March 18, 1941. D. A. MAFFEI ET AL 2,235,717

STRINGED MUSICAL INSTRUMENT

Filed March 31, 1939 3 Sheets-Sheet 1

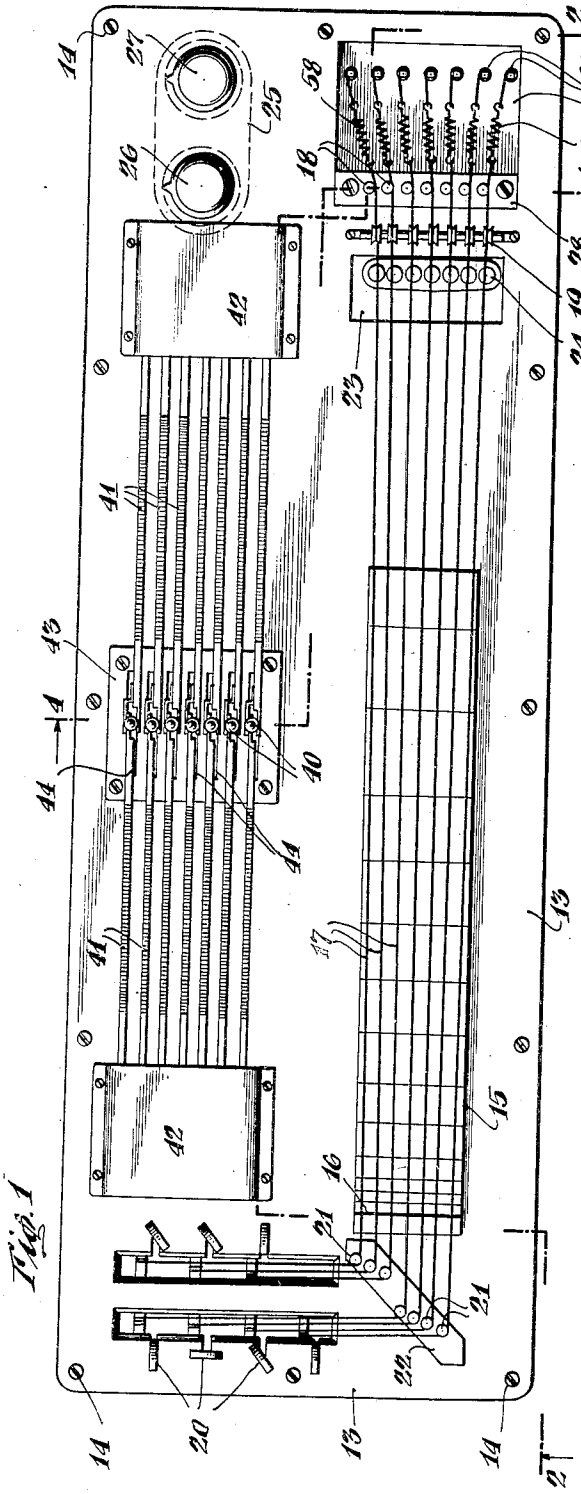


Fig. 1

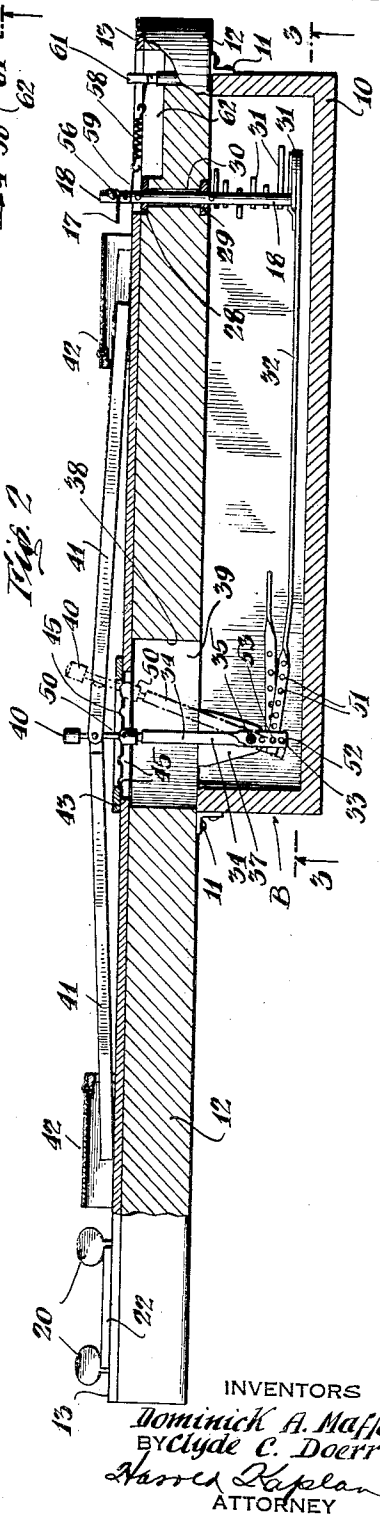


Fig. 2

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Fig. 3

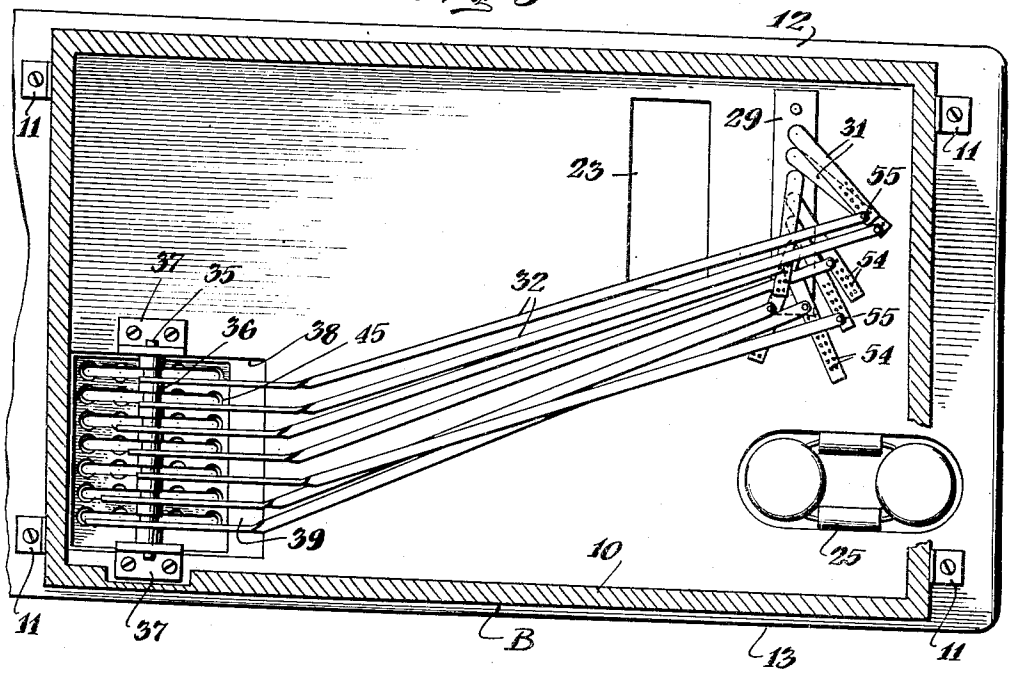


Fig. 4

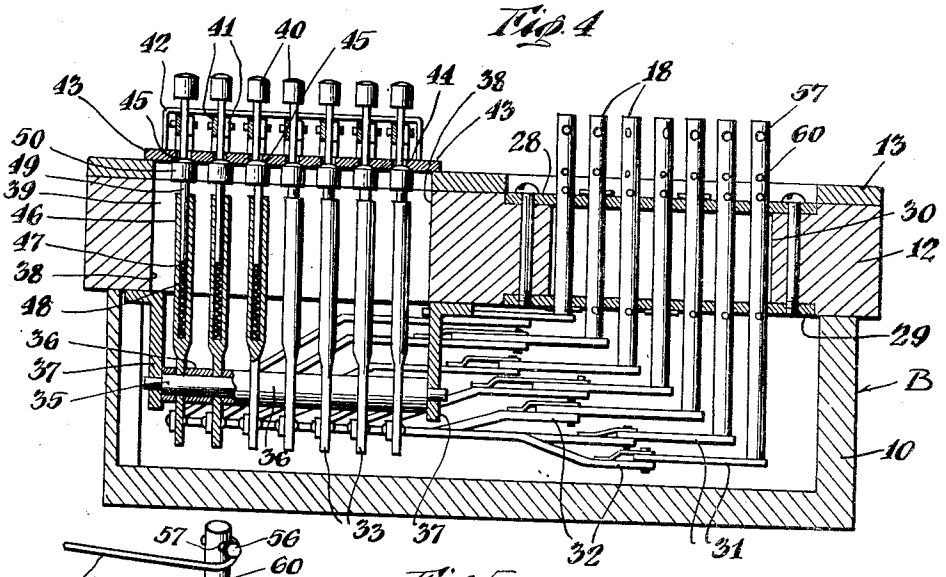
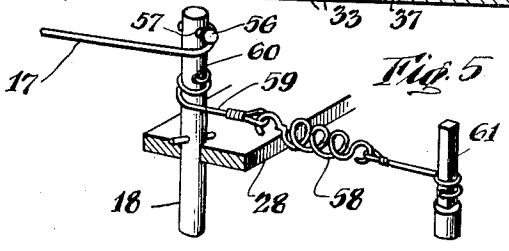


Fig. 5



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Fig. 6

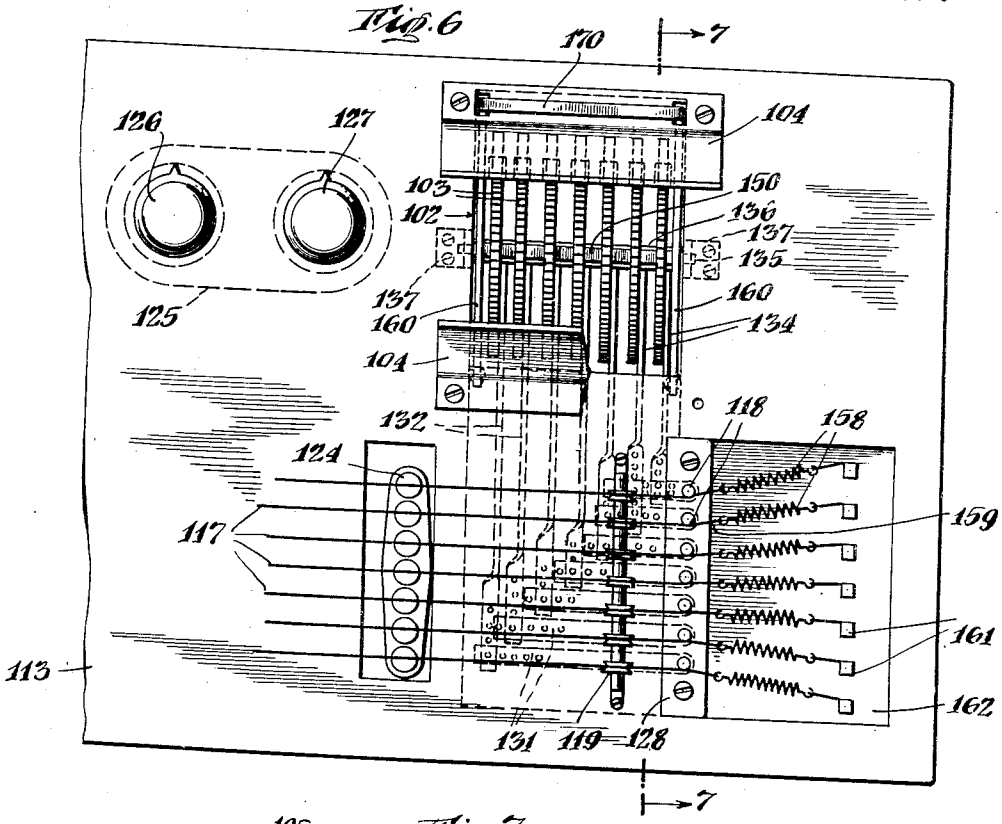


Fig. 7

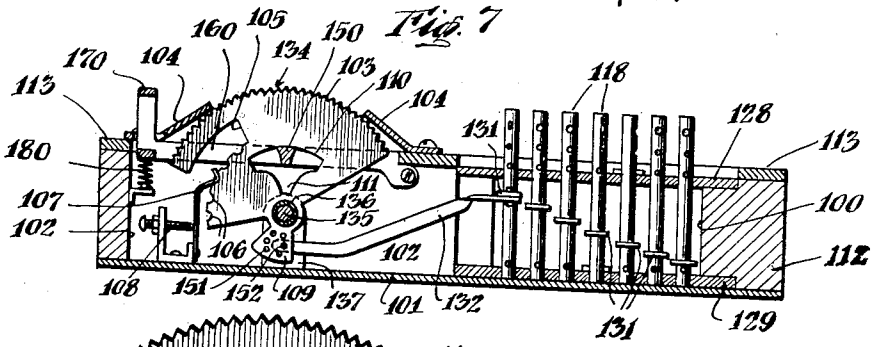
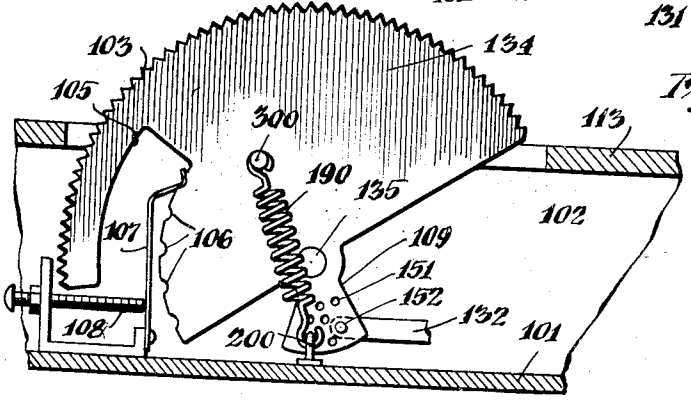


Fig. 8



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Patented Mar. 18, 1941 2,235,717

UNITED STATES PATENT OFFICE

2,235,717

STRINGED MUSICAL INSTRUMENT

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Application March 31, 1939, Serial No. 265,130

12 Claims. (Cl. 84—312)

The present invention relates to stringed musical instruments, especially to instruments of the type of the electrical steel guitar, and more particularly to improvements in tuning mechanism for such instruments.

Modern rendition of musical compositions upon stringed musical instruments requires the provision of instrument structure which lends itself readily to such changes in tuning as will make it possible to follow the changing score which embodies the modern composer's musical concept, and will also make it possible for the player to introduce into his performance the wide variations in rendition which appeal to the player, or to his audience. Existing means for accomplishing such changes in tuning as will satisfy these demands of the player and his audience have not been altogether satisfactory, both for the reason that they have been unduly complicated in structure and operation, and because they are insufficiently exact in execution of the required changes in tuning.

Accordingly, the principal object of the present invention is to provide in a stringed musical instrument of the above mentioned type, means by which the player may be enabled to accomplish the frequent and rapid changes in tuning required for the rendition of a musical program under modern conditions.

In furtherance of the aforesaid object, the invention aims to provide tuning means, auxiliary to the more conventional tuning keys, whereby the tension of each string may be varied selectively at will, with little effort on the part of the player and under his control at all times.

As a feature of the invention, such auxiliary tuning means comprises a series of rotatable anchorage posts mounted upon the body of the instrument, one for each string, for applying tension to the strings, the posts being connected to suitable operating levers mounted in a compact group conveniently accessible to the hand of the player.

As a further feature of the invention, this group of operating levers is provided with retaining means whereby each of said levers may be held securely in each of a series of adjusted positions to which it may be moved by a simple, easily made, and rapidly completed adjustive movement.

A particular feature of the invention is the provision of balancing means whereby each of the said anchorage posts is urged toward a position of normal tension of the connected string, upon release of its corresponding operating lever from retained adjusted position.

As a modification of the auxiliary tuning structure, there may be provided a group of operating levers taking the form of sectors, mounted to rotate about an axis common to the group and adapted for ready manipulation by the hand of the player to change at will the tension of any one or more of the strings, and ancillary retaining means to hold in any adjusted position each of the sector levers when it shall have been moved to the selected position.

A feature of the modified form of the invention is the provision of means whereby all of the said sector levers may be returned to a neutral position simultaneously by the actuation of a single control device; also the further provision of means whereby the said device for effecting the return of the sector levers to their neutral position, is itself automatically set in an inoperative position leaving the sector levers ready for such further adjustive manipulation as may be desired at any time.

Another highly important object of the invention, is to provide auxiliary tuning means of a novel type which makes it possible to obtain a wide range of pitch variation for each string and to multiply to an extent heretofore unknown the number of chord combinations which may be secured by the player of a stringed musical instrument, whether it be a guitar of the modern electronic type, or any other of the many stringed musical instruments whose musical range has been heretofore limited.

Other objects and advantages of the present invention will in part be pointed out hereinafter and will in part be apparent to those skilled in the art to which the present invention relates.

With the above and other objects in view the present invention consists of the novel features of construction, combination of elements, and arrangement of parts hereinafter described and illustrated in the accompanying drawings which show the preferred physical embodiment of the invention.

In the accompanying drawings which form an integral part of this specification,

Fig. 1 is a view in plan of a stringed musical instrument in the construction of which the present invention has been embodied;

Fig. 2 is a view in vertical, longitudinal section on the irregular section line 2—2 of Fig. 1;

Fig. 3 is a bottom plan view taken on the line 3—3 of Fig. 2, looking upward;

Fig. 4 is a view in vertical transverse section,

taken on the irregular section line 4—4 of Fig. 1;

Fig. 5 is a fragmentary, detail view in perspective of one of the rotatable anchorage posts, with its associated string and balancing spring;

Fig. 6 is a fragmentary detail view in plan of a modified form of tuning mechanism shown in connection with a stringed musical instrument of the same general character illustrated in the preceding figures;

Fig. 7 is a fragmentary detail view in vertical, transverse section, taken on the section line 7—7 of Fig. 6; and

Fig. 8 is a fragmentary detail view in vertical section taken on an enlarged scale parallel to the section line of Fig. 7 and showing a toggle arrangement as an alternate of modified form of balancing means.

Referring now to the drawings, which illustrate a stringed musical instrument of the electric guitar type in the construction of which the present invention has been embodied, and wherein like reference characters indicate corresponding parts throughout the several views, B designates the body of the instrument comprising generally a hollow wooden box member 10 secured, as at 11, to an overlying panel 12 of relatively thick hard wood, which is provided on the upper side thereof with a metal plate 13 attached to the panel, as by the studs 14. The instrument is provided with a suitable fretted fingerboard 15 extending longitudinally thereof in the conventional manner, and with a nut 16 which is mounted at the head portion of the fingerboard.

In pursuance of the present invention the strings 17 instead of being secured to the usual tailpiece, are anchored at the tail ends to anchorage posts 18. These posts will be referred to in greater detail as this description proceeds. The strings 17 are guided over suitable guide rolls 19, which in pursuance of the present invention are intended to replace the usual bridge over which the strings are generally tensioned, and thence pass over the fingerboard 15 toward the other end of the instrument, over the nut 16, and are attached at their other ends to the conventional tuning keys 20. In order to reduce the length of the instrument the string portions adjacent to the tuning keys 20 are disposed at right angles to the string portions extending over the fingerboard and in order to provide for bending of the strings there are provided the direction posts 21 which are mounted upright upon a diagonally disposed strip 22 carried by the plate 13.

The instrument selected for illustration being an electric steel guitar, there is shown in Fig. 1 an aperture 23 which is provided in the panel 13 adjacent the tail end of the instrument, beneath which there is mounted a suitable pick-up device 24 of well known type, which is adapted to transmit the sound vibrations of the strings to an amplifier and loud-speaker unit associated with the instrument. In Figs. 1 and 3 there is also shown suitable volume and tone control means 25 which is inserted in the pick-up circuit and is designed for modifying the volume and tone of the instrument. These controls are adapted to be manually operated by means of the control knobs 26 and 27 which are readily accessible to the hand of the player.

In pursuance of the present invention, tuning or string tensioning means of an auxiliary character are provided which are adapted to vary at will the pitch of any of the strings independently of the keys 20 or any other tuning or string tensioning mechanism with which such an instrument may be equipped. A group of such auxiliary tensioning devices is illustrated in the drawings.

This group comprises a series of rotatable posts 18 all carried by bearing plates or bars 28 and 29 mounted within the upper and the lower extremities of a slot 30 extending transversely of the panel 13. Each of the posts 18 extends downwardly into the hollow of box member 10 and is there provided with a crankarm 31 from which a link 32 extends to an arm 33 of an operating lever 34 constituting one of a group of such levers. This group of operating levers is preferably fulcrumed upon a common shaft 35, and the pivot portions of the levers are spaced apart by spacing sleeves 36, the shaft 35 being carried by brackets 37 depending from the edges 38 of an aperture 39 in the panel 12. Each lever 34 extends upwardly out of the aperture 39 and is provided with means by which it may be selected readily and operated easily by one of the player's hands.

Such operating means may be of any suitable kind and in the instance illustrated in Figs. 1, 2, 3 and 4 each lever 34 has a terminal handle or button 40, and also has an extension in the form of a horizontal member 41 of which there may be two for each lever, one extending toward the head of the instrument and the other extending tailward, both extensions being disposed in parallelism with the strings on the fingerboard, and each being serrated or roughened on its upper surface to aid in manual actuation, the ends of these extensions being preferably guided in housings 42 secured to the plate 13.

In further pursuance of the invention, means are provided to hold the operating levers 34 in any selected position of several such possible positions, an index plate 43 serving this purpose in the instance illustrated, the plate 43 having a set of slots 44, one for each lever, and each slot having several sockets or recesses 45, to receive a lever in say five positions of tensional adjustment of one of the strings. This structure is illustrated in detail in Fig. 4, which figure shows also means for aiding the levers to be engaged retentively in their several adjustive positions, while making it possible also to move them freely to different positions of adjustment at will.

For this purpose the shank 46 of each operating lever 34 may have a longitudinal bore 47 in which is housed a coiled spring 48 acting to urge a plunger 49 upwardly into a position in which a collar 50 thereon is engaged retentively within one of the index sockets or recesses 45. When the handle or button 40 of any operating lever is depressed manually, the plunger collar 50 is freed from its recess 45 and the lever is cleared for the adjustive movement thereof. It will be noticed that the plunger 49 may be depressed also by pressing down upon either of the horizontally extending members 41, so that the release of the lever from its adjusted position may be accomplished easily from any position occupied by the player.

In Fig. 2, a series of holes 51 are shown in one end of the link 32 and a like series of holes 52 in the arm or end of each operating lever 34, and by shifting a coupling pin 53 connecting these holes, to different positions, it is possible to vary the throw of the link 32, and consequently the rotative actuation of the crank arm 31 and its post 18. A similar series of holes 54, as illustrated in Fig. 3, are provided in each crank arm 31, to which the other end of the link 32 is connected, and by adjustment of a coupling pin 55 the throw of the link 32 may be further varied.

In further pursuance of the present invention the tailward portion of each string 17 is attached to its corresponding rotatable anchorage post 18 by winding it on the end of the post in the manner indicated in Figs. 2 and 5, the end of the string being secured to the post by a pin 56 in a transverse hole 57. Rearwardly of the anchorage posts 18 there is provided a series of tension springs 58, each of which is connected at one end to one of the anchorage posts by a wire 59 which is wound upon the post in a direction counter to that of its associated string 17, the end of the wire 59 being secured by a pin 60 in the hole lower down upon the post. The other ends of the tension springs 58 are wound around and attached to wrench faced studs 61 which are mounted threadedly within a recess 62 in the panel 12, and are rotatable by means of a hand key or like instrument for the purpose of adjusting the tension of the springs 58.

In preparing the instrument for practice of the invention, it is required that the instrument be first tuned to basic or normal tensional adjustment of the strings. This may be readily accomplished by manipulation of the conventional tuning keys 20, whereby each string is individually tensioned to its normal pitch. It will be understood that during the aforesaid tuning operation, the operating levers 34 of the auxiliary tuning means are retained in neutral position within the centrally located recesses or sockets 45 of the index plate 43. The studs 61 are then rotated with a suitable key wrench or the like, to adjust the tension springs 58 so that each of the springs 53 exerts a tension upon its associated anchorage post 18 equal to the tension exerted by the string 17 at its normal pitch adjustment. In view of the fact that the strings 17 and the connecting wires 59 of the springs 58 are wound upon the anchorage posts 18 in opposite directions, and the opposite tensions upon each anchorage post or equally balanced, as heretofore pointed out, it will be apparent that each anchorage post is thus normally maintained against rotation in either direction.

It will be evident, that when the anchorage post is rotated, as upon movement of the operating lever 34 to an adjusted position, the opposite tensions of the string 17 and the spring 58 thereby become unbalanced. For example, when the lever 34 is operated for rotating the anchorage post 18 so as to increase the tension of the connected string 17 above its normal tensional adjustment, then the tension of the spring 58 will be relaxed below normal tensional adjustment; likewise, when the lever 34 is moved to rotate the anchorage post 18 so as to decrease the tension of the connected string 17 below its normal tensional adjustment, then the tension of the spring 58 will be increased above normal tensional adjustment. When, therefore, the lever 34 is released from a retained position of above normal tensional adjustment, by depressing the plunger 49, then the increased tension of the string 17 will tend to counter rotate the anchorage post 18 toward its normal tensioning position. In a similar manner, when the lever 34 is released from a retained position of below normal tensional adjustment, by depressing the plunger 49, then the increased tension of the spring 58 will tend to counter rotate the anchorage post 18 toward its normal tensioning position. The foregoing balancing arrangement is therefore designed to urge the anchorage posts 18 at all times toward position for restoring the strings to a state of normal tensional adjustment.

In Figs. 6, 7 and 8 is illustrated a modification of the structure of the auxiliary tuning or tensioning mechanism, wherein certain of the features already described have been retained, and are identified similarly to like parts in the structure already described, while other parts have been modified to carry out objects ancillary to those already set forth.

As will be noted readily upon reference to the said figures, the panel 112 with its faceplate 113 resembles the corresponding panel 12 and plate 13 in the structure of Figs. 1 to 5, while the strings 117 are similarly stretched from a conventional set of tuning keys like those shown at 20 in Fig. 1, over a pick-up unit 124, over guide rolls 119, and are anchored to anchorage posts 118 which are mounted rotatably in bearing plates 128 and 129 carried by the panel 112. It will also be noted that the plate 129 receives the lower end of each post 118, also that the panel 112 is of sufficient thickness to accommodate, in a suitable cavity 100, the several crankarms 131 by which the posts 118 are respectively turned for increasing or decreasing the tension upon strings 117, substantially in the manner already described. A set of balance springs 158, similar to those numbered 58, is also provided, connected with the heads of the rotatable anchorage posts as before, by wires 159 wound upon the posts in a direction counter to that of the string ends, the structure illustrated in Fig. 5 being followed in this modification also, the other ends of springs 158 being attached to wrench faced studs 161 mounted threadedly in a recess 162 in the panel 112.

In said modification, a set of operating levers 134 is provided, each of which takes the form of an upright sector plate rotatable about a horizontal shaft 135 common to the sectors and supported by brackets 137 carried by the bottom wall 101 of the cavity 102 as shown in Fig. 7, the sector levers being separated from each other by distance pieces or sleeves 136.

The group of sector levers 134 is disposed in convenient disposition as shown in Fig. 6, with that portion of the strings 117 operated upon by the player, and also proximate to the tone and volume control knobs 126 and 127, and their upwardly presented arcuate parts 103 are serrated, to facilitate manual operation thereof. Preferably the region for such manual engagement will be restricted to the area defined by the edges of spaced apart shield plates 104 secured to the upper plate 113 at opposite ends of the cavity 102 in which the group of sector levers 134 is mounted.

Each sector lever has its web cut away, as at 105, to form a notched edge 106 adapted to be engaged by a click 107 formed from a spring strip which is held against the notched edge 106 by a limit screw 108, which may be set to vary the pressure of the click. A lower arm 109 of each sector lever is provided with a series of holes 151 adapted to be entered selectively by a pin 152 which couples therewith in adjusted position, the end of an appropriate link 132 connected to the arm 131 of the anchorage post 118 to be operated rotatively at will by the turning of the connected sector lever 134.

As a further novel feature of the modification illustrated in Figs. 6, 7 and 8, and with particular reference to Fig. 7, each sector lever is shown as provided with a body opening 110, having downwardly rounded walls forming a groove 111

adjacent to the fulcrum shaft 135, and adapted to receive therein a cross-bar 150 carried by lever arms 160, when said lever arms are pressed downward by operation of a hand-rest 170 spanning the space between the said lever arms.

The cross-bar 150 is common to all of the sector levers, extending through their body apertures 110 from side to side of the group and is provided to permit all of the sector levers to be thrown simultaneously into neutral position, so that all of the anchorage posts 118 may, at will, be restored to a position of normal tension of the connected strings.

When the player releases the hand rest 170, a spring 180 returns the cross-bar 150 to its inoperative position shown in Fig. 6, and the clicks 107 hold all of the sector levers in their neutral position, as shown, ready to be operated again, as desired. Thus, a single volitional act by the player suffices to restore the sector levers, as a group, to their neutral position, while it will be readily understood that each sector lever will be held, by automatic operation of its click 107, in the last adjusted position to which it may have been moved by the player.

As a modified balancing arrangement for effecting restoration of the strings to normal tensioning adjustment, and as a substitute means for the balancing springs 158, there may be provided a series of toggle springs 190, similar to the one which is illustrated in Fig. 8. One end of each toggle spring 190 is connected to an anchorage stud 200 set in the bottom wall 101 of the body of the instrument, and its other end is connected to an anchorage stud 300 provided on the side of the sector lever 134. These toggle springs are offset to one side of the shaft 135 and are preferably arranged in transverse alignment. Each toggle spring is preadjusted in tension to equalize the normal tension of the corresponding string 117 upon their associated anchorage post 118, in a manner similar to that described hereinabove in connection with the springs 58, so that the opposite tensions on the anchorage post are balanced when the sector lever is in neutral position. It will thus be apparent that when one of the sector levers is moved to rotate its corresponding anchorage post so as to decrease the tension of the connected string 117 below its normal tensional adjustment, then the tension of the toggle spring 190 will be increased above normal tensional adjustment, and when the sector lever 134 is released from its said adjusted position, then the increased tension of the toggle spring 190 will tend to counter rotate the sector lever 134, whose movement will be transmitted to the anchorage post 118 to urge return thereof to normal tensioning position.

In the practice of the invention, in either of the physical embodiment thereof illustrated and hereinabove described, each of the operating levers is adapted for movement by the hand of the player into five distinct adjusted positions, namely neutral position, and two positions on each side of the neutral position. These positions of adjustment are preferably arranged to provide for adjusting the tension of the strings in equal steps, so that the pitch of each string may be varied a half-tone upon movement of the corresponding lever from one adjusted position to an adjacent position. Each of the strings may thus be stretched two half-tones above normal pitch and contracted two half-tones below normal pitch.

From the foregoing disclosure, it will be clear that the novel tuning or tensioning mechanism constituted by the instrumentalities embodied in either of the forms herein illustrated and above described, provides for a wide range of pitch variations of each string, and for rapid execution with but little effort on the part of the player and under his control at all times.

That the present invention has achieved the stated object of increasing to an infinitely greater extent, the number of chord combinations which may be obtained by the player of a stringed instrument will be realized when it is considered that in the instrument herein illustrated by way of example it is possible to secure five half-tone pitch variations for each of seven strings, the various pitches of the strings being capable of grouping in many different combinations. One can readily appreciate the almost incalculable number of chord combinations possible in a stringed musical instrument having an indefinitely greater number of pitch variations for each of a much larger number of strings limited only by considerations of space and convenience in structural arrangement, the invention being of universal application and amplification.

While we have illustrated and described herein the now preferred embodiment of our invention, it is however to be clearly understood that we do not desire to be limited to the specific details of construction herein shown and disclosed, for obvious changes in construction are contemplated, which will fall within the spirit and scope of our invention as defined in the appended claims.

Having thus described and illustrated our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having an arm extending radially therefrom and each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted upon a common axis and movable independently of each other away from a neutral position, and a connecting link extending between each of said levers and the arm on its corresponding tensioning post whereby movement of said lever in either direction from its neutral position will effect rotation of the corresponding tensioning post in either direction from its normal tensioning position to vary the pitch of the string attached thereto.

2. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post to rotate said post upon operation of its corresponding lever, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, and a locking device associated with each of said levers and engaging a fixed part of the instrument to retain the lever and its corresponding tensioning post in a selected string tensioning position.

3. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post to rotate said post upon operation of its corresponding lever, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, a locking device associate with each of said levers and engaging a fixed part of the instrument to retain the lever and its corresponding tensioning post in a selected string tensioning position, and means for releasing said locking device to permit the lever and its corresponding tensioning post to return to normal string tensioning position.

4. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post to rotate said post upon operation of its corresponding lever, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, a locking device associated with each of said levers, resilient means for urging said device into locking position, and an index plate having a series of spaced recesses for each of said levers engageable by said locking device to retain each lever and its corresponding tensioning post in adjusted position.

5. In a stringed musical instrument having a plurality or strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post to rotate said post upon operation of the corresponding lever, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, a spring-pressed locking detent associated with each of said levers, and an index plate for each of said levers and having a series of spaced recesses selectably engageable by the spring-pressed locking detent associated with each of said levers whereby to retain each lever and its corresponding tensioning post in each of several adjustive positions.

6. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post to rotate said post upon rotation of its corresponding lever, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, each of said levers having a plurality of spaced recesses, and a corresponding series of locking devices associated with said levers, each adapted to be urged by spring means into the recesses of one of the levers, whereby each lever may be retained in each of several adjustive positions, said levers being manually operable for release.

7. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable levers pivotally mounted on a common axis and movable independently of each other away from neutral position, means operatively connecting each of said levers to its corresponding tensioning post to rotate said post upon rotation of its corresponding lever, a locking device associated with each of said levers to retain said levers in each of a plurality of possible adjustive positions, and a manually operable lever engageable with all of the first mentioned levers as a group to simultaneously release said levers from their adjusted positions and to return them to their neutral positions.

8. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having one of the strings of the instrument attached thereto, a corresponding series of manually operable sector-levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said sector-levers to its corresponding tensioning post to rotate said post upon rotation of its corresponding lever, a locking device associated with each of said levers to retain said levers in each of a plurality of possible adjustive positions, said sector-levers having alined, similarly disposed body apertures formed therein, a movable cross-bar transfixing said apertures, which bar, when in one position within the body apertures, permits independent movement of said sector-levers to permit locking thereof by said locking device and, when in another position, engages a wall defining the said body apertures to simultaneously release said sector-levers from their locked positions and to return them to their neutral positions, and means for moving said cross bar.

9. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having one of the strings of the intrument attached thereto, a corresponding series of manually operable sector-levers pivotally mounted on a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said sector-levers to its corresponding tensioning post to rotate said post upon rotation of its corresponding lever, a locking de-

vice associated with each of said levers to retain said levers in each of a plurality of possible adjustive positions, said sector-levers having alined, similarly disposed body apertures formed therein, a movable cross-bar transfixing said apertures and which bar, when in one position within the body apertures, permits independent movement of said sector-levers to permit locking thereof by said locking devices and, when in another position, engages a wall defining the said body apertures to simultaneously release said sector-levers from their locked positions and to return them to their neutral positions, a pivotally mounted lever connected to said cross-bar and operable manually to move said cross-bar into a position to permit independent adjustment and locking of the sector-levers or into a position to simultaneously release said sector-levers and to return them to their neutral positions, and spring means normally urging said last-mentioned lever into a position to permit independent adjustment and locking of the sector-levers.

10. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having one of the strings of the instrument attached thereto and windable thereon in a given direction, a corresponding series of manually operable levers pivotally mounted upon a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post whereby movement of said lever will cause rotation of said tensioning post, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, and a series of tension springs each aligned with one of the strings of the instrument and each having a flexible connecting member windable upon its corresponding tensioning post in a direction counter to that of said string, said tension springs urging their corresponding tensioning posts into normal tensioning position when its corresponding lever is moved to neutral position.

11. In a stringed musical instrument having a plurality of strings tensioned thereon, means for selectively varying the pitch of each of the several strings, said means comprising a series of rotatable string tensioning posts, each having one of the strings of the instrument attached thereto and windable thereon in a given direction, a corresponding series of manually operable levers pivotally mounted upon a common axis and movable independently of each other away from a neutral position, means operatively connecting each of said levers to its corresponding tensioning post whereby movement of said levers will cause rotation of said tensioning post, each of said tensioning posts being rotatable in either direction from normal tensioning position upon operation of its corresponding lever, and a series of tension springs each aligned with one of the strings of the instrument and each having one end thereof connected to a fixed support positioned rearwardly of one of the tensioning posts and each having at its other end a flexible connecting member windable upon said tensioning post in a direction counter to that of the string connected to said post, said tension springs counterbalancing the tension of the strings on the string tensioning post to which said string and spring are connected.

12. In a stringed musical instrument having a plurality of strings tensioned thereon, a series of rotatable string tensioning posts each having the tailward end of one of the strings attached thereto and windable thereon in a given direction, a corresponding series of manually operable levers, means operatively connecting each of said posts with its corresponding lever to rotate said post in either direction away from normal tensioning position upon operation of said lever, and a series of corresponding tension springs aligned with the strings and positioned rearwardly of the tensioning posts, each tension spring having one end thereof connected to a fixed anchorage post and having at its other end a flexible connecting member windable upon its corresponding tensioning post in a direction counter to that of the connected string, said tension springs urging their corresponding tensioning posts into normal tensioning position when its corresponding lever is moved to neutral position.

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