

CONTROL ELEMENT OR SWITCHING ELEMENT FOR VEHICLES

[0001] The present invention relates to a control element or switching element for vehicles which is designed as an information element or as an interactive information element and communications element.

[0002] In motor vehicles a series of information systems is installed which comprise a specific sensor or detector and associated display which is usually installed in the dashboard. Such displays are the speedometer, the temperature display of the cooling system, fuel tank display, oil pressure warning lamp, engine speed meter and a series of monitoring lights for the parking brake, doors which are open and the like. In addition there is a series of proposals for displaying general hazardous situations in the field of vision of the driver. These include displays which relate to distance warning systems (distance radar) and the like.

[0003] The disadvantage of such systems is that movements of the head and eyes are necessary in order to detect the visual signals and intellectual effort has to be expended since in an individual case it is necessary to recognize which hazardous situation or which deficiencies of the vehicle are being indicated by the respective display. In each case, the driver is distracted, or his attention is at least briefly impaired, by the perception of a visual display and the assignment of its significance. This results in a prolonged reaction time to changed traffic conditions. This is associated with considerable disadvantages in particular when driving in the dark or in the rain.

[0004] It is known from toys and gaming machines that haptic impressions can also be conveyed in addition to visual impressions. However, in gaming machines such (haptic) stimulations which relate to the sense of touch and sensory perceptions are as a rule not conveyed at the same time as the visual impressions. For this reason, such haptic stimulations are not a supplement to the visual impression but rather additionally induced sense impressions which are perceived as a consequence of or as an accompanying circumstance of the visual impressions.

[0005] On an Internet website www.wissenschaft.de/six-cms, "bild der wissenschaft online", a technical report was published on Mar. 11, 2001 which describes how vehicle monitoring systems in the field of passenger car safety can be configured by means of a computer. In this context, the closing of the eyelids and the movements of the eyes of the driver are monitored and possible accidents as a result of the driver sleeping for a few seconds are prevented or other adverse effects on the driver are avoided. The system has what is referred to as a face model. It compares stored and current facial structures pixel by pixel with various resolutions. As a result, faces or parts of the face can be determined and compared with stored data.

[0006] The object of the present invention is to specify a device for transmitting warning instructions and the like to the driver of a vehicle, the use of which device distracts the driver from observing the traffic as little as possible.

[0007] This object is achieved by means of a control element or switching element having a haptic information element having the features of claim 1 and by means of the arrangements of a control element or switching element

having the features of claims 9 and 10. Configurations emerge from the dependent claims.

[0008] In the control element or switching element of the vehicle which is equipped with a haptic information element, means which stimulate the sense of touch mechanically, chemically or electrically are present in an operator control element for controlling or for switching a vehicle or vehicle component, said means being used to supply the driver who is in contact with these means with warnings and/or information about the state of the vehicle or the traffic. These means which stimulate the sense of touch are preferably integrated into the steering wheel or other wheels, handles or levers which are provided for controlling or switching and which form the actual control element or switching element.

[0009] More wide-ranging configurations of the control element or switching element provide for interactive functions to be connected to the integrated information element and for responses of the driver to the given information to be sensed and processed. In particular it is possible to provide for the driver to cause the information system of the vehicle also to represent the respective warning instructions at the desired time in a visual fashion, for example in corresponding monitoring lamps of the dashboard. The viewing direction of the driver is thus not distracted by red monitoring lamps lighting up; instead, the driver experiences, as a result of the haptically transmitted information, that a particular condition has occurred and he can cause the respective information to be represented visually, and read it from the display of the dashboard, at a moment at which the events on the road do not take up his entire attention.

[0010] The basic design of a control element or switching element having an integrated, in particular interactive, haptic information element preferably comprises four components, specifically an actuator element, if appropriate a sensor element, a housing and an electronic actuation unit. The actuator element has the function of generating stimulations which are analogous to the information to be transmitted and which can be registered by means of the sense of touch of the driver's hand. This can be effected by means of pressure, pulling, electrical voltage or by changing the chemical surface quality of the actuator.

[0011] A sensor element which is provided for an interactive function has the purpose of detecting the compressive and pulling movements as well as changes in the resistance of the skin and of converting them into analogous electrical signals. These signals are used to actuate the control element and form, if appropriate, the basis for further data processing.

[0012] The sensor element and the actuator element may form one unit. Such an element may comprise, for example, an electromagnetically moved coil former with an iron core which absorbs a relatively high current when a compressive resistance, which is opposed to an initially excited movement, occurs. This change in current is evaluated and made available to the actuation unit as a signal. The compressive resistance can be exerted on the combined actuator/sensor element by the driver in response to haptic information.

[0013] The housing of the control element or switching element is preferably a component of a steering wheel, of a control lever or switching lever or the like. In a utility