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71 Applicant: **FANUC LTD, 3580, Shibokusa Aza-Komanba Oshino-mura, Minamitsuru-gun Yamanashi 401-05 (JP)**

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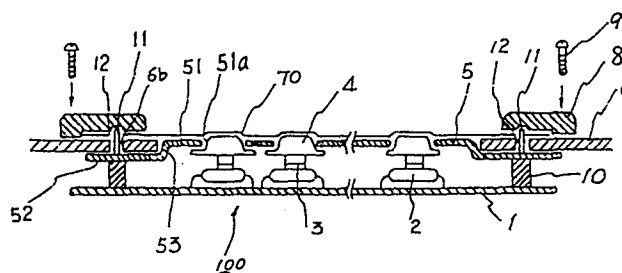
72 Inventor: **INOUE, Michiya, 28-6, Nishihiroyama 5-chome, Hino-shi Tokyo 191 (JP)**

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74 Representative: **Billington, Lawrence Emlyn et al, HASELTINE LAKE & CO Hazlitt House 28 Southampton Buildings Chancery Lane, London WC2A 1AT (GB)**

54 FLAT KEYBOARD.

57 A flat keyboard which is used as an operating board for numerical control units, and as an input device for calculators and electronic balances. It is an object of this invention to easily and accurately position an outer sheet (70) with which the outer surface of a keyboard assembly (100) is covered. A keyboard assembly (100) consisting of a printed board (1) on which keys (4) are arranged is attached to the rear surface of a smooth, flat panel (6) with holes therein. The outer surface of the keyboard assembly (100) and the outer sides of the holes in the smooth, flat panel (6) are covered with an outer sheet (70). The positioning means (11, 12) which are opposed to the keyboard assembly (100) are provided on a peripheral portion of the outer sheet (70). A smooth, flat frame (8) placed on the peripheral portion of the outer sheet (70) is fastened to the smooth, flat panel (6) by fixing means (9) to hold the peripheral portion firmly between the smooth, flat panel (6) and smooth, flat frame (8).



DESCRIPTION

FLAT KEYBOARD

Technical Field

This invention relates to a flat keyboard and,
5 more particularly, to a flat keyboard used in an
operator's panel of a numerical control unit, an input
unit of a computer, an input unit of an electronic
weigher and the like.

Background Art

10 Figs. 4 and 5 illustrate an example of a
conventionally used flat keyboard. Fig. 4 is a
sectional view taken along line IV-IV of Fig. 5, and
Fig. 5 is a plan view. The structure of the
conventionally used flat keyboard will now be described
15 based on Figs. 4 and 5. In the Figure, numeral 1
denotes a printed board on which wiring is formed by a
printing method. Numeral 2 denotes a reed switch a
plurality whereof are arranged on the printed board.
Numeral 4 denotes a key a plurality of which oppose and
20 overlie respective ones of the plural reed switches 2.
Fixed to the bottom surface of each key is a magnet 3
for turning the reed switch 2 on and off. The key 4 is
urged upwardly by a spring or the like, not shown, so
that the magnet 3 fixed to the bottom surface
25 ordinarily is spaced away from the reed switch 2. By
pressing the key, the magnet 3 is made to approach the
reed switch 2. Numeral 5 denotes a guide plate of key
4. The central portion of the guide plate is so formed

as to project upwardly and is equipped with a guide hole 51a into which the crown portion of the key is fitted, thus constructing a guide portion 51. The peripheral portion 52 thereof is attached to the printed board 1 via a spacer 10. Numeral 7 denotes a surface sheet covering the surface of the guide plate 5 and keys 4 and fixed to the overall surface of the guide plate 5 as by an adhesive. The above-described printed board 1, read switches 2, keys 4, magnets 3, guide plate 5, spacer 10 and surface sheet 7 construct a keyboard assembly. This keyboard assembly is mounted on a decorative panel 6, which has an opening 6a, from the inner side thereof (the lower side in Fig. 4) and is attached to the back side of the decorative panel 6 with the guide portion 51 being fitted into the opening 6a.

Since the surface sheet 7 is affixed to the guide plate 5 as by an adhesive, it is difficult to position the surface sheet. In particular, if a large number of keys are provided, affixing the surface sheet in such a manner that the sheet accurately coincides with the keys is a very difficult operation. In addition, there is the possibility that the surface sheet 7 will be damaged. How to readily position the surface sheet and improve positioning accuracy when the sheet is replaced are problems to be solved.

Disclosure of the Invention

The present invention has been devised to solve

the foregoing problems of the above-described conventionally employed flat keyboard and its object is to provide a flat keyboard in which the surface sheet covering the surface of the keyboard assembly can be readily positioned and accurately affixed.

According to the present invention, there is provided a flat keyboard having a decorative panel equipped with an opening, a keyboard assembly arranged opposite the opening and attached to the back side of the decorative panel, a detachable surface sheet covering the surface of the keyboard assembly and the outer side surface of the decorative panel at the opening, positioning means provided on a peripheral portion of the surface sheet and corresponding to the keyboard assembly, and fixing means for detachably fixing the surface sheet to the decorative panel.

Since the flat keyboard according to the present invention is constructed as described above and the surface sheet is provided at its peripheral portion with the positioning means located at a position corresponding to the keyboard assembly, the surface sheet can be easily and accurately positioned when affixing the same. In addition, assembly and replacement operations can be greatly facilitated.

Other objects and features of the present invention will become clear from the description that follows.

Brief Description of the Drawings

Figs. 1 and 2 illustrate an embodiment of a flat keyboard according to the present invention, in which Fig. 1 is a sectional view along line I-I of Fig. 2 and Fig. 2 is a plan view, Fig. 3 is a sectional view illustrating another embodiment of a flat keyboard according to the present invention, and Figs. 4 and 5 illustrate a conventionally used flat keyboard, in which Fig. 4 is a sectional view taken along line IV-IV of Fig. 5 and Fig. 5 is a plan view.

10 Best Mode for Carrying Out the Invention

The present invention will now be described in detail based on the illustrated embodiments.

15 Figs. 1 and 2 illustrate an embodiment of a flat keyboard according to the present invention, in which Fig. 1 is a sectional view along line I-I of Fig. 2 and Fig. 2 is a plan view. Parts identical with those of the conventional flat keyboard shown in Figs. 4 and 5 are designated by like characters.

In Figs. 1 and 2, numeral 1 denotes a printed board on which wiring is formed by printing. Numeral 2 denotes a reed switch arranged on the printed board 1. Numeral 4 denotes a key arranged to oppose and overlies the reed switch 2 and having a magnet 3 fixed to its bottom surface. Numeral 5 denotes a guide plate comprising a guide portion 51 having a guide hole 51a into which the crown portion of the key 4 is fitted, a peripheral mounting portion 52, and a connection portion 53 connecting the peripheral mounting portion

52 and guide portion 51. Numeral 10 denotes a spacer interposed between the guide plate 5 and printed board 1 for securing the two as by an adhesive. A keyboard assembly 100 is constructed by assembling these members and is substantially the same as that shown in Figs. 4 and 5. For this reason, a detailed description thereof will be deleted.

10 In the present embodiment, the peripheral portion 52 of the guide plate 5 constituting the keyboard assembly 100 is provided with a plurality of implanted positioning pins 11.

15 The keyboard assembly 100 thus constructed is attached to the decorative plate 6 by fitting the guide portion 51 of guide plate 5 into an opening 6a, which is formed in the decorative plate 6, from the inner side (the lower side in Fig. 1), and is positioned by inserting the positioning pins 11 into plural positioning holes 6b provided in the decorative plate 6 at the portion thereof surrounding the opening 6a.

20 A surface sheet 70 covering the surface of the keyboard assembly 100 is formed to be larger than the opening 6a formed in decorative panel 6 and the peripheral portion thereof is provided with positioning holes 12 at positions corresponding to the positioning pins. The surface sheet 70 is attached from the outer side (the upper side in Fig. 1) of the decorative plate 6 to which the keyboard assembly 100 is attached and the positioning holes 12 are fitted on the positioning

25

pins, whereby the surface sheet can be easily and accurately mounted at a predetermined, prescribed position. Thus, the surface sheet 70 attached to the surface of keyboard assembly 100 and decorative panel 6 is fixed by the decorative frame 8 arranged on the upper side of the peripheral portion. In other words, the surface sheet 70 is clamped and secured by the decorative panel 6 and the decorative frame 8, which is attached to the decorative panel 6 by screws 9. It should be noted that the degree to which the surface sheet 70 follows up manipulation of the keys 4 can be improved by constructing the surface sheet of an elastic material such as rubber.

The flat keyboard according to the present embodiment is constructed as set forth above. In mounting the surface sheet 70, the positioning holes 12 provided in the peripheral portion are fitted on the positioning pins 12 implanted in the peripheral portion of the guide plate 5 constituting the keyboard assembly 100, thereby positioning the surface sheet accurately and with facility.

Fig. 3 illustrates another embodiment of a flat keyboard according to the present invention, in which parts identical with those shown in Figs. 1 and 2 are designated by like reference characters and are not described again. The flat keyboard according to this embodiment includes a plurality of projections 14 provided on the peripheral portion of a surface sheet

71 on the back side thereof. The projections 14 are inserted into the positioning holes 13 provided in the decorative plate 6, whereby the surface sheet 71 can be positioned and attached accurately and with facility.

5 In the present embodiment, the positioning pins 11a implanted in the guide plate 5 constituting the keyboard assembly 100 are formed to have a length that will allow the pins to penetrate half way into positioning holes 13 provided in the decorative plate
10 6.

Industrial Applicability

A flat keyboard according to the present invention enables the surface sheet covering the surface of the keyboard assembly to be positioned easily and
15 accurately. Accordingly, the flat keyboard is well-suited particularly for use on the operator's panel of a numerical control unit for a machine tool, where the surface sheet is likely to be damaged by scraps from cutting or the like and is therefore
20 frequently replaced. The keyboard can also be used on an input unit of a computer or electronic weigher.

CLAIMS:

1. A flat keyboard comprising:
a keyboard assembly;
a surface sheet covering a surface of said
5 keyboard assembly; and
positioning means provided on a peripheral portion
of said surface sheet and corresponding to said
keyboard assembly.
2. A flat keyboard according to claim 1,
10 characterized in that the positioning means provided on
the peripheral portion of said surface sheet is a
positioning hole fitted on a positioning pin implanted
in said keyboard assembly.
3. A flat keyboard according to claim 1,
15 characterized in that the positioning means provided on
the peripheral portion of said surface sheet is a
projection fitted into a positioning hole formed in
said decorative panel provided at a position
corresponding to said keyboard assembly.

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Fig. 3

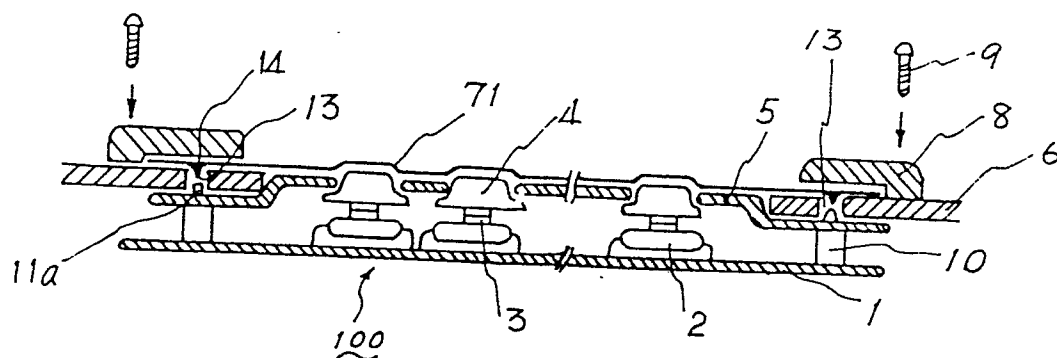


Fig. 4

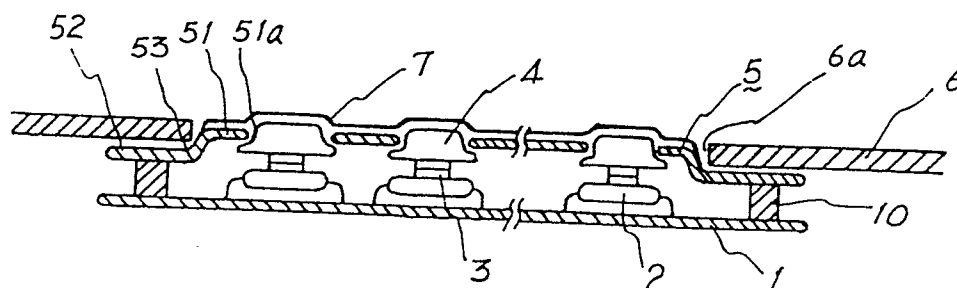
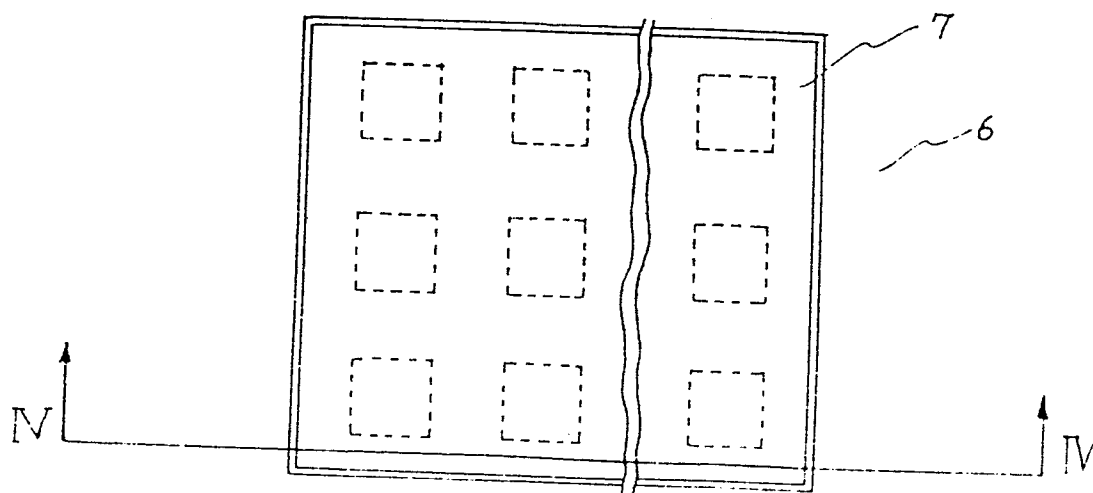


Fig. 5



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INTERNATIONAL SEARCH REPORT

International Application No. PCT/JP85/00311

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁴ H01H 13/06, G06F 3/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC	H01H 13/00-13/76, G06F 3/02	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵		
Jitsuyo Shinan Koho	1926 - 1985	
Kokai Jitsuyo Shinan Koho	1971 - 1985	
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category ⁶	Citation of Document, ¹⁵ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
Y	JP, U, 47-4466 (Tokyo Electric Co., Ltd.), 11 September 1972 (11. 09. 72), Figs. 1 to 4 (Family : none)	1 - 3
Y	US, A, 3,317,698 (Nichols Engineering Inc.), 2 May 1967 (02. 05. 67); Fig. 3 (Family : none)	1 - 3
Y	JP, U, 54-44647 (Omron Tateisi Electronics Co.), 27 March 1979 (27. 03. 79), Figs. 1 to 2 (Family : none)	2
* Special categories of cited documents: ¹⁵ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ¹	Date of Mailing of this International Search Report ²	
August 21, 1985 (21. 08. 85)	September 17, 1985 (17. 09. 85)	
International Searching Authority ¹	Signature of Authorized Officer ¹⁹	
Japanese Patent Office		