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KEY ASSEMBLY FOR MUSICAL INSTRUMENTS

Lord W. Halvorson, Duluth, Minn.

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10 Claims. (Cl. 84—365)

This invention relates to musical instrument keys and has special reference to keys for accordions and the like.

One of the principal objections to accordion keys is that they must be operated or keyed close to the outer edge thereof as when they are keyed inwardly from the outer edge they are more difficult to push in, and adjacent their inner ends it is practically impossible to depress the key for playing the instrument.

One of the principal objects of my invention is to overcome the above objection and provide a key which may be operated equally well from any point on its surface, and which will not be hard to operate at any point.

Another object is to provide a key which does not have to be depressed as far as present keys to operate the instrument, as with present keys, the outer ends travel as much as ¼ of an inch while my keys may travel only about half that distance.

Another object is to provide an accordion which gives more freedom in playing, especially in difficult reaches.

Another object is to provide key operating mechanism which can be used for either the black or the white keys as desired.

These and other objects and advantages will become more apparent as the description of the invention proceeds.

In the accompanying drawing forming a part of this application:

Fig. 1 is a broken side elevational view of a white key showing the lever arrangement and the spring return arrangement for the key.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a broken side elevational view of a black key to illustrate the slight differences over the white key.

Fig. 4 is a sectional view of portions of an accordion showing the installation of the keys.

Fig. 5 is an exploded view of the parts of the key mechanism in perspective.

Fig. 6 is a perspective view of a key supporting rib portion which is adapted to be secured to the keys by means of screws.

Fig. 7 is a perspective view of one of the levers of the key mechanism modified for use with either black or white keys.

In the drawing, the reference numeral 1 indicates the body portion of an accordion and 2 indicates the keyboard carrying portion thereof. The numeral 3 indicates the rod which is connected from the keys to operate the clappers 4, all of which are common in the art, as are the white keys 5 and black keys 6.

My improvement resides in the key mechanism for operating the clappers and all keys being the same, or substantially so, I will describe same as one.

The keys have a relatively narrow rib 7, preferably of wood, fixed to the under side thereof, either by gluing as in Fig. 1, or by screws as shown in Fig. 3 of the drawings. The rib 7 is preferably bifurcated at its rearmost end as at 8 to receive the end of the angular bracket 9 which extends downwardly and rearwardly from the rib 7, there being suitable holes provided whereby the end of the bracket 9 may be fixed in the bifurcation 8 as by riveted pins or the like.

The bracket 9 is preferably metal, aluminum or other light strong metal being very suitable, and provides means for suspending the keys in conjunction with the rib 7, as will be apparent from the following description.

To aid in supporting the keys a lever 10, composed of a pair of angularly shaped members, also of metal, are pivotally secured at their upper inner ends to the rib 7 adjacent the inner end of the rib, a hole 11 being provided in the rib to receive a pin 12 which also extends through the hole 13 in the lever 10, one member of the lever 10 being on each side of the rib 7 and both extending rearwardly of and substantially parallel with said rib and with each other, the length of the levers being more than that of the rib, preferably, so as to extend to adjacent the outer edge wall 14 of the keyboard supporting portion 2, see Fig. 4. A block 15 is fixed between the levers 10, as by rivets 16 through holes provided adjacent the rear ends thereof to hold the ends of the lever members firmly in spaced relation to each other. Rearwardly of the block 15, the lever members are correspondingly notched as at 17, this notch, in conjunction with the rod or bar 18, forms the fulcrum for the lever 10, the rod being carried by means of suitable spaced standards or brackets 19 which are secured to the keyboard carrying portion. The notch 17 in the lever 10 provides means to install the lever on its fulcrum very readily.

A second lever 20 is fulcrummed adjacent its inner or forward end on a rod 21 which extends through a hole 22 in the lever. The rod 21 extends through the keyboard portion of the accordion and is supported by suitable brackets 22 on each side of the key which are fixed to
and upstand from the keyboard portion adjacent the forward end thereof. The outer end of the lever 28 is pivotally united to the outer end of the bracket 3 as by a pin 23 which extends through the hole 24 in the lever and hole 26 in the bracket, the lever 28 having a vertical slot 26 therein to receive the bracket 3, preferably as shown.

The two levers 10 and 20 are pivotally united, preferably centrally between their respective fulcrums (it being noted that the fulcrums are on opposed ends of the levers) a pin 27 being provided to extend through the hole 28 in the lever 10, and through the transverse slot 25 in the lever 20. As shown herein, the lever 20 is of wood, and a metal bearing 30 is illustrated as being installed in the slot 28 to reinforce the slot 28 and to reduce wear during the operation of the keys. The slot 25 is provided to permit the longitudinal movement between the levers 10 and 20 as the keys are operated.

It may be seen, from the above, that the keys are suspended by the levers 10 and 20 which are fulcrumed at their opposed ends, and which are pivotally united substantially centrally thereof. With the key thus suspended, it may be reciprocated inwardly and outwardly, and the travel of the key in either direction will be substantially the same at all points throughout its length. That is, the key may be depressed from any point on its surface and it will move inwardly substantially the same distance at all points, and the moment of force required to depress the keys will be substantially equal at all points. This feature will permit more ease of playing and facilitate the keying of the accordian in awkward or difficult chords, runs, etc.

Of course, it is desirable to have the keys return to their normal position immediately as they are released while playing. To accomplish this, a spring is used. I have here shown a spring 31 which is biased to push inwardly against the block 15 which forms one end of the lever 10 and thus pressure is applied against the rod or fulcrum 24, and the key is biased outwardly, in a manner similar to the squeezing of an orange seed to force same from one's fingers. The spring 31 is preferably carried by a block 32 which fits snugly between the brackets 18, the block having a pin 33 extending therefrom which is inserted in a suitable hole in the portion 14 of the keyboard to hold the block in place. An adjustment screw, suggested at 34, may be provided for selective adjustment of the tension of the spring 31.

It is deemed apparent that a different spring return arrangement may be employed than that here shown if desired, and the keys will function equally as well. For example, an expansive spring could be employed between the portion 2 of the keyboard and the outer end of the lever 20 adjacent its connection to the bracket 8. Other arrangements also are possible to the above, and they will be clear to one skilled in the art.

Having thus described the key operating mechanism, the connection of the keys to raise the clappers 4 is logically next in line. There is a slight difference between the clapper operating lever 35 of the rod 3 and the lever 36 of the white keys, and this difference is dictated by the respective lengths of the rods 3 which connect the clappers 4 with the levers 35 and 36, the difference being in the length of the lever outwardly of the common fulcrum 37 thereof which extends through the holes 38 in the lever 35 and 36. The fulcrum 37 is preferably an elongated rod similar to the rod 21, and is supported or carried by suitable brackets, in the instant case the same being substantially parallel with the latter.

As shown in the drawings, the lever 25 is notched as at 33 to receive a projection 40 of the clapper levers 35 and 36, the position of the notch 33 being such as to correspond with the projection 40. If desired, a modified lever 20 may be employed having an elongated notch 39', see Fig. 7, so that either black or white keys may be constructed and operated using identically the same key mechanism except for the clapper lever. The purpose of the notch 39 is for permitting the keys in which the keys may be installed by receiving the projection 40 as shown, the projection 40 forming the means to pivotally unite the clapper levers 35 or 36 with the lever 10 by means of a pin 41 extending through the holes 42 in the lever 15 in the case of the black key, or through the holes 43 in the case of the white key, and through the slot 44 in the projection 40. If desired, the slot 44 may have a reinforcing bearing 45 which is installed in a manner similar to the bearing 30 to minimize wear.

It is deemed apparent that if the rod 3 is quite slenderly the case with the white keys here shown, the point where the clapper lever 36 is pivotally connected to the lever 10 must be spaced from the fulcrum 37 a greater distance, in order to raise the clapper the desired distance, than in the case of the black keys where the rod 3 is shorter, and consequently the pivotal connection of the lever 35 is closer to the fulcrum 37.

In operation, the rib 1 and bracket 9 form the connection between the keys proper and the lever arrangement for raising the clappers and is so designed that it may be used with either black or white keys without change, the advantages of which are obvious.

With the keys biased outwardly by a suitable spring arrangement, the pressing of the keys inwardly will apply inward pressure to the ends of the levers 18 and 20 which are pivotally connected to the supporting rib 1 of the key and the said ends will move downwardly. The fulcrumed ends of the levers, obviously, cannot move downwardly, but swing slightly on their fulcrums, and the fulcrumed end of the lever 10 moves vertically slightly on its pin 18, the end of the lever being notched for this purpose. This longitudinal movement of the lever 10 is against the spring 31, of course, so that when the key is released, the spring will return the key to normal position immediately.

As the pivotal end of the lever 10 moves down, obviously, the end of the clapper lever which is attached thereto moves down also, which raises the opposite end of the lever to which the rod 3 is attached and the clapper is raised therewith. As the keys are usually depressed to their limit when playing, the position of the connection of the clapper lever to the lever 10 determines the height to which the clapper will be raised.

The pivotal connection of the two levers 10 and 20 substantially centrally between their fulcrums and the connection of the key and clapper lever 10 and 20 permits the pressing of the key at any point on its surface to play the accordian, and the amount of stress or pressure required to operate the keys will be substantially the same from any point on their surface. Also, the keys will move inwardly substantially in the same plane as they are normally carried, that is, there will be little, if any, varia
tion of the depth to which either end, or any portion, of the keys will move when pressed. It is also deemed apparent that by regulating the pivotal connection of the clapper lever to the lever (10) in relation to the fulcrum of the clapper lever, the keys may be arranged so that they need only be pressed a very short distance, in comparison to present accordion keys, to raise the clappers the desired distance.

While I have here described my invention as relating to accordion keys, it is deemed apparent that same may be adapted for organs, pianos, and the like.

Having thus described my invention, what I claim is:

1. A key assembly comprising a key, a pair of levers adapted to be fulcrumed at opposite ends on a support, one of said levers being pivotally connected at its unfulcrumed end to said key adjacent the inner end thereof, and the other one of said levers being pivotally connected at its unfulcrumed end to said key adjacent the outer end thereof, said levers being pivotally connected on a common pivot point substantially centrally between the pivotal point of the end of said levers, and an operating lever pivotally connected at one end to one of said levers, being fulcrumed intermediate its ends, and having an operating arm at its opposite end.

2. A key assembly comprising a key, a pair of levers having a fulcrum at their opposite ends and extending in substantial alignment with each other and with said key, said levers being pivotally united at a common pivot point intermediate of their fulcums, the free ends of said levers being pivotally connected to opposite ends of said key, and an operating lever connected at one end to one of said levers, being fulcrumed intermediate its ends, and having an operating arm at its opposite end.

3. The structure as set forth in claim 2 and spring means disposed substantially in alignment with one of said levers and adapted to push against one end thereof to retain said key in normal operating position.

4. An accordion key assembly comprising a key, a pair of levers fulcrumed at opposite ends on said accordion and being pivotally united at a common pivot point substantially centrally between their fulcums, one of said levers being pivotally connected to said key adjacent the inner end thereof, and the other of said levers being pivotally connected to said key adjacent the outer end thereof, and a clapper lever pivotally connected at one end to one of said levers, being fulcrumed intermediate its ends, and having clapper operating means at its opposite end.

5. The structure as set forth in claim 1 and one of said pair of levers being composed of two members, said member being of similar shape and disposed on opposite sides of the other one of said pair of levers.

6. The structure as set forth in claim 1 and the pivotal union of said pair of levers to each other being a sliding connection to permit said levers to move longitudinally with respect to each other.

The structure as set forth in claim 2 and the fulcrum of one of said levers including a sliding connection to permit said lever to move longitudinally on said fulcrum.

8. The structure as set forth in claim 7 and a spring extending longitudinally from said last mentioned lever adjacent said last mentioned fulcrum to bias said lever in a predetermined di-

rection to retain said key in normal operating position.

9. A key assembly for operating the playing mechanism of a musical instrument comprising: a key, a first lever pivotally connected adjacent the inner end thereof to said key and extending under and in substantial alignment with said key towards outer end of the latter, a second lever pivotally connected at one end thereof adjacent the outer end of said key and extending under and in substantial alignment with said key towards the inner end thereof, the opposite ends of each of said levers being pivotally carried by portions of said musical instrument, said first and second levers being pivotally connected between their respective pivotal connections with said key, means incorporated in said pivotal connections to permit said key to reciprocate vertically, means to limit the extent of said reciprocation, spring means biasing said key to its outermost position, the pivotal connection of said first and second levers to each other being substantially centrally between their pivotal connection to said key whereby an inward pressure on any portion of said key will cause same to be depressed substantially equally throughout its length, and means for connecting said second one of said levers with the playing mechanism of said instrument to operate the latter when said key is reciprocated.

LORD W. HALVORSON.

REFERENCES CITED

The following references are of record in the file of this patent:

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