United States Patent

[11] **3,570,359**

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[33] **Japan**
[31] **43/100741**

[54] **KEY MEMBER DEVICE**
5 Claims, 6 Drawing Figs.

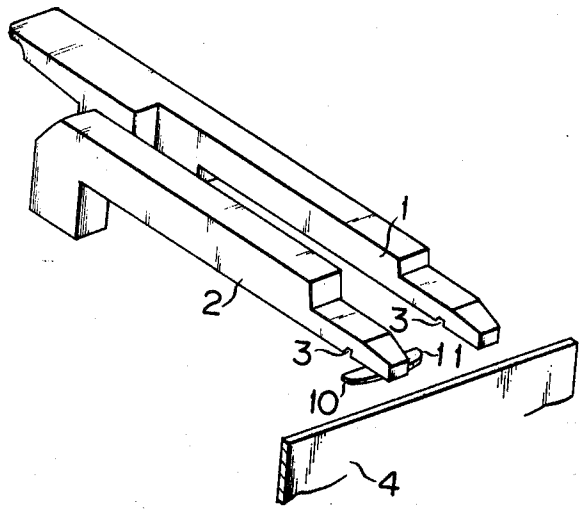
[52] **U.S. Cl.** **84/423,**
84/433, 84/436, 84/439
[51] **Int. Cl.** **G10c 3/12**
[50] **Field of Search** 84/423,
433, 434, 435, 436, 439

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Primary Examiner—Stephen J. Tomsky
Assistant Examiner—Lawrence R. Franklin
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ABSTRACT: A key member device is provided with a plurality of white key members and black key members regularly arranged by a chromatic scale. Each of the black key members has protrusions sidewise extending therefrom in a manner to contact the upper or lower surface of the adjacent white key members near or at a position at which each of the key members is rotatably supported.



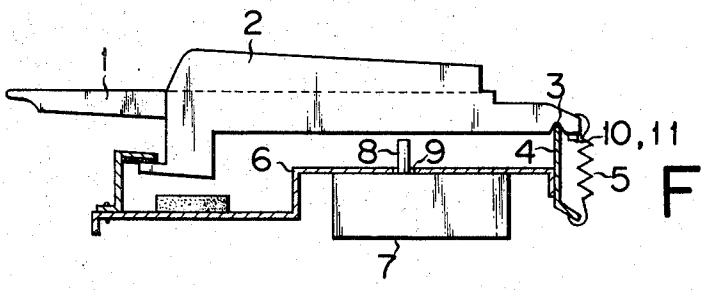


FIG. 1

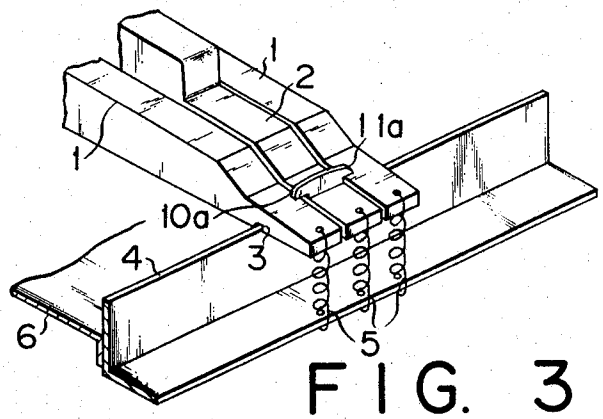


FIG. 3

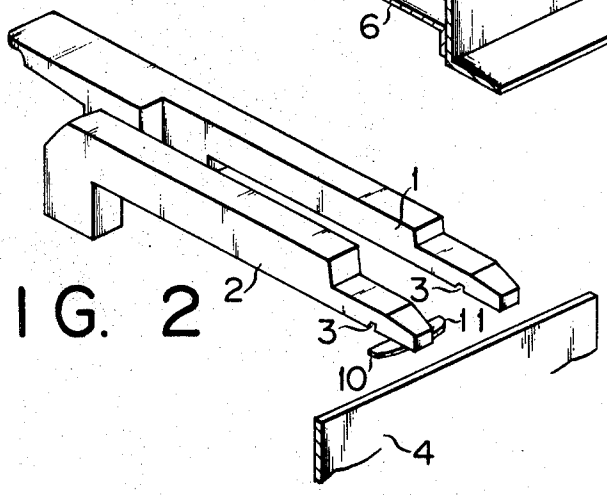


FIG. 2

FIG. 5

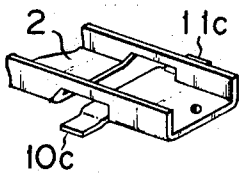


FIG. 6

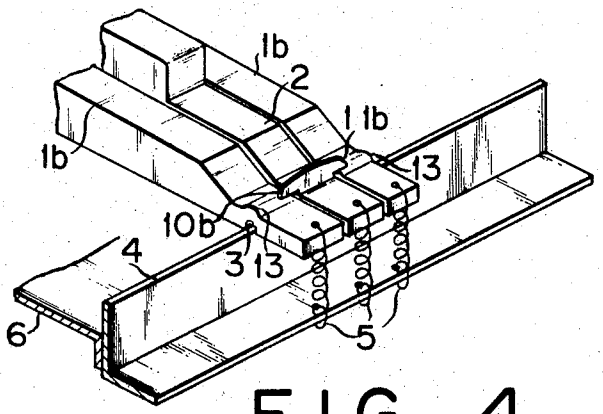
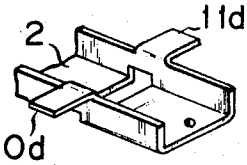


FIG. 4



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KEY MEMBER DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a key member device mainly used in a piano or an electronic musical instrument.

The prior art key member device is disadvantageous due to the face that the black key member rises higher than the white key member, that is, the upper surface of the black key member is elevated far higher than that of the white key member, so that the black key member is more liable to be inclined in the transverse direction thereof by a transverse force applied to said key member when glissando is performed than is the white key member. This obstructs smooth performance and results in mechanical noises, because the black key member thus inclined happens to contact the adjacent key members or the key frame.

SUMMARY OF THE INVENTION

An object of this invention is to provide a key member device so improved as to prevent the key member from being inclined in the transverse direction thereof.

In an aspect of this invention, the key member device is provided with a plurality of white key members and black key members regularly arranged by a chromatic scale, the upper surfaces of said black key members being higher than that of said white key members, each of said black key members having protrusions sidewise extending therefrom in a manner to contact the upper or lower surface of the adjacent white key members near or at a position at which each of the key members is rotatably supported on the upper edge of a supporting member.

The other objects and advantages of the present invention will be understood from the following description with reference to the accompanying drawings.

BRIEF EXPLANATION OF THE DRAWINGS

FIG. 1 is a side view of a key member device embodying this invention;

FIG. 2 is a perspective view of said key member device demounted in parts, wherein only two of the key members are illustrated;

FIG. 3 is a fragmentary perspective view of another embodiment of said key member device of this invention;

FIG. 4 is a fragmentary perspective view of a key member device modified from that of FIG. 3;

FIG. 5 is a perspective view of part of a black key member modified from those of the above-mentioned embodiments; and

FIG. 6 is a perspective view of part of a black key member still further modified from those of the above-mentioned embodiments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 and 2 indicate a key member device embodying this invention, said key member device being provided with a series of so-called white key members which are used for the natural tones and a series of so-called black key members which are employed for the sharps and flats, regularly arranged by a chromatic scale in a generally known manner. The upper surfaces of the black key members are elevated higher than those of the white key members. In the drawings, there are illustrated only two white and black key members 1 and 2 made of plastics. Each of said key members has a V-shaped groove 3 formed in the under portion thereof in a manner to extend in the transverse direction thereof, and is swingably supported on the upper edge of a supporting frame 4 with said edge fitted into said groove 3. A coiled tension spring 5 bridges the rear end portion of said key member and the lower edge portion of said supporting frame 4 rearwardly extending from the vertical portion, so as to cause the key member to be maintained in a nonoperating position. Said supporting frame

4 is attached to the rear end of a key bed frame 6, to the lower portion of which is so attached a keying switch device 7 as to correspond to each of said key members. An actuator member 8 for said keying switch device 7 upwardly extends through a bore 9 formed in the key bed frame 6, and faces the lower surface of the key member, so that when the key member is pushed down against the action of the spring 5, the actuator 8 is downwardly moved so as to cause the switch device 7 to be operated.

Said black key member 2 has protrusions 10 and 11 sidewise extending therefrom. Said protrusions 10 and 11 may consist of a transverse bar formed or disposed on the lower surface of the rear portion of said black key member 2 in a manner to extend over the width thereof and to face with a slight gap (a gap of 0.1 to 0.2 mm.) the lower surface of the adjacent white key member 1 near a position at which each of the key members is rotatably supported as already described.

Accordingly, when glissando is performed, such a force is exerted as would incline the black key member in the transverse direction thereof, but its inclination is prevented with the protrusion 10 or 11 being engaged on the lower surface of the adjacent white key member.

FIG. 3 indicates a modification of the key member device of this invention, wherein protrusions 10*a* and 11*a* are positioned on the upper surface of the black key member 2 in a manner to contact or face with a slight gap the upper surface of the adjacent white key members near or at a position at which each of the key members is rotatably supported. Since the other parts of said key member device are substantially of the same form as those of FIGS. 1 and 2, here is eliminated the detailed explanation of said parts.

FIG. 4 indicates white key members 1*b* slightly modified from those of FIG. 3, wherein a rounded portion 13 is so formed on the upper portion of each of said white key members 1*b* as to contact the protrusion 10*b* or 11*b*. Said rounded portion 13 may be formed into a transversely extending semicircular body with its center defined at a point at which the key member is turnable. When the black key member 2 is depressed, the protrusions 10*b* and 11*b* rotate concentrically around the semicircular body of the rounded portion 13, thus providing no difficulties in the rotational movement of the key member.

FIGS. 5 and 6 indicate protrusions 10*c* and 11*c*, and 10*d* and 11*d*, each of which is integrally formed by bending outward the cutout portion of the same channeled metal plate, from which is fabricated each of the black key members. Said protrusions 10*c* and 11*c* are positioned on the lower edges of the sidewalls of the channel, and said protrusions 10*d* and 11*d* on the upper edges thereof.

I claim:

1. A key member device provided with a plurality of white key members and black key members regularly arranged by a chromatic scale, the upper surfaces of said black key members being higher than that of said white key members, each of said black key members having protrusions sidewise extending therefrom in a manner to face the upper or lower surface of the adjacent white key members near or at a position at which each of the key members is rotatably supported on the upper edge of a supporting member.

2. The key member device claimed in claim 1 in which said protrusions are positioned on the lower surface of the rear portion of said black key member.

3. The key member device claimed in claim 1 in which said protrusions are positioned on the upper surface of the rear portion of said black key member.

4. The key member device claimed in claim 1 in which said protrusions are formed by bending outward the cutout portion of the same channeled metal plate from which is fabricated each of the black key members.

5. The key member device claimed in claim 1 in which each of said adjacent white key members has a rounded portion with its center defined at a point at which said black key member is turnable, and each of said protrusions contacts the rounded portion.