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MUSICAL INSTRUMENT KEY ACTION

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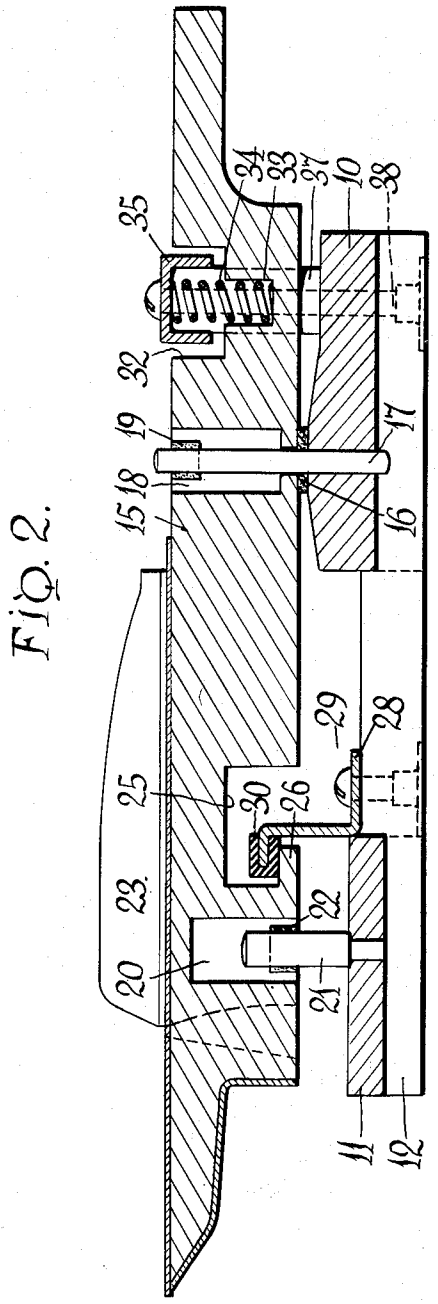


Fig. 2.

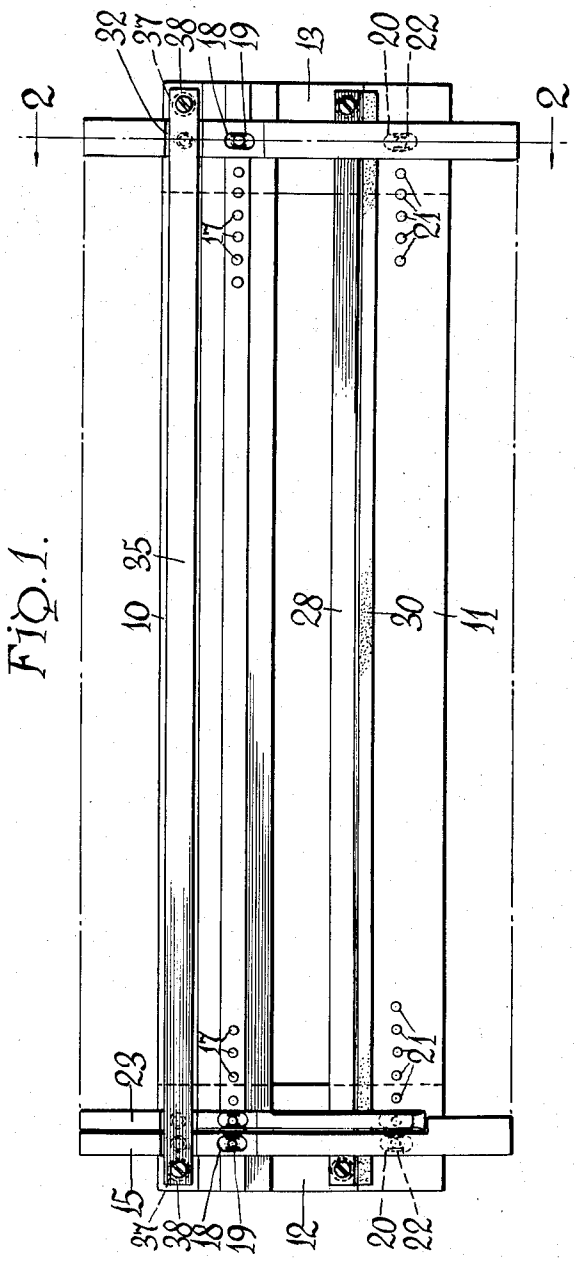


Fig. 1.

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MUSICAL INSTRUMENT KEY ACTION

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This invention relates to key actions for musical instruments and more particularly to key actions for musical instruments of the organ type.

In musical instrument key actions means are conventionally provided for biasing the keys to an inactive or rest position and for limiting the movements of each key in opposite directions. The present invention provides improved means for effecting these purposes. In the key movement limiting arrangement of the present invention the movements of all of the keys of a keyboard or manual are defined or limited in both directions of key movement by a single rail member which acts directly against the individual keys to stop the same at a precisely predetermined point in both the downward and upward movements of the keys.

Furthermore, the individual keys are resiliently biased to their upper idle poistions by novel individual compression coil springs which act directly between the individual keys and a common reaction member in the form of a rail which bears against all of the biasing springs of a keyboard or manual. The biasing spring arrangement is such that no mechanical connections or extraneous parts are required other than the keys, the compression coil springs, and the above-mentioned reaction rail member.

While the key limiting and key biasing means of the present invention serves the intended purposes in a highly effective manner, a considerable part of the value thereof resides in the economy of manufacture which is attained in practicing the invention. Several of the parts usually employed for each key for accomplishing the foregoing purposes is eliminated and the resulting saving when this is multiplied by the number of keys in a keyboard or manual is self-evident.

Furthermore, the assembly of a keyboard constructed and arranged in accordance with the present invention is very much simpler and more expeditious than in the prior art and most of the usual connecting of parts and all individual adjustments of the limiting and biasing mechanisms for each key are eliminated, as will appear from a consideration of the typical embodiment of the invention which is described in the following specification and depicted in the accompanying drawing.

The key biasing means and the stop or limit means of the present invention cooperate in an extremely simple and highly effective manner to maintain the keys in a level and precisely aligned arrangement which is highly desirable and, in fact, of the utmost importance in constructing musical instrument keyboards.

While the above mentioned typical embodiment is set forth herein by way of example, it is to be understood that the principles of the present invention are not limited thereto nor otherwise than as defined in the appended claims.

In the drawing:

FIG. 1 is a fragmentary top plan view of a keyboard or manual showing only the end keys thereof and the underlying and supporting structure, in accordance with one form of practicing the present invention; and

FIG. 2 is a cross-sectional view taken approximately on the line 2—2 of FIG. 1 but on a larger scale.

In the drawing like characters of reference denote like parts and the numerals 10 and 11 designate, respectively, a key fulcrum rail generally referred to as a balance and guide pin rail, and a front rail. The rails 10 and 11 are

supported at their opposite ends on members 12 and 13 which comprise portions of the frame assembly of the instrument.

Referring particularly to FIG. 2, a key member 15, usually of wood, rests on the balance rail 10 through an interposed felt strip 16 and a guide pin 17 fixed in the balance rail 10 extends upwardly through the key 15, the latter having an oblong clearance counterbore 18 which guides and locates the key in a left to right direction as viewed in FIG. 1. Lateral cushioning pads 19 of felt or the like are secured to opposite sides of the oval counterbore 18. All of this portion of the keyboard and key action construction is entirely conventional.

Adjacent to its front portion each key has an oblong bore 20 and a front guide pin 21 fixed into front rail 11 extends upwardly thereinto to locate and guide the key in a left to right direction as viewed in FIG. 1. Here again lateral cushioning pads 22 are disposed against the flat side walls of the oblong bore 20 to cushion contact of the keys with guide pins 21. This also is conventional construction in keyboards of the general type here under consideration.

One of the usual black keys of an organ keyboard is designated 23 in FIGS. 1 and 2 and apart from the usual difference in shape the black keys are constructed and arranged in the same manner as the white keys, such as the key 15.

Reference will now be had to that portion of an organ or other musical instrument keyboard construction which is novel to the present invention, namely, the key movement limiting means and the key biasing means. Referring particularly to FIG. 2, it will be noted that each key member is notched at its under side as at 25 and that a lip formation 26 extends rearwardly from the front of each notch 25.

A single limit stop and key leveling bar which is common to all of the keys of a keyboard or manual is designated 28 and is secured at its opposite ends to the frame members 12 and 13 as at 29. Bar 28 is Z-shaped in cross section, its lower flange being disposed upon the frame members 12 and 13 and its upper flange extending into each of the notches 25 of the several keys and in a position to overlie the lips 26 thereof. A continuous channel-shaped rubber strip 30 is disposed over the upper flange of bar 28 to cushion the contact thereof with the top walls of the notches 25 of the keys and the top surfaces of the lip formations 26 thereof.

It is believed to be obvious that manual depression of any of the keys of the keyboard will be limited by engagement or abutment of the upper wall of the notch 25 thereof with the top surface of the rubber strip 30 of the limit bar 28. Conversely, the return movement of each key will be limited by abutment of the lower side of rubber strip 30 with the top surface of the lip formation 26 of the key. The several keys 15 will be held in normally level and aligned positions by cooperation between this latter abutment between the rubber strip 30 and bar 28 and by the novel key biasing means provided herein, and such key biasing means will now be described.

Each of the keys 15 and 23 is laterally notched at its upper rear portion as at 32 in FIG. 2 and is further provided with a counterbore or blind recess 33 in the base of the notch 32. A compression coil spring 34 rests in each recess 33 and a common abutment and enclosing member for the upper ends of the several springs 34 is provided in the form of an inverted channel member 35. The notches 32 of the keys provide clearance for the channel member 35 and in effect house the same, and the latter is fixed at its opposite ends to the tops of posts 37, which in turn rest upon balance rail 10, and screw means 38 engage through the channel member, the posts and the balance rail to retain the same in relatively fixed positions.

It will be noted that assembly of the key biasing means is effected by simply depositing one of the coil springs **34** in each recess **33** and disposing the single spring rail **35** through the series of notches **32** and over the several coil springs **34** and securing the same to the tops of end posts **37**. Thus the springs **34** and the abutment of rubber channel strip **30** with the lip formations **26** of the keys **15** cooperate to maintain the several keys **15** in true and level position in the keyboard or manual. The extreme simplicity of the key limiting and biasing means of the foregoing construction will be apparent to those skilled in the present art and familiar with conventional constructions for attaining the same ends.

It will be understood by those skilled in the musical instrument art that the rear portions of the keys, that is the right-hand tail portions thereof as viewed in FIG. 2, are adapted to come into engagement with sound-producing or initiating devices upon depression of the front of a key and consequent upward movement of such tail portion. These sound-producing or initiating devices may comprise reeds, air valves, electrical contacts or other devices of this general character.

I claim:

1. In a keyboard for musical instruments, a balance rail and a plurality of keys fulcrumed thereon, each of said keys having a transverse notch in its upper surface rearwardly of said balance rail and a recess in the bottom of such notch, a compression coil spring disposed in each of said recesses and projecting thereabove, and a spring rail extending generally parallel to said balance rail through the transverse notches of the plurality of keys and bearing jointly against the upper ends of the coil springs of said plurality of keys, whereby said keys are resiliently biased to rest position with their front ends raised.

2. In a keyboard for musical instruments, a balance rail and a plurality of keys fulcrumed thereon, each of said keys having a transverse notch in its upper surface rearwardly of said balance rail and a recess in the bottom of such notch, a compression coil spring disposed in each of said recesses and projecting thereabove, and a spring rail comprising an inverted channel member extending generally parallel to said balance rail with its inner web surface bearing against the upper ends of the coil springs and its flanges depending into said transverse notches to enclose the upper portions of said springs, whereby said keys are resiliently biased to rest position with their front ends raised.

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