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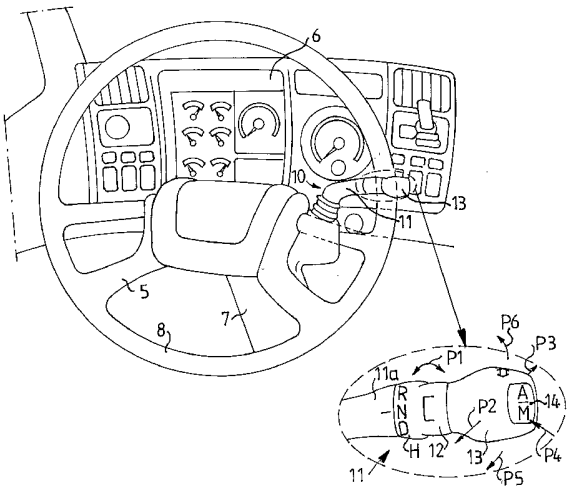
(54) **Title:** A CONTROL DEVICE FOR A SEMI-AUTOMATIC GEARBOX TO BE USED IN A VEHICLE AND AN ARRANGEMENT IN A VEHICLE COMPRISING SUCH A CONTROL DEVICE



(57) **Abstract:** The invention relates to a control device for operating a semiautomatic gearbox of a vehicle, which control device comprises a control means (12; 50) which can be moved step by step by rotary or linear movement between at least two fixed setting positions in order to set various gear change modes, whereby said fixed setting positions comprise a first fixed setting position (D) for setting a first gear change mode, and a second fixed setting position (N) for setting a second gear change mode. The control means (12; 50) can be moved from a first fixed setting position (D) to a springback setting position (H) for setting a further gear change mode, whereby the control means (12; 50) is arranged to spring back to the first fixed setting position (D) when it has been moved to the springback setting position (H) from the first fixed setting position. The invention also relates to an arrangement comprising such a control device.

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Control device

FIELD OF THE INVENTION AND STATE OF THE ART

The present invention relates to a control device according to the preamble of claim 1 and an arrangement comprising such a control device.

In vehicle technology it is usual, particularly in the case of heavy motor vehicles such as trucks, tractor units and buses, to try to facilitate the driver's work by reducing and simplifying the amount of work involved in changing gear. This may be achieved both by indirect operation of the vehicle's gearbox, whereby the driver operates a control device to cause the control device to emit signals which control gear changing, and by using a control unit which on the basis of current driving conditions, such as vehicle speed, power applied, gear engaged and engine speed, is capable of automatically selecting and engaging appropriate gears. A semiautomatic gearbox of this type is described in patent specification SE 462 246 B. Said document also describes a control device for such a semiautomatic gearbox.

The expression "semiautomatic gearbox" in this description and the attached claims means a gearbox which via a control unit can be set by means of a control device whereby the vehicle driver can, at will, effect gear changing manually by operating the control device or cause the control unit to effect gear changing automatically.

Many heavy motor vehicles are equipped with a hydraulic auxiliary brake, a so-called retarder, which is connected to the vehicle's gearbox. A retarder comprises two vanes arranged in a housing, whereby one of the vanes is fixed and the other rotates at a speed proportional to the vehicle's speed. Pumping hydraulic oil into the confined space between the vanes causes a resistance to rotation, resulting in braking torque on

the vehicle's driveshafts. The retarder's braking effect is regulated by the driver by means of a control lever which in certain applications may be drawn step by step towards the driver, whereby the braking effect increases the closer the control lever is drawn towards the driver.

From patent specification SE 514 131 C2, various types of control device are previously known by means of which a vehicle driver can control both a semiautomatic gearbox and a auxiliary brake in the form of a so-called retarder. The majority of the control devices described in SE 514 131 C2 are provided with a control means which can be moved step by step by rotary or linear movement between three fixed setting positions in order to set various gear change modes, whereby said setting positions successively comprise a setting position for setting a gear change mode for driving ("Drive"), a setting position for setting a neutral position of the gearbox ("Neutral") and a setting position for setting a gear change mode for reversing ("Reverse").

OBJECT OF THE INVENTION

The object of the present invention is to provide a further development of a control device of the type indicated above in order to make it easier for a driver to operate it.

SUMMARY OF THE INVENTION

According to the invention, said object is achieved by means of a control device exhibiting the features indicated in claim 1.

The control device according to the invention is intended for operating a semiautomatic gearbox of a vehicle and comprises a control means which can be moved step by step by rotary or linear movement between at least two fixed setting positions for setting various gear change modes, whereby said fixed setting positions comprise a first fixed setting position for setting a first gear change mode and a second fixed setting position for setting a second gear change mode. With the solution

according to the invention, the control means can be moved from a first fixed setting position to a springback setting position for setting a further gear change mode, whereby the control means is adapted to springing back to the first fixed setting position when it has been moved to the springback setting position from the first fixed setting position. It is likely to be significantly easier for the vehicle driver to associate said further gear change mode, which may for example be a gear change mode for driving uphill ("Hill"), with a springback function than with a particular direction of rotary or linear movement. When the control means is in the first fixed setting position, which is preferably a setting position for setting a gear change mode for driving in normal conditions ("Drive"), and the driver intends, for example, to set the gear change mode associated with the second fixed setting position, which gear change mode is preferably the gear change mode for neutral position ("Neutral"), the driver will feel the springing back between the first fixed setting position and the springback setting position if he/she applies rotary or linear movement to the control means in the wrong direction. Due to the springback function between the first fixed setting position and the springback setting position the driver thus is provided with a direct indication as to whether he/she has applied rotary or linear movement to the control means in a correct or incorrect direction from the first fixed setting position when shifting from the gear change mode associated with the first fixed setting position to a desired gear change mode associated with an adjacent setting position of the control means.

According to a preferred embodiment of the invention, the control means can also be moved from the second fixed setting position to a third fixed setting position which is for setting a gear change mode for reversing ("Reverse"), whereby the second fixed setting position is a setting position for setting a gear change mode for neutral position of the gearbox ("Neutral").

According to another preferred embodiment of the invention, the control means can be moved from the first fixed setting position to the springback setting position in order to set a gear change mode for driving uphill ("Hill"), whereby the first fixed setting

position is a setting position for setting a gear change mode for driving in normal conditions ("Drive").

According to another preferred embodiment of the invention, the control means can be moved from the first fixed setting position to the springback setting position in order to set a gear change mode selected from among a plurality of further settable gear change modes, whereby the gear change mode thus set depends on the number of repeat movements from the first fixed setting position to the springback setting position. It thus becomes easy to use the control means for setting any desired number of gear change modes.

According to another preferred embodiment of the invention, the control device is also designed to operate a auxiliary brake. This makes it possible for the driver to control both the gearbox and the auxiliary brake with the same control device, thereby facilitating the driver's work. Using the same control device for both gear changing and braking also saves space as compared with a conventional solution with two different control devices for these functions.

Other preferred embodiments of the control device according to the invention are indicated by the dependent claims and the description set out below.

The invention also relates to an arrangement exhibiting the features indicated in claim 16 and an arrangement exhibiting the features indicated in claim 17.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described below in more detail by means of examples of embodiments with reference to the attached drawings. It is shown in:

Fig. 1 a schematic perspective view of part of a driver's cab in a heavy motor vehicle with a control device according to a first embodiment of the

invention fitted to the vehicle's steering column, with an inset showing an enlargement of the outer portion of the control device.

Fig. 2 a schematic perspective view of part of a control device according to a second embodiment of the invention,

Fig. 3 a schematic perspective view of part of a control device according to a third embodiment of the invention,

Fig. 4 a schematic perspective view of part of a control device according to a fourth embodiment of the invention,

Fig. 5 a schematic perspective view of part of a control device according to a fifth embodiment of the invention,

Fig. 6 a schematic illustration of the possible settings of the rotatable control means of the control device according to Figs. 1-4,

Fig. 7 a schematic illustration of the possible settings of the control means movable in a linear manner of the control device according to Fig. 5, and

Fig. 8 a schematic block diagram illustrating an arrangement according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The control device 10 according to the invention is designed for operating a semiautomatic gearbox 1 (indicated schematically in Fig. 8) of a vehicle such as a truck, a tractor unit for semitrailers or a bus. The semiautomatic gearbox is in principle a manual gearbox provided with a number of servos which effect the engagement and disengagement of gears in response to control signals from a control

unit 2 connected to the gearbox. The control unit 2 may be provided by various sensors with information about current driving conditions and can on the basis thereof calculate in a manner known per se the gear to be applied. One sensor may provide information about current engine load. Further sensors may provide the control unit 2 with information as to, for example, which gear is engaged or about current engine speed or vehicle speed. Other parameters may of course also be detected by means of suitable sensors. The control device 10 is connected to the control unit 2 and the vehicle's driver can use the control device to cause the control unit to set the gearbox as desired. To make this possible, the control device 10 is provided with suitable sensors which detect the driver's movements of the control device and emit on the basis thereof control signals to the control unit 2.

In the control unit 2, gear change modes for various types of driving conditions are preprogrammed and the control device 10 can be used to set the control unit 2 to control the gearbox 1 in accordance with desired gear change modes. Said gear change modes comprise inter alia a gear change mode for driving in normal conditions, which gear change mode is hereinafter called "Drive", a gear change mode for neutral position of the gearbox, which gear change mode is hereinafter called "Neutral", and a gear change mode for reversing, which gear change mode is hereinafter called "Reverse". Said gear change modes may also comprise one or more further gear change modes for other types of driving conditions, e.g. a gear change mode for driving uphill, which gear change mode is hereinafter called "Hill". The driver can also use the control device 10 to shift between a gear change mode for manual upward and downward gear changing, which gear change mode is hereinafter called "Manual", and a gear change mode for automatic upward and downward gear changing, which gear change mode is hereinafter called "Automatic". When the control unit 2 is on Manual, upward and downward gear changing, i.e. gear selection, is controlled by the driver via the control device 10, and when the control unit 2 is on Automatic, upward and downward gear changing (gear selection) is controlled automatically by the control unit.

The control device 10 according to the invention is preferably also designed for operating a auxiliary brake 3 (indicated schematically in Fig. 8) in the form of a retarder of the respective vehicle, whereby the control device can be used to control the auxiliary brake in order to regulate the latter's braking effect. In such cases, the control device 10 is with advantage connected to the auxiliary brake 3 via a control unit 4, whereby the vehicle's driver can use the control device to cause the control unit 4 to regulate the auxiliary brake in order to provide a desired braking effect. To make this possible, the control device 10 is provided with suitable sensors which detect the driver's movements of the control device and emit on the basis thereof control signals to the control unit 4.

As will be exemplified in more detail below, the control device 10 comprises a control means 12, 50 which can be moved step by step by rotary or linear movement between at least three successive setting positions for setting various gear change modes, whereby said setting positions comprise a first fixed setting position for setting a first gear change mode, a second fixed setting position for setting a second gear change mode and a springback setting position for setting one or more further gear change modes. From the first fixed setting position, the control means can either be moved in one direction to the second fixed setting position or in the opposite direction to the springback setting position, whereby the control means is adapted to springing back to the first fixed setting position when it is been moved to the springback setting position from the first fixed setting position. Said three setting positions do not lock, so there is no locking function to be cancelled to allow movement between these setting positions.

Fig. 1 illustrates part of the driver's location in the cab of a heavy motor vehicle such as a truck or a tractor unit for semitrailers. It shows inter alia the vehicle's steering wheel 5 and instrument panel 6. The steering wheel 5 is mounted on a steering column 7. A control device 10 according to the present invention is also mounted on the steering column. The control device 10 comprises a lever 11 which is with advantage situated in the region close to the vehicle's steering wheel 5 in such a way that the lever 11 can be operated by the vehicle's driver without having to alter his/her driving

position and preferably without having to let go of the steering wheel. Other locations for the control device 10 are also conceivable, e.g. on the engine tunnel or the instrument panel. In the embodiment illustrated in Fig. 1, the control device's lever 11 is fitted in the steering column 7 and the control device comprises in this example a control means 12 mounted for rotation on the outer portion of the lever in order to set various gear change modes of a control unit of the type described above which is connected to a semiautomatic gearbox. In this case the control means 12 can be operated step by step by rotation in the directions indicated by arrow P1 preferably about the centreline of the lever, forwards and rearwards between four different mutually successive setting positions. These setting positions comprise successively a springback setting position H for setting, for example, Hill, a first fixed setting position D for setting Drive, a second fixed setting position N for setting Neutral and a third fixed setting position R for setting Reverse. From setting position D, the control means 12 can be rotated forwards one step to setting position H and rearwards one step to setting position N, whereby the control means 12 is adapted to springing back, under the action of a spring mechanism, to setting position D when it has been rotated from setting position D to setting position H. From setting position N, the control means 12 can be rotated forwards one step to setting position D and rearwards one step to setting position R. Setting position R locks, but the other setting positions N, D, H do not lock. This means that a locking function has to be cancelled in order to rotate the control means 12 from setting position N to setting position R, whereas there is no locking function to be cancelled in order to move between the other setting positions N, D, H. Said locking function is for example so designed that the control means 12 has to be moved in its axial direction, with advantage inwards, before it can be rotated from setting position N to setting position R.

Shifting between the Reverse, Neutral and Drive gear change modes is effected quite simply by the driver rotating the control means 12 to whichever of the fixed setting positions R, N and D represents the desired gear change mode, whereby the control means 12 stops in that setting position. Shifting from Drive gear change mode to Hill gear change mode is effected by the driver rotating the control means 12 from setting position D to setting position H, whereby the control means springs back to setting

position D and stops there. Shifting from Hill gear change mode to Drive gear change mode is effected by the driver rotating the control means 12 from setting position D to setting position H, whereby the control means springs back to setting position D and stops there. Shifting from Hill gear change mode to Neutral gear change mode is effected by the driver rotating the control means 12 from setting position D to setting position N, whereby the control means stops in setting position N. In addition, the control unit 2 is with advantage adapted to responding to rotation of the control means 12 from setting position N to setting position H, which entails passing through setting position D, by shifting from Neutral gear change mode to Drive gear change mode. In this latter case the control means will spring back from setting position H to setting position D and stop there. Fig. 6 illustrates schematically how the control means 12 can be rotated between the three fixed setting positions R, N, D and the springback setting position H.

The gear change modes available for selection may be marked by letters on the control means 12, and an adjacent non-rotatable portion 11a of the lever 11 is with advantage provided with a mark in the form of, for example, a line or dot situated centrally to the letter corresponding to the selected gear change mode, as illustrated in Fig. 1. Alternatively, said letters may be situated on the non-rotatable portion 11a of the lever and said mark may be situated on the control means 12. The letter indicating the gear change mode selected is with advantage shown on a display on the instrument panel 6 together with other information concerning gear changing, e.g. gear engaged, next gear etc.

With advantage, the control means 12 can be moved from the first fixed setting position D to the springback setting position H in order to set a gear change mode selected from among a plurality of settable gear change modes, whereby the gear change mode thus set depends on the number of repeat movements from the first fixed setting position D to the springback setting position H. The number of repeat movements of the control means from the first fixed setting position D to the springback setting position H has of course to be subject to some predetermined conditions, e.g. that the repeat movements take place with a certain maximum time

interval between two mutually successive movements or that the repeat movements take place within a predetermined period of time from the initial movement.

With advantage, the lever 11 or a portion of it is switchable, with springback, from a neutral position in two substantially opposite directions for upward and downward gear changing respectively. In the embodiment illustrated in Fig. 1, upward and downward gear changing are respectively effected by the driver moving the lever's end portion 13 upwards towards the steering wheel in the direction indicated by arrow P2 or downwards away from the steering wheel in the direction indicated by arrow P3. The upward and downward gear change function is designed to spring back so that the lever's end portion 13 always returns to its original neutral position after a gear change. Gear changing can be effected irrespective of which gear change mode is selected.

The lever 11 is with advantage also provided with a control means 14, preferably in the form of a push-button as illustrated in Fig. 1, for setting Manual or Automatic upward and downward gear changing. In the embodiment illustrated in Fig. 1, shifting between Manual and Automatic is effected by pressing the push-button 14, as represented by arrow P4.

The control device 10 is preferably also designed for operating a auxiliary brake in a form of a retarder. Setting a desired braking effect of the auxiliary brake is with advantage effected by linear movement of the control device's lever 11 or a portion of it. In the embodiment illustrated in Fig. 1, the lever 11, or alternatively its outer portion 13, can be moved substantially along the steering wheel rim 8 between various linear positions in order to set desired braking effects of the auxiliary brake. The linear movement is with advantage adapted to taking place step by step between a number of fixed positions. With advantage, the braking effect increases gradually the further the lever 11, or its outer portion 13, is moved in a clockwise direction (indicated by arrow P5) along the steering wheel rim 8, whereas the braking effect gradually decreases as the lever 11 or its outer portion 13, is moved in an anticlockwise direction (indicated by arrow P6) along the steering wheel rim 8. In this case the zero position for the

auxiliary brake is situated furthest anticlockwise with regard to linear movability along the steering wheel rim. The auxiliary brake is switched off when the lever 11, or its outer portion 13, is right up in the zero position. Lever movements other than those described above are of course also conceivable for operating the auxiliary brake.

Figs. 2-4 depict other alternative embodiments of a control device 10 according to the present invention, which, like the control device according to Fig. 1, comprise a lever 11 and a control means 12 adapted to rotation on the lever in order to set various gear change modes, e.g. Hill, Drive, Neutral and Reverse. In these embodiments, this control means 12 can be rotated step by step in the manner described above with regard to the corresponding control means 12 of the embodiment according to Fig. 1. In the embodiments according to Figs. 2-4, the lever 11, or its outer portion, can also be moved in a linear manner between different linear positions in order to set desired braking effects of the auxiliary brake in the manner described above with regard to the corresponding lever of the embodiment according to Fig. 1, i.e. in the directions indicated by arrows P5 and P6.

The control device 10 according to Fig. 2 comprises a further control means 20 arranged for rotation at the outer end of the lever 11. In this embodiment, upward and downward gear changing are effected by rotating the control means 20 which may either be rotatable, with springback, from a neutral position in two opposite directions, indicated by arrow P7, or be rotatable between respective fixed setting positions for upward and downward gear changing. Upward gear changing is effected by rotation of the control means 20 in one direction, preferably rearwards towards the driver, and downward gear changing by rotation of the control means 20 in the opposite direction. Each revolution of the control means 20 causes a gear change of one step.

The control device 10 according to Fig. 3 comprises a control means 30 in the form of a springback toggle switch arranged on the lever 11. The toggle switch 30 is pivotable, with springback, from a neutral position in two opposite directions indicated by arrow P8. In this embodiment, upward gear changing is effected by the toggle switch 30 being moved in one direction, preferably rearwards towards the driver, and

downward gear changing by the toggle switch 30 being moved in the opposite direction. As in the embodiment according to Fig. 1, the lever 11 is here provided with a control means 14 in the form of a push-button at the outer end of the lever, for setting Manual or Automatic upward and downward gear changing. In the embodiment illustrated in Fig. 3, shifting between Manual and Automatic is effected by pressing the push-button 14, as represented by arrow P4.

The control means 10 according to Fig. 4 comprises two springback push-buttons 41, 42 arranged on mutually opposite sides of the lever 11. In this embodiment, upward gear changing is effected by pressing in one of the push-buttons, e.g. by pressing the push-button 41 in the direction indicated by arrow P9, and downward gear changing by pressing in the other push-button, e.g. by pressing the push-button 42 in the direction indicated by arrow P10. In this case the lever 11 is angled, preferably in such a way that its outer end protrudes outside the steering wheel rim, making it easier for the driver to reach the lever.

Fig. 5 depicts an alternative embodiment of a control device 10 according to the present invention, which, like the control device according to Fig. 1, comprises a lever 11 and a control means 50 arranged on the lever, for setting various gear change modes, e.g. Hill, Drive, Neutral and Reverse. In this embodiment the control means 50 is mounted for linear movement on the lever 11 and takes the form of a slide-button. This control means 50 can be moved step by step in a linear manner in the directions indicated by arrow P11 in order to set desired gear change modes. Fig. 7 illustrates schematically how this control means 50 can be moved between three fixed setting positions, R, N, D and a springback setting position H in a manner corresponding to that described above with regard to the rotatable control means 12 of the embodiment according to Fig. 1. In the embodiment according to Fig. 5, the lever can be moved, with spring back, from a neutral position in opposite directions, indicated by arrow P12 and P13, substantially perpendicular to the vehicle's steering wheel, i.e. upwards towards the steering wheel in the direction indicated by arrow P12 and downwards away from the steering wheel in the direction indicated by arrow P13. Upward gear changing is effected by the lever 11 being moved in one of these directions, preferably

upwards towards the vehicle's steering wheel in the direction indicated by arrow P12, and downward gear changing by the lever being moved in the opposite direction. In the embodiment according to Fig. 5, the lever 11 or its outer portion is also movable in a linear manner between various linear positions in order to set desired braking effects of the auxiliary brake in the manner described above with regard to the corresponding lever of the embodiment according to Fig. 1, i.e. in the directions indicated by arrows P5 and P6.

The control device 10 according to Figs. 2, 4 and 5 is of course also with advantage provided with a control means for setting manual or automatic upward and downward gear changing, although no such control means is therein depicted.

The control device 10 according to the invention might with advantage be provided with a control means, e.g. in the form of a electric switch or a push-button, in order in a conventional manner to set a position for automatic connection of the auxiliary brake and so-called constant speed braking upon activation of the brake pedal.

According to an alternative embodiment, the control device comprises a lever 11 which can be moved in a linear manner in two opposite directions in order to set various gear change modes, e.g. Hill, Drive, Neutral and Reverse. In this case the control means 12 described above takes the form of the control device's lever, which means that this lever might be movable in a linear manner between three fixed setting positions R, N and D and a springback setting position H in the manner illustrated in Fig. 7 and in accordance with what is described above with regard to the control means 12, 50 of the embodiments according to Figs. 1-5.

The invention is of course no way limited to the preferred embodiments described above, since a multiplicity of possible modifications thereof are likely to be obvious to a specialist in the field, without having thereby to deviate from the basic concept of the invention as defined in the attached claims. For example, the number of setting positions of the control means 12, 50 and their mutual sequencing may be varied as necessary.

CLAIMS

1. A control device for operating a semiautomatic gearbox of a vehicle, which control device comprises a control means (12; 50) which can be moved step by step by rotary or linear movement between at least two fixed setting positions in order to set various gear change modes, whereby said fixed setting positions comprise a first fixed setting position (D) for setting a first gear change mode, and a second fixed setting position (N) for setting a second gear change mode, **characterised** in that the control means (12; 50) can be moved from the first fixed setting position (D) to a springback setting position (H) for setting a further gear change mode, whereby the control means (12; 50) is arranged to spring back to the first fixed setting position (D) when it has been moved to the springback setting position (H) from the first fixed setting position.

2. A control device according to claim 1, **characterised** in that said second fixed setting position (N) constitutes a setting position for setting a gear change mode for neutral position of the gearbox.

3. A control device according to claim 2, **characterised** in that the control means (12; 50) can also be moved from the second fixed setting position (N) to a third fixed setting position (R) which constitutes a setting position for setting a gear change mode for reversing.

4. A control device according to any one of claims 1-3, **characterised** in that said first fixed setting position (D) constitutes a setting position for setting a gear change mode for driving in normal conditions.

5. A control device according to claim 4, **characterised** in that the control means (12; 50) can be moved from the first fixed setting position (D) to the springback setting position (H) for setting a gear change mode for driving uphill.

6. A control device according to any one of claims 1-5, **characterised** in that the control means (12; 50) can be moved from the first fixed setting position (D) to the springback setting position (H) for setting a gear change mode selected from among a plurality of further settable gear change modes, whereby the gear change mode thus set depends on the number of repeat movements from the first fixed setting position (D) to the springback setting position (H).

7. A control device according to any one of claims 1-6, **characterised** in that the control device (10) comprises a lever (11) and that the control means (12, 50) is mounted for movement on said lever (11).

8. A control device according to claim 7, **characterised** in that the control means (12) is mounted for rotation on the lever (11), whereby the control means (12) can be rotated step by step between said setting positions (R, N, D, H), preferably about the centreline of the lever.

9. A control device according to claim 7, **characterised** in that the control means (50) is mounted for linear movement on the lever (11), whereby the control means (50) can be moved step by step in a linear manner between said setting positions (R, N, D, H), preferably in the longitudinal direction of the lever.

10. A control device according to any one of claims 7-9, **characterised** in that the lever (11) or a portion (13; 30) of the lever is switchable, with springback, from a neutral position in two substantially opposite directions for upward and downward gear changing respectively.

11. A control device according to any one of claims 7-10, **characterised** in that the lever (11) is provided with a control means (14), preferably in the form of a push-button, for setting manual or automatic upward and downward gear changing.

12. A control device according to any one of claims 7-11, **characterised** in that the lever (11) is situated in the region near the vehicle's steering wheel so that the

lever (11) can be operated by the vehicle's driver without having to alter his/her driving position and preferably without having to let go of the steering wheel.

13. A control device according to any one of claims 1-12, **characterised** in that the control device (10) is also designed for operating a auxiliary brake.

14. A control device according to claim 13 in combination with any one of claims 7-12, **characterised** in that the lever (11) or a portion of it is movable in order to operate the auxiliary brake.

15. A control device according to claim 14, **characterised** in that the lever (11) or a portion of it can be moved in a linear manner substantially along the rim of the vehicle's steering wheel between various linear positions in order to set desired braking effects of the auxiliary brake.

16. An arrangement of a vehicle, which arrangement comprises a semiautomatic gearbox (1) and a control unit (2) connected to the gearbox, whereby the control unit can be used to control the gearbox in accordance with various gear change modes, **characterised** in that the arrangement further comprises a control device (10) according to any one of claims 1-15 which is connected to the control unit (2), whereby the control unit (2) by means of the control device (10) can be set to control the gearbox in accordance with a desired gear change mode.

17. An arrangement of a vehicle, which arrangement comprises a semiautomatic gearbox (1) and a control unit (2) connected to the gearbox, and a auxiliary brake (3) whereby the gearbox can be controlled in accordance with various gear change modes by means of the control unit, **characterised** in that the arrangement further comprises a control device (10) according to any one of claims 13-15 which is connected to the control unit (2) and to the auxiliary brake, whereby the control unit (2) by means of the control device (10) can be set to control the gearbox in accordance with desired gear change modes, and

the auxiliary brake (3) is controlled by means of the control device (10) in order to regulate the braking effect of the auxiliary brake.

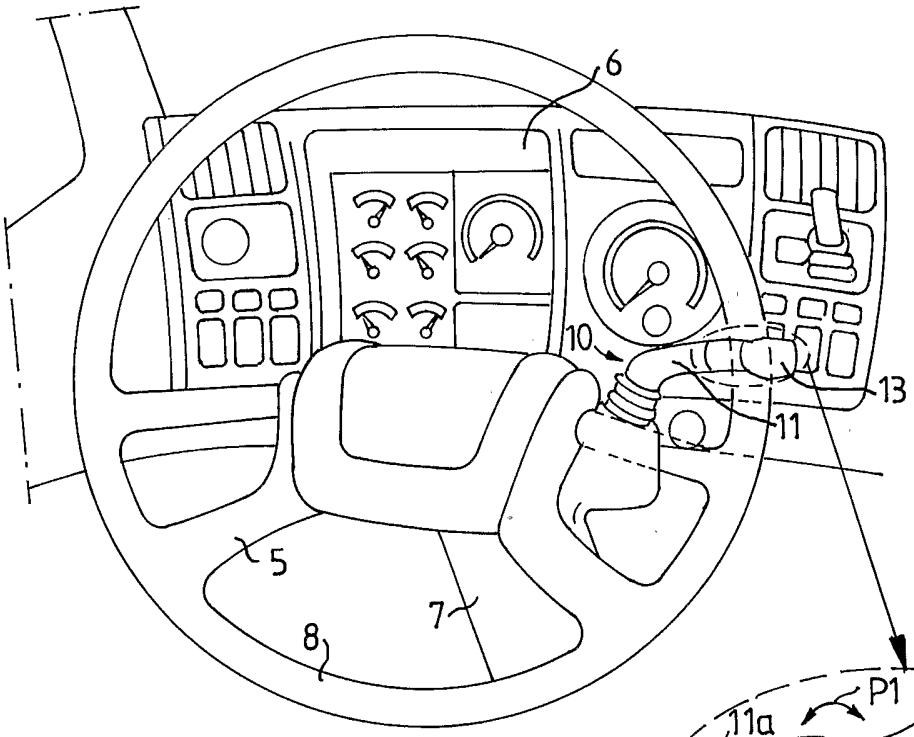
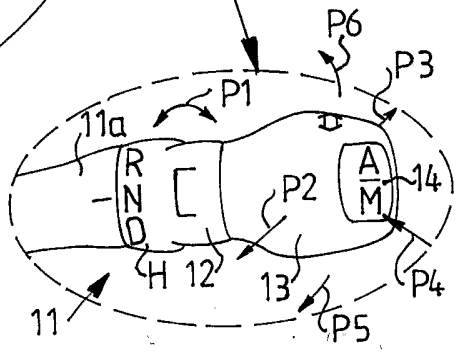


FIG. 1



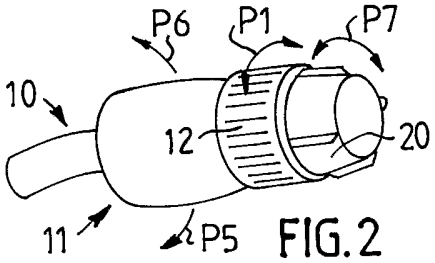


FIG. 2

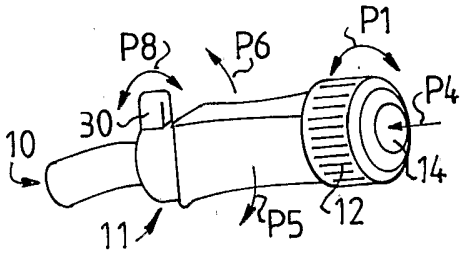


FIG. 3

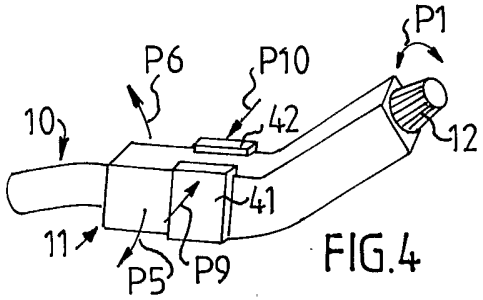


FIG. 4

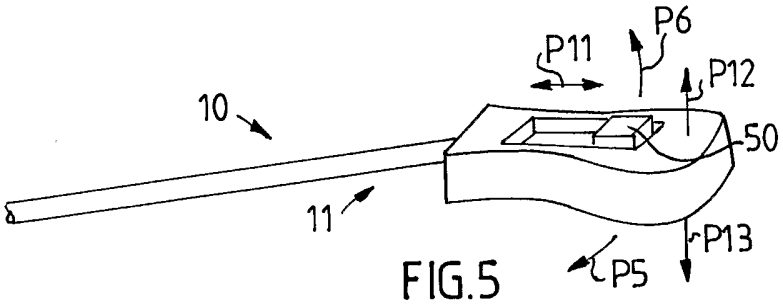


FIG.5

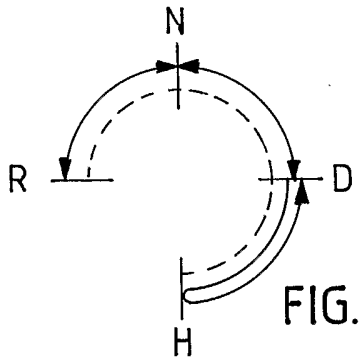


FIG.6

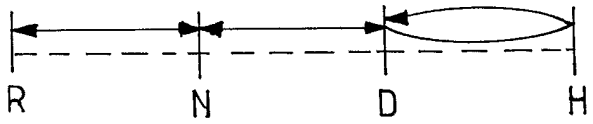


FIG.7

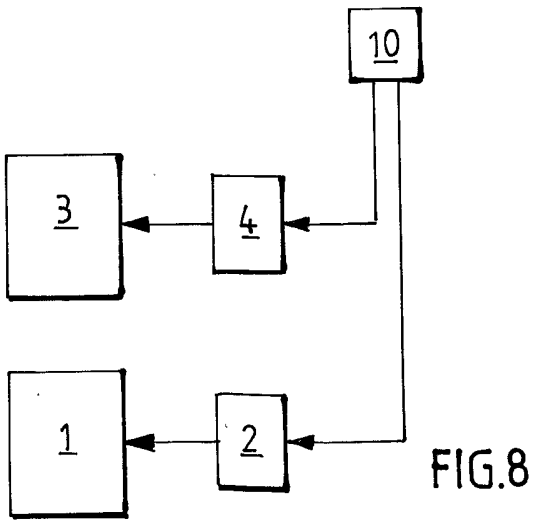


FIG.8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2006/000149

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G05G, B60K, B60T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SE 462246 B (SAAB-SCANIA AB), 21 May 1990 (21.05.1990), whole document	1-4,6,16
Y	--	5,7-15,17
Y	SE 514131 C2 (SCANIA CV AB), 8 January 2001 (08.01.2001), whole document	5,7-15,17
	--	
A	WO 02078995 A1 (KONGSBERG AUTOMOTIVE AB ET AL), 10 October 2002 (10.10.2002), whole document	
	--	
A	FR 2792085 A1 (RENAULT), 13 October 2000 (13.10.2000), whole document	
	--	

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Date of the actual completion of the international search	Date of mailing of the international search report
15 May 2006	16-05-2006
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Leif Vingård / JA A Telephone No. +46 8 782 25 00

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International patent classification (IPC)

G05G 5/05 (2006.01)
G05G 1/02 (2006.01)
G05G 1/04 (2006.01)
G05G 9/06 (2006.01)
G05G 9/08 (2006.01)
B60K 20/02 (2006.01)
B60K 20/06 (2006.01)
B60T 7/10 (2006.01)

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Cited literature, if any, will be enclosed in paper form.

SE	462246	B	21/05/1990	BR	8907119	A	05/02/1991
				GB	2237852	A,B	15/05/1991
				GB	9013768	D	00/00/0000
				SE	8803674	A	14/10/1988
				WO	9004225	A	19/04/1990
SE	514131	C2	08/01/2001	AT	263689	T	15/04/2004
				BR	0016512	A	17/09/2002
				DE	60009749	D,T	28/04/2005
				EP	1246732	A,B	09/10/2002
				JP	2003518464	T	10/06/2003
				SE	9904751	A	08/01/2001
				US	6945349	B	20/09/2005
				US	20030000763	A	02/01/2003
				WO	0147738	A	05/07/2001
WO	02078995	A1	10/10/2002	AT	279749	T	15/10/2004
				AU	6091601	A	11/12/2001
				BR	0110766	A	11/02/2003
				DE	60106449	D,T	14/04/2005
				EP	1297426	A,B	02/04/2003
				EP	1373004	A	02/01/2004
				PL	359134	A	23/08/2004
				SE	520258	C	17/06/2003
				SE	0101123	A	30/09/2002
				US	7017861	B	28/03/2006
FR	2792085	A1	13/10/2000	NONE			