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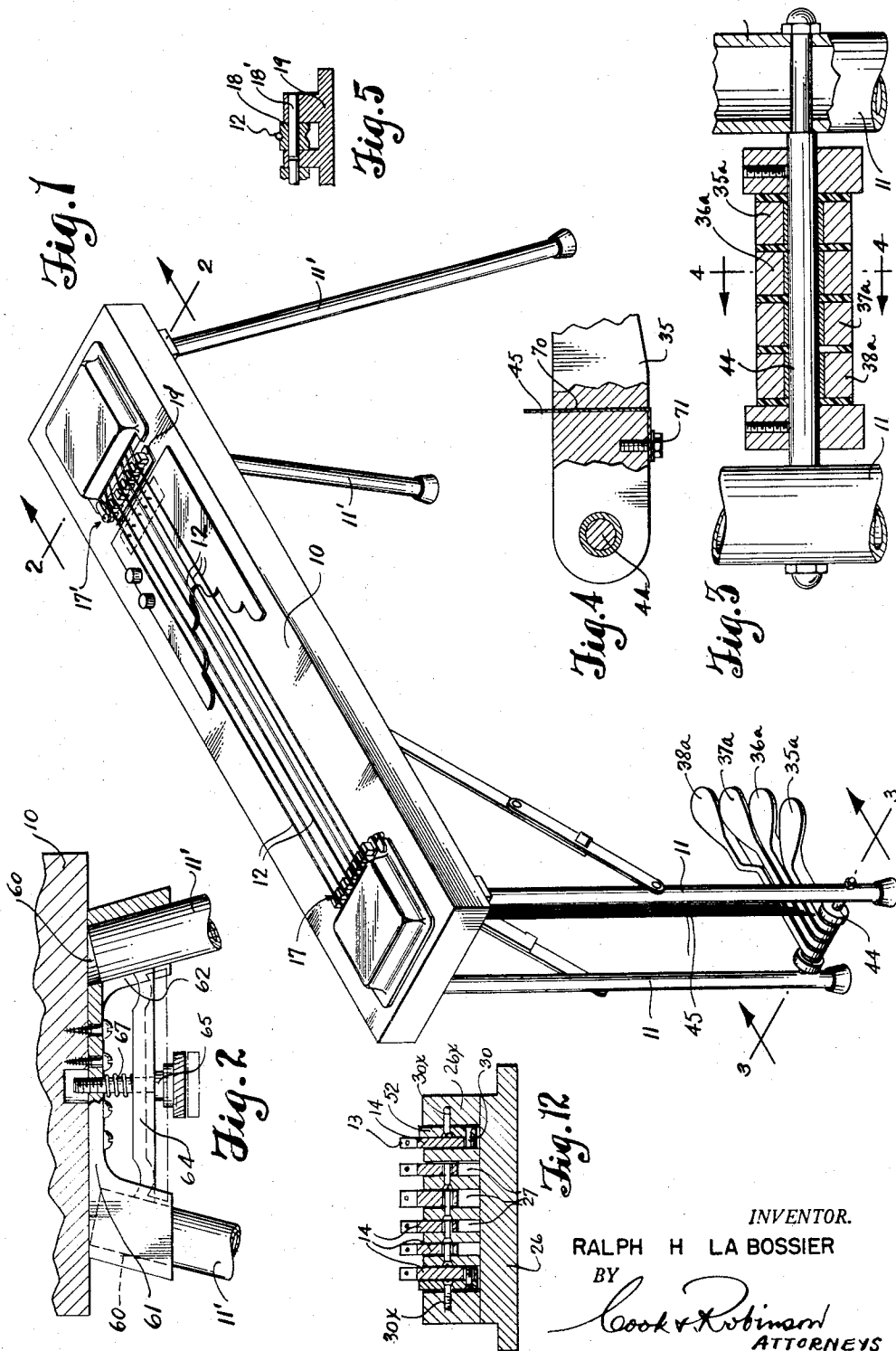
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2,914,982

TUNING DEVICE FOR A GUITAR TYPE INSTRUMENT

Filed Nov. 25, 1955

2 Sheets-Sheet 1



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Fig. 6

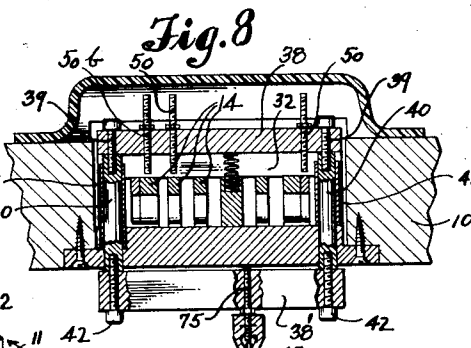
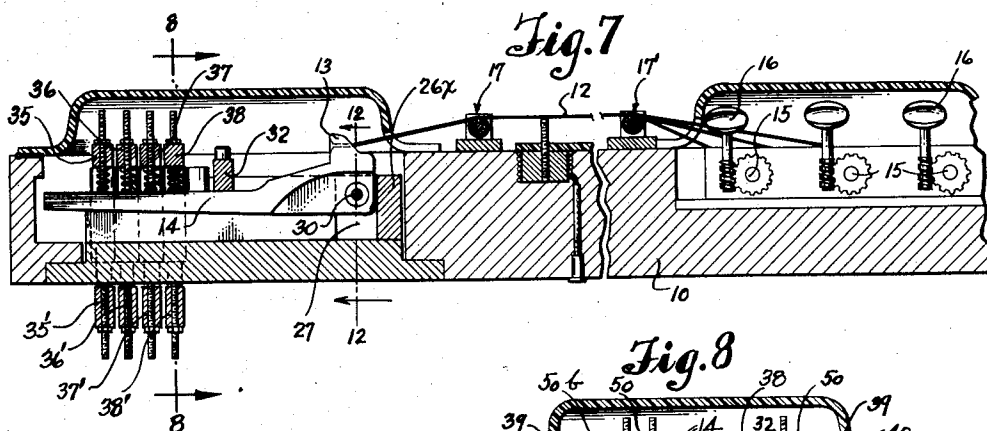
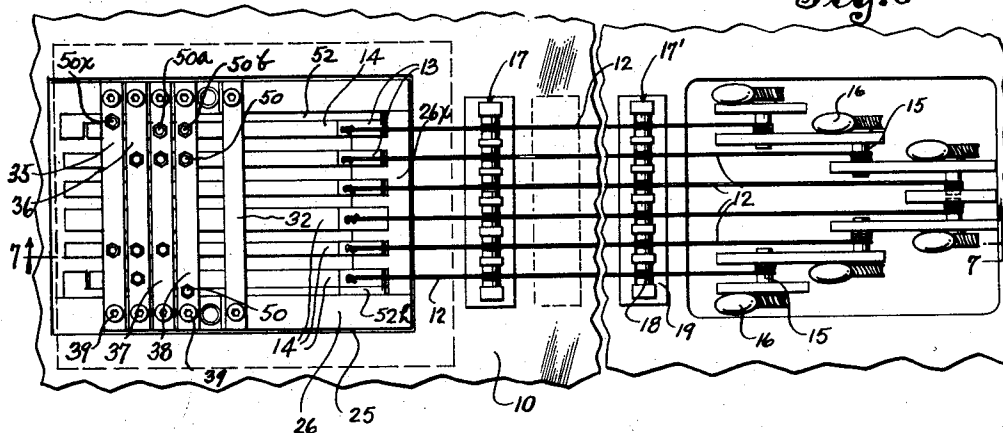
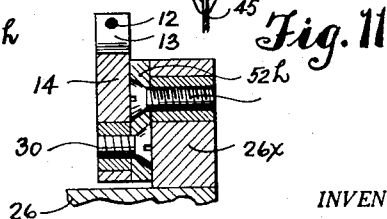
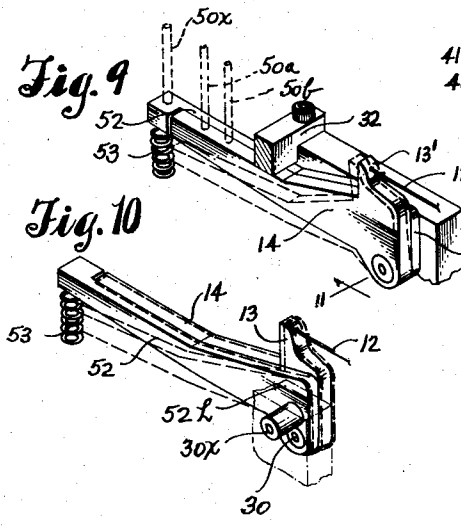


Fig. 9

Fig. 10



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TUNING DEVICE FOR A GUITAR TYPE INSTRUMENT

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1 Claim. (Cl. 84—312)

This invention relates to improvements in stringed musical instruments of the guitar or banjo types which are played by stroking across the strings with the fingers or with a plectrum or pick, and by means of which various tones and chords may be produced. More particularly the present improvements reside in a novel means, separate from the tuning keys with which the instrument is provided, for effecting a quick, and what may be a temporary or a momentary change in tension of selected strings to effect a change in tuning.

It is the principal object of the present invention to provide those certain improvements above referred to in stringed instruments of the guitar, banjo or mandolin types whereby a variety of chords can be played on the strings without resort to fingering operations. Furthermore, to provide a means whereby the tension of certain selected strings can be increased, and the tension of others decreased, so as to provide for the playing of chords that are ordinarily impossible to produce by the usual fingering technique.

More specifically stated, the present invention resides in equipping an instrument of the above character with a number of selectively operable devices, each providing means whereby the tension of one or more selected strings may be easily and quickly changed, independently of the normal string tuning means, to effect a change in tuning of the instrument for the producing of different chords.

Further objects of the invention reside in the details of construction of the various tension adjusting devices; in their combination and functional relationship, and in their mode of use, as will hereinafter be fully described.

In accomplishing these 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 perspective view of a stringed instrument equipped with chord tuning mechanisms embodied by and in accordance with the present invention.

Fig. 2 is an enlarged cross-section, taken on the line 2—2 in Fig. 1, showing a leg clamping means.

Fig. 3 is an enlarged cross-section, taken on line 3—3 in Fig. 1, showing the foot pedal mounting shaft and bearings.

Fig. 4 is a cross-section taken on line 4—4 in Fig. 3 showing the connecting of a pull cable with a foot pedal.

Fig. 5 is a cross-sectional detail of one of the string supporting rollers as associated with one of the string supporting bridges.

Fig. 6 is an enlarged plan view of a part of the sounding board, with the central part broken away to shorten the view, showing the strings, their tuning keys at one end of the board, and the present string tension changing means at the other end.

Fig. 7 is a vertical section taken on line 7—7 in Fig. 6.

Fig. 8 is a cross-section on line 8—8 in Fig. 7.

Fig. 9 is a perspective view of one of the string tension changing lever combinations embodied by the present invention.

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Fig. 10 is a perspective view of a similar combination of levers but in reversed relationship.

Fig. 11 is a vertical section taken on line 11—11 in Fig. 9.

Fig. 12 is a cross-section taken on line 12—12 in Fig. 7 showing the arrangement of levers in the block and their pivot points.

Referring more in detail to the drawings:

The instrument, as shown best in Fig. 1, has been selected as typical of those to which the present invention is applicable. It comprises a horizontally disposed sounding board, or box, 10, supported at a suitable playing height by a pair of parallel legs 11—11 at one end and by paired diverging legs 11'—11' at its other end. Mounted on the board 10, longitudinally thereof and in parallel relationship, are the strings 12, here shown to be six in number. Each of these strings is fixed at one end to an anchoring lug 13 on a tension establishing and changing lever 14 embodied by the invention and presently to be described in detail, and at its other end is wound on the string tension adjusting shaft 15 of a common form of tuning head operated by a key or knob 16. Near their opposite ends, the strings are supported by transversely directed bridges, designated in their entirety, respectively, by numerals 17 and 17'; each bridge comprising a plurality of axially aligned rollers 18 mounted on pins 18' carried in a cross bar 19. The rollers are circumferentially grooved to seat the strings therein as shown in the sectional detail comprising Fig. 5. All strings are thus held in the same horizontal plane and at a properly established level above the sounding box.

It is to be understood that the strings 12 are normally tensioned to what might be referred to as a "standard" tuning and the instrument can be played, if desired, without resort to the present chord tuning means. However, to make it possible to produce certain difficult or unusual chords, easily, quickly and accurately without fingering, or at least without difficult fingering operations, the improved string tension changing means of this invention has been devised. It will now be described in detail.

Fixedly mounted in a rectangular opening 25 that is formed through what will be referred to as the "tail end" of the sound board 10, is a block 26 of metal or other suitable material on which the several string tensioning levers 14 are mounted; the disposition of this block being best shown in Figs. 6 and 7, wherein it will be observed that the several string tension controlling levers 14 are in parallel, spaced relationship, aligned with the strings to which they are attached, with their inner end portions disposed in vertical recesses 27 formed in what will be designated as the "head portion" 26x of the block 26. These tension adjusting levers are disposed in transverse alignment, and each is pivotally mounted at its inner end by means of a pivot screw 30 that is applied horizontally therethrough and into the recess wall, or as in some case into another lever, as shown in Figs. 11 and 12, permitting the outer end, or left hand end of the lever as seen in Fig. 7, to be rocked in a vertical plane.

The lugs 13 to which the strings are attached, are formed on the levers 14 substantially directly above the pivotal mounting means 30, to extend upwardly therefrom, as noted in Fig. 7, and thus any vertical action of the outer or free ends of the levers will operate to decrease or increase the string tension accordingly, and thus change its vibratory tone.

Fixed securely at its opposite ends to the block 26 and extended directly across the medial portions of the several tension changing levers 14, is a stop bar 32 against which all levers are adapted to engage to limit their upward swinging movements. It is against this bar that all levers generally are engaged when the strings

are adjusted to a standard tuning by means of the keys 16.

Also extended directly across the free end portions of the several levers 14 in close parallel relationship are four tension adjusting bars; these being designated in Figs. 6 and 7 by reference characters 35, 36, 37 and 38, respectively. Each of these cross-bars is fixedly mounted at its opposite ends, by screws 39, upon the upper ends of paired vertical posts 40—40, as shown in Fig. 8. These pairs of posts, as associated with the four cross-bars 35, 36, 37 and 38 are slidably movable in tubular guides 41—41 fixed to and extended upwardly from the block 26. These posts also extend through and below the block and at their lower ends are fixed by screws 42 to the opposite ends of cross-bars which in Fig. 7, are designated, respectively, by reference numerals 35', 36', 37' and 38'. The cross-bars 35, 36, 37 and 38 are positioned substantially above and in the clear of the tension changing levers 14 as shown in Fig. 8, however, in accordance with the provisions of this invention, these bars 35, 36, 37 and 38 may be selectively pulled down to lever actuating positions as required for the producing of various chord changes.

For the actuation of the bars 35, 36, 37 and 38, to make the chord changes, I have provided four foot pedals, as best shown in Fig. 1, wherein they are designated, respectively, by numerals 35a, 36a, 37a, 38a. The pedals are pivotally mounted on a cross-rod 44 common to all and extended between and mounted by the lower end portions of the paired legs 11—11 as shown in Fig. 3. Each pedal has a pull cable connection 45 with its corresponding cross-bar 35', 36', 37' and 38', and in each case the connection is such that, upon depression of any foot pedal, the cross-bar 35, 36, 37 or 38 corresponding thereto will be pulled downwardly for the selective actuation of one or more of the tension changing levers 14 as presently explained. By effecting definite changes in tension of selected strings, it is possible to obtain the different chords. In the present instance, without fingering the strings, five different chords, aside from that of the original tuning are possible by use of the four pedals, and more are possible when using them in combination.

By reference to Fig. 8 in particular, it will be noted that pins 50 are threaded downwardly through and beyond the bar 38 in positions to be engaged with the vertically movable ends of certain selected levers 14. Thus, when the bar 38 is pulled downwardly by its cable 45 upon depressing the corresponding foot pedal 38a, these selected levers are actuated downwardly by the pins 50 to an extent necessary to obtain the vibratory tone that is suited to the chord desired. It will be understood that the pins 50 may be more or less extended as required to obtain the desired string tension, and when in exact adjustment may be secured by tightening the lock nuts threaded thereon against the bar. Similar pins 50 are arranged in other cross-bars 35, 36, and 37 accordingly. With pins of the different bars in different positions for the actuation of the different tensioning levers, the different chords are obtainable either by the individual use of the foot pedals or by their use in different combinations.

In the changing of chords or in the obtaining of certain chords, it frequently is required that some of the strings 12 be loosened from normal tuning instead of tightened. Provision for loosening the strings has, in this instance been accomplished by a combination of levers as shown in Figs. 9 and 10. Referring now to Fig. 9, this shows the string tensioning lever 14 to be pivotally supported by its pivot screw 30 from the head portion 52h of a lever 52. The lever 52 has a pivot screw mounting 30x in the block head 26x; this being somewhat above the pivot 30, as shown in Fig. 11. The lever 52 extends along lever 14 and slightly beyond it at its free end, and is normally urged upwardly at that end by a coiled spring 53 shown in Fig. 9, to normally retain

it engaged against the stop bar 32. The lever 14 of this combination is adapted, in the Fig. 6 showing of parts, to be actuated downwardly at its free end by pins applied to the cross-bars 37 and 38, and designated in this particular view by reference numerals 50a and 50b. Such action, as effected by the downward movement of bars 37 and 38, will effect the tightening of the string attached to the lever. However, it has been shown in Fig. 6 that a pin designated at 50x, is applied through cross-bar 35 which is so positioned that when the bar 35 is depressed, the lever 52 will be engaged thereby and rocked on its pivot screw 30x. This particular action of lever 52 causes a slight shifting of the pivot point of lever 14. This shifting of lever 14 results in the loosening of the string that is attached thereto as distinguished from the tightening operation where the lever combination is not used. Thus, by the combination of levers 14 and 52, as shown in Fig. 9, the lever 14 when actuated independently of lever 52 in the normal way, will operate to tighten the string, whereas if actuated through the lever 52, the string will be loosened; the extent of loosening being determined by the setting of the pin 50x in the bar 35.

The showing of levers in Fig. 10 is comparable to the showing in Fig. 9, but since the lever combination therein is for the string at the opposite side of the series, the levers are in reversed position, but their purpose and use is exactly the same. Therefore, like reference numerals have applied to corresponding parts in these views.

In Fig. 2, I have shown a detail of construction in the leg mounting means. In this view, it is seen that the diverging paired, tubular legs 11'—11' are inserted in sockets 60—60 formed on a cross-head 61 fixed to the underside of the sound box 10. Slots 62—62 are formed along the insides of and open into the sockets, and a clamp bar 64 extends between the sockets with its ends opposite end portions contained in said slots. The bar ends are beveled or inclined to fit the angle of the legs and a clamp screw 65 is passed upwardly through the bar and threaded into the cross-head as a means of drawing the bar upwardly and its ends tightly against the legs to hold them in place. To release the legs, the screw is loosened, and a coiled spring 67 applied about the screw pushes the clamp bar free of the legs. They can then be withdrawn from their sockets.

The manner of and means for attaching the pull cables to the foot pedals is shown in Fig. 4 wherein it is shown that the cable extends through a hole 70 in the pedal and is wrapped around a bolt 71 and clamped by the tightening of the bolt head against it.

At their other ends, the pull cables are attached, as noted in Fig. 8, to the lower ends of pins 75 applied through the cross-bars 35', 36', 37' and 38'.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

In a stringed musical instrument, a string anchoring and tuning means, a string tension changing lever of bell-crank form paired therewith, comprising a relatively short vertically directed lever arm and a relatively long, horizontally directed lever arm, a pivotal mounting for said string tension changing lever located at the junction of said lever arms, a string secured at one end to said anchoring and tuning means and secured at its other end, under tension, to said vertical lever arm of said string tension changing lever, and extending substantially in a direct line between its points of connection with said anchoring means and string tension changing lever, a rocker lever coextensive with and extended along the horizontal lever arm of said string tension changing lever and mounting the pivotal support of said tension changing lever therein at its inner end and having a stationary pivotal mounting at its inner end located directly above and close to the pivotal mounting of the string tension-

ing lever, a stop bar extending across the outer end portions of both levers to establish their normal setting; said rocker lever being manually movable on its pivot away from said stop bar to shift the pivotal mounting of the string tensioning lever to decrease tension in said string, and said string tensioning lever being movable away from said stop bar to increase tension in the attached string.

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