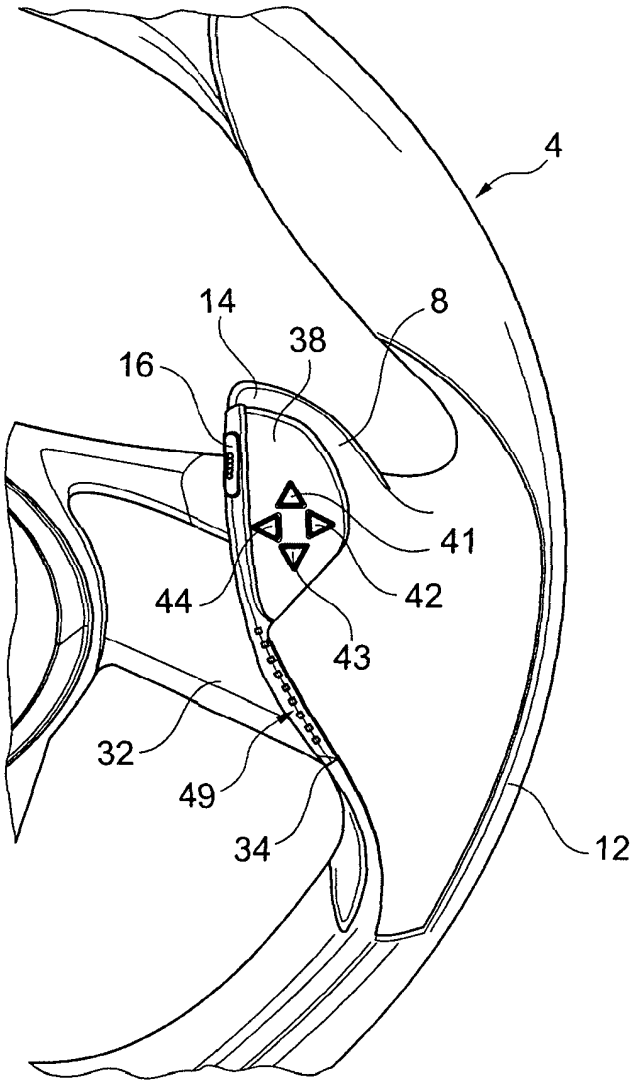


Fig. 3A

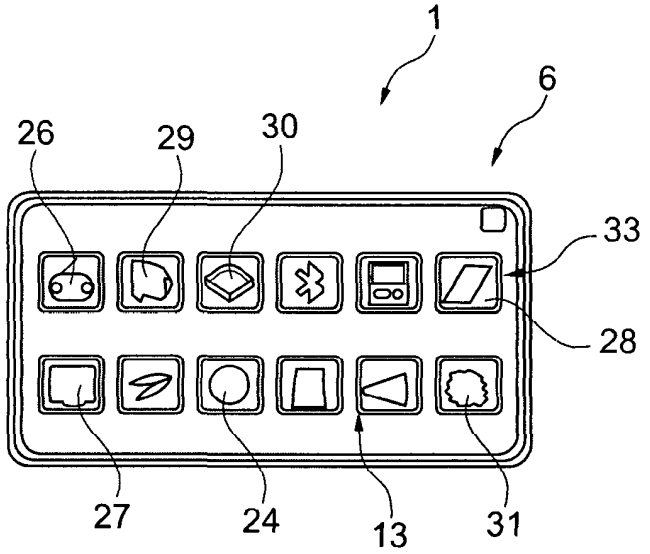


Fig. 3B

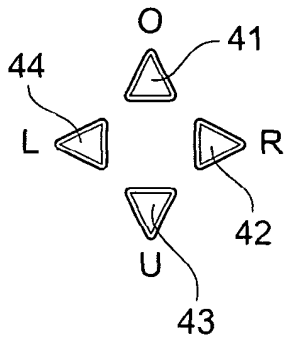


Fig. 3C

Fig. 3

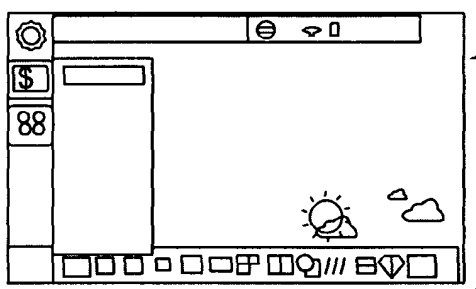


Fig. 4B

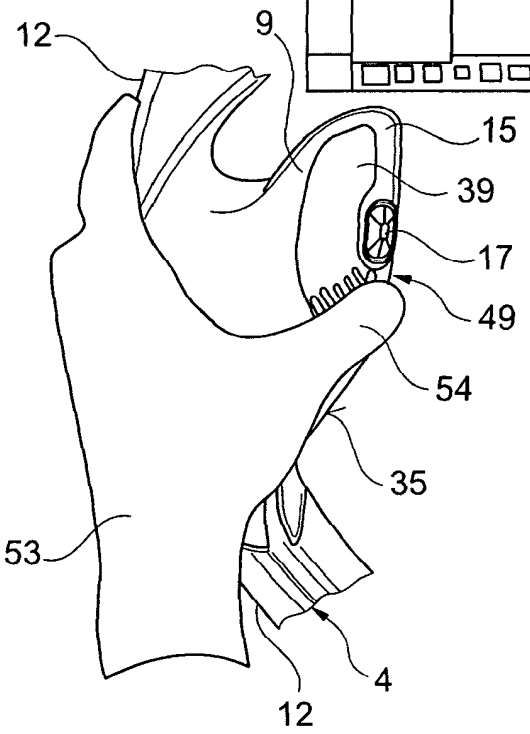


Fig. 4A

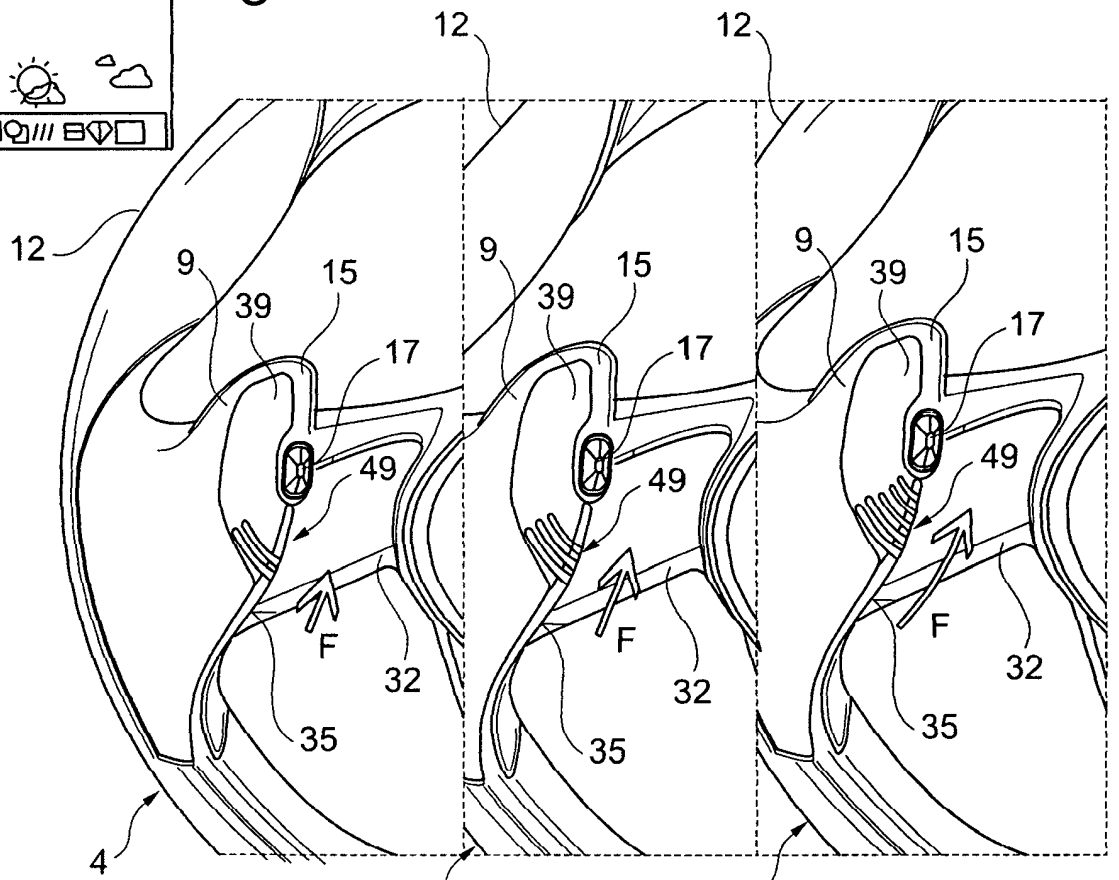


Fig. 4C Fig. 4D Fig. 4E

Fig. 4

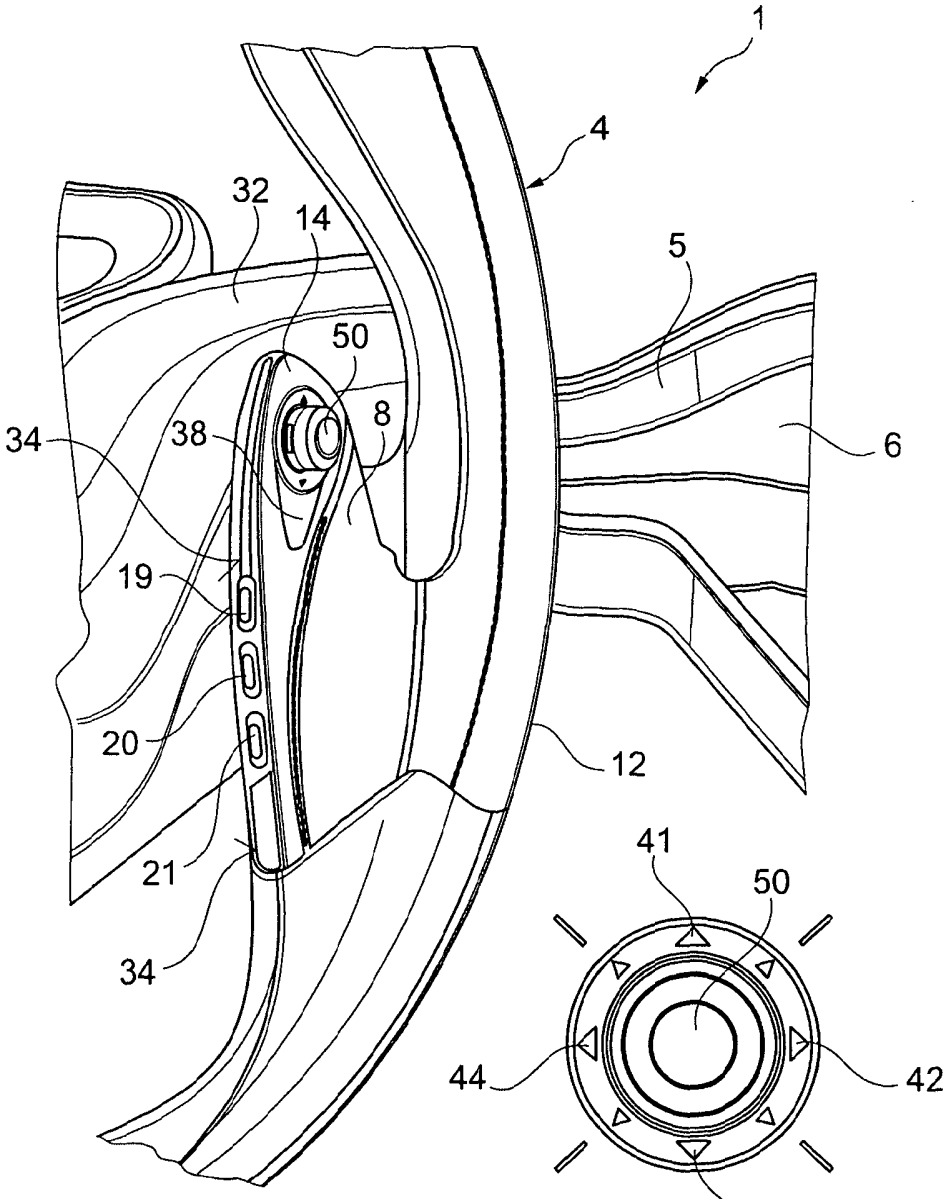


Fig. 5A

Fig. 5B

Fig. 5

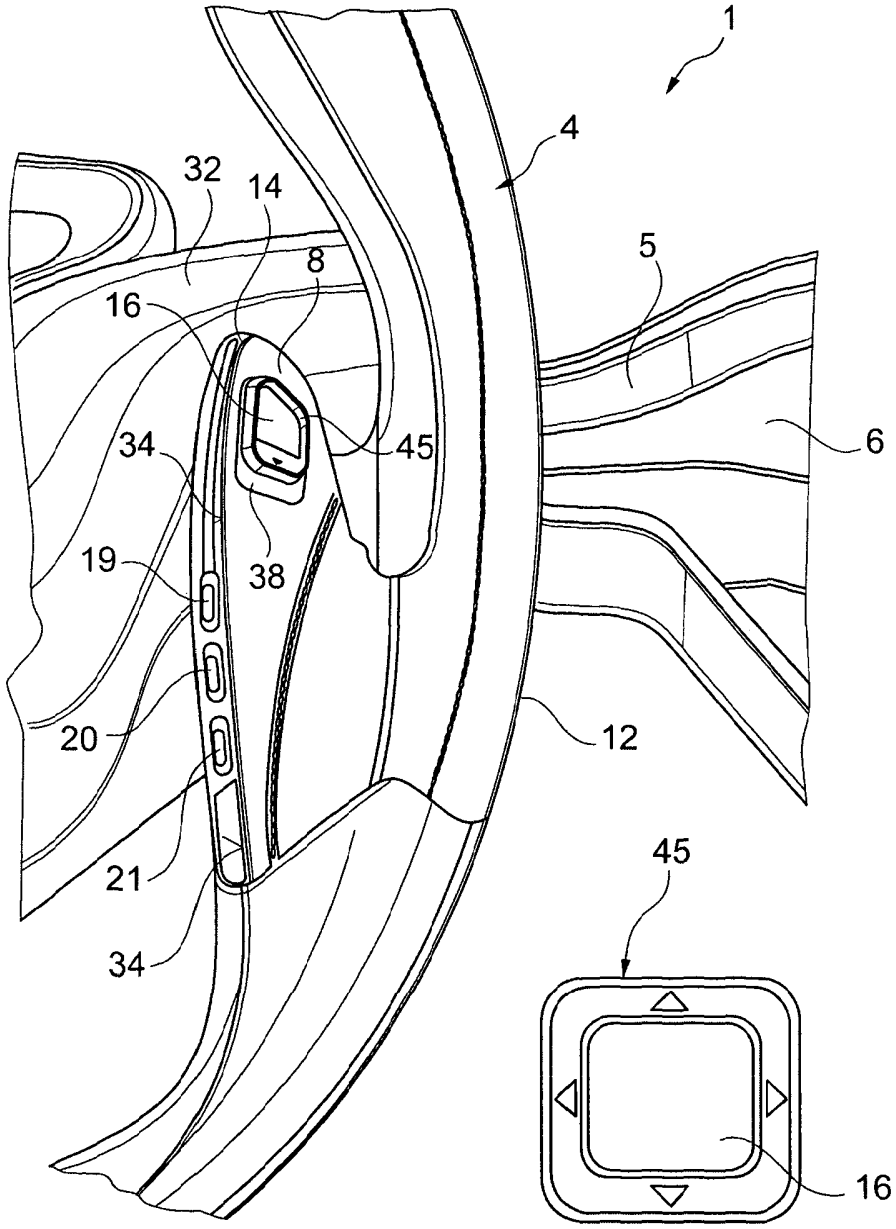


Fig. 6A

Fig. 6B

Fig. 6

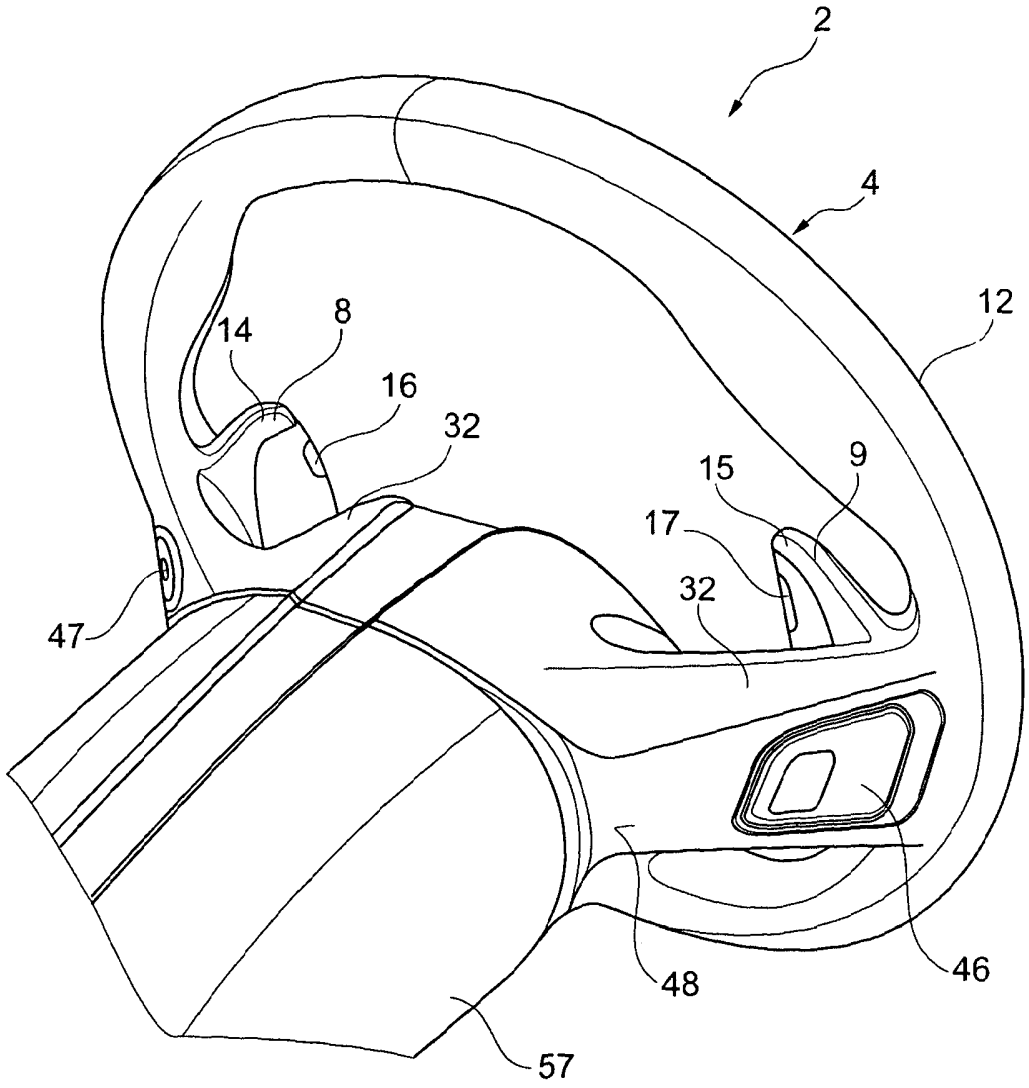


Fig. 7

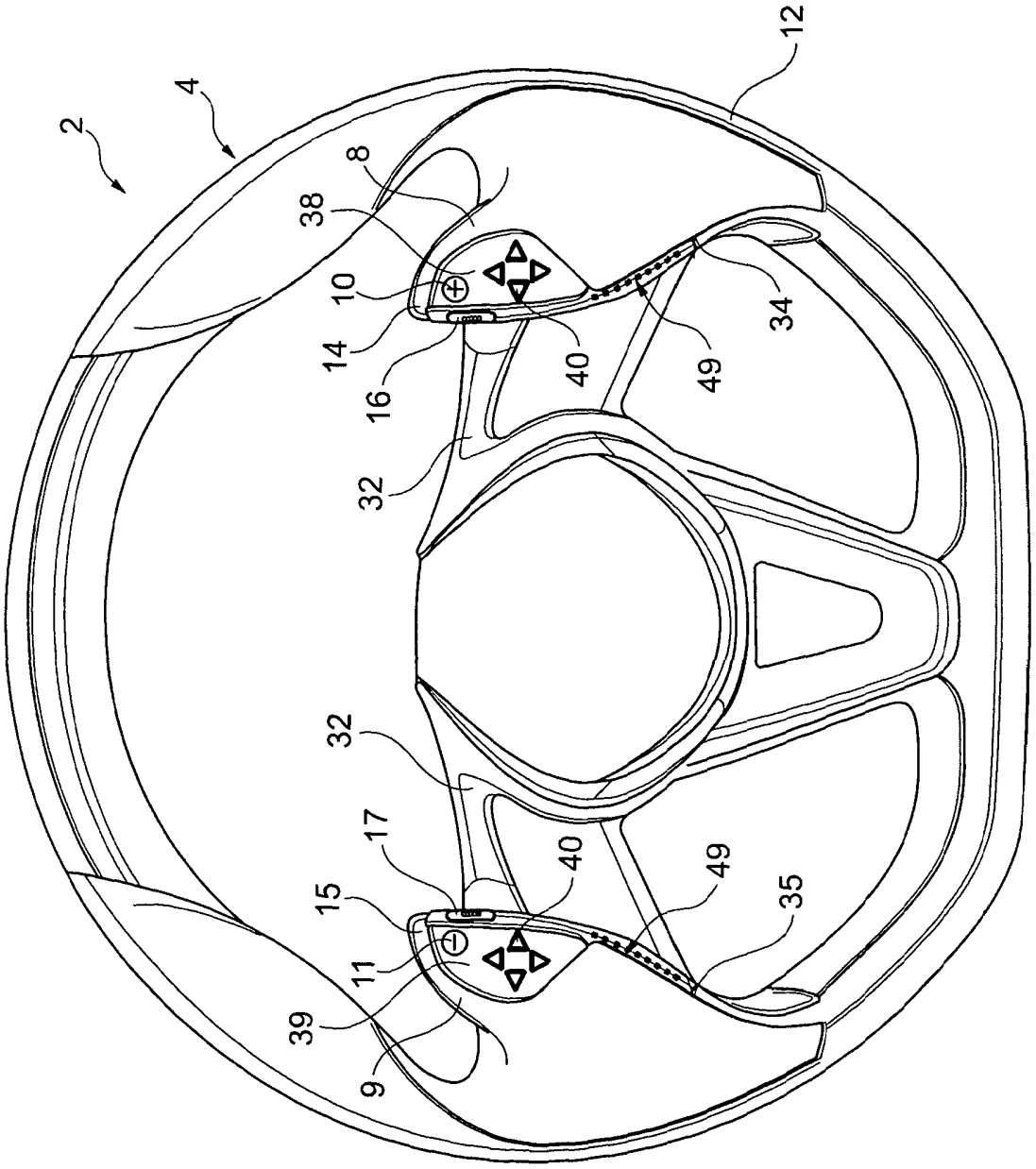


Fig. 8

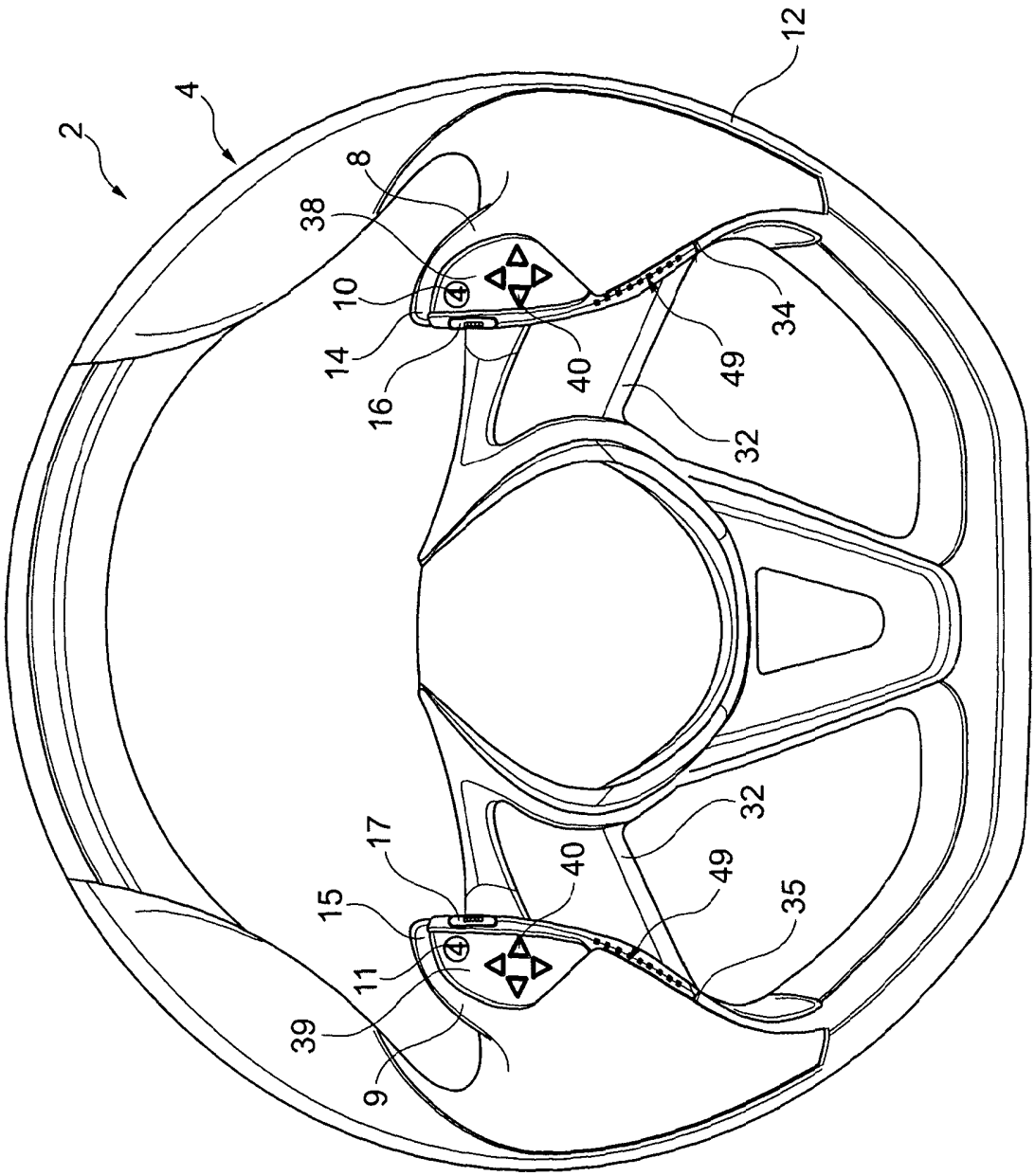


Fig. 9

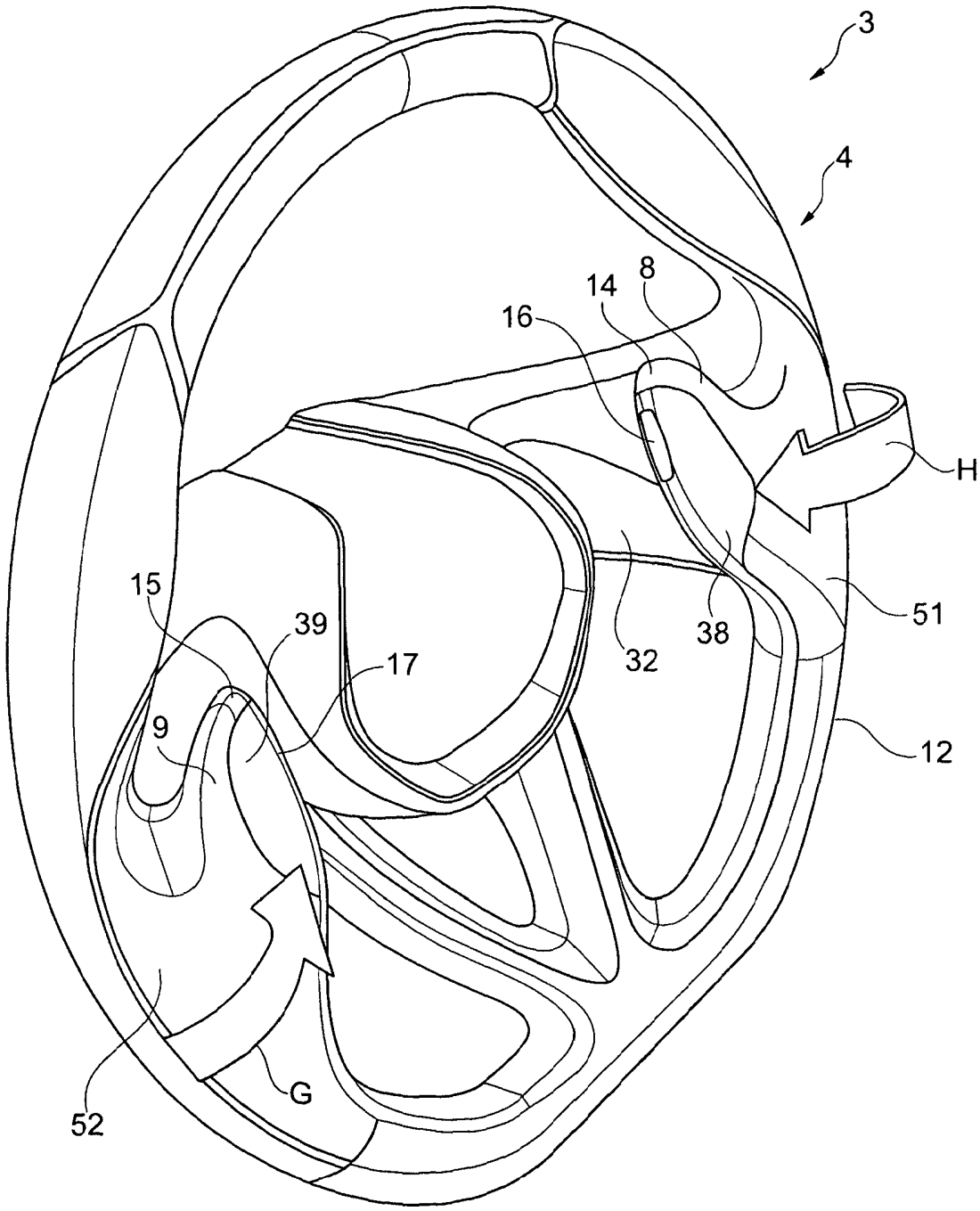


Fig. 10

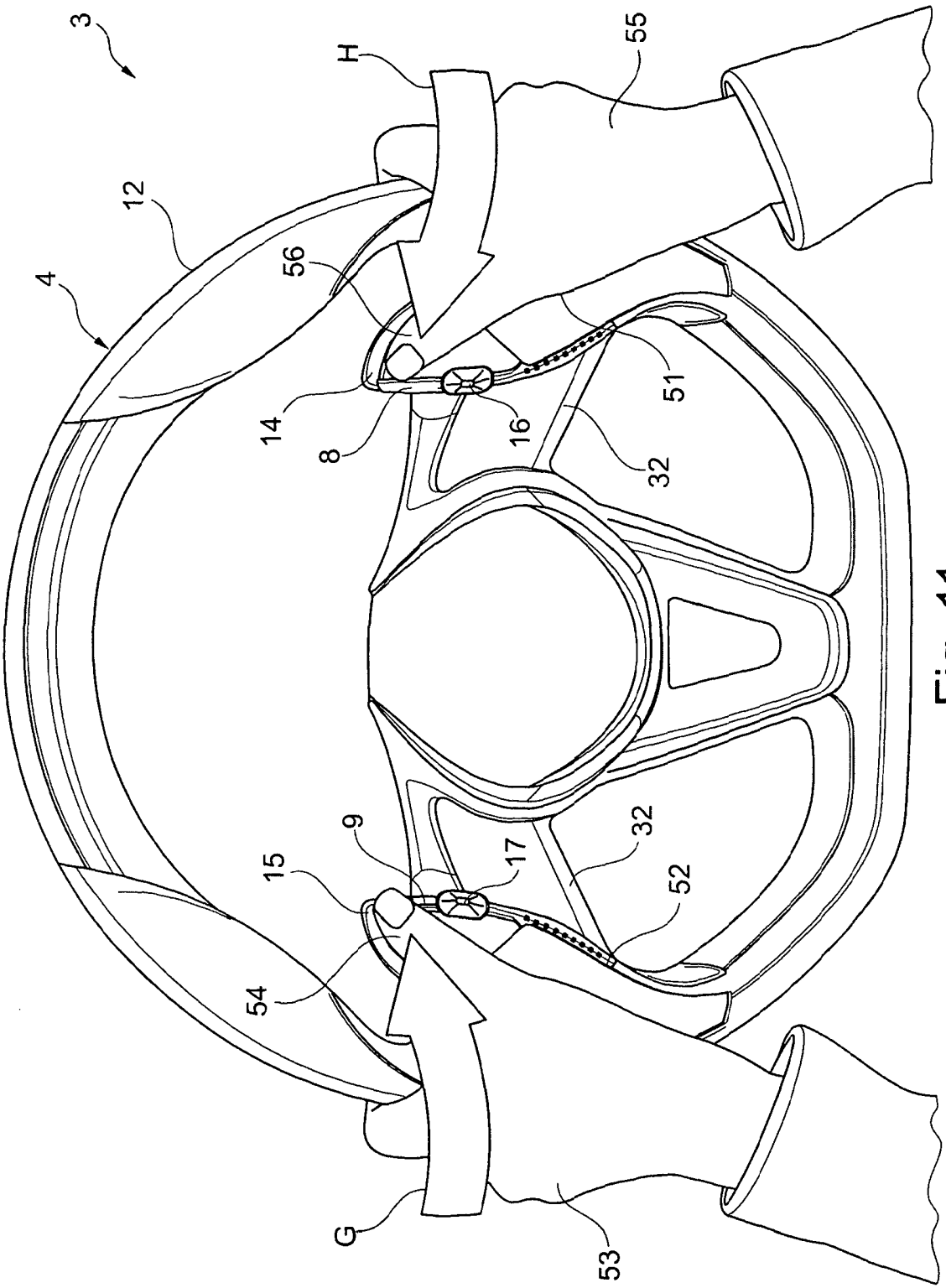


Fig. 11

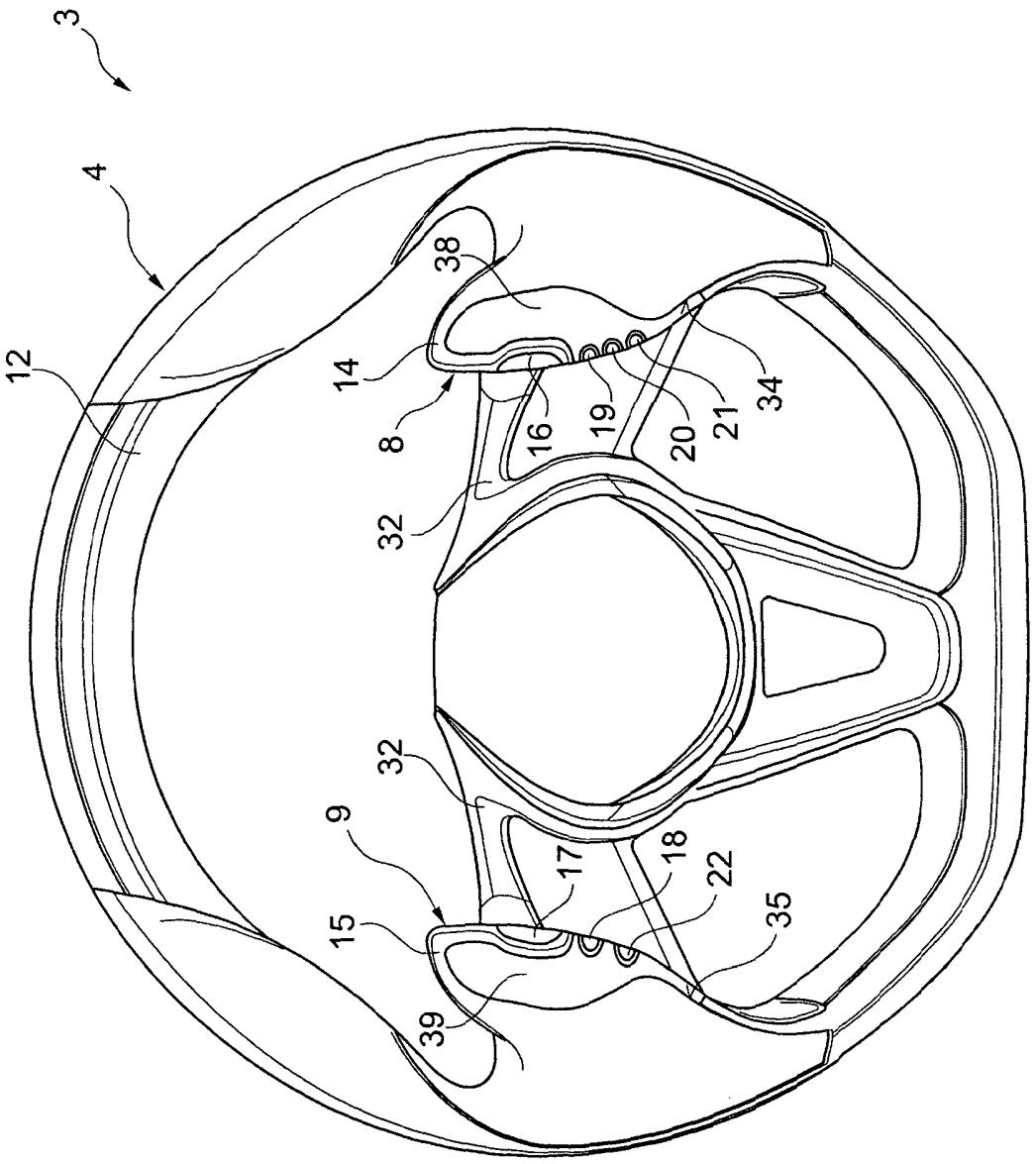


Fig. 12

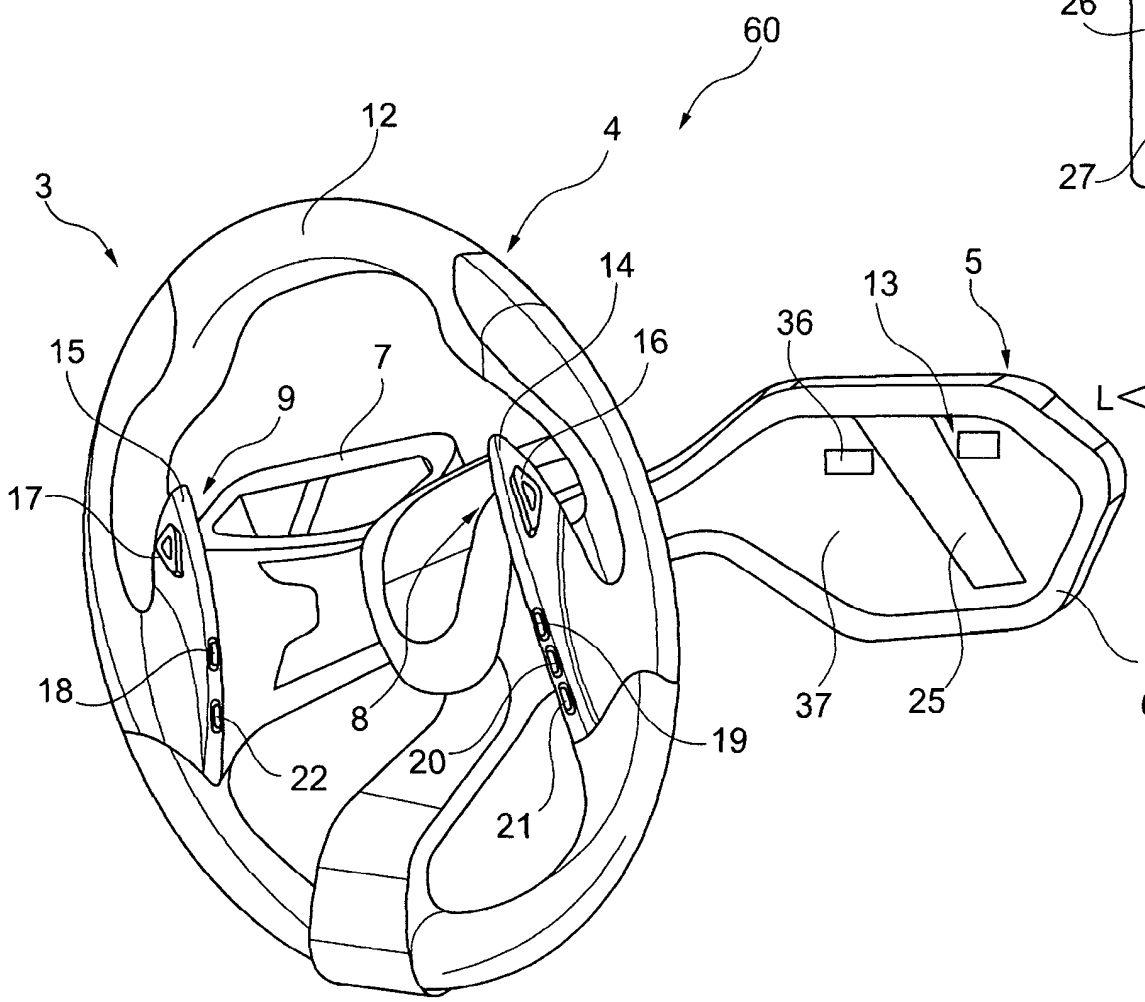


Fig. 13A

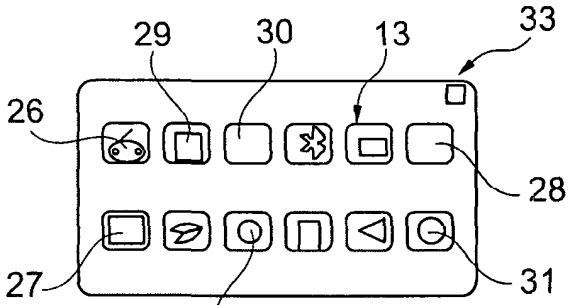
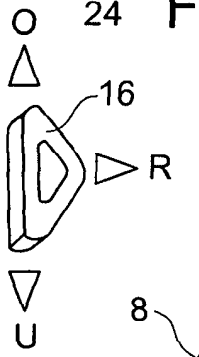


Fig. 13C



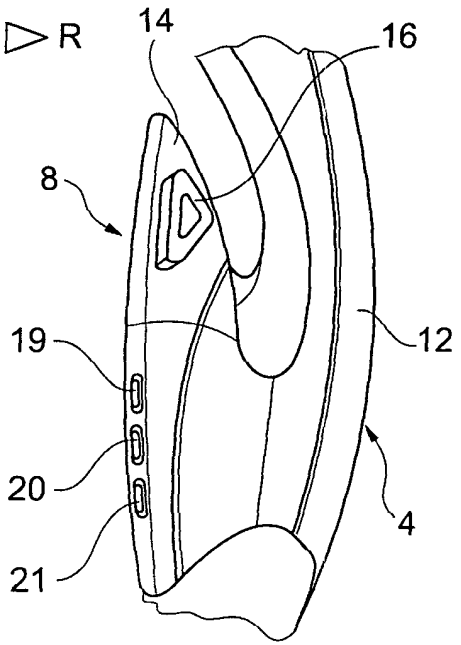


Fig. 13D

Fig. 13

Vehicle steering device having vehicle steering wheel

The application relates to a vehicle steering device having a rotatable vehicle steering wheel and at least one fixed display console in the field of vision of the driver. Control and display means are situated on the display console.

A vehicle steering wheel is known for this purpose from publication EP 1 141 587 B1, which has input buttons on a crossbar of the vehicle steering wheel. A switching device for an electronically controlled automatic transmission of a motor vehicle is activated using the input buttons. In other steering wheel forms, input buttons are situated around an airbag area in the center of the steering wheel.

Such buttons on the crossbar of the steering wheel or around the airbag area require the driver to remove at least one hand from the vehicle steering wheel in order to actuate one of the input buttons. In addition, the driver must concentrate his vision on the steering wheel from the events of traffic for this purpose. It is not possible to perform inputs without visual contact on the steering wheel and without removing at least one hand from the steering wheel, in order to actuate the input buttons reliably and securely.

The object of the application is to provide a vehicle steering device having a rotatable steering wheel, whereby inputs of operationally-relevant functions can be executed from the steering wheel without visual contact with the steering wheel and without removing the hands from the steering wheel.

This object is achieved by the subject matter of independent Claim 1. Advantageous refinements of the solution result from the dependent claims

In one embodiment of the application, a vehicle steering device having a rotatable vehicle steering wheel and at least one fixed display console in the field of vision of the driver is proposed. Control and display means are situated on the display console. A corotating right actuating console and a corotating left actuating console are situated on the vehicle

steering wheel for selecting and operating the control and display means from the vehicle steering wheel

This vehicle steering device has the advantage that the control means on the actuating consoles can be actuated by the driver without visual contact, i.e., blind, so that by means of the operating surfaces, an automobile radio, an automobile navigation device, an automobile telephone or mobile telephone, an Internet access device, a music storage device, or other communication devices are retrievable and controllable.

A further advantage is that the best possible design for the vehicle steering wheel is provided with this vehicle steering device, so that the driver can easily control a plurality of functions from the vehicle steering wheel, so that it is not only possible to turn on the automobile radio, but rather also a broadcaster search, a volume regulation, a speech control, telecommunication connections, etc., can be controlled from the vehicle steering wheel.

For this purpose, no operating levers or switches are to be actuated on the vehicle steering column or on a central console of the vehicle, for which one hand would be removed from the vehicle steering wheel, but rather operating elements of the operating surfaces on the actuating consoles are to be touched or pressed, the actuating consoles being situated toward the driver on the steering wheel. A plurality of the control functions are operable by the thumbs of the hands of a driver from these operating elements in the operating surfaces of the actuating consoles. A greater degree of safety can be achieved by the usage of the vehicle steering device in cooperation with a display console and the actuating consoles directly on the steering wheel, since the driver is no longer extremely distracted from the surrounding street traffic in such a way by typical operating elements on the central console.

It is provided that when one of the operating elements of the operating surfaces is touched, the display console causes function symbols to be marked or illuminated, or acoustically signals which of them are activatable by at least one input button on one of the corotating actuating consoles. For activation, either the operating element itself or a separate input button can be actuated by pressure contact. In addition, it is further provided that inner edges of the actuating consoles have scroll functions, which execute control functions for preselected communication devices upon sliding touching, for example, volume, pitch, or balance controls. Instead of the scroll functions, preselection or

favorite buttons can also be situated in each case below the corotating right and left input buttons, which activate a preselected favorite function in the menu after being pressed.

Fixed directional input buttons can also be situated as preset searches at fixed positions on the operating surfaces and can retrieve individual function symbols in different directions on the display console in the displayed menu. These fixed directional input buttons can have a raised edge and can trigger an audio identification signal or a light signal upon being touched, which signals to the driver that he has selected or touched the correct or the incorrect input button.

Instead of individual directional input buttons for each direction during the selection of the menu symbols, it is also possible in a further embodiment to situate an individual fixed input element on an operating surface in each case, which has a raised polygonal edge. Each edge side of the polygonal edge can trigger one direction of the search in a menu of the display console upon being touched or pressed, while the field within the polygon has the input button, which can be actuated after ending the preselection. In addition, it is also possible to provide a joystick on the operating surface as the single search and input element.

In further embodiments of the vehicle steering device, it is provided that at least two switch elements situated separately from one another are to be actuated simultaneously, in order to turn on gear change functions or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle. This can be implemented in that, in addition to a switch element on the vehicle steering wheel, a foot pedal is to be initiate to cause such critical safety-relevant functions. On the other hand, both switch elements to be actuated simultaneously can also be provided on the steering wheel, which are situated at different locations from one another in such a way that both a left hand and also a right hand of a driver are required simultaneously in order to trigger or initiate a function such as a gear change or a vehicle operation change. This advantageously increases the reliability and the safety of the vehicle operation.

In a further embodiment, a left corotating switch element and a right corotating switch element are provided for this purpose on a lower side of a crossbar of the vehicle steering wheel, which are operable by the left or right hand, respectively, of the driver from the rotatable vehicle steering wheel, and activate gear change functions or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle.

For example, upshifting of the gears can be provided with a right-side switch element and downshifting of the gears can be provided with a left-side switch element. Plus or minus symbols or gear numbers can simultaneously display the shift status on the corotating operating consoles.

Instead of the arrangement of left and right corotating switch elements, which are not visible to the driver, on a lower side of a crossbar of the vehicle steering wheel, the actuating consoles can also serve as the switch elements, in that they are situated so they are pivotable on the vehicle steering wheel and preselect and activate gear change functions or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle, by pivoting the actuating consoles. In order to prevent incorrect operation, simultaneous actuation of two switch elements either on the crossbar or the corotating and pivotable actuating consoles or a foot pedal and one of the switch elements is provided to activate a gear change function or other safety-relevant functions which affect the vehicle operation or driving dynamics of the vehicle, such as speed increase or cruise control functions.

In addition, gear preselect buttons can be situated in each case between the corotating right and left input buttons, in order to trigger a gear change from the steering wheel without visual contact. After pressing on a gear preset button, a gear preset can be retrieved and an automatic gear change can activated when the input buttons of both actuating consoles are pressed jointly. These actions can be triggered from the two ends on the actuating consoles in the form of horns or ears with the aid of the freely movable thumbs, without the driver permitting his field of vision to deviate from the flow of traffic.

Functions which have been heretofore activated blindly by foot pedals can be operated from the steering wheel using the hands, so that the foot well can be designed free of pedal levers. The frequently overloaded central console of a vehicle having its manifold of operating elements and display elements, which are only operable when the head of the driver turns downward and toward the central console, at least one hand being removed from the steering wheel in order to preselect, set, and activate the functions on the central console, can also therefore be dispensed with.

In addition to the possibility of performing the activation of gear changes or other functions relevant to vehicle operation solely through a specific input button arrangement on the actuating consoles blindly and without visual contact by the driver, it is also provided that

function symbols are displayed, for example, on a display console which can be situated by a holding device on the non-rotatable steering column, which retrieve a function when the function symbol is touched, which is activatable by at least one input button on one of the corotating actuating consoles. This display console having function symbols is situated so it is well visible in proximity to the steering wheel, for example, so that the required visual contact by the driver does not impair his attentiveness to the flow of traffic.

A further embodiment additionally provides that the holding device on the steering column has a right-side display console and a left-side display console, the corotating right actuating console of the vehicle steering wheel being associated with the right-side display console and the corotating left actuating console of the vehicle steering wheel being associated with the left-side display console. On the one hand, this increases the number of the possible functions to be activated, on the other hand, it is possible to concentrate the functions which are relevant to vehicle operation and safety on one steering wheel side, and therefore on one display console, and to concentrate communicative function symbols so they are located on the other side of the steering wheel.

In a further embodiment of the application, it is provided that the input buttons are situated as preselect finders or cursors so they are displaceable on the actuating consoles, in order to preselect individual function symbols on the display console by displacing the input button in at least two, or at most four movement directions and to activate the function by pressing at least one of the input buttons upon confirmation by illumination of the preselected function symbol on the display console.

In order to also separate safety-relevant function symbols from communicative function symbols with respect to location, it is provided in a second embodiment of the application that safety-relevant function symbols such as gear change function or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle, such as speed increase or cruise control functions, are selectable on the left display console and are to be activated using at least the left input button or both input buttons, and communicative function symbols such as signal source selection are to be made activatable on the right display console using the right input button.

For this purpose, it is provided that, for example, a GPS street viewing program is displayed audio-visually on the display console upon selection of a GPS function symbol

and activation by means of corotating right input button. In this way, the vision of the driver can remain concentrated on the events of traffic and nonetheless additionally use the right-side display console, which is situated in the surroundings of the steering wheel, for navigation.

In addition, it is provided that a list of radio frequency ranges or radio broadcasters is displayable on the right-side display console upon selection of a radio function symbol and activation by means of corotating right input button, and upon selection of a radio broadcaster on the display console, an audio menu of a selection of playback means such as headsets, earphones, or loudspeakers and a setting of the audio quality with respect to volume, bass or treble amplification or damping, or stereo balance are selectable by means of displacement of the right input button and by pressing the input button.

In addition, it is provided that a selection menu of various TV programs is listed on the right-side display console upon selection of a TV function symbol and activation using corotating right input button and a television program is activatable by selection by means of displacement of the input button and is displayable on the right-side display console. Therefore, the driver can also at least partially follow TV programs on the right-side display console, if desired, but can at least control corresponding display screens in the backrest of the front seats for vehicle occupants on the back seats from the vehicle steering wheel.

During the playback of the television program, further menus can be retrievable and selectable to set the image, sound, or format with respect to brightness, color rendering, contrast, volume, or magnification by means of displacement of the input button and are activatable by pressing the input button. However, an Internet access can also be placed on the right display console in TV programs alone, in order to produce communication with other vehicles and place an advance warning on the right display device in the event of traffic jams and other traffic obstructions, for example.

Furthermore, it is provided that a list of storage contents of a plug-in memory connected via USB is retrievable on the right-side display console upon selection of a USB function symbol and activation by means of corotating right input button and, upon selection of a storage content, it can be played audio-visually on the right display console.

In addition to the selection of a USB function symbol, it is also possible to select and activate a DVD signal source or a CDC memory card by means of corotating right input button on the right-side display console upon selection of a DVD function symbol or a CDC function symbol. Through the activation of the DVD signal source or a CDC memory card, an audio-visual playback of the DVD signal source or a storage space content of the CDC storage card can be incorporated on the display console by further function symbols in the display console.

A SETUP function symbol can thus be selected and activated by means of the corotating right input button, in order to incorporate alternative or additional function symbols with respect to e-mail or MMS or SMS communication or Internet accesses, for example, on the display console. The vehicle steering device thus becomes a central control element and allows the driver, with complete leg freedom, to preselect, search out, and activate all functions, which have heretofore been activated and monitored in the foot well and on the central console, directly from the steering wheel using the associated display consoles.

The subject matter of the application will be explained in greater detail on the basis of the appended figures.

Figure 1 schematically shows a right section of a vehicle steering wheel of a vehicle steering device according to a first embodiment;

Figure 2 schematically shows a right section and a left section of a vehicle steering wheel of a vehicle steering device according to Figure 1;

Figure 3 schematically shows, in Figures 3A, 3B, and 3C, a vehicle steering device having the right section of a vehicle steering wheel according to Figure 1;

Figure 4 schematically shows, in Figures 4A to 4E, the left section of the vehicle steering wheel of the vehicle steering device according to Figure 3 having scroll functional element;

Figure 5 schematically shows a vehicle steering wheel of a vehicle steering device having a joystick as an input element;

Figure 6 schematically shows a vehicle steering wheel of a vehicle steering device having a single polygonal input element;

Figure 7 schematically shows a bottom view of a vehicle steering wheel of a vehicle steering device according to a second embodiment of the application;

Figure 8 schematically shows a top view of a vehicle steering wheel of a vehicle steering device according to Figure 7;

Figure 9 schematically shows a top view of a modified vehicle steering wheel of a vehicle steering device according to Figure 7;

Figure 10 schematically shows a perspective view of a vehicle steering wheel of a vehicle steering device according to a third embodiment of the application;

Figure 11 schematically shows a perspective view of the vehicle steering wheel according to Figure 10 having symbolized hand movement of a driver during activation of a gear change;

Figure 12 schematically shows a vehicle steering wheel of a vehicle steering device according to a fourth embodiment of the application;

Figure 13 schematically shows in detail, in Figures 13A, 13B, 13C, and 13D, a vehicle steering device having a vehicle steering wheel according to Figure 12.

A right section of a vehicle steering wheel 4 of a vehicle steering device 1 is shown in Figure 1. The vehicle steering wheel 4 has a rotatable outer ring 12, which is connected via a crossbar 32 to a corotating steering wheel linkage (not visible in this view) within a non-corotating steering column. A corotating right actuating console 8 having an operating surface 38 for selecting and operating various communication devices of the vehicle is situated on the outer ring 12. The actuating console 8 is in the form of a horn or an ear and is fixed on the right on the outer ring 12 of the vehicle steering wheel 4. The actuating console 8 protrudes into the inner area of the outer ring 12, a rounded, freestanding end 14 being oriented upward.

Directional input buttons 41, 42, 43, and 44 are situated on the operating surface. An input button 16 is situated on the inner edge 34 close to the freestanding end 14 of the actuating console 8, using which a function preselected by the directional input buttons 41, 42, 43, and 44 can be activated from a menu. A driver can actuate both the directional input buttons 41, 42, 43, and 44 of the operating surface 38 and also the input button 16 using his right hand, without removing his right hand from the vehicle steering wheel 4. In addition, the directional input buttons 41, 42, 43, and 44 are provided with raised edges, so that the driver does not have to look away from the street traffic in order to perform a preselection by the directional input buttons 41, 42, 43, and 44 in a menu of a display console. Such a display console (not shown in Figure 1) is situated in the field of vision of the driver. To support the driver, touching the directional input buttons 41, 42, 43, and 44 can be made audible through various audio signals.

A scroll functional element 49 is situated in a lower area of the inner edge 34 of the right actuating console 8. Through sliding touching of the inner edge 34, the driver can actuate the scroll functional element 49 and set, for example, a broadcaster search selection, a volume, a pitch, or other audio properties of an automobile radio.

A top view of the right section and a left section of the vehicle steering wheel 4 according to Figure 1 is shown in Figure 2. Components having the same functions as in a preceding figure are identified by identical reference numerals in the following figures and are not explained separately.

The left section is a mirror image of the right section. The additional left directional input buttons 41, 42, 43, and 44 are situated on a left operating surface 39 of a left actuating console 9. A left input button 17 and a further scroll functional element 49 are situated on the left inner edge 35 of the left actuating console 9. The second operating panel 39 can cooperate with the same display console as the first operating panel 38, or can be connected to a second display console (not shown in Figure 2). The option is connected thereto that further function symbols can be retrieved in the second display console independently of the functions of a first display console.

In Figures 3A, 3B, and 3C, Figure 3 shows a vehicle steering device having the right section of a vehicle steering wheel 4 according to Figure 1 and a display console 6 in the field of vision of the driver. Such a display console 6 can be integrated in the central display area for monitoring the vehicle operation of the vehicle or can be provided as an

independent display. Finally, it is also possible to integrate such a display console 6 in a windshield or to project it on the windshield.

The display console 6 can be operated from the corotating right actuating console 8. Via the directional input buttons 41, 42, 43, and 44, which corotate with the vehicle steering wheel 4, as shown in Figure 3C, function symbols can be selected upward in arrow direction O, downward in arrow direction U, to the right in arrow direction R, and to the left in arrow direction L in the display console 6, which is shown in Figure 3B. The respective function can be activated by pressing the input button 16.

Thus, for example, Figure 3B shows a main menu 33 having twelve different function symbols 13, which are preselectable with the aid of the directional input buttons 41, 42, 43, and 44, for example, and are activatable by pressing the input button 16. For example, a list of possible radio broadcasters can be retrieved by selecting the radio function symbol 26, for example.

Correspondingly, by selecting a TV function symbol 27, a list of television broadcasters can appear on the display console 6. Upon the selection of a GPS function symbol 24, for example, an image of a GPS street viewing program can be displayed on the display console 6. Upon the selection of a USB function symbol 28 or a DVD function symbol 29 or a CDC function symbol 30, for example, a USB or DVD or CDC signal source can be preselected and activated using the input button 16. Upon selection of a SETUP function symbol 31, for example, further function symbols can be incorporated into the main menu 33 shown in Figure 3B, such as an Internet access or other function symbols for signal sources. Alternatively, the selection can also be provided by touching the function symbols on the display console 6, however, this requires that the driver removes at least one hand from the steering wheel 4 and dispenses with the operating comfort which the actuating console 8 offers. In the case of a parking vehicle, such a so-called "touchscreen display console" can be advantageous.

In Figures 4A to 4E, Figure 4 shows the left section of the vehicle steering wheel 4 of the vehicle steering device 1 according to Figure 3 with operation of the scroll functional element 49 on the left inner edge 35 of the actuating console 9 by a left hand 53 of a driver. By sliding up or down with a thumb 54 of his left hand 53 in or opposite to the arrow direction F, as shown in Figures 4C to 4E, it is possible for the driver to select various services from the Internet from the menu of a left display console 7, which is shown in

Figure 4B. The selected service can be retrieved or requested by pressing the left input button 17.

A right section of the vehicle steering wheel 4 having a modified joystick 50 on the operative surface 38 of the vehicle steering device is shown in Figure 5. The joystick 50 can, as shown in Figure 5D, travel as an input element through the menu field of the display console 6 like a cursor in nearly arbitrary direction and select an arbitrary function, which is activatable by pressing the joystick 50. Instead of a scroll functional element, preselect buttons 19, 20, and 21 are provided in this steering wheel 4 on the inner edge 34 of the right actuating console 8, on which favorite functions from the menu of the display console 6 can be placed, so that more rapid access is possible. The display console 6, of which only a section is shown, is situated in this case via a holding device 5 on a non-corotating steering column.

The right section of the vehicle steering wheel 4, as shown in Figure 5, is also shown in Figure 6. However, a single polygonal input element 45 is situated on the operating surface 38 of the right actuating console 8 in place of the joystick. The input element 45 has raised edges. The edges form directional input buttons. By touching or pressing one edge of the polygonal input element 45, a preselection of a function symbol on the display console is performed and the function is activated by pressing the polygonally bounded inner surface of the input element 45. The inner surface of the input element 45 therefore forms the input button 16. Therefore, no input button is required on the inner edge 34, and therefore preselect buttons 19, 20, and 21 can be preprogrammed for favorite functions.

Figure 7 shows a second embodiment of a vehicle steering device 2 of the application in a bottom view of the vehicle steering wheel 4. The vehicle steering wheel 4, which is visible from its lower side 48 and is rotatable in relation to a steering column 57, is situated on the non-corotating steering column 57. In this embodiment, a gear change of a shift transmission or a vehicle operation change of a vehicle having automatic transmission from the vehicle steering wheel 4 is provided. For this purpose, switch elements 46 and 47 are provided, which are actuable from the outer ring 12 of the vehicle steering wheel 4, and are situated on the lower side 48 of the crossbar 32. To switch over gear change functions or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle, it is provided that at least two switch elements separated from one another with respect to location are actuated. This can be performed by actuating the switch elements 46 and 47, which are in the area of the left hand and the right hand of a

driver. On the other hand, a foot pedal can be provided, which is to be actuated in addition to a switch element 46 or 47 of the vehicle steering wheel 4.

On the front side of the vehicle steering wheel 4, as shown in Figure 8, the possibility of gear upshifting by a right switch element 46 situated on the lower side of the crossbar 32 can be marked, in addition to the operating elements 40, by a plus symbol on the right operating surface 38 and by a right gear display 10. The possibility of gear downshifting can be displayed, in addition to the operating elements 40, by a minus symbol on the left operating surface 39 and by a gear display 11.

The possibility of confirming the respective activated gear using the gear displays 10 and 11 on the operating surfaces 38 and 39 is shown in Figure 9. An additional plus or minus symbol can inform the driver which switch element is to be actuated in order to change from the displayed gear to a higher gear or a lower gear with the aid of the switch elements.

Figure 10 shows a vehicle steering wheel 4 of a vehicle steering device 3 according to a third embodiment having actuating consoles 8 and 9 which are pivotable or tiltable around the outer ring 12. The actuating consoles 8 and 9 are additionally used as switch elements 51 and 52 in this embodiment. A pivot movement by a few millimeters in the arrow directions G or H can be used in order to preselect and/or activate gear change functions or other safety-relevant functions which affect the vehicle operation or driving dynamics of the vehicle. The preselection can be performed by actuating one of the two actuating consoles 8 or 9 and the activation can only be triggered by simultaneously actuating both actuating consoles 8 and 9, for the sake of safety. An assignment of the right or left actuating console to upshifting or downshifting can be provided as in the second embodiment. A display of a currently operated gear or vehicle operation in the operating surfaces 38 and 39 can also be performed as in the second embodiment.

As Figure 11 shows, both thumbs 54 and 56 of the left hand 53 or the right hand 55 can be used to pivot or tilt the actuating consoles 8 and 9 in the arrow directions F and H.

Figure 12 shows a vehicle steering wheel 4 of a vehicle steering device 60 according to a fourth embodiment of the application. Three preselection buttons 19, 20, and 21, for example, for preselecting the second, third, and fourth gears of the vehicle, are situated below the input button 16 on an inner edge 34 of the right actuating console 8.

Preselection buttons 18 and 22 are provided on an inner flank 35 of the left actuating console 9 under the input button 17, for example, the first forward gear being preselectable using the button 18 and the reverse gear being preselectable using the button 22. In order to activate the individual gears, it is provided that the driver encloses the actuating consoles 8 and 9 using both hands and actuates both input buttons 16 and 17 together and, simultaneously using both thumbs, activates the preselected gear after preselection of a gear with the aid of one of the preselection buttons 18 to 22. This serves for safety, so that in the event of unintentional actuation of one of the input buttons 16 or 17, a gear change cannot be triggered.

The provision of the first forward gear and the reverse gear on the left side having the gear preselection buttons 18 and 22 has the advantage that during driving maneuvers having multiple changes from the first gear into the reverse gear, it is preselectable using the same hand and therefore a more rapid change from forward travel to reverse travel is possible during parking of the vehicle, for example. Simultaneously, the right preselection buttons 19 to 21 can be electronically locked such that a change into the reverse gear 22 is not activatable from the right buttons.

This vehicle steering device has the advantage that the driver can initiate a gear change from the steering wheel 4, without having to look at the steering wheel 4 itself. In addition, this steering wheel device has the advantage that a shift lever on the central console can be dispensed with, and finally, only an acceleration lever in the form of the gas pedal and a brake lever in the form of the brake pedal remain in the foot well. These functions can also be integrated in such a steering device, as shown in the following figures, so that the foot well of the driver is fully free of pedals.

Figur 13 shows a vehicle steering device 60 according to Figure 12 in detail in Figures 13A, 13B, 13C, and 13D. In this fourth embodiment of the application, a holding device 5, which has a right-side display console 6 and a left-side display console 7, is situated on a non-corotating steering column, which encloses a corotating steering wheel rod of the steering wheel 4. The right-side display console 6 can be operated from the corotating right actuating console 8, while the left-side display console 7 is operable from the corotating left actuating console 9.

With this embodiment of the invention, in addition to a gear preselection with the aid of the gear preselection buttons 19 to 22, as were already described in Figure 12, an input

button 16 or 17 can now be provided on each of the actuating consoles 8 and 9 protruding into the inner area of the outer ring 12 of the steering wheel 4. As shown in Figure 13B, such an input button 16 can be displaced upward in the arrow direction O, downward in the arrow direction U, to the right in the arrow direction R, and to the left in the arrow direction L. Various function symbols 13 can be preselected on the associated right display console 6 with this displacement and the respective function can be activated by pressing the input button 16.

Thus, for example, Figure 13C shows a main menu 33 having 12 different function symbols 13, which are preselectable with the aid of the right input button 16 and are activatable by pressing the input button 16, for example. By the selection of the radio function symbol 26, for example, as shown by the display console 6, a list 36 of preferred radio broadcasters can be listed.

A list of television broadcasters 37 can accordingly appear on the display console 6 by selecting a TV function symbol 27. Upon the selection of the GPS function symbol 24, for example, an image of a GPS street viewing program 25 can be displayed on the display console 6. Upon the selection of a USB function symbol 28 or a DVD function symbol 29 or a CDC function symbol 30, for example, a USB or DVD or CDC signal source can be preselected and activated using the input button 16. Upon selection of a SETUP function symbol 31, for example, further function symbols can be incorporated into the main menu 33 shown in Figure 13C, for example, an Internet access or other function symbols for signal sources. Alternatively, the selection can also be provided by touching the function symbols, however, this requires that the driver removes at least one hand from the steering wheel 4.

Figure 13D shows a detail view of the right operating console 8 on the vehicle steering wheel 4 having the outer ring 12, the right actuating console 8 protruding into the inner ring 12 and having a horn-shaped form having an upwardly directed, rounded, freestanding end 14, an input button 16 displaceable in four directions being situated and further preselection buttons 19 to 21 for the preselection of forward gears being provided on the right actuating console 8, as already explained in Figure 12.

List of reference numerals

1	vehicle steering device (first embodiment)
2	vehicle steering device (second embodiment)
3	vehicle steering device (third embodiment)
4	vehicle steering wheel
5	holding device
6	display console (right)
7	display console (left)
8	actuating console (right)
9	actuating console (left)
10	gear display (right)
11	gear display (left)
12	outer ring
13	function symbol
14	freestanding end (right)
15	freestanding end (left)
16	input button (right)
17	input button (left)
18	preselection button (left)
19	preselection button (right)
20	preselection button (right)
21	preselection button (right)
22	preselection button (left)
24	GPS function ssymbol
25	GPS street viewing program
26	radio function symbol
27	TV function symbol
28	USB function symbol
29	DVD function symbol
30	CDC function symbol
31	SETUP function symbol
32	crossbar
33	main menu

34 inner edge (right)
35 inner edge (left)
36 list of radio programs
37 list of television programs
38 operating surface (right)
39 operating surface (left)
40 operating elements
41 directional input button
42 directional input button
43 directional input button
44 directional input button
45 single input element
46 switch element (lower side)
47 switch element (lower side)
48 lower side of the crossbar
49 scroll functional element
50 joystick
51 switch element (actuating console)
52 switch element (actuating console)
53 left hand
54 left thumb
55 right hand
56 right thumb
57 steering column
60 vehicle steering device (fourth embodiment)

Patent Claims

1. A vehicle steering device having a rotatable vehicle steering wheel (4) having at least one fixed display console (6) in the field of vision of the driver, wherein control and display means are situated on the display console (6), and a corotating right actuating console and a corotating left actuating console (8 and 9) are situated on the vehicle steering wheel (4) for selecting and operating the control and display means from the vehicle steering wheel (4).

2. The vehicle steering device according to Claim 1, wherein the actuating consoles (8, 9) are fixed on an outer ring (12) to the right and left of the vehicle steering wheel (4) and protrude into the inner area of the outer ring (12), the operating consoles (8, 9) having operating surfaces (38, 39) having operating elements (40), which are reachable by hands of the driver from the rotatable vehicle steering wheel (4).

3. The vehicle steering device according to Claim 2, wherein an automobile radio, an automobile navigation device, an automobile telephone or mobile telephone, an Internet access device, a music storage device, or other communication devices are retrievable and controllable by means of the operating surfaces (38, 39).

4. The vehicle steering device according to Claim 2 or Claim 3, wherein, when one of the operating elements (40) is touched, the display console (6) shows function symbols (18), which are activatable by at least one input button (16, 17) on one of the corotating actuating consoles (8, 9).

5. The vehicle steering device according to one of the preceding claims, wherein inner edges (34, 35) of the actuating consoles (8, 9) have scroll functions, which provide control functions for preselected communication devices upon sliding touching.

6. The vehicle steering device according to one of Claims 2 to 5, wherein fixed directional input buttons (41, 42, 43, 44) are situated as preselection searches at

fixed positions on the operating surfaces (38, 39) and retrieve individual function symbols (13) in different directions on the display console (6).

7. The vehicle steering device according to Claim 6, wherein fixed operating elements (40) have a raised edge and trigger an audio identification signal or light signal upon being touched.

8. The vehicle steering device according to Claim 7, wherein a single input element (45) is situated on each operating surface and has a raised polygonal edge, and each edge side of the polygonal edge provides one direction of the search in a menu of the display console (6) upon being touched or pressed.

9. The vehicle steering device according to Claim 7, wherein the one input element situated on an operating surface is a joystick (50).

10. The vehicle steering device according to one of the preceding claims, wherein at least two switch elements (46, 47) situated separately from one another are to be actuated simultaneously in order to turn on gear change functions or other safety-relevant functions which affect the vehicle operation or driving dynamics of the vehicle.

11. The vehicle steering device according to Claim 10, wherein a left and a right corotating switch element (46, 47) are situated on a lower side (48) of a crossbar (32) of the vehicle steering wheel (4), which are operable by the left or right hand, respectively, of the driver from the rotatable vehicle steering wheel (4) and activate gear change functions or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle.

12. The vehicle steering device according to Claim 11, wherein upshifting of the gears is provided with a right-side switch element (46) and downshifting of the gears is provided with a left-side switch element (47), and plus or minus symbols or gear numbers display the shift state on the corotating operating consoles.

13. The vehicle steering device according to Claim 10, wherein the actuating consoles (8, 9) serve as switch elements (51, 52) and are situated so they are pivotable on the vehicle steering wheel (4) and gear change functions or other safety-relevant

functions, which affect the vehicle operation or driving dynamics of the vehicle, are activatable by pivoting the actuating consoles (8, 9).

14. The vehicle steering device according to Claim 10, wherein, for activation of a gear change function or other safety-relevant functions, which affect the vehicle operation or driving dynamics of the vehicle, such as speed increase or cruise control functions, they are activatable by simultaneously actuating two switch elements (46, 47; 51, 52) of the crossbar (32) or the corotating actuating consoles (8, 9).

15. The vehicle steering device according to Claim 10, wherein favorite or preselection buttons (18 to 22), which activate a favorite function preselected in the menu after pressing one of the favorite or preselection buttons (18 to 22), are situated in each case below the corotating right and left input buttons (16, 17).

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Claims searched: 1-15 **Date of search:** 25 November 2011

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
X	1-3	US2010/0188343 A1 (BACH) whole document relevant
X	1-3	US2006/0079372 A1 (RINGGER) whole document relevant
X	1, 2	JP2006111047 A (YANMAR) esp WPI abstract 2006-301795 [32]
X	1, 2	DE19941947 A1 (VOLKSWAGEN) esp WPI abstract 2001-258915 [27] & fig 1
X	1, 2	JP2010105609 A (TOKAI) esp figs 1 & 2 & WPI abstract 2010-F10732 [33]
X	1	US2007/0193814 A1 (DUPONT) esp fig 1 & abstract
X	1	WO2008/014880 A1 (DAIMLER) esp figs 1, 2, 4, 5
X	1	EP2374690 A1 (AKKA) esp figs 1 & 2 & para 19
X	1	JP08238951 A (HITACHI) esp fig 2 & WPI abstract 1991-141437 [20]

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B60K; B62D; F16H

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

Online: EPODOC & WPI

International Classification:

Subclass	Subgroup	Valid From
B62D	0001/04	01/01/2006
B60K	0035/00	01/01/2006
B60K	0020/06	01/01/2006