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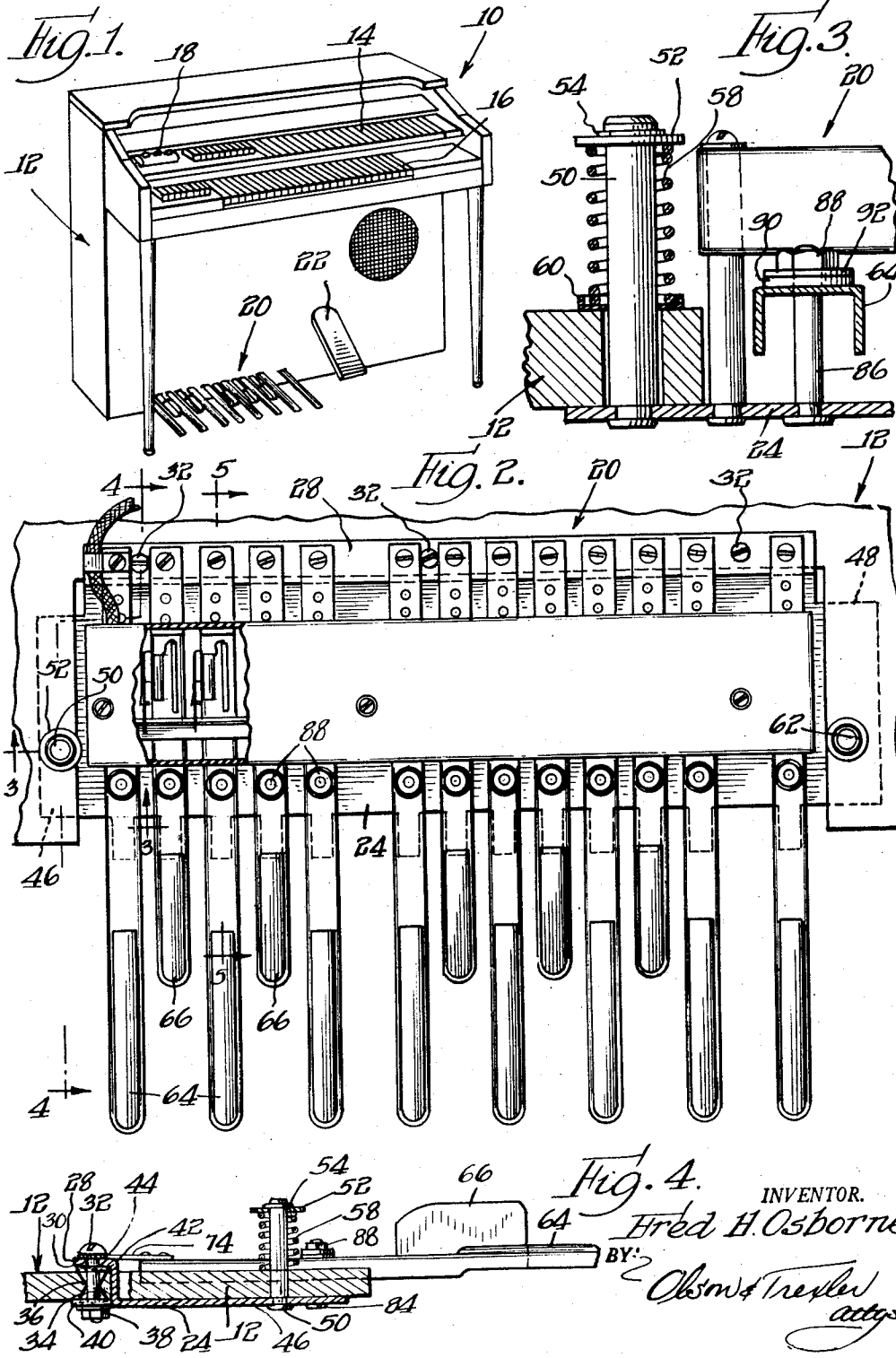
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2,911,873

ORGAN PEDAL STRUCTURE

Filed July 23, 1953

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

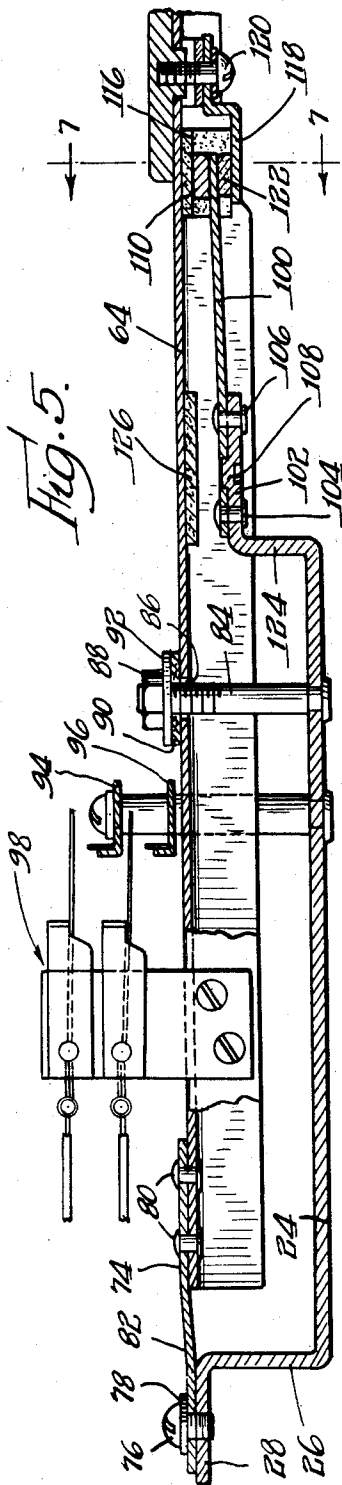


Fig. 5.

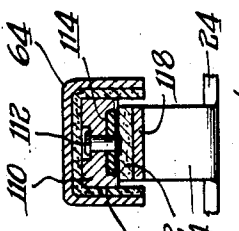


Fig. 7.

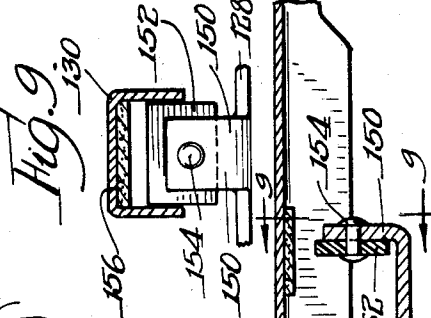


Fig. 9.

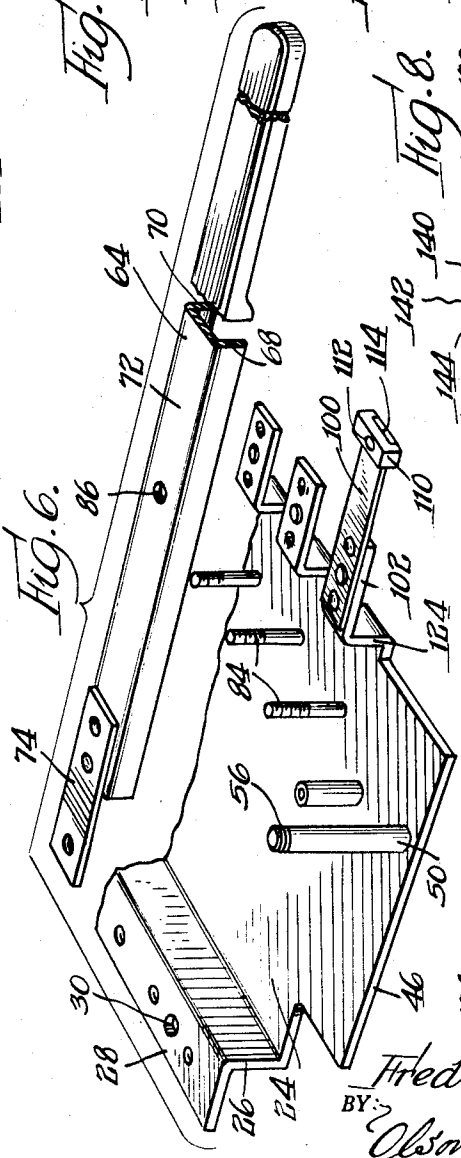


Fig. 6.

Fig. 8.

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ORGAN PEDAL STRUCTURE

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10 Claims. (Cl. 84—225)

The present invention relates to a pedal keyboard for instruments and more particularly to a novel pedal keyboard for musical instruments such as organs.

As is well known, pedal keyboards of instruments such as organs may be subjected to considerable loads while the instrument is being played and in the event the pedals are accidentally stepped upon. Furthermore, the pedals of such keyboards are often subjected to considerable laterally directed stresses so that the pedals tend to move sideways, thereby hindering proper operation. It is therefore necessary to make the pedal keyboards sufficiently rugged to withstand not only normal loads but also any overloads that may be applied thereto. It is also necessary to provide guide means for preventing lateral movement of the pedals in order to obtain proper operation. However, it is undesirable to obtain ruggedness by unduly increasing the bulk of the pedal keyboard since this will require too much space and in addition may be rather unsightly. Guides have heretofore been proposed to prevent lateral movement of the pedals but many of these guides have not been sufficiently smooth in operation or have been unduly noisy in operation because of sliding contact between the pedals and the guides which sliding contact may also reduce the useful life of the guides.

An object of the present invention is to provide a novel pedal keyboard which is relatively simple and compact and yet sufficiently rugged to withstand overloads applied thereto.

A more specific object of the present invention is to provide a novel pedal keyboard which may be yieldably mounted in the instrument or organ whereby upon the application of an overload to the keyboard it will yield so as to prevent injury.

A further object of the present invention is to provide a novel pedal keyboard with guide means constructed so as to promote smooth and noiseless operation of the pedals.

Still another object of the present invention is to provide a pedal keyboard with novel guide means arranged so that there is substantially no relative movement between a portion of the guide means contacting a pedal and the pedal whereby substantially to eliminate frictional wear and noises and to promote smooth operation.

A still further object of the invention is to provide an improved pedal keyboard, particularly adapted for controlling the key contacts of an electric organ.

Other objects and advantages of the present invention will become apparent from the following description and accompanying drawings wherein:

Fig. 1 is a perspective view illustrating an organ utilizing the novel pedal keyboard of this invention;

Fig. 2 is a plan view of the novel keyboard of this invention mounted in the frame of the organ;

Fig. 3 is an enlarged fragmentary cross sectional view taken along the line 3—3 in Fig. 2;

Fig. 4 is a cross sectional view taken along the line 4—4 in Fig. 2;

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Fig. 5 is an enlarged cross sectional view taken along line 5—5 in Fig. 2;

Fig. 6 is an exploded perspective view illustrating various elements of this invention;

Fig. 7 is a fragmentary cross sectional view taken along the line 7—7 in Fig. 5;

Fig. 8 is a fragmentary cross sectional view similar to Fig. 5 but showing a modified form of the present invention; and

Fig. 9 is a fragmentary cross sectional view taken along the line 9—9 in Fig. 8.

Referring now more specifically to the drawings, wherein like parts are designated by the same numerals throughout the various figures, an organ 10 is shown in Fig. 1 for the purpose of illustrating the use to which the novel keyboard of this invention may be applied. The organ 10 is an electric organ having constantly vibrating reeds as tone generators, and the present invention in certain of its aspects is particularly adapted to electric organ control. It will be understood, however, that the pedal keyboard of this invention is adapted for use in other types of organs and similar instruments.

The organ 10 includes a cabinet and frame 12 on which are mounted upper and lower manual keyboards 14 and 16 and controls 18. A pedal clavier or keyboard 20 embodying the principles of this invention is mounted on a lower portion of the organ frame along with a volume control foot pedal 22.

Referring now to Figs. 2 through 6, it will be seen that the pedal keyboard 20 includes a base plate 24 which is preferably constructed of relatively heavy sheet metal. The longitudinally extending rear marginal portion of the base plate is provided with a vertical wall 26 terminating in a horizontal extending flange 28 adapted to overlie a portion of the organ frame 12 as shown best in Figs. 2 and 4. A plurality of apertures 30 are spaced along the flange 28 for receiving bolts or screws used to secure the base plate to the organ frame. As shown best in Fig. 4, a bolt 32 extends through the flange 28 and through an aperture 34 in the organ frame. Preferably the aperture 34 has a diameter substantially equal to the diameter of the bolt at the midpoint 36 from where the aperture flares outwardly in opposite directions to permit the bolt to pivot therein while at the same time limiting horizontal movement of the bolt and thus the keyboard. The bolt 32 is retained in position by a nut 38 and preferably a felt washer 40 is disposed between the bolt and the frame 12 and a similar washer 42 is disposed between the frame and the flange 28. The bolt 32 may be retained against retrograde movement by any suitable means such as a lock washer 44.

In order to retain the base plate 24 in its normal position which is usually horizontal, extensions or tabs 46 and 48 are provided at opposite ends of the base plate and positioned to underlie the organ frame 12. A vertically upstanding post 50 is staked or otherwise secured to the tab 46 and projects upwardly through a suitable aperture in the frame 12. A washer 52 is retained on the upper end of the post 50 by any suitable means such as a snap ring 54 fitting within a groove 56. A heavy compression spring 58 is also disposed on the post and acts between the washer 52 and the frame 12 whereby to draw the base plate tab securely against the downwardly facing surface of the frame. Preferably a spring cup 60 is provided between the frame 12 and the spring to prevent the spring from digging into the frame which frame is normally constructed of wood. A post 62 similar to the above described post 50 is staked to the base plate tab 48 and also extends upwardly through a suitable aperture in the organ frame. Spring means identical to the above described spring 58 and its associated elements is also provided for the post 62 but need not be described

in detail. With this structure it is seen that the pedal keyboard base plate is securely mounted to the frame but at the same time it is resiliently mounted so that upon the application of any overload to the pedals of the keyboard the base plate will yieldably pivot downwardly to relieve the overload.

As shown best in Fig. 2, a plurality of relatively long pedals 64 and relatively short pedals 66 are mounted on the base plate 24. Since all these pedals are mounted and guided in the same manner, only the mounting guiding means for one of the longer pedals 64 will be described in detail.

As shown in Figs. 5, 6 and 7, the pedals 64 are in the form of elongated U-shaped channel members having opposed legs 68 and 70 and a top section 72. Each pedal 64 is pivotally connected with the base plate by means of a relatively strong flat flexural spring 74. As shown in Fig. 5, the flexural spring 74 is secured to the horizontal flange 28 of the base plate by means of a suitable screw 76 and a lock washer 78. A pair of rivets 80 secure the spring to the top section 72 of the pedal. In order to prevent loose operation of the pedal the flexural spring 74 is preferably bent upwardly as at 82 to hold the pedal with some force against upper stop means. This stop means includes a post 84 staked or otherwise secured to the base plate and extending upwardly through a suitable aperture 86 in the pedal. An adjustable nut 88 is threaded onto the upper end of the post and a felt stop washer 90 is disposed between the nut and the pedal. Preferably the felt washer is also backed up by a metal washer 92. With this structure it is seen that the uppermost position of the pedal may be adjusted as desired. In the particular electric organ used to illustrate the present invention upper and lower commons or contact bars 94 and 96 are suitably supported on and insulated from the base plate and the upper stop means should be adjusted so as to prevent the pedal from contacting the lower bar 96. Suitable switch means generally designated by the numeral 98 is mounted on each pedal so that upon downward movement of the pedals the switches engage the contact bars to close circuits which control the playing of the desired notes or chords.

In accordance with a feature of this invention guide means is provided for restraining the pedals against lateral movement which guide means is smoothly and noiselessly operable. The guide means is shown best in Figs. 5, 6 and 7 and includes a relatively light flat flexural spring 100 secured to an arm 102 extending from the forward edge of the base plate. Preferably a pair of spaced rivets 104 and 106 are provided for attaching the spring to the arm 102 and in addition a portion of the arm is half punched as at 108 so as to extend into a suitable aperture in the spring. With this structure the spring is rigidly fixed to the base plate and securely retained against any possibility of lateral movement relative to the base plate. The flexural or guide spring 100 is operatively connected with the pedal 64 for guiding the same by means of a rectangular block 110 which is secured to the outer end of the spring by a rivet 112 or any other suitable means. It should be noted that, as is shown best in Fig. 7, the block 110 is provided with a recess 114 which snugly receives the flexural spring whereby the block is prevented from twisting relative to the spring. As shown in Fig. 5, the spring 100 extends upwardly and outwardly from the arm 102 so that the block 110 is disposed within the channel of the pedal. A felt pad 116 is also disposed within the channel and is located between the block 110 and the pedal. With this structure it is seen that the spring 100 through its connecting block 110 fitting snugly within the pedal effectively restrains the pedal against any lateral movement. Furthermore, since the connecting block 110 moves up and down with the pedal there is no substantial relative movement between the block and the pedal whereby the operation of the pedal is noiseless and smooth.

The guide spring 100 is preferably formed so that it

is slightly bent or flexed even when the pedal is in its uppermost position. This not only assists the main mounting spring 74 in returning the pedal to the upper position quickly and smoothly, but also holds the connecting block 110 securely within the channel of the pedal. However, in order to prevent all possibility of the connecting block slipping out of the pedal channel a clamping finger 118 is secured to the underside of the pedal by a screw 120 and underlies the free end of the spring 100. A felt pad 122 is secured to the clamping finger 118 for contacting the guide spring and clamping the connecting block within the pedal.

As shown in Fig. 5, the guide spring mounting finger 102 is preferably positioned above the plane of the base plate by a vertically extending finger portion 124. Thus the finger 102 also provides a stop for limiting downward movement of the pedal. Preferably a felt pad 126 is secured to the pedal for engagement with the finger 102 or more specifically for engagement with the top of the spring 100 overlying the finger to eliminate any possibility of noise which might occur upon engagement of the pedal with the lower stop.

Figs. 8 and 9 illustrate a slightly modified form of the present invention wherein a pedal keyboard base plate 128 essentially identical to the above described base plate 24 is provided for supporting a plurality of pedals 130 identical to the above described pedals 64 or 66. However, in this embodiment the pedal 130 is pivotally mounted to the base plate by a relatively light flexural spring 132 which is secured to the base plate by a screw assembly 134 and to the pedal by rivets 136. The upper stop of this embodiment is identical to the above described upper stop and thus includes a post 138 staked to the base plate and having a nut 140, a metal washer 142 and a felt washer 144 assembled on its upper end. In this embodiment the main spring force for urging the pedal to its upper position is provided by a coil spring 146 surrounding the post 38 and acting between the pedal and the base plate. If desired, a spring cup 148 may be provided between the spring and the base plate 128.

The base plate 128 is substantially identical to the above described base plate 24 and is adapted to be yieldably mounted to the instrument or organ frame in the same manner as the base plate 24. The base plate 128 differs only in the means provided for guiding the pedal and for limiting the downward movement of the pedal. This means includes a short upstanding tab 150 disposed at the forward end of the base plate 128 and having a guide block 152 of plastic or any other suitable material secured thereto by means of a rivet 154. As shown best in Fig. 9, the guide block 152 fits snugly within the channel of the pedal 130 and thus restrains the pedal against lateral movement. By selecting a plastic material that is not too hard for the guide block 152 the sliding contact between the guide block and the pedal will not create objectionable noises. The guide block 152 also acts as the lower stop for the pedal and in order to prevent objectionable noise when the pedal reaches its lower limit of movement a felt pad 156 is secured within the pedal for engagement with the top of the block 152.

From the above description it is seen that the present invention has provided a novel pedal keyboard structure which is simple and compact and which is adapted to withstand any overloads applied thereto. In addition, it is now seen that the present invention has provided novel means for supporting the pedals so as to promote rapid, smooth and substantially noiseless operation. More specifically, it is seen that one form of the present invention has provided novel guide means for restraining lateral motion of the pedals which guide means is arranged so that there is substantially no sliding motion between it and the pedals whereby smooth and noiseless operation is obtained along with an increased operating life. The pedal structure shown is also particularly

adapted to control the key contacts of an electric organ with the facility and accuracy required for rapid and smooth playing with such instruments.

While the preferred embodiments of the present invention have been shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

The invention is hereby claimed as follows:

1. In a musical instrument of the piano or organ type having a case of substantial size adapted to stand on a floor or the like, a pedal keyboard comprising base means, pedal means mounted on said base means for up and down playing movement relative thereto, and means for yieldably mounting said base means on said case, said mounting means including means substantially preventing horizontal movement of said base means relative to said case and further means permitting controlled vertical movement of said base means relative to said case so that said base means may yield vertically upon the application of a load thereto to relieve the load and reduce any possibility of injury to the keyboard.

2. In a musical instrument of the piano or organ type having a case of substantial size adapted to stand on a floor or the like, a pedal keyboard comprising base means, pedal means mounted on said base means for up and down playing movement relative thereto, means for yieldably mounting said base means to reduce any possibility of injury to the keyboard upon the application of a load thereto, said mounting means including substantially vertical post means associated with said base means, said case having aperture means through which said post means extend, thereby preventing any substantial horizontal movement of said base means relative to said case, and spring means on said post means coacting between said base means and the member to yieldably support the base means for limited vertical movement relative to said case.

3. In a musical instrument of the piano or organ type having a case of substantial size adapted to stand on a floor or the like, a pedal keyboard comprising base means, pedal means mounted on said base means for up and down playing movement relative thereto, means for mounting said base means to a supporting case for pivotal movement about a horizontal axis, spring means associated with said case and spaced transversely of said horizontal axis for yieldably supporting said base means whereby to reduce any possibility of injury to the keyboard upon application of a load thereto.

4. In a musical instrument of the piano or organ type having a case of substantial size adapted to stand on a floor or the like, a pedal keyboard comprising a base plate, pedal means mounted on said base plate for up and down playing movement relative thereto, said base plate having a longitudinally extending portion adapted to be secured to said case, said base plate having an end portion adapted to be positioned beneath said case, post means associated with said base plate end portion and adapted to be operatively connected with said case, and spring means on said post means and operable between said base plate and said case for yieldably supporting said base plate.

5. In an instrument of the type described, frame means, a pedal keyboard mounted on said frame means, said keyboard including a base plate having a rearwardly extending flange overlying a portion of said frame means

and an end portion underlying said frame means, means pivotally connecting said flange to said frame means, and spring means operatively associated with said base plate end portion and said frame means for yieldably supporting said base plate.

6. A pedal keyboard comprising base means, a pedal, a flat flexural spring movably mounting said pedal on said base means, and a second flat flexural spring means having one end connected substantially flat against the base means and fixed against lateral movement relative to the pedal and the opposite end slidingly interfitting with the pedal to guide the pedal and restrain the pedal against lateral movement whereby to promote smooth and substantially noiseless operation.

7. A pedal keyboard comprising base means, a pedal, a flat flexural spring movably mounting said pedal on said base means, and a second flat flexural spring having one end rigidly secured to said base means, said second flexural spring having means thereon spaced from said fixed end and said pedal at substantially the same location having means cooperatively and snugly interfitting therewith whereby to guide the pedal and restrain the pedal against lateral movement.

8. A pedal keyboard comprising base means, a pedal, a relatively heavy flat flexural spring pivotally mounting said pedal on said base means and yieldably biasing said pedal toward a raised position, a second flat flexural spring having one end thereof rigidly secured to said base means, the free end of said second flexural spring being disposed adjacent said pedal, and means on the free end of said second flexural spring and snugly interfitting with said pedal whereby to smoothly and substantially noiselessly guide the pedal and restrain the pedal against lateral movement.

9. A pedal keyboard as set forth in claim 1 wherein the pedal means comprises a plurality of pedals, a plurality of flat flexural springs respectively mounting said pedals on said base means and also biasing said pedals toward the raised position, and guide means connected with said base means and associated with the pedals for smoothly and substantially noiselessly guiding the pedals for movement toward and away from the base means and for restraining the pedals against lateral movement.

10. A pedal keyboard as set forth in claim 9 wherein the guide means includes a plurality of plastic block-like members respectively snugly and slidably fitting within recesses in the pedals.

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