

mation which is based on vibrations easily has vibrations of the vehicle superimposed on it in the driving mode and as a result under certain circumstances increased attentiveness is necessary to detect these vibrations satisfactorily so that feedback of this type is not sufficient for reliable and convenient operator control.

#### SUMMARY

[0010] An example embodiment of the present invention may provide an operator control device which may permit both selecting inputs and the inputting of handwritten characters for the purpose of controlling systems in a vehicle, and which may be reliably operated in the driving mode.

[0011] The operator control device for controlling systems in a motor vehicle may include a touch-sensitive operator control panel on which a user may select inputs from a selection of menu items which correspond to particular zones on the touch-sensitive operator control panel, or on which he may make hand-written inputs in a different operating state of the operator control panel. The operator control panel may be configured such that its surface may, on the one hand, be structured such that it may be sensed in a tactile fashion for the selection of menu items, and on the other hand, the surface may be smoothed such that the operator control panel may also be used for handwritten inputs despite the possibility of structuring it.

[0012] For all application cases in which the operator control of systems in a motor vehicle or its functions is to be carried out by a graphic or handwritten input, the surface of the operator control device is operated in a planar state. In order to control the functions by selection operations, the surface is contoured in a manner which may be sensed in a tactile fashion. The operator control panel may therefore be configured in a plastic or flat fashion irrespective of whether the selection of menu items or handwritten inputs is more favorable for the operator control of a function. In this context, the selectable zones of the structured surface may be varied, depending on the operator control process, in extent, shape and position, so that the structure which may be sensed in a tactile fashion may be adapted to the requirements of the respective operator control situation. This means, for example, that only the required number of selectable zones are represented in a plastic fashion, and that the individual zones which may be structured in a manner which may be sensed may be localized in an ergonomically favorable fashion according to the available space and may be represented with different sizes of extent or shape.

[0013] The regions of the operator control panel which become selectable zones for a specific operator control process are structured in a manner which may be sensed in a tactile fashion by an actuator system. In order to be able to generate selectable zones, which are different in shape, extent and position, the actuator system which is structured as individual elements may be used. The elements of the actuator system are, depending on the desired embodiment of the operator control panel, capable of being actuated in different groupings or at different locations of the operator control panel, as a result of which the division of the surface of the operator control panel which may be structured in a fashion which may be sensed is implemented in a variable fashion. The degree of variability in the division of the surface is dependent on the structure and the delicate nature

of the elements which implement the actuator system. Given a correspondingly suitable arrangement and division of these elements, it is possible to generate a large number of different divisions by combinations of only a small number of actuator elements.

[0014] If the functional assignment of the touch-sensitive operator control panel is freely programmable, selectable zones with the desired functionalities may be allocated to the areas which have been structured in a manner which may be sensed in a tactile fashion on the operator control panel, being, for example, adapted to the shape and position of the areas. The functional assignment may therefore always be adapted to the division of the operator control surface into areas which may be sensed in a tactile fashion. In this manner, for the different requirements of various operator control processes, it is possible for both the areas which may be sensed in a tactile fashion and the selectable zones which are congruent therewith to be distributed and configured in terms of position and extent according to ergonomic criteria on the operator control panel, permitting an easy-to-understand and reliable method of operator control.

[0015] If, for example, only two alternatives are available for selection in an operator control situation, whether the navigation system or the telephone is to be subsequently operated, for example, two selectable zones which are separated from one another in a manner which may be sensed are presented on the operator control surface. Depending on how many alternative input possibilities require an operator control situation, the selectable zones or the areas which may be sensed in a tactile fashion may be larger or smaller. Thus, for example, in one case the operator control panel may be divided into relatively small “telephone pushbutton keys”, while in another case four relatively large pushbutton keys for direction inputs may be represented.

[0016] For handwritten inputs, it may be provided that the entire user surface of the operator control panel is available without subdivisions for inputting characters since handwritten operator control of the device by the user is to be carried out in an uncomplicated manner—simply with a finger—without the aid of a stylus. When characters are input with a finger, more space is required for writing than when inputs are made with a stylus, and the recognition reliability of a character recognition program which is associated with the operator control panel is also increased if the writing may be as large as possible. If the entire operator control panel is available for the inputs, the user may not need to pay particular attention to compliance with certain limits for the handwritten inputs, so that the user may not need to continuously look at the operator control panel when operating it.

[0017] A manner of implementing the operator control panel is to configure the operator control panel as a perforation matrix whose holes are filled with plungers which may be raised and lowered again by an actuator system, located under the operator control panel, with an electro-mechanical device. The plungers may be controlled, for example, individually or in groups.

[0018] The sensor system for implementing the touch-sensitivity of the operator control panel may be implemented in the plungers or in the perforation matrix. For example, a capacitive or resistive sensor system is possible for the