

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 766 275 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.04.1997 Bulletin 1997/14

(51) Int. Cl.⁶: **H01H 13/70**

(21) Application number: **95306877.2**

(22) Date of filing: **29.09.1995**

(84) Designated Contracting States:

DE ES FR GB IT NL

Designated Extension States:

LT LV SI

(71) Applicant: **BRILLIANT CONCEPTS**

INTERNATIONAL LIMITED

Shatin, New Territories (HK)

(72) Inventors:

• **Mini, Oscar**

F-93600 Aulnay Sous Bois (FR)

• **Chan Chun Hing, Pony**

Tai Po, New Territories (HK)

(74) Representative: **Leale, Robin George**

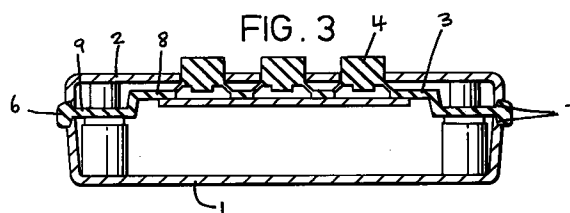
Frank B. Dehn & Co., European Patent Attorneys,

179 Queen Victoria Street

London EC4V 4EL (GB)

(54) **Keypad**

(57) An electronic keypad has an elastomeric key sheet (3) clamped between a bottom housing (1) and an apertured top cover (2), the exposed edge of the key sheet being formed as an enlarged bead (6) to act as a shock-absorber if the device is dropped or knocked.



EP 0 766 275 A1

Description

This invention relates to keypads, which term includes devices consisting only or mainly of a keypad, such as calculators or infrared controllers for electronic equipment, and keypads forming part of devices of any kind which have a keypad as a part thereof, such as telephone handsets or portable radios.

It is known for the keys of a keypad to be formed as upstanding buttons or the like formed integrally in a sheet of elastomeric material such as silicone rubber, the buttons protruding through openings in a top cover of the keypad, which overlies the key sheet, for operation by a user. It is also known for the perimeter of such a key sheet to be gripped between the edges of such a top cover and another underlying housing part of the device in which electronic components to be operated by the keys are located, so that the sheet seals such components from dust or moisture which can enter through the openings in the top cover. See for example US-A-5175873 and US-A-5270499.

Thus the prior art includes a keypad comprising a key sheet made of elastomeric material, a first housing part formed with openings through which the keys protrude, and a second housing part, a perimetric region of the key sheet being received between the edges of said housing parts.

The present invention is characterised in that the said perimetric region of the key sheet extends outwardly of the said housing parts to form a shock-absorbing rim.

The said perimetric region of the key sheet could be of constant thickness. Preferably however the shock-absorbing rim of the key sheet comprises a perimetric bead of substantially greater thickness than the region immediately inwardly thereof, the latter region being gripped between the edges of the said housing parts.

The said bead could be located wholly outwardly of the edges of the housing parts. Preferably however the said edges are formed with outwardly facing rebates in which the inner part of the said bead is seated.

The said shock-absorbing rim of the key sheet can be of any desired extent relative to the keypad and any device of which the keypad forms part. Thus it need not extend all around the key sheet. Embodiments of the invention may be envisaged in which the key sheet does not extend to the edges of the said housing parts on every side, for example where the keypad occupies only part of the area of a larger device, such as an elongate telephone handset having a keypad in its central region. In other words the rim need only be provided where the keypad has exposed edges or provides exposed edges of a larger device. In many embodiments of the invention, however, the said rim extends continuously around the perimeter of the keypad.

In addition to its shock-absorbing function the said rim may be formed as a hand grip. Thus for example two parts of a continuous rim, or two separate rim portions, on opposite sides of the keypad or of another device

incorporating the same, may be formed as hand grips. This optional feature of the invention may be particularly useful when the invention is applied to a hand-held controller for electronic games.

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which :-

Figure 1 is a top plan view of a keypad according to the invention; and

Figures 2 and 3 are cross-sections on the lines II-II and III-III of Figure 1 respectively.

Referring to the drawings, a keypad is shown in simplified form to illustrate the principal features of the invention and comprises a bottom housing part 1 containing electronic components, a top housing part or cover 2, and a resilient silicone rubber key sheet 3 clamped between the housing part 1 and 2 and formed with keys 4 which protrude through openings in the cover 2 for operating the electronics. The housing parts 1 and 2 are held together by screws (not shown) which pierce the key sheet when they are inserted, the housing parts clamping the key sheet around each of the screw locations 5 (Figure 2).

Referring particularly to Figures 2 and 3, the key sheet 3 is formed with a substantially D-shaped bead 6 extending continuously around its perimeter, which is received in rebates 7 formed in the edges of the housing parts 1 and 2, with the part of the key sheet immediately inward of the bead clamped between the edges of the housing parts. Thus about half of the thickness of the bead 6 extends outwardly of the side faces of the housing parts, and acts as a shock-absorbing resilient rim extending all around the keypad, to protect it if it is dropped or knocked. It will also be noted that the key sheet acts as a shield against the ingress of dust or moisture to the electronic components in the bottom housing part 1 via the key openings in the cover 2.

Referring particularly to Figure 3, it will be noted that the central region 8 of the key sheet 3, which is formed with the keys 4, is in a higher plane than the outer region 9 which is formed with the bead 6. The purpose of this is to minimise the volume of the space defined between the key sheet and the cover 2, thus in turning minimising the amount of moisture or liquid which can enter through the openings in the cover.

Claims

1. A keypad comprising a key sheet (3) made of elastomeric material and formed with upstanding keys (4), a first housing part (2) formed with openings through which the keys protrude, and a second housing part (1), a perimetric region of the key sheet being received between the edges of said housing parts, characterised in that the said perimetric region of the key sheet extends outwardly of the said housing parts to form a shock-absorbing

rim (6).

2. A keypad as claimed in claim 1, wherein the said shock-absorbing rim of the key sheet comprises a perimetric bead (6) of substantially greater thick- 5
ness than the region immediately inwardly thereof, the latter region being gripped between the edges of the said housing parts (1, 2).
3. A keypad as claimed in claim 2, wherein the said 10
edges of the housing parts (1, 2) are formed with outwardly facing rebates (7) in which the inner part of the said bead (6) is seated.
4. A keypad as claimed in claim 3, wherein the said 15
bead (6) is of substantially D-shaped cross-section with the straight side of the D facing inwardly.
5. A keypad as claimed in any preceding claim, wherein the said shock-absorbing rim (6) of the key 20
sheet (3) extends continuously around the whole perimeter of the keypad.
6. A keypad is claimed in any preceding claim, wherein the said rim (6) is formed as a hand grip. 25
7. A keypad as claimed in any preceding claim, wherein the central region (8) of the said key sheet (3) which is formed with the keys (4) has its plane 30
elevated above that of the outer region (9) thereof so as to reduce the space between the key sheet and the first housing part (2). 35

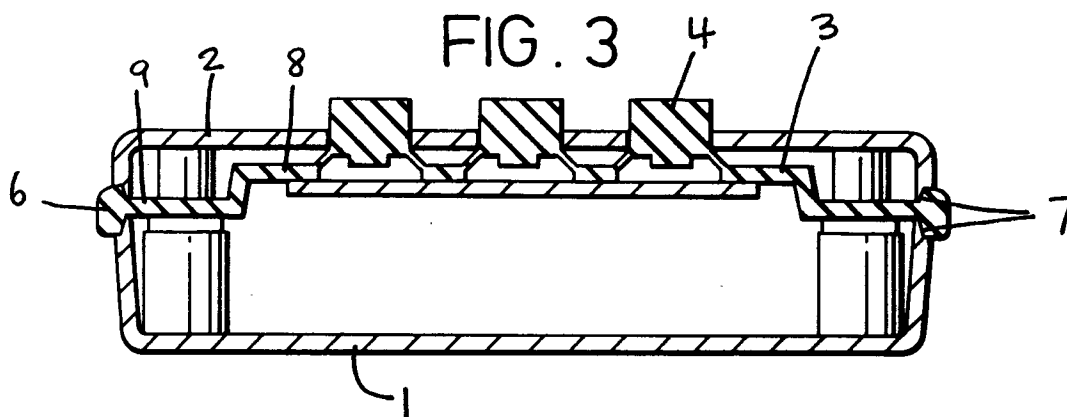
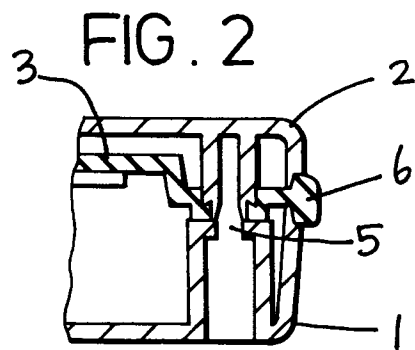
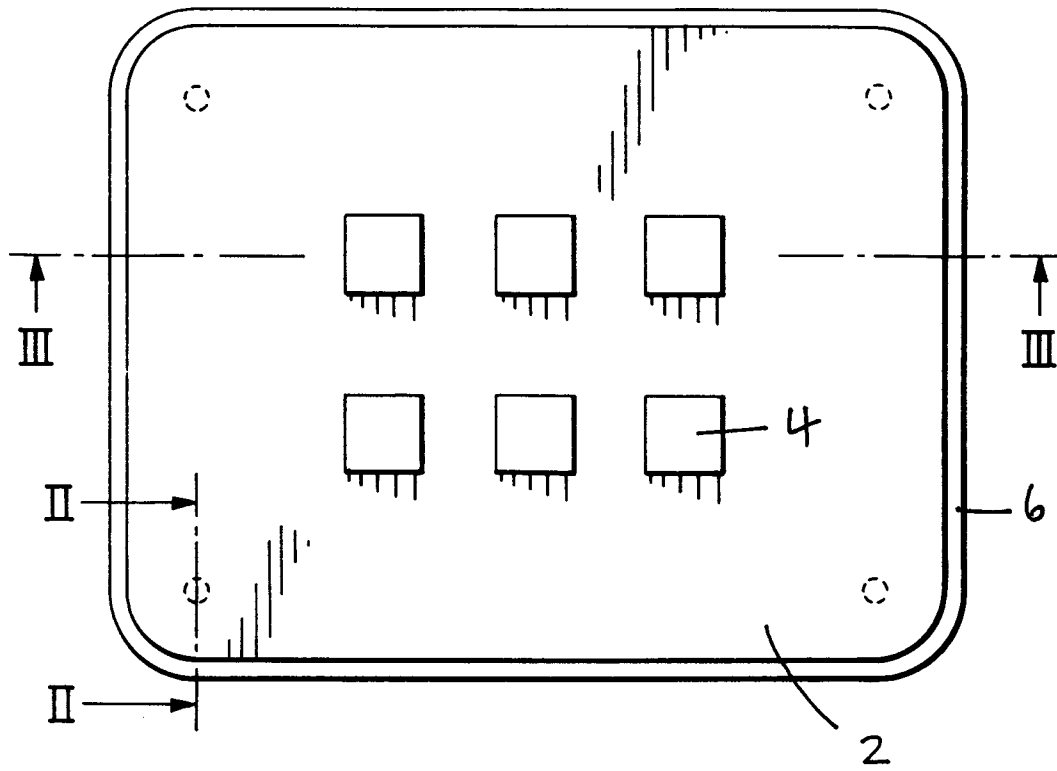
40

45

50

55

FIG. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 6877

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP-A-0 610 689 (SEDI SRL) 17 August 1994 * column 4, line 23 - line 43; figures * ---	1	H01H13/70
A	US-A-4 022 993 (SHATTUCK RONALD CORROALLES) 10 May 1977 * column 2, line 36 - line 41; figure 2 * ---	1	
A	DE-U-86 31 342 (HOESCH METALL) 5 March 1987 * page 6, paragraph 1; figure 2 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01H
Place of search THE HAGUE		Date of completion of the search 1 March 1996	Examiner Janssens De Vroom, P
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			

EPO FORM 1503 03.82 (P04C01)