

19

stimulated and a capacitive coupling over the insulator being formed between the conducting electrode and the at least one body member to be stimulated;

providing a high-voltage source for applying an electrical input to the one or more conducting electrodes, wherein the electrical input comprises a low-frequency component in a frequency range between 10 Hz and 500 Hz, the capacitive coupling and electrical input being dimensioned to produce an electrosensory sensation, and the electrosensory sensation being produced independently of any mechanical vibration of the one or more conducting electrodes or the insulator and independently of movement of the at least one body member to the one or more conducting electrodes.

12. An apparatus for producing an electrosensory sensation to a body member to be stimulated, the apparatus comprising:

a conducting electrode being provided with an insulator wherein, when the body member to be stimulated being proximate to the conducting electrode, the insulator prevents a flow of direct current from the conducting electrode to the body member and a capacitive coupling over the insulator being formed between the conducting electrode and the body member;

a high-voltage source to apply an electrical input to the conducting electrode, the electrical input comprising a low-frequency component in a frequency range between 10 Hz and 1000 Hz, the capacitive coupling and the electrical input being dimensioned to produce an electrosensory sensation, and the electrosensory sensation being produced independently of any mechanical vibration of the conducting electrode or the insulator; and

a modulator to convey information via the electrosensory sensation by modulating the electrical input according to the information.

13. The apparatus according to claim 12, further comprising a grounding connection between:

a reference voltage of the high-voltage source other than the electrical input to the conducting electrode; and

a grounding electrode separate from the conducting electrode, wherein the grounding electrode is positioned so as to be touched by a second body member distinct from the body member to be stimulated.

20

14. The apparatus according to claim 12, wherein the apparatus comprises one conducting electrode for each spatially distinct area of the body member to be stimulated.

15. The apparatus according to claim 12, wherein the apparatus comprises one conducting electrode for each of several spatially distinct areas of the body member to be stimulated.

16. The apparatus according to claim 12, further comprising:

a surface arranged so as to be touched or approached by the body member, the surface having at least one touch-sensitive area, each touch-sensitive area having a predetermined position; and

a controller to assign a function to the at least one touch-sensitive area and to vary an intensity of the electrosensory stimulus spatially or temporally based on a detected touching or approaching of the at least one touch-sensitive area by the body member, wherein the apparatus is able to produce feedback to a user via the body member.

17. The apparatus according to claim 16, wherein the electrosensory sensation being used to create a sensation of texture on the surface.

18. The apparatus according to claim 16, wherein the controller varies the intensity of the electro-sensory stimulus temporally, wherein the controller is operable to dynamically change the function assigned to the least one touch-sensitive area, and wherein the apparatus is operable to vary the feedback based on the function.

19. The apparatus according to claim 12, wherein the modulator modulates the electrical input based on the low-frequency component.

20. The apparatus according to claim 12, wherein the electrical input to the conducting electrode has a peak-to-peak voltage of 750 to 100,000 Volts.

21. The apparatus according to claim 12, wherein the insulator comprises a first layer and a second layer such that the first layer is closer to the conducting electrode than the second layer, and wherein the second layer has a lower surface conductivity than the first layer.

* * * * *