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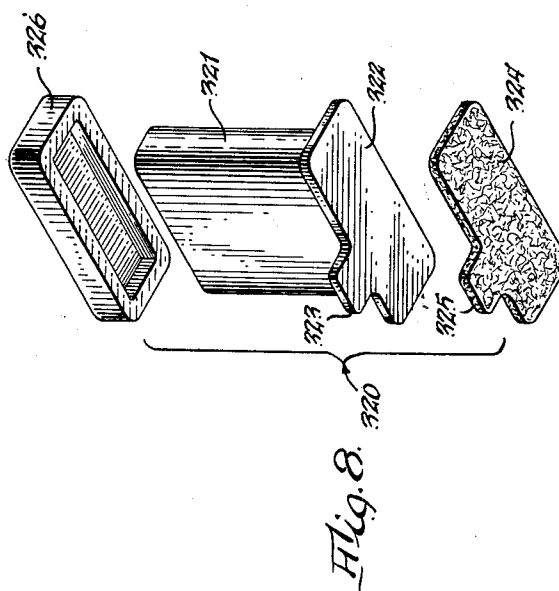
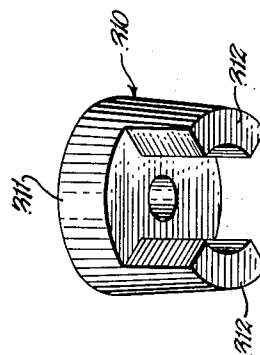
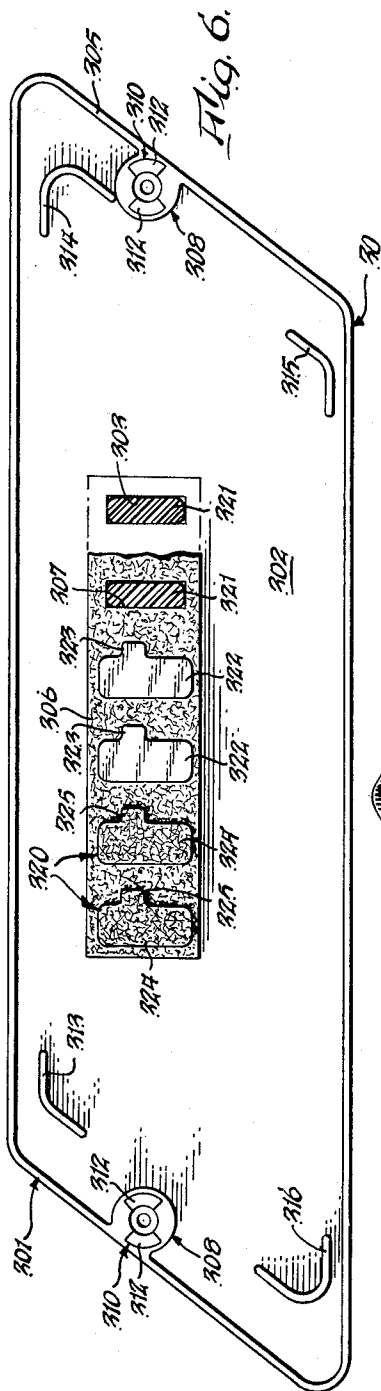
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3,180,197

AUXILIARY KEYBOARD

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2 Sheets-Sheet 2



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AUXILIARY KEYBOARD

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This invention relates to improvements in note playing mechanisms for association with a musical instrument, and more particularly to a new and improved auxiliary keyboard for the main keyboard of such a note playing mechanism.

The playing of a musical instrument such as a piano has been greatly facilitated by the addition of an electro-mechanical chord playing mechanism such as that disclosed in my prior copending applications Serial No. 176,240, filed February 28, 1962, as a division of Serial No. 794,902, filed February 24, 1959, and Serial No. D-62,103, filed September 12, 1960. This mechanism includes a main keyboard comprising a cover having through openings and an array of main push buttons reciprocable through such openings for severally playing various chords, bass notes and thirds by electro-mechanically actuating certain piano actions and keys.

A person knowing some fundamentals of music can readily learn to use this mechanism and thereby perform substantially as well or better than an accomplished musician can perform on a conventional piano. However, it is more difficult for a beginning player to learn the use of this mechanism because of the relatively large number of buttons to choose from.

For example, the mechanism includes a total of seventy-two buttons arranged in six elongated horizontal rows of twelve buttons each and twelve vertical rows of six buttons each. The horizontal rows are arranged in the following order, from the top down, for playing thirds, bass notes, major chords one or more octaves above the bass notes, minor chords, 7th chords, and augmented or diminished chords, while the vertical rows are arranged in the following order from left to right, for playing in the ensuing musical keys, Db, Ab, Eb, Bb, F, C, G, D, A, E, B and F#. Even though the main keyboard may be provided with indicia at each end of the button array for designating the various notes and chords, and along the top of the array for designating the various musical keys, and even though certain buttons may be differentially and distinctively colored, etc., to facilitate proper selection, a beginner still may be somewhat confused when he first sees the entire main keyboard. In order to eliminate this confusion and possible psychological barrier, it has been found to be both necessary and desirable to hide all buttons from the beginner's view, except those needed by him, and these are buttons for the six major chords in the keys of Bb, F, C, G, D and A.

Accordingly, it is a primary object of the present invention to provide a new and improved auxiliary keyboard which not only accomplishes the above purpose, but also permits playing of notes in different octaves simultaneously merely by pressing one push button to obtain music normally requiring the use of two hands. To this end, the inventive auxiliary keyboard is so constructed and designed that it has auxiliary push buttons spanning and engaging pairs of main push buttons for severally playing notes in one octave, such as chords, and notes in another octave, such as bass notes in a lower octave, simultaneously.

Other objects are to provide an auxiliary keyboard which is so constructed and designed as to be (1) quickly and easily located in the proper position over the main keyboard, (2) firmly held in place thereon magnetically,

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and (3) readily removed therefrom, all without harming the main keyboard and indicia thereon or the need for mechanical fastening devices.

Further objects and advantages of the invention will become apparent upon consideration of the following detailed description and accompanying drawings wherein:

FIG. 1 is a fragmentary top plan view of a piano keyboard, the main keyboard of a chord playing mechanism, and the inventive auxiliary keyboard with the left end portion broken away to illustrate the underlying structure;

FIG. 2 is a fragmentary front elevational view illustrating the main and auxiliary keyboards of FIG. 1;

FIG. 3 is a right end elevational view of the main and auxiliary keyboards of FIG. 1;

FIG. 4 is an enlarged fragmentary sectional view taken on line 4-4 of FIG. 1;

FIG. 5 is a section taken on line 5-5 of FIG. 4;

FIG. 6 is a bottom plan view of the auxiliary keyboard;

FIG. 7 is an enlarged bottom perspective view of a permanent magnet incorporated in the auxiliary keyboard, and

FIG. 8 is an enlarged exploded perspective view of the various parts making up an auxiliary push button used in the auxiliary keyboard.

Referring to the drawings, and particularly FIG. 1, the white keys of a piano keyboard are generally indicated at 10, and along the front of the piano keyboard are arranged a part of the chord playing mechanism including the main keyboard generally indicated at 20, and the auxiliary keyboard 30 constituting a preferred embodiment of the invention.

As best shown in FIG. 4, the main keyboard 20 is composed of a cover or plate 201 provided with through openings 202 and to the underside of which is suitably secured a sound deadening felt pad 203 provided with through openings 204 aligned with openings 202. As also shown in FIG. 1, an array of main cylindrical push buttons 205 are vertically reciprocable through openings 202 and 204 and are biased upwardly to the inoperative position of FIG. 4 by any suitable means such as springs (not shown). Each of the buttons 205 is provided with a collar 206 engageable with pad 203 for limiting its upward movement.

As illustrated in FIG. 1, there are a total of seventy-two main push buttons 205 arranged in six parallel horizontal rows of twelve buttons each and twelve vertically inclined parallel rows of six buttons each, to form an array having a rhomboidal outline or periphery, and at least partially surrounding the array are indicia for designating notes, chords and musical keys. At each end of the array the various note and chord designations are abbreviated. Reading from top to bottom, these indicia designate the horizontal rows of buttons 205 for playing third and bass notes, and major, minor, seventh, and augmented (left end) or diminished (right end) chords. Along the top of the array are the musical key indicia, and reading from left to right, these designate the vertical rows of buttons 205 for playing in the keys of Db, Ab, Eb, Bb, F, C, G, D, A, E, B and F#.

The array is preferably arranged along the piano keyboard for convenient left hand playing of such chords in a control octave preferably ranging from D above middle C to Eb below middle C, with the bass and third notes being played preferably in the next lower octave. While the manner in which the chord playing mechanism operates to electro-mechanically play the various notes and chords is not necessary to a full understanding of the auxiliary keyboard constituting the present invention, a detailed description of such mechanism and its operation may readily be obtained by reference to my copending application, Serial No. 176,240.

Returning to the main keyboard 20 of FIG. 1, should a person desire to play a Db major chord with the mechanism, he merely depresses the first button 205 at the left end of the third horizontal row from the top and headed by "Maj" (i.e. the third button down in the first vertical row headed by "Db"). To play the bass note Db in a lower octave simultaneously, he also depresses the first button 205 at the left end of the second horizontal row from the top and headed by "Bass" (i.e. the second button down in the first vertical row headed by "Db"). To play other chords and bass or third notes, a similar procedure is followed. When so playing chords and bass notes, this produces music normally requiring the use of two hands, as the bass note of the chord is beyond the span of the player's hand. To facilitate such music, the horizontal "Bass" and "Major" rows of buttons are adjacent each other, and in each musical key, these buttons are arranged in pairs spanning such rows.

While learning to use main keyboard 20 is a relatively simple matter for one who knows some fundamentals of music, it is considerably more difficult for the beginner, who may be confused by the relatively large number of buttons 205. However, the inventive auxiliary keyboard 30 effectively solves this problem.

As will be evident from FIGS. 1-3, the auxiliary keyboard 30 overlies main keyboard 20. As also shown in FIGS. 4-6, auxiliary keyboard 30 is composed of an auxiliary cover 301 arranged over the array of main buttons 205 and the indicia, and a row of auxiliary push buttons 320 preferably six in number and severally spanning the "Bass" and "Maj." rows of main buttons 205.

Auxiliary cover 301 is preferably molded into a shell of rhomboidal outline or periphery corresponding to that of the main button array from suitable rigid plastic material, whereas main cover 201 is preferably made of magnetizable metallic material for a purpose to be described below. Cover 301 includes a flat upper wall portion 302 provided with six through apertures 303 of elongated rectangular shape surrounded by upstanding bosses 304 and terminates in an integral endless marginal flange 305 depending downwardly around the main button array and indicia. Suitably secured to the underside of wall portion 302 is a sound deadening felt pad 306 having six through apertures 307 aligned with apertures 303, with each of these aligned apertures spanning aligned openings 202, 204 for a pair of main buttons 205, as shown in FIG. 4.

As best illustrated in FIG. 6, a pair of integral hollow cylindrical housings 308 depend downwardly from the underside of wall portion 302 at each end adjacent and coextensive with the depth of flange 305. Embedded in each of housings 308 is a cylindrical permanent magnet 310 which, as shown in FIG. 7, includes an annular upper disc portion 311 and integral lower segmental pole pieces 312. Thus, magnets 310 serve to firmly hold auxiliary cover 301 firmly in place magnetically on metallic main cover 201 without the need for any separate mechanical fastening devices. At the same time auxiliary cover 301 is readily detachable by hand from main cover 201.

Continuing with FIG. 6, four integral legs 313, 314, 315 and 316 also depend downwardly from the underside of wall portion 302 within flange 305 and at spaced points around the inner periphery of flange 305 and the outer periphery of the main button array. Legs 313 and 315 are of the same obtuse angular cross-section and are arranged at diagonally opposed positions, conforming to and fitting snugly around the obtuse corners of the main button array, while legs 314 and 316 are of the same acute angular cross-section and are arranged at opposite diagonally opposed positions conforming to and fitting snugly around the obtuse corners of the main button array, while legs 314 and 316 are of the same acute angular cross-section and are arranged at opposite diagonally opposed positions conforming to and fitting

snugly around the acute corners of the array, as partially shown in dotted lines in FIG. 1. At the same time, each of these four legs are of the same length and depend downwardly slightly beyond flange 305, housings 308 and magnets 310 onto main cover 201. Thus, legs 313, 314, 315 and 316 not only support, but also properly locate auxiliary cover 301 on main cover 201, thereby preventing the depending flange 305, housings 308 and magnets 310 from marring the upper surface of the main cover, especially the indicia thereon. At the same time, the air gap between magnets 310 and main cover 201 is so slight that the magnets attract the metallic main cover sufficiently to hold auxiliary cover 301 firmly in place thereon.

Reciprocal through openings 303, 307 are the six auxiliary push buttons 320, and as best illustrated in FIGS. 4 and 8, each includes an elongated plastic stud or plug 321 of elongated rectangular cross section projecting upwardly through boss 304. Each stud 321 is provided at its lower end with an integral enlarged foot 322 having an outstanding tab 323, and suitably secured to the underside of foot 322 is a complementary shaped, sound deadening felt pad 324 having tab 325. Removably secured over the upper end of stud 321 to facilitate insertion and removal of each auxiliary button 320 through openings 303, 307 in wall portion 302 is an enlarged plastic cap 326 and, as shown in FIG. 1, each cap 326 is provided with indicia identifying the particular key of the chord and bass note to be played, viz. "Bb," "F," "C," "G," "D" and "A."

Referring specifically to FIGS. 4 and 5, the foot 322 of each auxiliary button 320 spans the corresponding pair of main buttons 205. The particular auxiliary button 320 shown in these figures is the "A" button, and one portion of its foot pad 324 engages the A major chord button 205 while another portion and pad tab 325 engages the base button 205 for this chord. Accordingly, when depressed, the auxiliary buttons 320 severally depress the underlying pairs of main buttons 205 at the same time to severally play such chords and bass notes simultaneously. Downward movement of buttons 320 is limited by the engagement between caps 326 and bosses 304, while upward movement is limited by the engagement between feet 322 and pad 306, and both the main buttons 205 and auxiliary buttons 320 are returned to the inoperative position of FIG. 4 by suitable springs (not shown) in the chord playing mechanism.

As noted above, auxiliary buttons 320 preferably total only six in number, as compared to the seventy-two main buttons 205, and the former are limited to the following six basic major chords, "Bb," "F," "C," "G," "D," and "A." These six auxiliary buttons are quite sufficient for the beginning player, and since they are larger and further apart than the main buttons, and are clearly marked for unmistakable identification, they not only eliminate any psychological barrier to learning how to use the chord playing mechanism, but also permit the playing of these basic chords and their bass notes simultaneously, merely by depressing a single auxiliary push button 320. The ability to so obtain music normally requiring the use of two hands enables the beginner to enjoy full chord playing immediately and facilitates his progression to fuller use of the main keyboard.

The numerous advantages of the invention and the manner in which it accomplishes its various objects will now be apparent from the foregoing detailed description. At the same time, it is to be understood that the embodiment referred to herein is to be considered as illustrative of the invention, and not as restricting its scope, which is to be determined by the appended claims. For example, while the inventive auxiliary keyboard has been disclosed and illustrated as particularly adapted for use with a piano, it is not necessarily confined to such use, but may also be employed in conjunction with push but-

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ton chord playing mechanisms of other musical instruments such as that of a chord organ.

What is claimed is:

1. In a note playing mechanism for association with a musical instrument and including a main keyboard comprising a main cover having through openings, and a pair of main push buttons reciprocable through said openings, with one button playing a note in one octave and the other button playing a note in another octave in harmony with said note in said one octave, the combination therewith of an auxiliary keyboard comprising a cover arranged over said main buttons and supported on said main cover, and an auxiliary push button spanning said main buttons, said auxiliary cover being provided with a through aperture, and said auxiliary button being reciprocable through said aperture and engageable with said main buttons for playing said notes simultaneously.

2. In a note playing mechanism for association with a musical instrument and including a main keyboard comprising a main cover having through openings, and two rows of main push buttons reciprocable through said openings and arranged in pairs spanning said rows, with the buttons of said pairs in one row severally playing notes in one octave and the buttons of said pairs in the other row severally playing notes in another octave in harmony with said notes in said one octave, the combination therewith of an auxiliary keyboard comprising an auxiliary cover arranged over said rows of main buttons and supported on said main cover, and a row of auxiliary push buttons spanning said rows of main buttons, said auxiliary cover being provided with through apertures, and said auxiliary buttons being reciprocable through said apertures and severally engageable with pairs of said main buttons for severally playing said notes in said one octave and said notes in said other octave simultaneously.

3. In a chord playing mechanism for association with a musical instrument and including a main keyboard comprising a main cover having through openings, and an array of main push buttons reciprocable through said openings and including two adjacent rows of buttons arranged in pairs spanning said rows, with the buttons of said pairs in one row severally playing chords in one octave and the buttons of said pairs in the other row severally playing notes in another octave in harmony with said chords, the combination therewith of an auxiliary keyboard comprising an auxiliary cover arranged over said array and supported on said main cover, and a row of auxiliary push buttons spanning said rows of main buttons, said auxiliary cover including a flat upper wall portion provided with through apertures and terminating in an endless marginal flange depending downwardly around said array, and said auxiliary buttons being reciprocable through said apertures and severally engageable with pairs of said main buttons for severally playing said chords and notes simultaneously.

4. In a chord playing mechanism for association with a musical instrument and including a main keyboard comprising a main cover having through openings, and an array of main push buttons reciprocable through said openings and including two adjacent rows of buttons arranged in pairs spanning said rows, with the buttons of said pairs in one row severally playing chords in one octave and the buttons of said pairs in the other row severally playing notes in another octave in harmony with said chords, the combination therewith of an auxiliary keyboard comprising an auxiliary cover arranged over said array, and a row of auxiliary push buttons spanning said rows of main buttons, said auxiliary cover including

a flat upper wall portion provided with through apertures and terminating in an endless marginal flange depending downwardly around said array, and leg means depending downwardly from said wall portion within and beyond said flange and onto said main cover around the periphery of said array for locating and supporting said auxiliary cover on said main cover, and said auxiliary buttons being reciprocable through said apertures and severally engageable with pairs of said main buttons for severally playing said chords and notes simultaneously.

5. In a chord playing mechanism for association with a musical instrument and including a main keyboard comprising a magnetizable main cover having through openings, and an array of main push buttons reciprocable through said openings and including two adjacent rows of buttons arranged in pairs spanning said rows, with the buttons of said pairs in one row severally playing chords in one octave and the buttons of said pairs in the other row severally playing bass notes in a lower octave in harmony with said chords, the combination therewith of an auxiliary keyboard comprising an auxiliary cover arranged over said array, and a row of auxiliary push buttons spanning said rows of main buttons, said auxiliary cover including a flat upper wall portion provided with through apertures and terminating in an endless marginal flange depending downwardly around said array, permanent magnet means arranged beneath said wall portion for detachably securing said auxiliary cover magnetically to said main cover, and a plurality of legs depending downwardly from said wall portion within said flange and beyond said flange and magnet means onto said main cover at spaced points around the periphery of said array for locating and supporting said auxiliary cover on said main cover, and said auxiliary buttons being reciprocable through said apertures and severally engageable with pairs of said main buttons for severally playing said chords and bass notes simultaneously.

6. An auxiliary keyboard for the main keyboard of a note playing mechanism for association with a musical instrument, said auxiliary keyboard comprising a cover, and a push button, said cover including a flat upper wall portion provided with a through aperture and terminating in a downwardly depending endless marginal flange, and leg means depending downwardly from said wall portion within and beyond said flange, and said button being reciprocable through said aperture.

7. An auxiliary keyboard for the main keyboard of a chord playing mechanism for association with a musical instrument, said auxiliary keyboard comprising a cover, and a row of push buttons, said cover including a flat upper wall portion provided with through apertures and terminating in a downwardly depending endless marginal flange, permanent magnet means arranged beneath said wall portion, and a plurality of spaced legs depending downwardly from said wall portion within said flange and beyond said flange and magnet means at spaced points around the inner periphery of said flange, and said buttons being reciprocable through said apertures.

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