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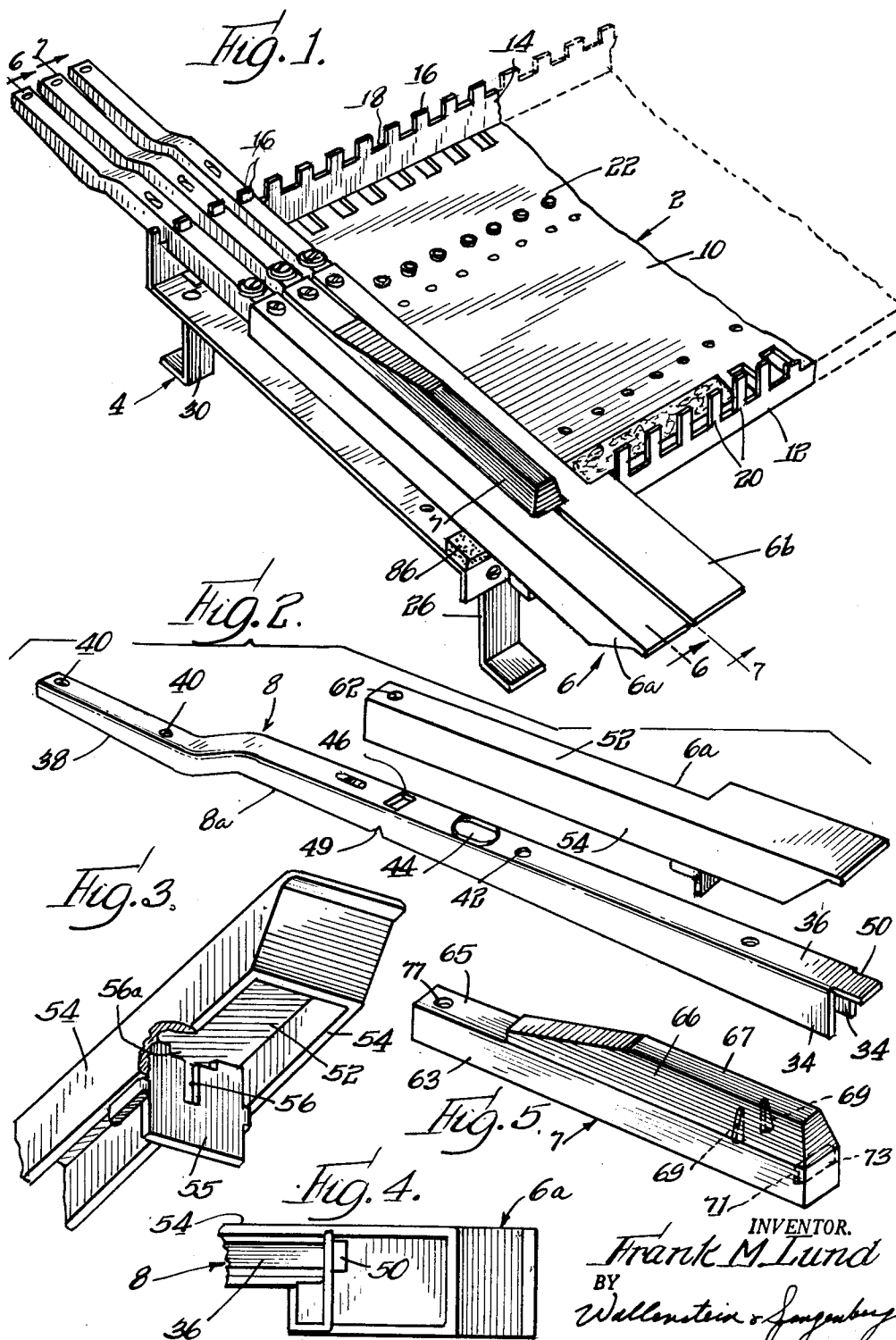
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KEYBOARD CHASSIS ASSEMBLY

Filed July 14, 1960

3 Sheets-Sheet 1



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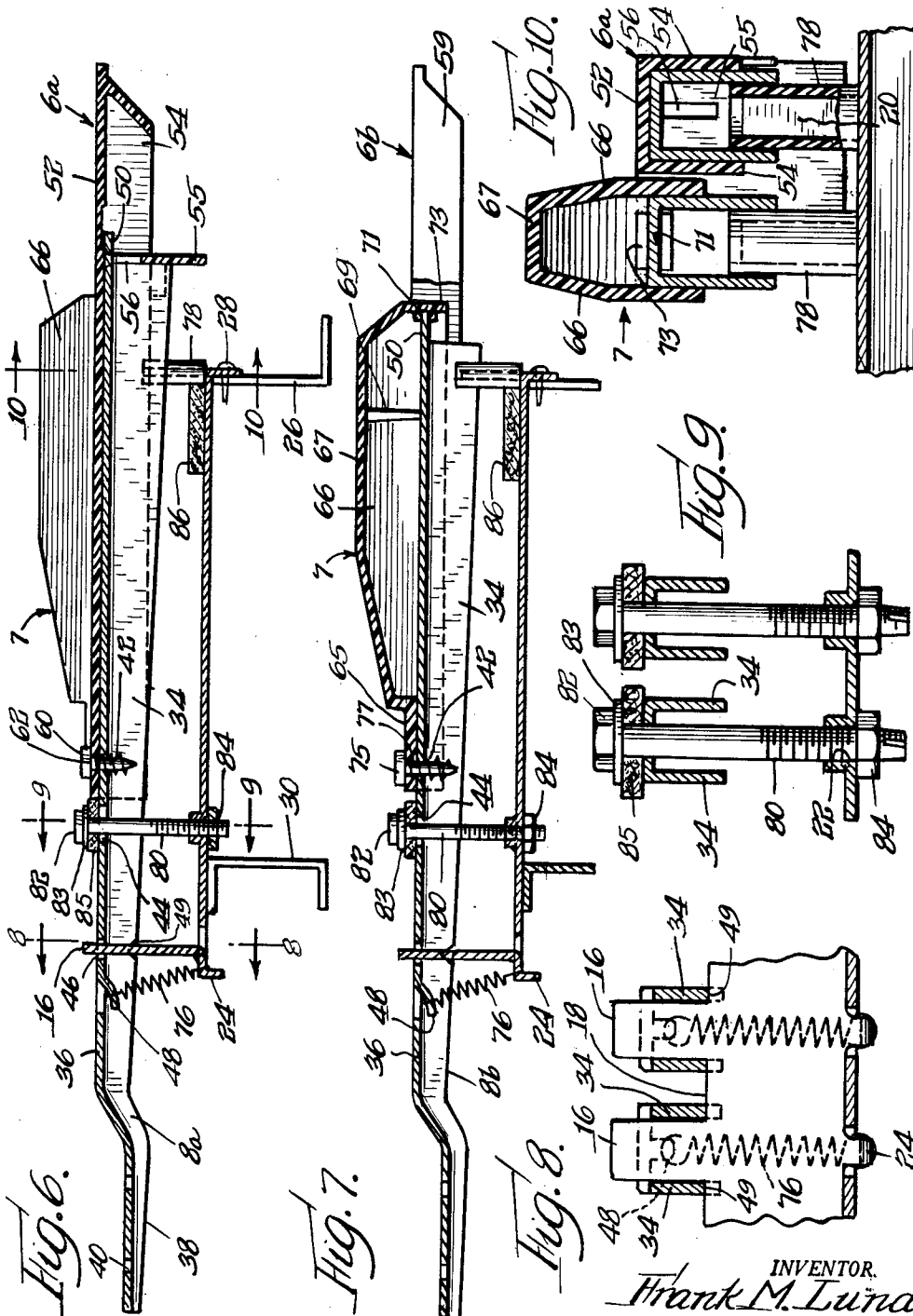
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KEYBOARD CHASSIS ASSEMBLY

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3 Sheets-Sheet 2



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KEYBOARD CHASSIS ASSEMBLY

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22 Claims. (Cl. 84-423)

This invention relates to keyboard musical instruments, such as organs, accordions, pianos, and the like.

Keyboards are generally constructed of individually pivotally mounted, spring-biased black and white key units. Each key unit comprises an outer hollow key piece made of a suitable plastic material having the necessary size, shape and color for the key involved and a wooden or metal core acting as a lever or connecting arm of the key. In both types of key units, the hollow key piece is secured to the core by securing means arranged and located in such a manner that it is impossible to separate each key piece from the associated core in the assembled keyboard without first removing the entire key unit from the keyboard assembly. This complicates servicing and fabrication problems. For example, during the assembly of the keyboard, it sometimes occurs that a key piece becomes damaged requiring its replacement. With the prior key unit constructions, appreciable time is wasted in removing the entire key unit so that a new key piece can be substituted for the damaged one.

The hollow key pieces have commonly been made of synthetic thermosetting plastic materials which are expensive relative to thermoplastic materials. The latter type of material has, heretofore, been found unsatisfactory for use as hollow key pieces mainly for the reason that it readily becomes deformed through use.

It is an object of the invention to provide a key unit construction for the keyboards of musical instruments wherein the hollow key piece thereof may be easily removed from the core thereof without requiring the removal of the entire key unit from an assembled keyboard.

Another object of the invention is to provide a unique key unit construction using key pieces made of a thermoplastic material and metal cores which are so constructed and related to the key pieces that the thermoplastic key pieces maintain their shape indefinitely under normal usage.

Still another object of the invention is to provide an improved keyboard assembly comprising a simple and compact unitary chassis upon which a large number of key units may be quickly and easily assembled. A related object of the invention is to provide a keyboard chassis as just described provided with simple means for holding the key units against lateral movement and means for limiting the upward vertical movement thereof. A related object of the invention is to form the last two mentioned means for each key unit as a single element on the chassis to simplify the construction of the chassis and to render the same more effective to carry out their intended functions.

An overall object of the present invention is to provide an improved assembly of a keyboard chassis and key units which are constructed and arranged to provide an extremely rugged and simply constructed keyboard chassis assembly.

In accordance with the most preferred form of the invention, the keyboard chassis assembly includes a chassis member having a front marginal wall from the top of which extend a first series of longitudinally-spaced, upwardly projecting fingers, and a rear, marginal, fulcrum-forming wall from the top of which extend a second series of longitudinally-spaced upwardly projecting fin-

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gers. These latter series of fingers are respectively positioned in transverse alignment to the first mentioned series of fingers at the front of the chassis member. The chassis member is further provided with a series of spring anchoring lugs struck from the chassis member, one such lug being positioned opposite each of the fingers on the fulcrum-forming wall.

The key units making up the keyboard (sometimes also referred to as key assemblies) extend between corresponding pairs of said fingers at the front and rear of the chassis member, which fingers fix the position of the key units on the chassis member. Each key unit most advantageously comprises a channel-shaped metal core or lever arm having flanges extending downwardly from a connecting web. The flanges of each lever arm straddle the corresponding front and rear chassis fingers, the latter fingers forming lateral stops for the key unit involved. The flanges are provided with inverted V-shaped slots which form fulcrum points which are pivotally mounted upon the upper marginal edge of said fulcrum-forming wall. A tension spring extends between each spring anchoring lug of the chassis member and the associated lever arm at a point rearwardly of the fulcrum-forming wall to bias the front end of the associated lever arm upwardly.

Adjustable elevation limiting means are provided for each key unit and preferably are formed by said lateral stop fingers at the front of the chassis member. These fingers are turned back at the tops thereof to form rearwardly projecting extensions around which a strip of felt or other noise deadening material is bent and adhesively or otherwise secured. Each horizontal finger extension is located between the flanges of a key unit lever arm, and acts as a vertical stop or abutment shoulder. One (or both) of the flanges of the lever arm is provided with an inwardly extending stop lug located at or near the bottom of the flange and this stop lug abuts against the bottom of the associated chassis finger projection to limit the upward movement of the lever arm. Minor adjustments in elevation of the control lever may be made by bending the associated chassis finger extension up or down a limited amount.

Each key unit includes a hollow key piece preferably made of a molded thermoplastic material and having depending side flanges which closely straddle the flanges of the associated lever arm. The hollow key piece fits tightly around the web and flanges of the associated lever arm which thereby maintain the shape of the key piece. Each key piece is removably anchored to its lever arm preferably by means comprising a screw passing through the top of the rear end portion of the key piece (which is normally hidden from view by the casing or frame of the musical instrument involved) and threading into the web of the associated lever arm. The forward end of the lever arm is most advantageously provided with a tongue which fits snugly into a slot formed in an internal rib in the front portion of the key piece, so that both the front and rear portions of the key piece are anchored in place. The key piece may be simply removed from its lever arm by removing the screw from the rear end portion of the key piece and then sliding the key piece forwardly to remove the tongue from the aforesaid slot. It is apparent that, with such a key unit construction, each key piece can be removed from its associated control lever without removing the control lever from the chassis member.

Other objects, advantages and features of the invention will become apparent upon making reference to the specification to follow, the claims and drawings wherein:

FIG. 1 is a fragmentary perspective view of an organ keyboard chassis assembly constructed in accordance with one form of the present invention;

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FIG. 2 is an exploded view of the two main component parts making up a white organ key unit used in the keyboard chassis assembly of the present invention;

FIG. 3 is a fragmentary perspective view of the front portion of a white key piece on an enlarged scale;

FIG. 4 is an enlarged fragmentary bottom plan view of an assembled white key unit;

FIG. 5 is a perspective view of a black key piece used in the keyboard chassis assembly of the present invention on an enlarged scale;

FIG. 6 is a vertical sectional view through a white key piece of the keyboard chassis assembly of FIG. 1, taken substantially along the line 6—6 therein;

FIG. 7 is a vertical sectional view through a black key piece of the keyboard assembly of FIG. 1, taken substantially along the line 7—7 therein;

FIG. 8 is an enlarged transverse section through the keyboard chassis assembly of the present invention, taken substantially along the line 8—8 in FIG. 6;

FIG. 9 is an enlarged transverse section through the keyboard chassis assembly of the present invention, taken substantially along the line 9—9 in FIG. 6;

FIG. 10 is an enlarged transverse section through the keyboard chassis assembly of the present invention, taken substantially along the line 10—10 in FIG. 6;

FIG. 11 is a perspective view of the most preferred form of keyboard of the present invention which constitutes an improvement over the embodiment shown in FIGS. 1—10;

FIG. 12 is a vertical longitudinal sectional view through one of the key units of the keyboard of FIG. 11, taken substantially along section line 12—12 therein on an enlarged scale;

FIG. 13 is a perspective view of the front end portion of one of the control levers of the keyboard of FIGS. 11 and 12;

FIG. 14 is an enlarged transverse sectional view through a portion of the keyboard, as taken substantially along the line 14—14 in FIG. 12; and

FIG. 15 is a perspective view in partial section of a modification of the shape of the rear of the chassis member which provides increased rigidity of the key assembly.

Referring now to the embodiment of the invention shown in FIGS. 1—10, the keyboard chassis assembly of the present invention there shown comprises an elongated chassis member 2 supported on legs 4, and a plurality of key units 6 supported in longitudinally spaced relation upon the chassis member 2 to form a conventional organ or accordion keyboard. The chassis member 2 and the inner end portions of the key units 6 to be described are normally hidden from view within a cabinet or housing (not shown). Each key unit comprises a left or right hand white key piece 6a or 6b or a black key piece 7, and a lever arm 8a or 8b, the front portion of which is overlaid by the key piece involved. The left hand white key piece 6a is shaped to extend partway around the front portion of a black key piece 7, and the right hand white key piece 6b is shaped to extend partway around the front portion of a black key piece in the usual manner. The present invention relates to the construction and arrangement of the chassis member and its relationship to the key units which result in a unique, rugged, and simple keyboard chassis assembly. Another feature of the invention is related to the construction and relationship of key pieces and their lever arms.

The chassis member 2 is made of a single sheet metal stamping having a main, generally horizontal, rectangular panel section 10 having a narrow depending skirt or flange 12 extending for substantially the full length of the front longitudinal margin of the chassis member, and an upwardly extending marginal fulcrum-forming wall 14 extending for substantially the full length of the rear longitudinal margin of the chassis member. A series of upwardly projecting, longitudinally spaced fingers 16 pro-

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ject upwardly from a horizontal upper marginal edge 18 of the fulcrum-forming wall 14. A series of longitudinally spaced fingers 20 are struck upwardly from the front longitudinal margin of the rectangular panel section 10, the latter fingers respectively being in transverse alignment with the rear fingers 16.

A series of longitudinally spaced threaded apertures 22 are tapped in the rear portion of the rectangular panel section 10 at a point spaced from the fulcrum-forming wall 14. The threaded apertures 22 are respectively in alignment with the associated pairs of front and rear chassis fingers 16 and 20. Spring anchoring lugs 24 (FIGS. 6, 7 and 8) are struck downwardly and rearwardly from the rear margin of the horizontal panel section 10.

The chassis 2 is preferably elevated above a support surface in the housing (not shown) of the organ or accordion by suitable legs which may comprise an angle member secured by screws 28 (FIG. 6) to the front flange 12 of the chassis member and channel shaped members 30 secured by screws to the rear portion of the chassis member.

As above indicated, the keyboard 6 supported on the chassis 2 includes a series of key units each formed of a key piece 6a, 6b, or 7 and an associated lever arm 8a, or 8b. The lever arms 8a associated with the white key pieces 6a or 6b are somewhat longer than the lever arms 8b associated with the black key pieces 7.

Each of the lever arms is most advantageously made of a channel-shaped sheet metal stamping having a pair of flanges 34—34 depending from the margins of a web 36. The depth of the flanges gradually increases toward the front end of the lever arm and the rear portion thereof has a downwardly offset portion 38 which cooperates with the operating instrumentalities of the musical instrument involved. To this end, the offset portion 38 may be provided with one or more openings 40 for receiving suitable connecting links (not shown).

The web of each lever arm is provided with a threaded opening 42, an opening 44 positioned a short distance rearwardly of the threaded opening 42, and a transverse slot 46 positioned a short distance rearwardly of the opening 44. A pair of inverted V-shaped indentations 49 are formed in the bottom marginal edges of the side flanges 34—34 at a point opposite the slot 46 to form fulcrum points for pivotally supporting the lever arm 8 in the manner to be described upon the chassis member 2. A spring anchoring lug 43 is struck downwardly and rearwardly from the web 36 of the lever arm at a point located a short distance rearwardly of the slot 46. The side flanges 34—34 of the lever arm terminates a short distance rearwardly of the front marginal edge of the web 36 to form thereby a horizontally, forwardly extending tongue 50.

Each white key piece 6a or 6b comprises a body of suitable material, such as a white thermoplastic material, having a hollow configuration formed by a top wall 52 which overlies the associated lever arm web 36 and depending side walls 54—54 which straddle the associated lever arm flanges 34—34. This thermoplastic material, for example, may be an acrylic or butyrate resin. The front end portion of each key piece 6a or 6b is provided with a downwardly extending rib 55 having a T-shaped slot 56 (FIG. 3) at the upper extremity thereof adjacent the bottom surface of the top wall 52. The head portion 56a of the slot 56 is sized snugly to receive the tongue 50 at the front end of the associated lever arm 8a, which anchors the front end of the white key piece involved to the lever arm. The rear end portion of the key piece 6a or 6b may be fixedly anchored to the lever arm by means including a screw 60 passing through a hole 62 at the rear end of the top wall 52 of the key piece and threading into the threaded opening 42 in the associated lever arm 8a. A key piece may be readily removed from a lever arm by unscrewing the screw 60 and then pulling

forwardly on the key piece to pull the lever arm tongue 50 out of the head portion 56a of the slot 56.

The black key pieces are made of any suitable material, most preferably a black thermoplastic material, formed into a hollow member having a base portion defined by vertical side walls 63 and a flat rear top wall portion 65, and an upper portion formed by generally upwardly and inwardly inclining side walls 66—66 having a top wall 67 well above the level of the top wall 52 of the adjacent white key pieces, are clearly shown in FIG. 10 when the black key piece is placed over the front portion of the associated lever arm 8b, the base sidewalls 63—63 straddle the flanges 34—34 of the associated lever arm and the web 36 of the lever arm bears against the bottom end of a pair of ribs 69—69 projecting from the inside surface of the black key piece. The tongue 50 at the front end of the lever arm 8b passes into a horizontal slot 71 formed in an internally projecting portion 73 on the inside of the black key piece. The rear end portion of the black key piece is anchored in place by means including a screw 75 which passes through an opening 77 formed in the rear top wall portion 65 of the key piece and threading into the threaded opening 42 of the lever arm 8b.

As shown most clearly in FIGS. 1, 6 and 7, the various key units are mounted transversely of the chassis member 2 with the flanges 34—34 of the lever arms 8a and 8b straddling the respective corresponding pairs of front and rear chassis fingers 16 and 20. Sleeves 78 made of a soft noise-deadening material which may be a pliable synthetic plastic material is preferably placed around each front chassis finger 20. The rear chassis fingers 16 pass freely through the various transverse slots 46 in the lever arm webs 36 and the adjacent inverted V-shaped flange indentations 49 receive the top marginal edge 18 of the fulcrum-forming wall 14 with the apexes of the latter indentations forming fulcrum points which pivotally support the key units. Sufficient clearance exists between the front and rear of the fingers 16 and the defining walls of the slots 46 that the fingers never touch the slot walls for all positions of the key units. There is preferably no clearance between the fingers and the sides of the slot walls. The key units are spring biased by individual tension spring members 76 extending between the spring anchoring lugs 48 and 24 respectively struck from the lever arms and the chassis member. The front ends of the key units are thereby biased upwardly. The upward movement of each key unit is limited by adjustable stop means comprising a screw 80 having a threaded shank portion passing through the web opening 44 in the associated lever arm web and threading into the corresponding threaded aperture 22 formed in the horizontal panel section 10 of the chassis member. The screw 80 has a head 82 overlying the associated lever arm web 36 and bearing down upon a metal washer 83 and a subjacent felt washer 86 which are sandwiched between the screw head 82 and the lever arm web 36. The adjusted position of the screw 80 is fixed by any suitable means, such as a lock nut 84 threaded around the bottom end of the screw shank 80 below the chassis member 2.

The bottom edges of the lever arm flanges 34—34 project a small distance below the bottom edges of the side walls of the various key pieces as shown in FIGS. 6 and 7. Contact between the flanges of the lever arms and the chassis member 2 is prevented by means of a strip of felt 86 or other similar noise-deadening material adhesively or otherwise secured to the front marginal edge portion of the rectangular panel section 10 of the chassis member.

Refer now to the embodiment of the invention illustrated in FIGS. 11 through 14 which represents the most preferred form thereof. In general, the construction of the individual key units 6 is the same as that shown and described in connection with the embodiment of FIGS. 1 through 10 except for one difference to be explained, and similar reference numerals have been used for corre-

sponding parts thereof. The chassis member 2', however, has been modified to a substantial extent. The chassis member 2' has a hollow frame construction rather than the flat panel construction of the chassis 2 previously described. The chassis 2' has front and rear marginal walls 12' and 14' which respectively have outwardly extending horizontal flanges 90 and 92 having screw holes 91 for anchoring the chassis to a suitable portion of the housing or frame (not shown) of the musical instrument involved. Frame 2' also has side or end wall members 94—96 respectively extending between the end portions of the front and rear marginal walls 12' and 14'. Bracing members 98 and 99 are shown extending between medial portions of the front and rear walls 12' and 14' to impart strength and rigidity to the chassis member.

The rear marginal wall 14' has fingers 16' extending upwardly from the top marginal edge 18' thereof which respectively serve the same function as the fingers 16 and the marginal edge 18 described in connection with the embodiment of FIGS. 1 through 10. Rearwardly extending spring anchoring lugs 24' are struck from the rear marginal wall 14' at points below the respective finger 16' to serve as anchoring points for the bottom ends of the springs 76 which spring bias the key units 6.

One of the most important features of the chassis member 2' now being described is the construction of upwardly extending, longitudinally spaced fingers 20' extending upwardly from the top marginal edge 21' of the front marginal wall 12'. The fingers 20' have one function which is similar to the fingers 20 previously described in that they limit lateral movement of the key units. The fingers 20' are thus positioned opposite the corresponding fingers 16' on rear marginal wall 14' and are straddled by the flanges 34—34 of the key units. The fingers 20' are each bent back at the upper portions thereof to provide rear extensions 100. The rear extensions 100 extend generally in a horizontal plane but may be bent upwardly or downwardly a small amount for reasons to be explained. Each of the rear finger extensions 100 is encased by a loop or sleeve of noise-deadening material 102 which may be felt or other similar material. The felt-covered finger extensions 100 serve as elevation adjusting and limiting means as well as lateral stops. To this end, each of the control levers of the key units is provided with inturned lugs 103—103 projecting from the bottom of the side flanges 34—34 thereof a short distance from the front ends of the lever arms, as shown most clearly in FIG. 13. The lugs 102—102 together form a horizontal abutment shoulder at the bottom of the lever arm which abut against the bottom portion of the felt-covered finger extensions 100 to thus limit the upward movement of the key unit involved. Sufficient clearance is provided above the felt-covered finger extensions to permit the necessary downward movement of the key unit involved.

Refer now to FIG. 15 which shows a modification in the shape of the rear chassis fingers 16'' and the top marginal edge 18'' of the chassis member resulting in increased rigidity of the key pieces and decrease in key noise. The fingers 16'' are narrower than the previously described fingers 16 and 16' so that the fingers do not rub against the inside surfaces of the lever arm flanges 34—34. The lever arm web slot 46' is shortened so that the narrower fingers 16'' touch the sides thereof. More importantly, the top marginal edge 18'' is provided with pairs of slots 105—105 into which the lever indentations 49—49 extend to impede relative lateral movement between the lever arm flanges and the chassis member. Each of the slots 105 has a downwardly and inwardly inclining outer edge 105a, a narrow horizontal bottom edge 105b of the width of the lever arm flanges 34—34 and a vertical inner edge 105c.

It is apparent that the various forms of the invention described above provide extremely compact, rugged, simple and inexpensive keyboard chassis assemblies for musical instruments. The individual key units are so con-

structed that the outer key pieces may be readily separated from the associated control levers without requiring removal of the entire key unit from the associated chassis member. Moreover, because of the relationship between the key pieces made of thermoplastic material and the channel-shaped lever arms, the key pieces maintain their shape indefinitely, and the manner in which the key units are mounted upon the chassis member enables the quick and easy assembly of the keyboard. Also, with regard to the improved embodiment of the invention shown in FIGS. 11 through 14, the unitary lateral stop and elevation limiting means provides a relatively rigid, simple and effective means for maintaining the proper position and elevation of the key units.

It should be understood that numerous modifications may be made of the preferred forms of the invention described above without deviating from the broader aspects of the invention.

What is claimed and desired to be protected by Letters Patent of the United States is:

1. A musical instrument keyboard chassis assembly including in combination, a chassis member having a first series of upwardly projecting longitudinally spaced fingers at the front portion thereof and an upstanding fulcrum-forming wall at the rear portion thereof having a horizontal upper marginal edge, said upstanding, fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from said horizontal upper marginal edge and respectively positioned in transverse alignment to said first series of fingers, said chassis member having spring anchoring means below each of said second series of fingers; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies including an elongated channel-shaped lever arm extending between and beyond a pair of the corresponding chassis fingers at the front and rear of said chassis member which fingers fix the position of the lever arm, said lever arm having a web portion and downwardly extending marginal flanges fulcrumed on said upper marginal edge of said fulcrum-forming wall pivotally to support the lever arm, and spring means extending between said spring anchoring means below each of said rear chassis fingers and the associated lever arm at a point rearwardly of the latter finger to bias the front end of each lever arm upwardly, said lever arms including stop means cooperating with said first series of spaced fingers to limit vertical and lateral movement of said lever arms.

2. A unitary musical instrument keyboard chassis assembly comprising a chassis member having a first series of upwardly projecting, longitudinally spaced fingers at the front portion thereof and an upstanding, fulcrum-forming wall at the rear portion thereof having a horizontal upper marginal edge, said upstanding fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from said horizontal upper marginal edge and respectively positioned in transverse alignment to said first series of fingers, said chassis member having spring anchoring means extending from said fulcrum-forming wall below each of said second series of fingers; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies including an elongated channel-shaped lever arm extending between and beyond a pair of the corresponding chassis fingers at the front and rear of said chassis member and having marginal flanges extending downwardly from a connecting web, the flanges of each lever arm straddling the associated front and rear chassis fingers which fix the position of the lever arm, the bottom of the lever arm flanges which straddle each rear chassis finger having corresponding inverted V-shaped indentations therein forming fulcrum points which engage over the said upper marginal edge of said

fulcrum-forming wall to pivotally support the lever arm, and a tension spring extending between said spring anchoring means below each of said rear chassis fingers and the associated lever arm at a point rearwardly of the latter finger to bias the front end of each lever arm upwardly, said lever arms including stop means cooperating with said first series of spaced fingers to limit vertical and lateral movement of said lever arms.

3. A keyboard chassis assembly for a musical instrument including in combination, a chassis member having a first series of upwardly projecting, longitudinally spaced fingers at the front portion thereof and an upstanding, fulcrum-forming wall at the rear portion thereof having a horizontal upper marginal edge, said upstanding fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from said horizontal upper marginal edge and respectively positioned in transverse alignment to said first series of fingers, said chassis member having spring anchoring means extending from said fulcrum-forming wall below each of said second series of fingers; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies including an elongated channel-shaped lever arm extending between and beyond a pair of the corresponding chassis fingers at the front and rear of said chassis member and having marginal flanges extending downwardly from a connecting web, the flanges of each lever arm straddling the associated front and rear chassis fingers which fix the position of the lever arm, and the rear portion of the connecting web thereof having a finger-receiving opening through which the associated rear chassis finger extends, the bottom edges of the lever arm flanges which straddle each rear chassis finger being fulcrumed on said upper marginal edge of said fulcrum-forming wall to pivotally support the lever arm, a tension spring extending between said spring anchoring means below each of said rear chassis fingers and the associated lever arm at a point rearwardly of the latter finger to bias the front end of each lever arm upwardly, said first series of spaced fingers cooperating with said marginal flanges of said lever arms to limit lateral movement of said lever arms, and adjustable stop means cooperating with said lever arms for adjusting the vertical pivotable movement thereof.

4. A keyboard chassis assembly for a musical instrument including in combination, a chassis member having a generally horizontal panel section from the front portion of which upwardly extends a first series of longitudinally spaced fingers and from the rear portion of which upwardly extends a fulcrum-forming wall, said fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from a horizontal upper marginal edge thereof and respectively positioned in transverse alignment to said first series of fingers, said horizontal panel section of the chassis member having spring anchoring means at the base of said fulcrum-forming wall below each of said second series of fingers, said horizontal panel section of the chassis member having a threaded aperture positioned forwardly of said fulcrum-forming wall and opposite each of said second series of fingers; and a set of transversely extending key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies comprising an elongated channel-shaped lever arm extending between and beyond a pair of corresponding chassis fingers at the front and rear of said chassis member and having marginal flanges extending downwardly from a connecting web, the flanges of each lever arm straddling the associated front and rear chassis fingers which fix the position of the lever arm, said flanges of each lever arm cooperating with the associated front chassis finger for limiting lateral movement of said lever arm, the rear portion of the connecting web of each of said lever arms having a finger-receiving opening which receives the asso-

ciated rear chassis finger, the bottom edges of the lever arm flanges which straddle each rear chassis finger having corresponding inverted V-shaped indentations therein forming fulcrum points which engage over the said upper marginal edge of said fulcrum-forming wall pivotally to support the lever arm, a tension spring extending between said spring anchoring means below each of said rear chassis fingers and the associated lever arm at a point rearwardly of the latter finger to bias the front end of each lever arm upwardly, adjustable stop means for adjusting the normal position of the lever arm comprising a screw having a shank portion passing through the web of each lever arm and threading into one of said threaded apertures in said chassis member and a head portion on top of said web, a noise-deadening washer sandwiched between said screw head portion and said web, and a lock nut threaded around said screw shank portion for locking screw in any of its adjusted positions, each key assembly having a hollow key piece overlying the front portion of each lever arm and including depending flanges straddling the flanges of the lever arm, and means removably anchoring each key piece to said lever arm, and a strip of sound deadening material mounted on the key of the front portion of said horizontal panel section of the chassis member against which material the bottom of said key assemblies bear when fully depressed.

5. A keyboard chassis assembly for a musical instrument including in combination, a chassis member having a generally horizontal panel section from the front portion of which upwardly extends a first series of longitudinally spaced fingers and from the rear portion of which upwardly extends a fulcrum-forming wall, said fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from a horizontal upper marginal edge thereof and respectively positioned in transverse alignment to said first series of fingers, said horizontal panel section of the chassis member having spring anchoring means at the base of said fulcrum-forming wall below each of said second series of fingers, said horizontal panel section of the chassis member having a threaded aperture positioned forwardly of said fulcrum-forming wall and opposite each of said second series of fingers; and a set of transversely extending key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies comprising an elongated channel-shaped lever arm extending between and beyond a pair of corresponding chassis fingers at the front and rear of said chassis member and having marginal flanges extending downwardly from a connecting web, the flanges of each lever arm straddling the associated front and rear chassis fingers which fix the position of the lever arm, said marginal flanges cooperating with said front chassis fingers to limit lateral movement of said lever arms, said rear portion of the connecting web of each of said lever arms having a finger-receiving opening which receives the associated rear chassis finger, the bottom edges of the lever arm flanges which straddle each rear chassis finger having corresponding inverted V-shaped indentations therein forming fulcrum points which engage over the said upper marginal edge of said fulcrum-forming wall pivotally to support the lever arm, a tension spring extending between said spring anchoring means below each of said rear chassis fingers and the associated lever arm at a point rearwardly of the latter finger to bias the front end of each lever arm upwardly, and adjustable stop means for adjusting the normal position of the lever arm comprising a screw having a shank portion passing through the web of each lever arm and threading into one of said threaded apertures in said chassis member and a head portion on top of said web, a noise-deadening washer sandwiched between said screw head portion and said web, and a lock nut threaded around said screw shank portion for locking screw in any of its adjusted positions.

6. A keyboard chassis assembly for a musical instru-

ment including in combination, a chassis member having a generally horizontal panel section from the front portion of which upwardly extends a first series of longitudinally spaced fingers and from the rear margin of which upwardly extends a fulcrum-forming wall, said fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from a horizontal upper marginal edge thereof and respectively positioned in transverse alignment to said first series of fingers, said horizontal panel section of the chassis member having spring anchoring means at the base of said fulcrum-forming wall below each of said second series of fingers, said horizontal panel section of the chassis member having a threaded aperture positioned forwardly of said fulcrum-forming wall and opposite each of said second series of fingers; and a set of transversely extending key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies comprising a lever arm extending between and beyond a pair of corresponding chassis fingers at the front and rear of said chassis member which fingers fix the position of the lever arm, each of said lever arms having a web portion and marginal flanges extending downwardly from said web portion and cooperating with the associated front chassis finger to limit lateral movement of said lever arm, each of said lever arms being fulcrumed over the said upper marginal edge of said fulcrum-forming wall pivotally to support the lever arm, a tension spring extending between said spring anchoring means below each of said rear chassis fingers and the associated lever arm at a point rearwardly of the latter finger to bias the front end of each lever arm upwardly, and adjustable stop means for adjusting the normal position of the lever arm comprising a screw having a shank portion passing through each lever arm and threading into one of said threaded apertures, and a head portion on top of the lever arm, a noise-deadening washer sandwiched between said screw head portion and said lever arm, and a lock nut threaded around said shank portion for locking screw in any of its adjusted positions.

7. A musical instrument keyboard chassis assembly comprising: chassis means having a series of upwardly projecting, longitudinally spaced, front key positioning fingers and rear fulcrum-forming means; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means and forming a keyboard, each of said key assemblies including an open-bottom channel-shaped lever arm having a web portion and a pair of spaced marginal side walls extending downwardly from said web portion, the rear end portion of each lever arm being pivotally mounted upon said fulcrum-forming means and the front end portion thereof fitting over the top of one of said front key-positioning fingers, said side walls of each lever arm cooperating with the associated front finger to limit lateral movement of said lever arm, spring means extending between each of said lever arms at a point behind said fulcrum-forming means and said chassis means to bias the front end portion of each lever arm upwardly, and means limiting the elevation of the front end portion of each lever arm comprising a lateral extension on the associated front key-positioning finger of the chassis means and a stop shoulder on the inside of the lever arm which abuts against the bottom of the associated finger extension when the front end portion of the lever arm reaches the desired elevation, and there being a clearance space above each finger extension inside each lever arm to permit the necessary downward movement of the lever arm.

8. A musical instrument keyboard chassis assembly comprising: chassis means having a series of upwardly projecting, longitudinally spaced front key-positioning fingers and rear fulcrum-forming means; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means and forming a keyboard, each of said key assemblies includ-

ing a channel-shaped metal lever arm having a web portion and marginal flanges extending downwardly therefrom, said lever arm having a rear end portion pivotally supported upon said fulcrum-forming means and a front end portion straddling the top of one of said front key-positioning fingers, said marginal flanges of each lever arm cooperating with the associated key positioning finger to limit the lateral movement of the lever arm, said lever arm projecting beyond the associated key-positioning finger, resilient means for urging the front end portion of the associated lever arm upwardly, and means limiting the elevation of the front end portion of each lever arm comprising a lateral extension on the associated key-positioning finger which lateral extension is surrounded by a noise-deadening material and a stop shoulder extending inwardly from one marginal flange of the associated lever arm which abuts against the bottom of the associated finger extension when the front end portion of the lever arm reaches the desired elevation, there being clearance provided above said finger extension permitting the necessary downward movement of the lever arm.

9. A musical instrument keyboard chassis assembly comprising: chassis means having a series of upwardly projecting, longitudinally spaced front key-positioning fingers and rear fulcrum-forming means; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means and forming a keyboard, each of said key assemblies including a channel-shaped metal lever arm with a web portion and marginal flanges extending downwardly therefrom, said lever arm having a rear end portion pivotally supported upon said fulcrum-forming means and a front end portion straddling the top of one of said front key-positioning fingers, said marginal flanges of each lever arm cooperating with the associated front key positioning finger to limit the lateral movement of the lever arm, resilient means for urging the front end portion of the associated lever arm upwardly, and means limiting the elevation of the front end portion of each lever arm comprising a lateral extension on the associated key-positioning finger and a stop shoulder on the associated lever arm which abuts against the bottom of the associated finger extension when the front end portion of the lever arm reaches the desired elevation, there being clearance provided above said finger extension permitting the necessary downward movement of the lever arm.

10. A keyboard chassis assembly for a musical instrument keyboard comprising a chassis member having a main generally horizontal panel section from the front margin of which is struck a first series of upwardly projecting, longitudinally spaced fingers and from the rear margin of which there extends an upstanding marginal fulcrum-forming wall, said upstanding, marginal fulcrum-forming wall having a second series of longitudinally spaced fingers projecting upwardly from a horizontal upper marginal edge thereof and respectively positioned in transverse alignment to said first series of fingers, said horizontal panel section of the chassis member having a spring anchoring lug struck from the rear portion thereof below each of said second series of fingers, and a set of transversely extending key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies comprising an elongated channel-shaped lever arm having a web portion and marginal flanges extending downwardly therefrom, each of said lever arms extending between and beyond a pair of corresponding chassis fingers at the front and rear of said chassis member which fingers fix the position of the lever arm and the rear portion thereof having a finger-receiving opening which receives the associated rear chassis finger, and the bottom of the lever arm being fulcrumed over the said upper marginal edge of said fulcrum-forming wall pivotally to support the lever arm, and a tension spring extending between said spring anchoring lug below each of said rear chassis fingers and the associated lever arm at a

point rearwardly of the latter finger to bias the front end of each lever arm upwardly, said lever arms having stop means cooperating with said chassis member to limit vertical and lateral pivotal movement of said key assemblies.

11. A musical instrument keyboard chassis assembly comprising a chassis member having an upstanding, fulcrum-forming wall at the rear portion thereof with a horizontal upper marginal edge and a series of longitudinally spaced fingers projecting upwardly from said horizontal upper marginal edge, said chassis member having positioning means at the front portion thereof, and a set of transversely extending, longitudinally spaced key assemblies movably supported upon chassis member and forming a keyboard, each of said key assemblies including an elongated channel-shaped lever arm having marginal flanges extending downwardly from a connecting web, the flanges of each lever arm straddling one of the rear chassis fingers which fix the position of the lever arm, and a pair of slots formed in said horizontal marginal edge of said chassis member on opposite sides of each of said fingers and positioned snugly to receive the bottoms of the associated lever arm flanges and pivotally support the lever arms, each of said lever arms having stop means cooperating with said positioning means to limit vertical and lateral pivotable movement of the lever arm.

12. A musical instrument keyboard chassis assembly comprising a chassis member having an upstanding, fulcrum-forming wall at the rear portion thereof with a horizontal upper marginal edge and a series of longitudinally spaced fingers projecting upwardly from said horizontal upper marginal edge, said chassis member having upwardly projecting longitudinally spaced positioning fingers at the front portion thereof, and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis member and forming a keyboard, each of said key assemblies including an elongated channel-shaped lever arm having marginal flanges extending downwardly from a connecting web, the flanges of each lever arm straddling one of the chassis fingers which fix the position of the lever arm, and a pair of slots formed in said horizontal marginal edge of said chassis member on opposite sides of each of said fingers and positioned snugly to receive the bottoms of the associated lever arm flanges, the bottom of the lever arm flanges which straddle each rear chassis finger having corresponding inverted V-shaped indentations at the points thereof which pass into said slots to form fulcrum points which engage the bottom defining walls of said slots pivotally to support the lever arm, each of said channel-shaped lever arms having stop means thereon cooperating with the associated positioning finger to limit vertical and lateral pivotable movement of said lever arm.

13. A key assembly for musical instrument keyboard which has guide means for the keys thereon, said assembly including in combination, a horizontally elongated channel-shaped metal lever arm having a web at the top thereof and depending longitudinal flanges at the sides thereof, said lever arm having a rear portion adapted to be pivotally mounted and a front portion with a projection extending from the bottom of at least one of said flanges, said web and flanges of said front portion of said lever arm and said projection being arranged to surround the guide means to limit the upward, downward and lateral movement of the front portion of said lever arm, and a hollow, open-bottom, thin-walled key piece made of plastic material secured to said lever arm, said key piece having side walls extending along and straddling the flanges of said lever arm.

14. A musical instrument keyboard chassis assembly including in combination: chassis means having a series of upwardly projecting, longitudinally spaced, front key positioning fingers and rear fulcrum-forming means; and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means

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and forming a keyboard, each of said key assemblies including a channel-shaped metal lever arm having a pair of spaced side walls, each of said lever arms having a rear portion pivotally mounted upon said fulcrum-forming means and a front portion fitting over the top of one of said front key-positioning fingers, said key-positioning fingers cooperating with said side walls of said lever arms to limit lateral movement thereof, spring means extending between each of said lever arms and said chassis means at a point behind said fulcrum-forming means to bias said front portion of each lever arm upwardly, each of said front key-positioning fingers of said chassis means having a lateral extension, each of said lever arms having a portion projecting from the bottom of at least one of said side walls thereof and positioned to engage said lateral extension to limit the elevation of said front portion of said lever arm, said lateral extensions being positioned to permit downward movement of said lever arms, and a hollow, open bottom plastic key piece secured to each lever arm, said key pieces having side walls extending along the side walls of said lever arms.

15. A musical instrument keyboard chassis assembly including in combination: chassis means having a series of upwardly projecting, longitudinally spaced, front key positioning figures each having a lateral extension, said chassis means also having pivot means positioned rearwardly of said positioning fingers and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means and forming a keyboard, each of said assemblies including a channel-shaped metal lever arm having a web at the top thereof and depending flanges at the sides thereof, each of said lever arms having a rear portion thereof mounted upon said pivot means and a front portion thereof fitting over said lateral extension of one of said front key-positioning fingers, said pivot means including spaced slots for receiving the side flanges of each lever arm, spring means extending between each of said lever arms and said chassis means at a point behind said pivot means to bias said front portion of each lever arm upwardly, each of said lever arms having a portion projecting from the bottom of at least one of said side flanges thereof into the space between said side flanges and positioned to engage said lateral extension to limit the elevation of said front portion of said lever arm, said web and flanges of said front portion of each lever arm and said projecting portion thereof being arranged to surround said lateral extension of the associated positioning finger to limit the upward, downward and lateral movement of said front portion of said lever arm, and a hollow, open bottom plastic key piece secured to each lever arm, said key pieces having side walls extending along and straddling the side flanges of said lever arms.

16. A key for keyboard musical instruments comprising an elongated channel-shaped member, said member having a web portion and marginal flanges adapted to extend downwardly from said web portion, pivot means adjacent one end of said member operatively associated with said web and flanges, and stop means adjacent the opposite end of said member adapted to coact with a fixed member to limit vertical and lateral pivotal movement of said key.

17. A musical instrument keyboard chassis assembly including in combination, chassis means having a series of upwardly projecting, longitudinally spaced, front key positioning fingers, said chassis means also having pivot means positioned rearwardly of said positioning fingers, and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means and forming a keyboard, each of said key assemblies including an elongated channel-shaped metal lever arm extending between said pivot means and said positioning fingers, each of said lever arms having a portion thereof pivotally supported by said pivot means and a front portion with downwardly extending side flanges

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extending over one of said key positioning fingers, tension means extending between each of said lever arms and said chassis at a point behind said pivot means to bias said front portion of each lever arm upwardly, stop means for limiting the vertical and lateral movement of said front portion of each of said lever arms including noise deadening material about said key positioning fingers and cooperating with said side flanges of said lever arms to restrict lateral movement thereof, and a hollow open bottom plastic key piece secured to each lever arm, each of said key pieces having side walls extending along and straddling said side flanges of one of said lever arms.

18. The keyboard chassis assembly of claim 17 including resilient means on said chassis means positioned to be engaged by said flanges of the front portion of each of said lever arms for limiting downward movement of each of said key assemblies.

19. The assembly of claim 17 wherein each of said key positioning fingers has a lateral extension and each of said lever arms has a shoulder portion projecting from the bottom of at least one of said side flanges thereof into the space between said side flanges, with the maximum upward movement of the front portion of each of said lever arms being limited by engagement of said shoulder thereof with said noise deadening material on said lateral extension of said associated key positioning finger.

20. A musical instrument keyboard chassis assembly including in combination; chassis means having a series of upwardly projecting, longitudinally spaced, front key positioning fingers each having a lateral extension, said chassis means also having pivot means positioned rearwardly of said positioning fingers, and a set of transversely extending, longitudinally spaced key assemblies movably supported upon said chassis means and forming a keyboard, each of said assemblies including a channel-shaped metal lever arm having a web portion at the top thereof and downwardly extending flanges at the sides thereof, each of said lever arms having a portion thereof mounted upon said pivot means and a front portion thereof fitting over said lateral extension of one of said front key-positioning fingers, said pivot means including spaced slots for receiving the side flanges of each lever arm, means extending between each of said lever arms and said chassis means to bias said front portion of each lever arm upwardly, each of said lever arms having a stop portion projecting from the bottom of at least one of said side flanges thereof into the space between said side flanges and positioned to engage said lateral extension to limit the elevation of said front portion of said lever arm, said flanges of said front portion of each lever arm and said stop portion thereof being arranged to cooperate with said lateral extension of the associated positioning finger to limit the lateral and vertical movement of said front portion of said lever arm, and a hollow, open bottom plastic key piece secured to each of said lever arms, said key piece having side walls extending along and straddling the side flanges of said lever arm.

21. A key for keyboard musical instruments including in combination, an elongated channel-shaped member having front and rear portions, said member having a web portion and marginal flanges adapted to extend downwardly from said web portion, pivot means on said rear portion of said member operatively associated with said web and flanges, stop means on said front portion of said member adapted to coact with a fixed member to limit vertical and lateral pivotal movement of said key, and a hollow plastic key piece overlying said front portion of said lever arm and including depending flanges straddling said marginal flanges of said lever arm, means removably anchoring said key piece to said lever arm including relatively longitudinally movable engaging connecting means on the front end portions of said key piece and said lever arm, and screw means for securing the rear end portion of said key piece to said lever arm.

22. A key for keyboard musical instruments including

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in combination, an elongated channel-shaped member having front and rear portions, said member having a web portion and marginal flanges adapted to extend downwardly from said web portion, pivot means on said rear portion of said member operatively associated with said web and flanges, stop means on said front portion of said member adapted to coact with a fixed member to limit vertical and lateral pivotal movement of said key, and a hollow, open-bottom, thin walled key piece made of a synthetic thermoplastic material, said key piece having side walls snugly straddling said marginal flanges of said lever arm.

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