

June 27, 1961

D. D. BUNKER

2,989,884

STRINGED MUSICAL INSTRUMENT

Filed Sept. 16, 1957

3 Sheets-Sheet 1



INVENTOR.
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June 27, 1961

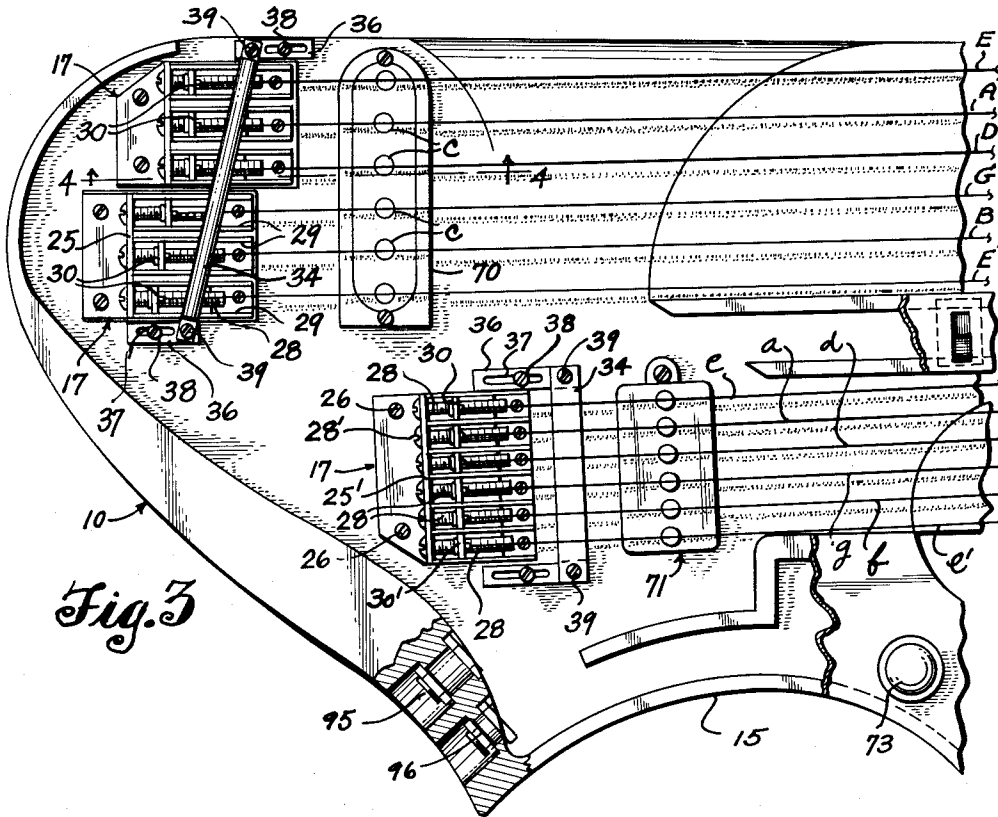
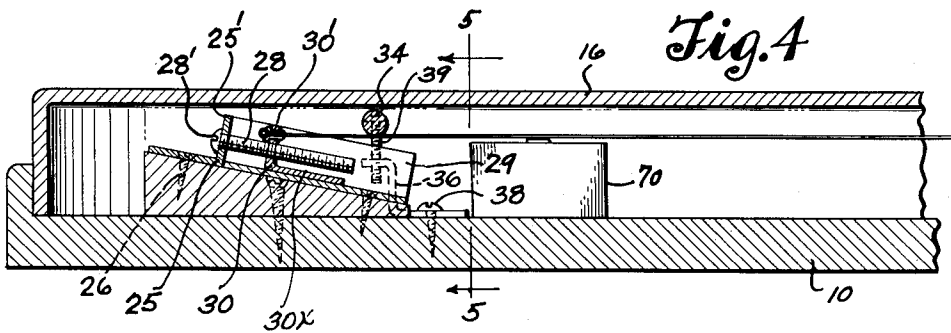
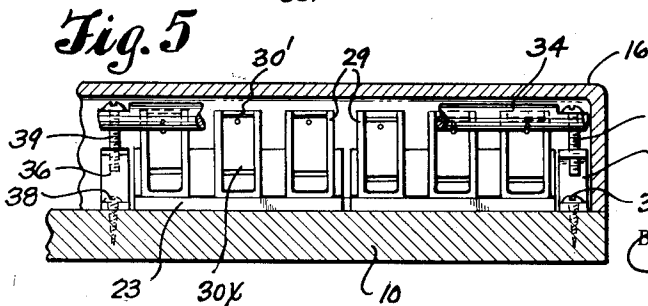
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3 Sheets-Sheet 2



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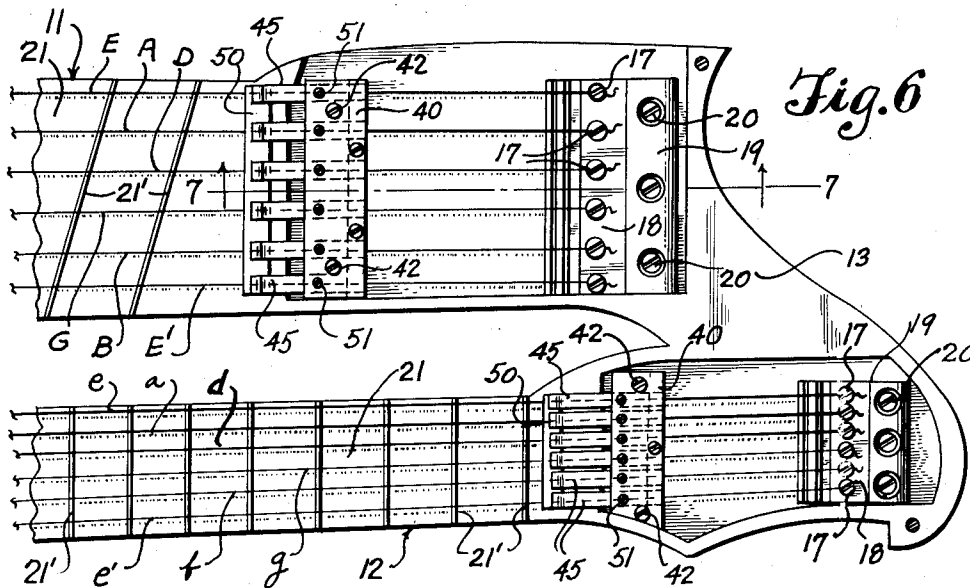
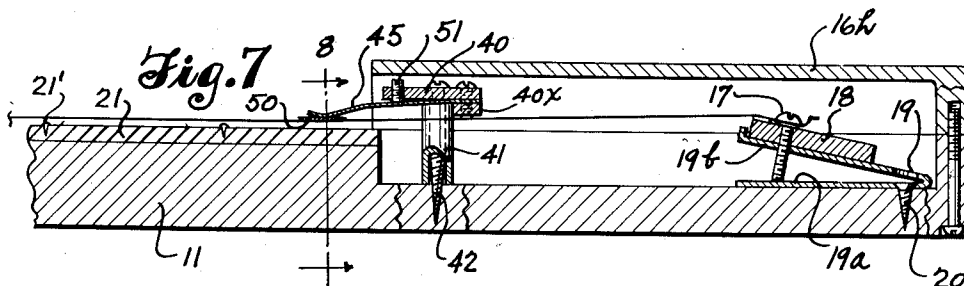
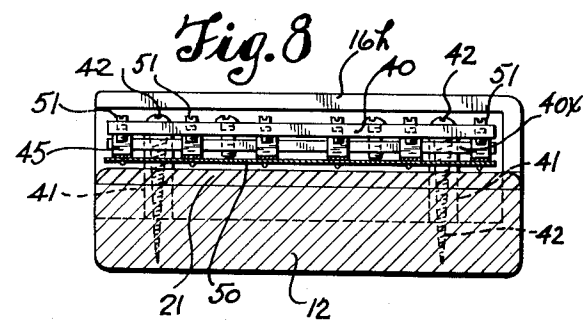
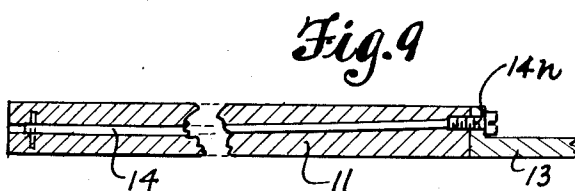
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STRINGED MUSICAL INSTRUMENT

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3 Sheets-Sheet 3



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2,989,884

STRINGED MUSICAL INSTRUMENT

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3 Claims. (Cl. 84-1.16)

This invention relates to electrically activated and controlled stringed musical instruments and it has reference especially to instruments of the guitar category. More particularly the present invention pertains to improvements in what has been designated as a "double necked," electric guitar; the term "electric" being employed to indicate that the tones produced by the strings when acted on by the player's fingers, are electrically "picked up" and amplified under manual control to various amounts as may be desired or required.

It is the primary object of the present invention to provide a double necked, electrically activated and controlled guitar, characterized by the embodiment therein of certain new and novel improvements which make it possible for the player to simultaneously play upon the separate banks of strings, as applied to the two necks of the instrument.

In order to better explain the novel features residing in the present musical instrument, it will here be pointed out that stringed musical instruments known as double necked guitars are already known in the art, especially in the "steel guitar" field. However, in the prior use of double necked guitars, to my knowledge, it has always been required that the player alternately switch from one neck to the other. Also, if the instrument was electrified, it has been required that the electrical tone pick-ups as applied to the unused neck be "shut-off" electrically or damped to prevent an undesired tone interference.

It is further desired to point out that the use of but one bank of strings at a time, as heretofore required in the playing of the double necked guitars, has been due to the method of playing, that is, it has been required that the player use one hand for the fingering of the strings for selecting the desired musical notes and that he use the other to strum or pick the strings to produce the tones. In other words, because of the particular method of playing, it has required use of both hands to play on the strings of either neck of the two necked instrument. The improvements hereinafter disclosed in the present double necked guitar, as embodied in the electric system and controls, and in the specific design of the instrument, make it possible for the user to play the bank of strings as applied to one neck with the fingers of one hand, and to simultaneously play those of the other neck with the fingers of the other hand.

More specifically stated, it has been the primary object of the present invention to provide an easily portable, electrically energized and controlled guitar, having two necks, each of which is equipped with a bank of strings, preferably but not necessarily in "Spanish" tuning, and by which strings selected notes are produced merely by "touch" or "tapping" by the fingers at the location of the proper fret as distinguished from being produced by strumming or by striking with a plectrum held in one hand after the note selection has been made by proper fingering with the other hand.

It is a further object of the invention to provide an instrument of the character above recited, which is characterized in one respect by use therein of a novel form and arrangement of string damping means with which the strings engage and which effect discontinuation of tone production therefrom upon their being released from any tone producing finger touch.

It is also an object of the present invention to arrange the two necks of the instrument in such relationship to

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each other that interference of the hands, one with the other, in playing thereon is avoided.

Another object is to provide a novel fret arrangement as applied to the finger board of one of the necks as an aid to easier playing of the instrument.

Yet another object of the present invention is to provide the main body portion of the instrument with a novel form of arm rest which serves additionally, in conjunction with a hollowed out portion of the body to which it is attached, to provide a sound box.

Still another object resides in the provision of novel controls for the electrical system that makes possible the proper balancing and control of the volume of sound emanating from each bank of strings, and means whereby various tone effects can be quickly selectively obtained.

Still further objects and advantages of the invention reside in the details of construction of the various parts of the instrument; in their combination and relationship in use, and in the particular design of the body that provides for the easy handling and holding of the instrument in use, and in the provision of means for the advantageous, and practical control of the electrical elements of the instrument.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings wherein:

FIG. 1 is a top, or plan view of the present double necked electric guitar.

FIG. 2 is a wiring diagram of the electrical system employed in conjunction with the instrument.

FIG. 3 is an enlarged, plan view of the lower end or main body portion of the instrument, with the arm rest removed therefrom to disclose the location and character of the string anchoring and tuning heads, and the relationship of the strings to the electric tone pick-up devices of the electrical system.

FIG. 4 is a vertical section taken substantially on line 4-4 in FIG. 1, showing the string anchoring and tuning means and the tone "pick-up."

FIG. 5 is a cross-section taken substantially on line 5-5 in FIG. 4.

FIG. 6 is an enlarged plan view of the upper end portion of the instrument with cover plate removed and showing the joined necks; the string anchoring means and the string damping fingers.

FIG. 7 is an enlarged vertical section taken substantially on line 7-7 in FIG. 6.

FIG. 8 is a cross-section taken on line 8-8 in FIG. 7.

FIG. 9 is a sectional view of a detail of the neck construction.

FIG. 10 is a view illustrating the normal manner of holding the instrument and the positioning of the hands for playing.

Referring more in detail to the drawings and first to the details of construction and relationship of the various parts of the instrument without reference to the electrical equipment.

As best shown in FIG. 1, the present instrument, which preferably is made in a size approximately equal to that of an ordinary Spanish guitar, thereby adapting it to be held for playing in substantially the same manner, comprises what will be herein referred to as the main body portion 10 from which two necks, 11 and 12, extend in parallel relationship.

The body portion 10 comprises a single block of selected wood, for example, maple, cut to the shape shown or other practical shape, and having its top portion, adjacent its lower end, hollowed out to provide a depression or recess wherein the string tuning and anchoring means and tone pick-ups are contained, as has been shown best in FIGS. 3 and 4. While it is not the intent to limit

the body to any specific shape or to definite dimensions, it has been found quite practical to form the body from a wooden block of about 1½ inch in thickness, and to hollow it out to a depth of about ¾ inch to provide the recess for reception of the parts above mentioned.

The two necks of the instrument are made also of selected wood and are joined to the upper end portion of the body in such manner as to extend in parallel, spaced relationship therefrom; being rigidly joined at their upper ends by a head block 13, as noted best in FIG. 6, thus to give rigidity thereto. In the present instance the neck forming pieces are longitudinally bored and a reinforcing rod 14 of steel is extended through each and anchored in the body 10 thus to give additional strength, and greater rigidity to the instrument.

The boring of the smaller neck 12 is preferably as shown in FIG. 9, and the rod 14 as applied thereto is downwardly bored. At its inner end the rod 14 is anchored in the neck. At the outer end of the neck, a nut 14n is mounted in abutment with the end of the rod. By adjustment of this nut, the proper tension on the strings can be obtained.

It is practical and also quite advantageous in holding and playing the instrument, to shape the above mentioned parts, particularly the body and head block, to the forms shown. It is to be observed that the body 10 is formed with a rounded lower end portion somewhat simulating the rounded end of the ordinary guitar, and at the lower side, the body is formed with an inwardly directed recess 15 shaped to receive the player's knee as a support when the instrument is being played by a player in sitting position.

A hollowed out cover member 16 is removably fitted to the recessed top portion of the body 10, over the sound pick up means and tuning heads for the two banks of strings as associated with the two necks of the instrument. In FIGS. 1, 4 and 5, this cover member is shown in place, while in FIG. 3, it has been removed for showing of parts beneath it, presently described in detail.

In the present instance, six strings are associated with each neck of the instrument although there might be more or less; the strings as applied to neck 11 are herein designated, respectively, by reference characters E, A, D, G, B, and E'; and those as applied to neck 12 being designated, respectively, by reference characters e, a, d, g, b and e'. While it is not the intent to limit the tuning of the two banks of strings to any particular system, it is practical and desirable to use the "Spanish" tuning. Each bank of strings is like the other and the strings of both are tuned to the same pitch.

At their upper ends, the strings of each neck are fixed as seen in FIGS. 6 and 7, to screws 17 applied downwardly through a bar 18 disposed upon a plate 19 that is permanently fixed to the head block 13 in alignment with the neck by screws 20. The plate 19 as associated with each neck, is folded upon itself, as shown in FIG. 7, to provide it with a base portion 19a that rests flatly upon the bottom of a recess in the head block 13 and an upwardly inclined top portion 19b through which the screws 17 pass into engagement at their lower ends with the base portion 19a.

Referring again to the two necks of the instrument: The neck 12, which will be referred to as the "lower" neck, preferably, is approximately the same size as the neck of an ordinary guitar; having a width at its upper end of about 1¾ inches. It is equipped with the usual finger board 21 carrying metal frets, 21', projecting somewhat above the finger board surface; these frets being disposed at right angles to the direction of the strings.

The neck 11, referred to as the "upper" neck is substantially wider than neck 12, being approximately 3¼ inches wide at its upper end, and the strings as applied to this neck are spaced farther apart in accordance with the greater width of the neck.

One of the novel features of the instrument pertaining to the necks, resides in the fact that they are in a close

parallel relationship, being spaced only sufficiently for the easy movement of the left hand along the lower neck as required for the playing of the strings applied thereto in the usual manner of Spanish guitar playing.

Another of the novel features resides in the relationship of the necks to each other in respect to their end limits. It is to be observed more particularly by reference to FIG. 1, that the wider upper neck 11 is offset endwise, substantially below the limits of neck 12. It is shown in FIG. 1 that the first fret of the finger board applied to neck 11 is approximately in alignment with the fifth fret applied to the finger board of the lower neck 12.

Still another novel feature of the neck formation resides in the slanting or inclining of the frets 21' relative to the strings and longitudinal line of the finger board of neck 11; it being noted particularly in FIGS. 1 and 6, that these frets 21' are not in the usual position, that is, not at a right angle to the direction of the strings but are inclined from the top to lower edge of the fret board in a direction toward the base end of the instrument.

The reason for the above mentioned close, parallel relationship of the necks 11 and 12 is to place them in a relationship most advantageous to the player for simultaneous playing on the two banks of strings. The greater width of the upper neck is to make possible the wider spacing of the strings as associated therewith; this wider spacing of strings being to make it possible to more easily play thereon in the particular manner presently to be explained. The inclination of the frets 21' as applied to the upper neck, also is to better adapt them to the present manner of playing the strings of this neck of the instrument, as will presently be apparent. The offsetting of the necks in respect to their end limits, is to eliminate possible interference between the player's hands, both from the standpoint of one hand directly interfering with the other in contacting the strings and also to prevent the top hand interfering with the line of vision of the player as directed toward the lower hand.

In reference to the direct interference of one hand with the other, this would be quite apt to occur if the two closely related necks were co-extensive and the player was required to finger the same chords on both necks. However, by the present offsetting, the upper or right hand as applied to the neck 11 for playing its strings is most generally at a location below that of the left hand in fingering the strings of neck 12 and no interference is encountered.

The tuning of strings as applied to this instrument is accomplished by the means best shown in FIGS. 3, 4 and 5. It is shown in FIG. 3 that the strings as applied to neck 11 are accommodated by two tuning heads 17, each tuning head accommodating three strings, while the six closer spaced strings of neck 12 are accommodated by a single tuning head 17. However, insofar as the anchoring and tuning means for the individual strings is concerned, they are all alike and are as best shown in FIG. 4.

The two tuning heads as employed for the strings of neck 11, are offset relative to each other on a line that is approximately at the same angle relative to the neck as the frets applied to that neck.

Each tuning head 17 is mounted, as shown in FIG. 4, on a base block 23 that is glued or otherwise suitably fixed to the body 10 near the lower limits of the recessed portion. This block has its top surface upwardly inclined toward the base end of the instrument. An anchoring cross-bar 25 of angle form has its base flange secured to the inclined top surface of the block by screws 26. The vertical flange 25' of this cross-bar extends upwardly and at a right angle to the direction of the strings. Mounted in the flange 25' of the cross bar, for easy axial rotation, and in a lateral spacing suitable to accommodate the strings that lead thereto, are six screw bolts 28; each bolt being anchored in the flange, for rotation, by its

head 28'. The bolts extend in the direction of the corresponding strings and are contained between the laterally spaced vertical flanges of channel-like guide bars 29 that are fixed to the top surface of the block 23.

Threaded onto each of the bolts, is a string anchor member 30 of angle form; each having a substantially vertical flange 30' through which the corresponding bolt 28 is threaded, and a substantially horizontal flange 30x that has sliding contact with the base of the corresponding channel guide 29. The strings corresponding to the anchor members 30, are suitably fixed to the top edges of the flanges 30' as noted in FIG. 4. All strings leading to the anchors pass beneath and when drawn taut engage against the under edge of a cross-bar or rod 34, located closely adjacent the tuning head and adjustably fixed to the body by supporting brackets 36—36 applied to its opposite ends. Each bracket has a foot portion 36' that is longitudinally slotted, as at 37, to receive an anchoring or securing screw 38 therethrough. This permits adjustment of the cross bar closer to or farther from the string anchors 30. Also, the bar is fixed at its ends to the brackets by screws 39 which provides for some vertical adjustment of the bar as may be desired to bring the strings in proper relationship to the sound pick-up devices presently described.

The previously mentioned damping means as applied to the two banks of strings, has been shown in FIGS. 6, 7, and 8. The damping means as applied to one bank of strings is like that applied to the other except as required to accommodate the inclination of the frets of neck 11. The damping means for each bank of strings comprises a plate 40 disposed across the strings as shown in FIG. 7, and supported at its opposite ends by posts 41 which are fixed to the head block 13 by screws 42. This plate is located at a predetermined distance from the upper end of the finger board 21 of the neck with clearance above the bank of strings. Extending from the plate 40, to which they are fixed by a clamp bar 40x, over and along the strings are resilient spring fingers 45, all of the same length and supporting, at their free ends, a felt pad 50. This pad extends across all strings and engages them under slight downward pressure or tension of the spring fingers 45 to prevent vibration of the strings when open.

It is shown in FIG. 7 that each finger is engaged by an individual adjusting screw 51 that is threaded downwardly thereagainst through plate 40. By adjustment of these screws the proper pressure can be exerted against pad 50 to obtain the pressure best suited for each string. It is to be understood, however, that the damping pressure applied by the pad 50 does not change the tension of the tuned strings or in any way affect their tone or tuning.

It is of significance in the electrical operation of this guitar, as presently will be explained, that the playing of the strings is effected by the finger tapping of the selected strings or string to actuate them down against the selected frets thus to cause the tapped strings, as extended between the cross bar 34 which is adjacent the tuning head and the contacted fret, to be vibrated. Those opposite end portions of any tapped string, that are above and below any tapping point, herein referred to, respectively, as the upper and lower end portions of the string, vibrate independently of each other unless damped and rarely at the same rate. The tone produced by the vibrating lower end portions of tapped strings being picked up electrically and amplified to the extent desired. When the player's fingers are lifted from the tapped strings they raise from the frets and vibrations produced incident to this are damped to the full length of all strings by the continuing pressure of pad 50 thereagainst.

Referring again to the cover member 16 that overlies the tuning heads and pick-up devices on the body; this serves as an arm rest and is designed to keep the player's right forearm from contacting the strings of neck 11. However, it is hollowed out in the form and nature of a

sound box and when in place, adds materially to the full tone of the instrument.

It is also shown in FIG. 1 that the damping means and string anchors as applied to the head block are also covered by a hollowed out plate 16h which protects these parts.

The various electrical elements and the wiring thereof is shown diagrammatically in FIG. 2. The various elements as used in connection with each of the banks of strings is exactly like those of the other, and also the circuitry of both sets are alike.

It has been found to be most practical to locate the various control switches in a block 65 fixed to and between the lower end portions of necks 11 and 12 in order that they may be easily and quickly reached by the player's right hand without moving the arm out of playing position.

The sound pick-up devices as used with the two banks of strings are applied within the body recess immediately forward of the tuning heads and beneath the strings as shown in FIGS. 3 and 4. The pick-up for strings of neck 11 is designated in its entirety by numeral 70 and that for the other bank of strings is designated by numeral 71. The sound picked up is amplified and delivered by a speaker 72 under control of manually operable buttons 73 and 74 which, respectively, serve the strings of necks 11 and 12.

In FIG. 2, the amplifier is designated by reference character A and its electrical connection with speaker 72 are as indicated. Electrical current for the electrical system is supplied through circuit lines designated at 75 and 76. Also, in FIG. 2, the relationship of strings to the pick-up coils has been indicated by the dash lines drawn across the pick-up devices as represented at 70 and 71.

While I do not claim anything especially new in the pick-up of sound and its controlled amplification for delivery by a speaker, it is believed that the various sound control switches as associated with the electrical system and as applied to the block 65, which is located between the lower end portions of the necks, presents an advantageous arrangement since all switches are in a position readily accessible to the right hand of the player without taking it away from playing position.

It is to be understood that each of the pick-up devices 70—71 includes an individual pick-up coil represented at c in FIGS. 2 and 3, for each of the six strings that pass across it. Each pick-up coil, as applied to each pick-up device, delivers its sound impulses to a circuit which has individual switch connection with three condensers, through any one or all of which the impulses may be passed by the selective manipulation of control switches. When all condensers are cut into the circuit, the tone is muted or softened to maximum extent. As the condensers are cut out, the sound is changed in tone accordingly.

In FIG. 2 the three condensers that are included in the circuitry of the pick-up 70 and the corresponding volume control rheostat 73 are designated at 80, 81 and 82, and these are cut in or out of circuit, respectively, by switches designated at 83, 84 and 85. Also included in the circuitry associated with the switches and condensers of the pick-up device 70 are resistors designated at 80r, 81r and 82r.

Likewise, condensers and resistors are associated with the circuitry of pick-up 71 and its volume control rheostat 74. The condensers are designated at 86, 87 and 88 and resistors at 86r, 87r and 88r, and these are cut in or out by switches designated at 89, 90 and 91. The condensers are employed as the tone control means, while the resistors are used to reduce noise when the corresponding switch is open, and also to eliminate the loud "pop" when the setting of a switch is changed.

Also associated with the circuitry of the condensers, resistors and switches of the two sets of strings, respectively, are master switches 92 and 93. It is shown in

FIG. 1 that in applying the electrical devices to the guitar, the switches 83, 84 and 85 are located at the left hand end of block 65; the switches 89, 90 and 91 are located at the right hand end, and switches 92 and 93 are located at a medial point. It is shown also in FIG. 2, that the circuitry also includes resistors 92r and 93r in the master switch circuit connections for the same reason that the previously mentioned resistors are employed.

Opening or closing of the condenser controlling switches can be done at any time at the pleasure of the player. Normally the player before starting a selection, sets the switches to give the tonal effect desired, and he balances the tone as produced by playing on one neck with that produced by the other by adjustment of rheostats controlled by the rheostat knobs 73 and 74. If the player desires, at any time while playing, to go to full tone, the master switches are closed, then when it is desired to return to the original tonal effect, these switches are opened.

The guitar is equipped to contain the circuitry necessary and the body 10 is formed, as shown in FIG. 3 with "plug in" sockets 95 and 96 for reception of jacks as used on the usual extension cords that carry the current to the circuitry as contained in the guitar and to the amplifier and speaker as indicated in FIG. 2.

Assuming the guitar to be so constructed, and the electrical equipment to be applied as explained and as diagrammatically shown in FIG. 2, its use is as follows: The normal manner of holding the guitar for playing is substantially as indicated in FIG. 10. The lower neck 12 is grasped for fingering its strings in the ordinary manner of playing a Spanish guitar. The right forearm is laid across the cover plate 16 as applied to the body 10, in alignment with neck 11 and the fingers of the right hand are extended along the strings of this neck, as indicated, and not across them as is the position of fingers applied to the lower neck.

Upon plugging in the circuit connections to electrify the guitar, its playing is accomplished by what has been designated as the "touch system" which consists of a rather quick downward tapping by the finger tips, of the selected strings against selected frets and holding that position as long as it is desired that the tone be sustained. This tapping of strings causes their lower end portions to be vibrated to produce the selected tones; the tones being sustained so long as the strings are held depressed. The produced tones are then amplified and passed to the speaker. It is the intent that the strings of the wider upper neck be used for playing a melody, with or without harmonizing tones, and that the proper accompanying chords be played by fingers of the left hand on the strings of the lower neck.

The amplified tone impulses as produced by strings of neck 11 through the pick-up 70 are controlled in volume by turning the rheostat control knob 73 and that produced from strings of neck 12 through pick-up 71 similarly controlled by turning the knob 74. Different tonal effects are obtained by use of the switches 83, 84 and 85 for neck 11 and switches 89, 90 and 91 for neck 12 as previously explained.

The present instrument, so designed, makes possible the simultaneous playing of two sets of strings instead of the usual single set. It provides, in a guitar, facilities that are comparable to those of a piano since instead of being a one hand instrument it is a two hand instrument, and instead of being a chording or accompanying instrument, it is complete in itself to the extent that it can be played to produce a harmonious melody from one

to four strings, with accompanying chords using up to six strings.

In accomplishing the objects of the invention, various factors are important. First, the rather close parallel relationship of the two necks; second, the endwise offsetting of the necks to avoid hand interference; third, the inclining of the frets of the upper neck and the widening of the neck to permit a wider spacing of strings that becomes necessary or at least desirable, to adapt the instrument to the specific manner of playing herein specified. Other advantages are the result of body design, the arrangement of control switches, and the method of their use.

It is to be explained further that the present instrument is not confined strictly to the present method of touch playing. It is possible by applying a metal bar across the neck 12 at the location of the damping pad 50, for support of the strings thereon, out of contact with the frets, the strings can then be played upon, as in playing a Spanish guitar. It is of course desirable even when playing in this manner to employ the electrical equipment for amplification of the tone and its control.

What I claim is:

1. In a stringed musical instrument of the character described having a finger board that is equipped with a succession of frets, and a bank of strings extending along the finger board, above and across its frets and adapted to be selectively finger tapped thereagainst, thus to cause tone producing vibrations to be set up therein; a vibration damping pad supported across said strings outwardly beyond the succession of frets to damp the tapping produced vibrations only in the outer end portions of the strings while the tapping fingers retain contact with the strings and operable to dampen vibrations of the strings to their full lengths when the tapping fingers are lifted therefrom.

2. The combination recited in claim 1 wherein separate means corresponding to each string are associated with the vibration damping pad at points where it crosses each string, to adjust and establish the damping pressure exerted by the pad individually against the strings.

3. The combination recited in claim 1 wherein said vibration damping means comprises a rigid bar that is mounted to extend across said bank of strings and spaced thereabove, spring metal fingers with ends fixed to said bar and extending inwardly along the strings, a string damping pad extended across the bank of strings and having supporting attachment to the other ends of said spring fingers and means for individually adjusting said spring fingers to establish the damping pressure to be exerted by the pad against the corresponding strings.

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