

FIG. 5 part E. Due to this deformation the blade **23** is lifted and is no longer flush with the plane of the plate **10**. The deformation of the part a made of material A causes mechanical deformation of the corresponding part of the sub-plate **19** made of material C. If at this stage the alloy C is heated, at the level of the arm **13c**, the alloy C regains its memorised form. This memorised form is shown in **FIG. 5** part F. In this case this is a flat form which brings back to the plane of the plate **10** the blade **23** such that the ensemble of the two alloys A and C regain their initial form.

[0062] **FIG. 6** shows a an exploded perspective view of a first embodiment of a device comprising a tactile interface in the form of a plate **10** according to the present invention, in which control means **40** comprise laser means **42**.

[0063] The display device **1** comprises a touch plate **10**, as described hereinabove in relation to **FIG. 1**. The touch plate can also in this case be a plate made of heat-conductive material, in the form of a continuum. In this instance, even though the modification elements of the tactile sensation cannot be distinguished physically, elements do exist all the same. They are determined at each instant, for example in the form of pixels, by the position of the radiation laser on the surface. The size of the pixels here is determined by the size of the minimum surface which is heated by a radiation laser applied to a surface of the plate situated for example opposite the touch surface **10a**, without any visual distinction of a delimitation of these elements being possible. The modification of the tactile sensation thus consists of a difference in temperature between hot pixels and cold pixels.

[0064] The device **1** also comprises control means **40** for selectively addressing the transformation means **21** of the modification elements **25** of the tactile sensation, so as to produce at any instant a tactile sensation determined at the level of the whole of the surface **10a** of the touch plate **10**.

[0065] In keeping with this embodiment of the invention, the control means **40** of the modification elements **25** of the tactile sensation comprise one or more laser emitters **42** whereof the radiation from each is utilised to make the transformation from one or more modification elements **25** of the tactile sensation. In **FIG. 6** a single laser **42** has been shown. In the example shown the radiation from the laser **42** can be moved to each of the modification elements **25** of the tactile sensation. For this the laser emitter **42** is mounted on a translation table **43** which can be a table fitted with a translation axis and first translation means according to this first axis, or a table of two axes equipped with second translation means according to this second axis, known per se, in one or the other of these forms. In a manner also known per se the table **43** is equipped with motor means not shown for shifting the laser emitter and thus the point of application of its radiation successively under transformation means **21** selected by a control circuit **41**, receiving the tactile data to be displayed. The circuit **41** on the one hand controls the motor means of the translation table **43** and on the other hand the emission or not from the laser emitter **42**, for example by action on a Pockel cell in optic series with the laser emitter **42** and a polariser. All these elements well known in themselves have not been illustrated here. Similarly, radiation focalisation means for example in the form of a lens have not been illustrated.

[0066] It is not obligatory that the laser emitter **42** is shifted. It could be enough, as shown in **FIG. 6**, to shift an

end **45** of a fibre optic **44**, whereof the other end **46** receives radiation from the laser emitter **42**.

[0067] Thus in the example shown in **FIG. 6**, the control means **40** of the modification elements **25** of the tactile sensation comprise, apart from the laser emitter **42**, the control circuit **41**, the table **43** and optionally a fibre optic **44**. This works as follows.

[0068] For each tactile image to be formed, the radiation laser is shifted successively by means of the table **43**, towards the modification elements **25** of the tactile sensation, which must be transformed into a working position, to form the image. Transformation can be achieved in a single pass, with a stop time on each modification element of the tactile sensation sufficing to cause transformation of the element. Transformation can also be achieved in a number of successive passes, with the total of the successive stop times on each modification element **25** of the tactile sensation being sufficient to cause transformation of the element. A next image following a former image is applied in the same way after the time necessary for the return of the modification elements **25** of the tactile sensation to a rest position.

[0069] **FIG. 7** shows an exploded perspective view of a second embodiment of a device comprising a tactile interface in the form of a plate **10** according to the present invention, in which control means **40** comprise laser means **42**. In reference to **FIG. 6**, the translation table **43** has been replaced by mobile mirror **47** mobile according to two perpendicular axes. The laser emitter **42** emits its radiation directly by means of a fibre optic, not shown here, to the mobile mirror **47**. The control circuit **41** receiving the tactile data to be displayed, controls by way of position changing means **48, 49** the position in rotation of the mirror **47**. Such rotation means of a reflector are known per se.

[0070] The operation is the same as in the example shown in **FIG. 6**, with the radiation shift being in this case produced by rotation controlled by the mirror **47**.

[0071] **FIG. 8** shows an exploded perspective view of a third embodiment of a device comprising a tactile interface in the form of a plate **10** according to the present invention, in which control means **40** comprise laser means **42**. In this third mode the laser emitters **42** are equal in number to the number of tactile modification elements **25** of the touch plate **10**.

[0072] In this third embodiment the control means **40** comprise a monolithic layer **30**, preferably obtained by utilisation of collective fabrication techniques, especially micro-electronics. This layer comprises a number of lasers **42** equal to the number of modification elements **25** of the tactile sensation. The radiation from a laser emitter **42** can be applied univalently to a single element **25**. The control circuit **41** is in this case a simple address circuit for emitters **42** which must emit for the formation of a current image. Although this embodiment requires an address circuit which can become complex if the number of elements **25** to be addressed is large, it has the advantage of being able to be made according to collective manufacturing techniques, as mentioned earlier for the layer **30**, but also for the touch plate **10**, and the address circuit **4**.

1. A device comprising a tactile interface formed by a plate (**10**) having a surface (**10a**) capable of being modified