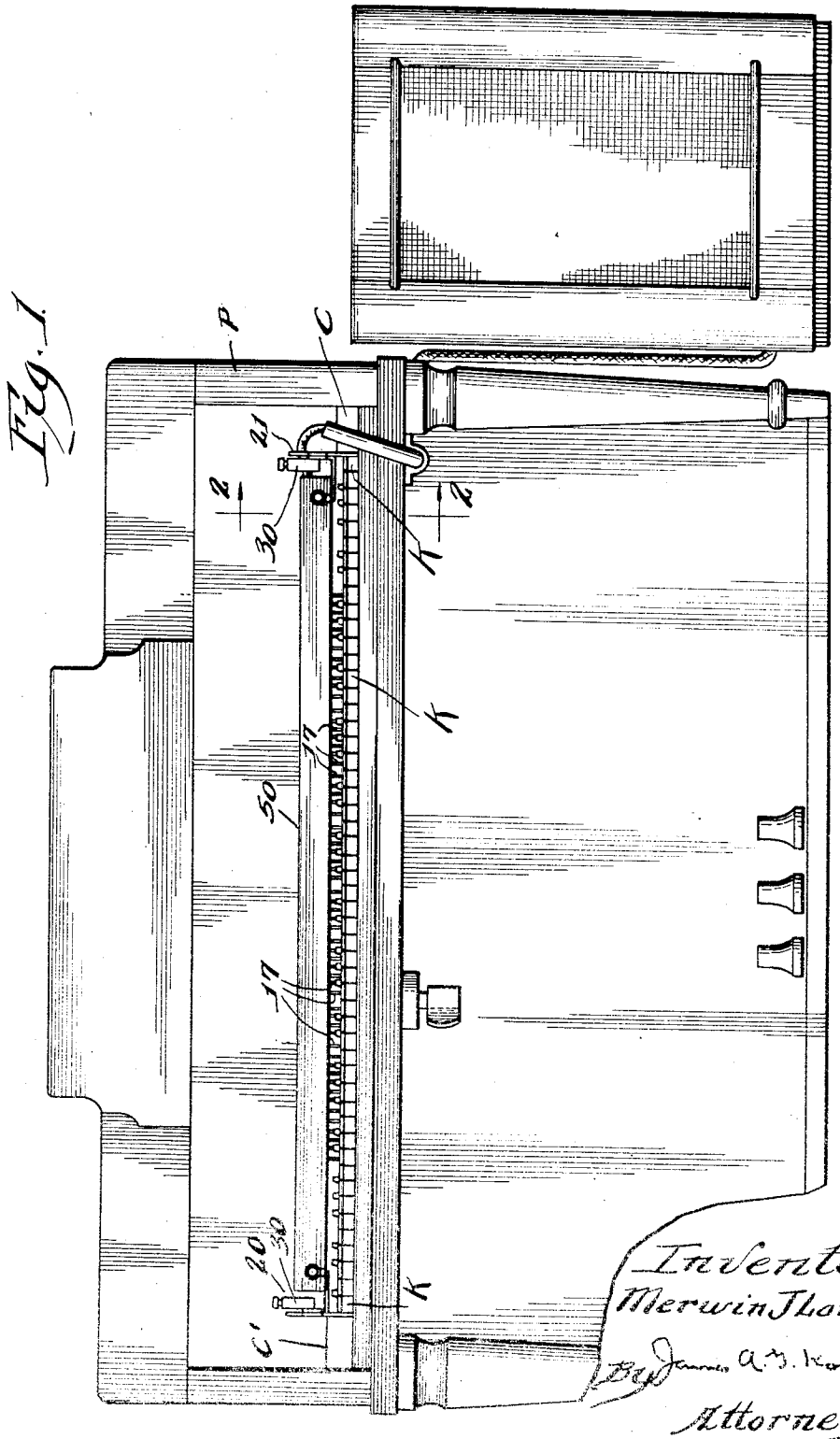
July 31, 1951 M. J. LARSEN 2,562,673

MOUNTING FOR SWITCH ASSEMBLIES

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Fig. 1.



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MOUNTING FOR SWITCH ASSEMBLIES

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Fig. 2.

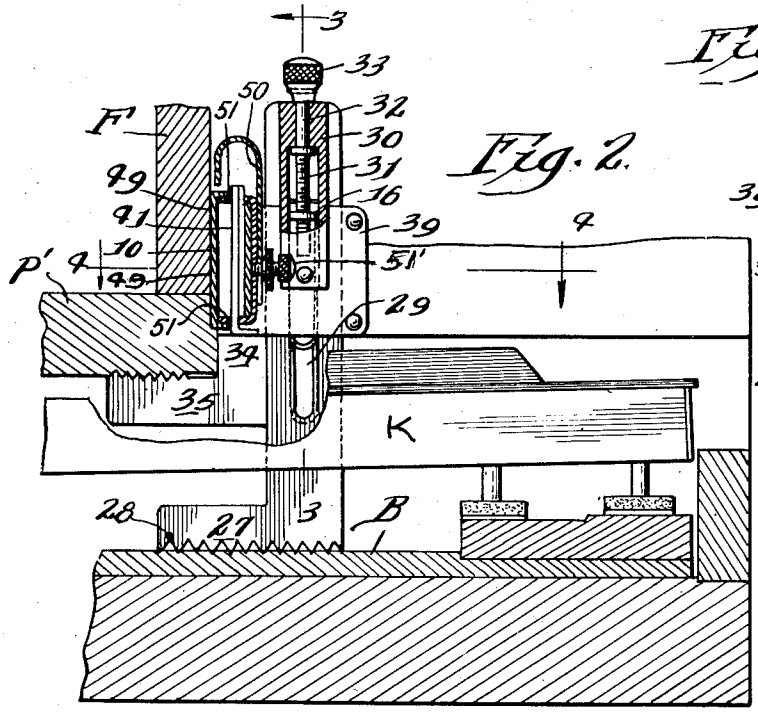


Fig. 5.

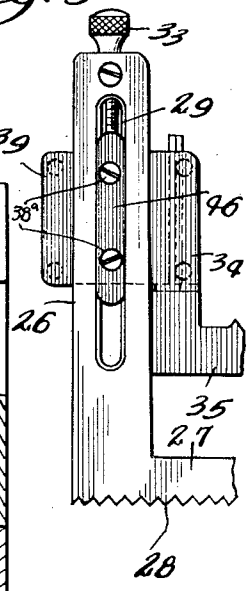


Fig. 3.

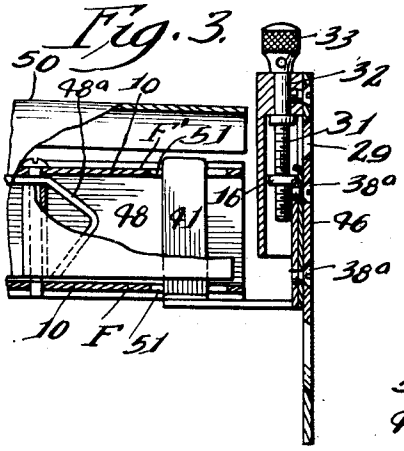
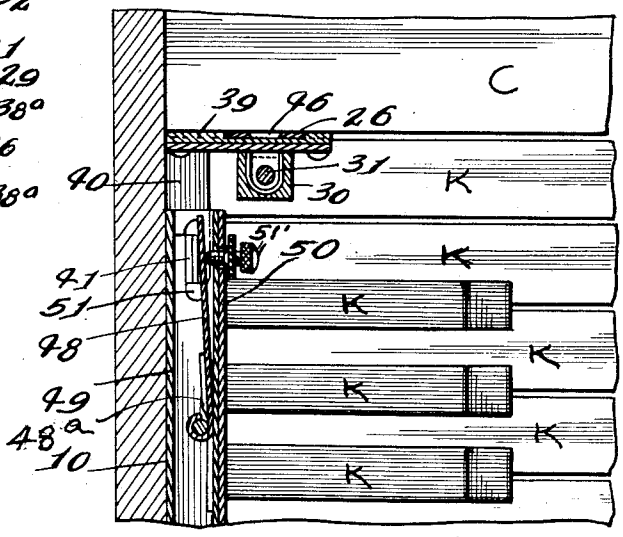


Fig. 4.



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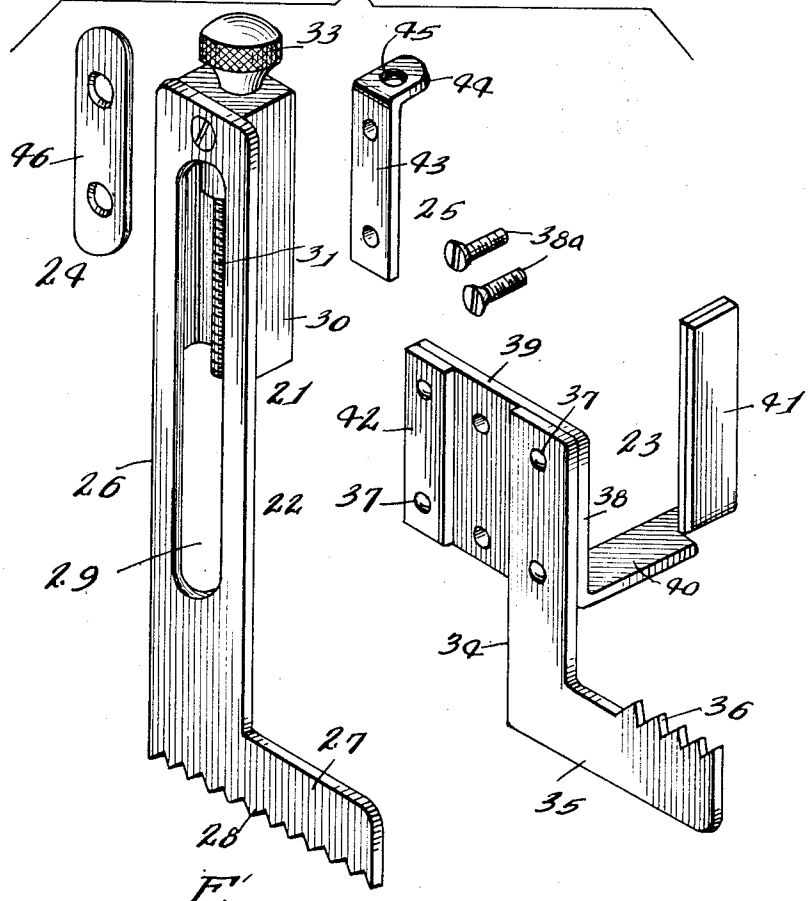
July 31, 1951 M. J. LARSEN 2,562,673

MOUNTING FOR SWITCH ASSEMBLIES

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Fig. 6.



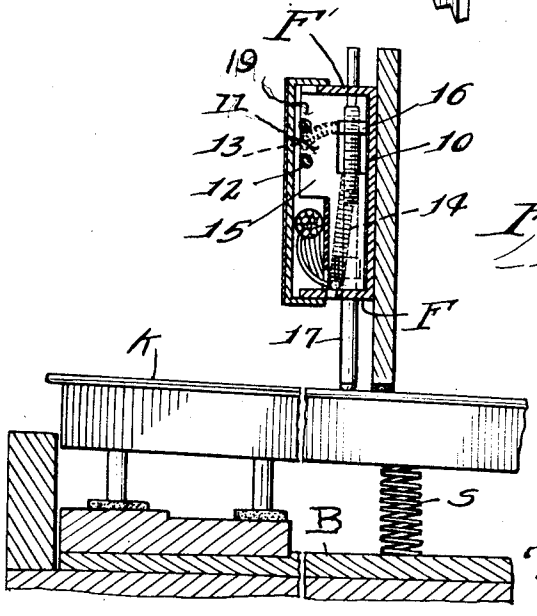


Fig. 7.

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Patented July 31, 1951

2,562,673

UNITED STATES PATENT OFFICE

2,562,673

MOUNTING FOR SWITCH ASSEMBLIES

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Application February 24, 1950, Serial No. 146,101

12 Claims. (Cl. 84—423)

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This invention relates to switch mountings and more particularly to a mounting for use with keyboard musical instruments of the class disclosed in United States Letters Patent Nos. 2,250,065 and 2,487,977 wherein mechanisms are employed for selectively translating audio tone signals into audible sounds for musical expression in response to depression of the playing keys of a piano or other keyboard instrument.

The herein disclosed invention makes use of an assembly of electric switches in which each individual switch is preferably of the same form as the switch disclosed in said Patent No. 2,487,977 and an object of the invention is the provision of a mounting for facilitating attachment of the assembly to and removal of same from the keyboard of a musical instrument.

A further object is the provision of a mounting of the class and for the purpose set forth, the form and construction of which insures application of a key switch assembly to a piano or other keyboard musical instrument with avoidance of injury to any part of the instrument, which mounting when attached will hold the key switch assembly at a fixed elevation above the keyboard and correctly correlate the individual switches of said assembly with respective playing keys thereof.

Other and further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a view in front elevation of a piano showing the invention applied thereto;

Figure 2 is a section taken substantially on line 2—2 of Figure 1 with parts in full lines;

Figure 3 is a section taken on line 3—3 of Figure 2;

Figure 4 is a section taken substantially on line 4—4 of Figure 3;

Figure 5 is a view in side elevation of one of the end jacks;

Figure 6 is a perspective view of one of the end jacks, the various parts of which are disassembled for the sake of clearness; and

Figure 7 is a vertical section through the switch supporting rail showing a preferred type of electric switch for use with the invention.

The key switch assembly comprises a horizontal U-shaped bar 10 which supports a plurality of longitudinally spaced apart switches 11, such that there is a switch for and individual to a respective playing key K of the keyboard of the piano P. Each individual switch is preferably of the form disclosed in United States Letters Patent No. 2,487,977 and in order that the full

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purpose of the invention shall be clearly understood by persons skilled in the art, said switch is herein shown to comprise at least an output terminal 12 and a movable contactor 13. The contactor is actuable in response to motion of an associated playing key and effectively makes electric engagement with said terminal 12 when the key is depressed. This is accomplished by forming the contactor with a coil 14, the lower terminal of which is attached to a vertical strip 15 of insulating material contained in the channel of bar 10. The contactor is connected to a nut 16 which is free to slide vertically in said strip, the coil 14 functioning as a retractile spring for urging the nut in a downward direction when the playing key K is depressed against the action of its customary elevating spring S. Passing through the nut and adjustable vertically therein is a playing key controlled plunger 17. Said plunger passes through the lower flange F of said U bar 10, and, as shown, it bears lightly against the upper surface of said playing key. When the playing key is elevated pressure in an upward direction is exerted against the plunger by the normal upward urge of spring S so as to disengage the contactor 13 from said terminal 12. When thus disengaged the contactor is advanced against a grounding terminal 19.

The coil 14 and the contactor are preferably formed from a single length of Phosphor bronze wire, and as in said Patent No. 2,487,977 signal voltage from a source of supply is impressed on said coil and by it impressed on said output terminal 12 when the key K is depressed.

No claim is made herein to any of the above named characterizing elements, except in combination with my invention. The key switch supporting rail 10 is a straight bar of metal of such dimensions as to be accommodated in a space of minimum proportions above the playing keys and at the extreme back ends thereof and disposed in a horizontal position above the keyboard. As shown, the length of said bar is approximately equal to that of a keyboard having eighty-eight playing keys. However, this may vary according to the octave range of the keyboard with which the invention is used.

The essential feature of the invention consists in providing end mounting jacks which are applicable to the opposite ends of the aforementioned key switch supporting bar 10 for quick and convenient application of the bar to or removal of same from the keyboard. To this is added the feature consisting of unique means for fixedly supporting the bar at any predetermined elevation above the keyboard and with-

out disabling any of the playing keys and whereby and with like ease and convenience the bar can be detached from said keyboard as and when desired.

The above referred to jacks are shown at 20 and 21 at Figure 1. Said jacks are substantially identical except that they are formed as rights and lefts for a purpose which will be manifest as the description proceeds. As the jacks are structurally and functionally alike except in the respect just mentioned, a description of one of them will suffice for the other. Referring now to Figure 6 in which the component parts of jack 21 are shown disassembled, the jack comprises four complementary parts 22, 23, 24 and 25.

Part 22 of said jack 21 consists of an L-shaped strip of thin gauge steel providing a vertically disposed long leg or portion 26 and a horizontally disposed short leg or portion 27, the latter formed on its lower edge with a longitudinal series of depending V-shaped teeth 28. The leg or portion 26 is formed with a vertical slot 29. At one side of and suitably secured to said leg 26 is a casing 30 having a vertically disposed adjusting screw 31 therein, the upper end of which is swiveled to the upper closed end of said casing as at 32 and formed exteriorly of the casing with a hand knob 33.

Part 23 of said jack is also L-shaped and formed of thin gauge steel and provided with a vertical leg or portion 34 and a horizontal leg or portion 35 at the lower end of said vertical leg, said horizontal leg having at its upper edge a longitudinal series of upwardly projecting V-shaped teeth 36. Secured at 37 to the upper end of leg 34 is a metal stamping 38 consisting of a vertically disposed substantially rectangular portion 39, a horizontal arm 40 at the base thereof and a vertical upwardly extending bracket extension 41 which is rectangular in cross-section. At one side of portion 39 is a guide strip 42 which is spaced apart from one edge of leg 34, a distance sufficient to receive the vertical leg 26 of part 22 of said jack so that when the complementary parts of the jack are assembled the legs 26 and 34 of parts 22 and 23 are in free edge to edge relation and whereby the horizontal leg 35 of part 23 is disposed above the horizontal leg 27 of part 22 and in the same general plane therewith. Said horizontal legs 35 and 23 are planar and of such thin gauge as to enable their insertion into the case of the piano via the space between an endmost playing key and the adjacent cheek block of the case of the piano.

Attached by screws 38*a* to one side of portion 39 of part 23 of said jack is a metallic stamping 43, the form of which is such that it is slidably received in said casing 30. Its upper end is formed with a horizontal lug 44 providing a nut through the threaded opening 45 of which said screw 31 passes. Slidable in the slot 29 is a plate 46. Said plate is attached to said portion 39 of part 23 and to stamping 43 by means of said screws 38*a*, the arrangement of the parts being such that portion 39 is interposed between plate 46 and part 25 and so that parts 23, 24 and 25 are movable vertically as a unit when said screw 31 is turned in one direction. It follows from the above that the toothed planar horizontally disposed legs 27 and 35 of parts 22 and 23 are capable of adjustment relative to each other, thus to form coactive jaws of a clamp for securing bar 10 in a fixed position of vertical adjustment above the keyboard.

Pivoted for horizontal motion in the channel of bar 10 at each end of the bar is a clamp plate 48. The open side of the channel bar 10 is closed by a removable cover 49. The front or closed side of said channel bar is provided with a removable cover 50. The upper and lower flanges F1 and F of said channel bar are formed with vertically aligned elongated slots 51.

As previously stated, the end jacks 20 and 21 are identical except that they are formed as rights and lefts, i. e., the vertical arm 41 of jack 21 extends to the left whereas the corresponding vertical arm of jack 20 extends to the right. This is appreciated on reference to Figure 1 which shows the switch assembly operatively mounted so that the lower ends of the key actuated plungers of the respective electric switches on bar 10 are in operating relation to the respective playing keys of the keyboard.

When attaching the switch assembly to the instrument the horizontal legs of parts 22 and 23 of jack 21 are placed edgewise as a unit in the space between end playing key K and the right hand cheek block C of the piano so that said legs extend into the case, the leg 35 of part 23 extending rearwardly and disposed beneath the lower edges of the horizontal board P' of the case and leg 27 extending downwardly and disposed in the same general vertical plane as leg 35. The screw 31 is then turned so as to move said legs away from each other, the teeth 36 of leg 35 being firmly imbedded in the under surface of said board. The teeth 28 of leg 27 of said part 22 are similarly imbedded in the upper surface of the key bed mounting board B. In this manner the jack is firmly clamped to the piano so as to dispose the extension 41 in a rigid vertical position at the front of the fall board of the case of the piano at one end of the keyboard. The jack 20 at the left end of the piano is similarly associated with the cheek block C' and the left end key of the keyboard.

With both jacks firmly clamped to the case of the piano as above stated bar 10 is then mounted on the jacks by passing the extensions 41 upwardly through their coactive slots 51—51 at the respective ends of said bar. Said extensions are disposed in back of the aforementioned clamp plates 48 and the latter are then pressed firmly against the extensions with resultant clamping engagement of the extensions against adjacent vertical walls of said slots. This is effected by clamp screws 51' which are mounted on the outer cover plate 50. Said plates 48 are each thereof urged to a released position by springs 48*a* so that when the screws are turned in an opposite direction bar 10 is released and can be either completely removed from the keyboard or adjusted vertically and horizontally to properly correlate the plungers of the individual key actuated switches with their respective playing keys.

The gist of the herein disclosed invention finds expression in the form, shape and construction of the component parts of jacks, each jack consisting of complementary parts, planar portions of which are freely insertable into the case of the piano or similar keyboard musical instrument from exteriorly thereof and via the spaces between the extreme end keys of the keyboard and the adjacent cheek blocks of the case of the piano, whereby and by virtue of the coactive toothed legs 27 and 35 the jacks are rigidly secured in a position. A further feature of the invention is the herein stated use of complementary elements of a clamp in which the coac-

tive superposed toothed clamping portions thereof be in the same vertical plane with each other and are of planar form and of the same gauge so as to be readily received in the space between said extreme end keys of the keyboard and said adjacent cheek blocks.

What is claimed is:

1. The combination with a musical instrument including a case having a keyboard and a plurality of longitudinally spaced apart electric switches for and actuable by respective playing-keys of said keyboard; of mounting means for supporting said switches above said keyboard for actuation thereof by said playing-keys, said mounting means comprising devices having clamping portions insertable in and removable from said case from exteriorly thereof and adapted for clamping engagement with surfaces of the case interiorly of the latter and at the respective ends of said keyboard and serving when in clamped engagement with said surfaces to support said switches at the back ends of the effective playing surfaces of said playing-keys for free fingering of any selected ones of said keys when playing a musical score.

2. The combination according to claim 1 wherein said devices are each provided with means located exteriorly of said case for adjusting the clamping portions thereof to cause effective clamped engagement thereof with and release of same from said surfaces.

3. The combination according to claim 1 wherein the aforementioned clamping portions of each of said devices consist of planar metallic stampings of like thin gauge.

4. The combination according to claim 1 wherein the aforementioned clamping portions of each of said devices are horizontally disposed and lie in the same general vertical plane and consist of thin gauge planar metallic stampings.

5. The combination with a musical instrument including a case having a keyboard and a plurality of longitudinally spaced apart electric switches for and actuable by respective playing-keys of said keyboard; of mounting means for supporting said switches above said keyboard for actuation thereof by said playing-keys, said mounting means comprising devices having horizontal clamping portions disposed in the same vertical plane and consisting of thin gauge planar metallic stampings insertable in and removable from said case from exteriorly thereof and adapted for clamping engagement with surfaces of the case interiorly of the latter, the upper edge of one clamping portion of each separate mounting device and the lower edge of the other clamping portion thereof having teeth for penetrating said surfaces.

6. A device of the class described comprising a pair of planar L-shaped, slidably connected, metallic members of substantially the same thin gauge; said members disposed edge to edge and respectively provided with coactive superposed and spaced apart clamping portions lying in the same general vertical plane; and means embodied in said device for causing relative sliding motion of said members to varying the spacing of said clamping portions.

7. A device according to claim 6 wherein said means for causing relative sliding motion of said members comprises a nut on one of said members and a screw swiveled to the other member and coacting with said nut to move said members as aforestated in response to rotation of said screw.

8. A mounting for use with a keyboard musical instrument employing a case and a switch assembly adapted to be disposed above said keyboard exteriorly of said case and provided with a plurality of spaced apart electric switches for actuation by respective playing keys of said keyboard, said mounting comprising similar devices for clamping engagement with interior structural parts of said case; and means on said devices for removably supporting said switch assembly above and in fixed horizontal relation to said keyboard with the switches of said assembly in coactive relation to said respective playing keys at the back ends of the effective playing surfaces thereof.

9. A mounting for use with a keyboard musical instrument employing a case and a switch assembly adapted to be disposed above said keyboard exteriorly of said case and provided with a plurality of spaced apart electric switches for actuation by respective playing keys of said keyboard, said mounting comprising similar devices for clamping engagement with interior structural parts of said case at the respective ends of said keyboard, and means on said devices for removably supporting said switch assembly above and in fixed horizontal relation to said keyboard with the switches of said assembly in coactive relation to said respective playing keys at the back ends of the effective playing surfaces thereof.

10. The combination with a keyboard musical instrument employing a case and a key switch assembly disposed above said keyboard at the back ends of the effective playing surfaces of the playing-keys thereof, of means for removably mounting said switch assembly on said case, said means comprising clamps at the respective ends of said assembly for clamping engagement with the case interiorly thereof, said clamps each comprising a pair of coactive clamping portions insertable as a unit between a respective end key and an adjacent end portion of the case.

11. The combination with a keyboard musical instrument including a case and a switch assembly disposed above said keyboard exteriorly of the case and at the back ends of the effective playing surfaces of the playing-keys of said keyboard, of a pair of jacks detachably connected with said switch assembly at the respective ends thereof, each of said jacks comprising a pair of coactive portions for clamping engagement with horizontally disposed spaced apart portions of said case interiorly of the latter.

12. A combined switch organization and mounting for use with a case having a horizontally disposed keyboard, said organization and mounting comprising a rigid rectilinear member, a plurality of longitudinally spaced apart electric switches carried by said member, and means coactive with said case from within the latter for fixedly supporting said member at any selected elevation above and in parallel relation to said keyboard and for disposing said switches for actuation by respective playing keys of said keyboard.

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