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(71) Applicant: **Fu David**  
**Songshan Taipei (TW)**

(72) Inventor: **Fu David  
Songshan Taipei (TW)**

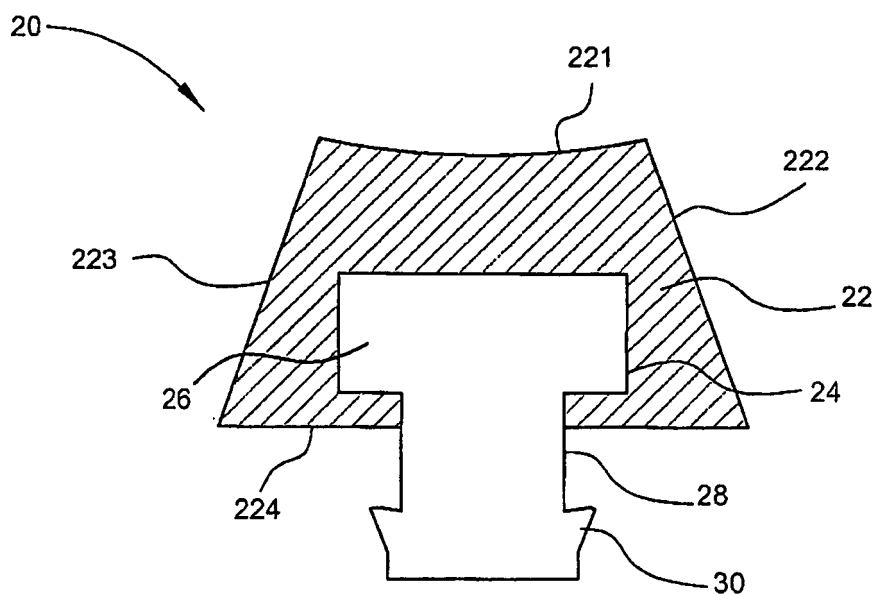
(74) Representative: **Epping - Hermann - Fischer**  
**Ridlerstrasse 55**  
**80339 München (DE)**

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(54) **Key for a keyboard**

(57) A keyboard key which comprises: 1) a base member including a fixing portion and a connecting portion; 2) a key body having a top surface and a bottom surface wherein the bottom surface of the key body is

attached to the fixing portion of the base member, and the base member is composed of a material substantially different from the key body such that the base member is more rigid than the key body, is disclosed.



## Description

**[0001]** The present invention generally relates to keyboard keys and more particularly to keyboard keys that are made of a material of adjustable rigidity.

**[0002]** As computers become popular and accessible, people start to use computers more often for both business and personal reasons. The standard input device for a computer is a keyboard. As computer use increases, discomfort or injuries, such as Carpal Tunnel Syndrome, associated with repetitive use of the keyboard are becoming a major concern for users. Therefore, it is desirable to provide a keyboard improvement so that the discomfort/injuries arising from keyboard use can be reduced.

**[0003]** Some attempts have been made to increase the cushioning effect of the keys. US 5,290,115 discloses a soft pad to be adhesively attached to the keytop of each key in a keyboard such that the soft pad provides additional cushioning effect. However, problems may arise from such adhesive attachment. For examples, the pad can cover or blur the symbol on the original key, and the extra thickness of the pad may change the typing pattern of a typist, as human fingers are extremely sensitive to even a thickness difference of 0.5 mm. US 5,813,777 discloses a cushioned key with a hollow cushion compartment in which silicone gel is filled. Such design provides little cushion effect since the gel is contained inside the key instead of on top of the key, and the manufacturing process for such key may be troublesome due to the complexities in molding of the key and the injection of the gel. US 7,040,824 describes a self-adhesive reusable translucent gel pad, each capable of being installed to a key in the keyboard. The major disadvantages of such pads are that the pads may easily detach from the keys and the increased thickness of the keys may significantly affect the typing pattern of a typist.

**[0004]** There remains a need for a keyboard design that provides cushioning effect for typists while the typing pattern is not affected and no cumbersome installation is required.

**[0005]** An object of the present invention is to provide a new design for the keyboard keys such that additional cushioning effect can be provided by the keys themselves instead of installing extra pads on each of the keyboard keys.

**[0006]** Another object of the present invention is to provide a new design for the keyboard keys such that the rigidity of the keys is adjustable by modifying the composition of the material from which the keys are made of.

**[0007]** In order to achieve the above objects, the present invention provides a new design for keyboard keys which comprises: 1) a base member including a fixing portion and a connecting portion; 2) a key body having a top surface and a bottom surface wherein the bottom surface of the key body is attached to the fixing portion of the base member, and the base member is composed of a material substantially different from the

key body such that the base member is more rigid than the key body.

**[0008]** The present invention also provides a keyboard comprising a plurality of keys, each key comprising: 1) a base member including a fixing portion and a connecting portion; 2) a key body having a top surface and a bottom surface wherein the bottom surface of the key body is attached to the fixing portion of the base member, and the base member is composed of a material substantially different from the key body such that the base member is more rigid than the key body. Each of the keys is also attached to the keyboard via the connecting portion of the base member.

**[0009]** In the present invention, the configuration of the base member is not limited as long as it can provide firm connection with the key body via the fixing portion and can be easily installed in a keyboard via the connecting portion. In one embodiment, the base member is a T-shape element comprising latches at the bottom of the T, wherein the lateral bar serves as the fixing portion to attach to the key body, and the latches serve as the connecting portion so that the key can be detachably installed on the keyboard.

**[0010]** In the present invention, the material comprising the key body is not limited as long as the material is chosen such that the rigidity of the key body is substantially lower than that of the base member, providing the desired cushioning effect. The key body can be made of at least one material selected from a group consisting of: plastics, rubbers, resins, silicone and the combination thereof. It is to be understood that in order to provide a cushioning effect, the rigidity of the key body has to be substantially less than the base member. For example, in one embodiment the base member can be made of ABS plastic, and the key body can be foamless polyurethane.

**[0011]** In the present invention, the rigidity of the key body is not limited. During the manufacture of the key body, the mixing ratio of different materials may be changed such that the rigidity of the key body can be adjusted accordingly.

**[0012]** The manufacture of the keyboard keys of the present invention generally involves mold making, molding, curing and, optionally, laser carving. It can be understood that the conditions of each step may vary depending on the materials used to make the key body. For example, in the molding step for a material such as ABS, injection molding may be employed, whereas for a material such as a resin rotational molding may be applied.

**[0013]** The term "keyboard" described herein is not limited to any certain type of computer keyboards. In one embodiment, for example, the keyboard is a standard 104-key keyboard. It can be understood that the keyboard keys of the present invention can be employed in any computer keyboard.

**[0014]** Referring to the drawings a preferred embodiment is explained in more detail.

Fig. 1 is a cross-sectional view illustrating a conventional keyboard key.

Fig. 2 is a cross-sectional view illustrating the keyboard key of the present invention.

**[0015]** Referring to Fig. 1, a cross sectional view of a conventional keyboard key 10 is shown. As can be seen in the figure, a conventional keyboard key 10 is typically integrated as a single unit, comprising a cap portion 12 and a stem portion 14, wherein at the bottom of the stem portion 14 there are provided two latches 16. The cap portion 12 has a top surface 121 and two sides 122, 123. From a perspective view, a keyboard key has one top surface and four sides. Latches 16 are used to install the key onto a keyboard. Therefore, a conventional keyboard key looks like a cap mounted on top of a hollow stem.

**[0016]** As can be seen from Fig. 1, the conventional keyboard keys are made of one single rigid material. Therefore, during typing little cushioning effect is provided.

**[0017]** Referring now to Fig. 2, there is shown a cross sectional view of the keyboard key 20 of the present invention. As can be seen in the figure, the keyboard key 20 comprises a key body 22 and a T-shape base member 24 including a bar portion 26 and a stem portion 28. At the bottom of the stem portion 28 are two outwardly extended latches 30.

**[0018]** The key body 22 has the same outer perimeter, namely a top surface 221 and two sides 222, 223, as the conventional key 10 shown in Fig. 1. However, the key body 22 is actually a solid trapezoid except for the space occupied by the base member 24. Thus the key body 22 further comprises a bottom surface 224.

**[0019]** The materials comprising the key body and the base member are selected such that the key body can firmly engage the base member while still be softer than the base member in order to provide extra cushioning effect. Therefore, the choice of the materials is readily comprehensive to a person skilled in the art in order to achieve the above goal. The materials for the key body can be, but not limited to, plastics such as PET (polyethylene terephthalate), PE (polyethylene), PVC (polyvinyl chloride), PP (polypropylene), foamless PS (polystyrene), foamless PU (polyurethane) and the like; rubbers; resins such as polyester and epoxy resins; and silicone.

**[0020]** In this preferred embodiment, the key body 22 and the base member 24 are made by the following procedure: making a mold that has the shape of the key body, injection-molding the key body using the mold with the base member in it, curing the key body at a temperature around 80 degree C, and carving the identifier, such as a letter, a number or a symbol, using laser carving technique. However, it is to be understood that depending on the materials chosen, the molding techniques as well as the curing conditions may vary accordingly, and the specific process conditions are not the characteristics of the present invention.

**[0021]** Moreover, by mixing more than one of the above-mentioned materials in different ratio, the rigidity of the key body can be adjusted. The fact that the rigidity of the key can be adjusted allows the manufacturer to design different cushioning indices of the keys to meet the needs of different target customers.

**[0022]** While the present invention is disclosed by reference to the preferred embodiments and examples detailed above, it is to be understood that these examples are intended in an illustrative rather than in a limiting sense. It is contemplated that modifications and combinations will readily occur to those skilled in the art, which modifications and combinations will be within the spirit of the invention and the scope of the following claims.

## Claims

1. A key (20) for using in a keyboard, comprising:

a base member (24) including a fixing portion and a connecting portion; and  
a key body (22) having a top surface (221) and a bottom surface (224), wherein said bottom surface (224) of said key body (22) is attached to said fixing portion of said base member (24);

wherein said base member (24) is composed of a material substantially different from said key body (22) such that said base member (24) is more rigid than said key body.

2. The key (20) according to claim 1, wherein said key body (22) is composed of at least one material selected from a group consisting of: plastics, rubbers, resins, silicone and the combination thereof.

3. The key (20) according to claim 1, wherein said key (20) is attached to a keyboard via said connecting portion of said base member (24).

4. The key (20) according to claim 1, wherein said key body (22) is attached to said base member (24) where said key body (22) covers at least a portion of said fixing portion of said base member (24).

5. A keyboard comprising a plurality of keys (20), each key (20) comprising:

a base member (24) including a fixing portion and a connecting portion; and  
a key body (22) having a top surface (221) and a bottom surface (224), wherein said bottom surface (224) of said key body (22) is attached to said fixing portion of said base member (24);

wherein said base member (24) is composed of a material substantially different from said key body

(22) such that said base member (24) is more rigid than said key body (22), and wherein each of said keys (20) is attached to said keyboard via said connection portion of said base member (24).

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6. The keyboard according to claim 5, wherein said key body (22) is composed of at least one material selected from a group consisting of: plastics, rubbers, resins, silicone and the combination thereof.

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7. The keyboard according to claim 5, wherein said key body (22) is attached to said base member (24) where said key body (22) covers at least a portion of said fixing portion of said base member (24).

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8. A keyboard comprising a plurality of keys (20), each key (20) comprising:

a base member (24) including a fixing portion and a connecting portion; and

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a key body (22) having a top surface (221) and a bottom surface (224), said bottom surface (224) of said key body (22) is attached to said fixing portion of said base member (24) where said key body (22) covers at least a portion of said fixing portion of said base member (24);

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wherein said key body (22) is composed of at least one material selected from a group consisting of: plastics, rubbers, resins, silicone and the combination thereof, and said base member (24) is more rigid than said key body (22), and wherein each of said keys (20) is attached to said keyboard via said connecting portion of said base member (24).

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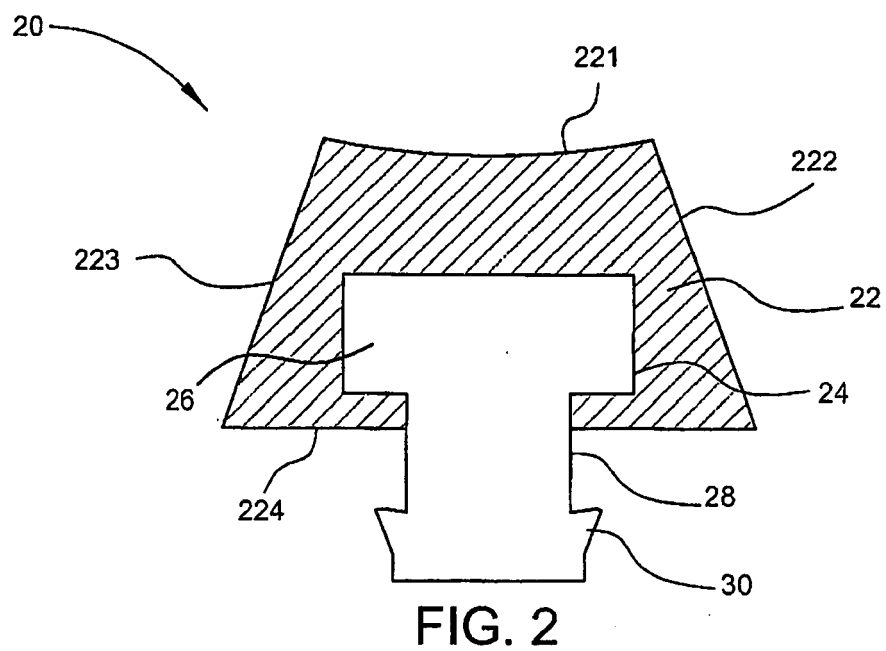
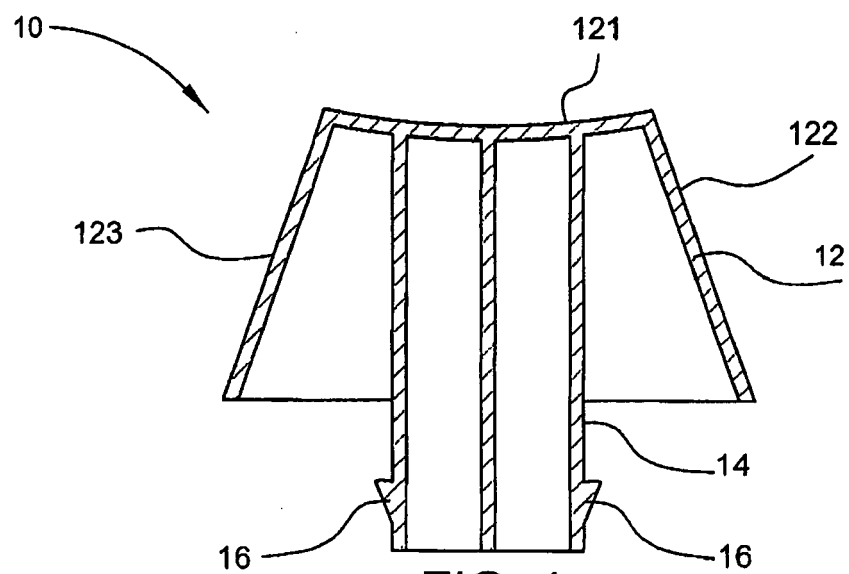
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
Munich		18 December 2007	Nieto, José Miguel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 06 02 6063

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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