July 7, 1953 W. E. SMITH 2,644,360

PITCH CHANGING DEVICE FOR MUSICAL INSTRUMENTS

Filed Feb. 23, 1950

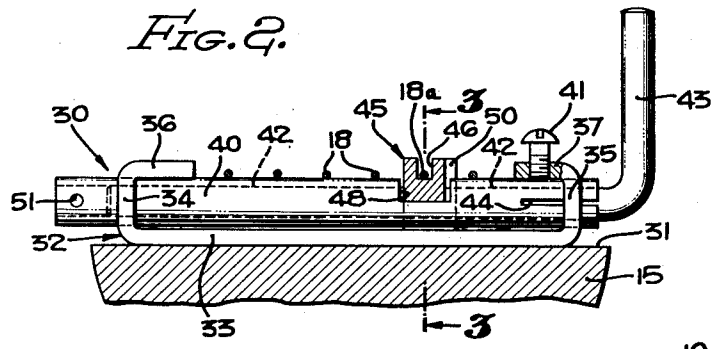


FIG. 2.

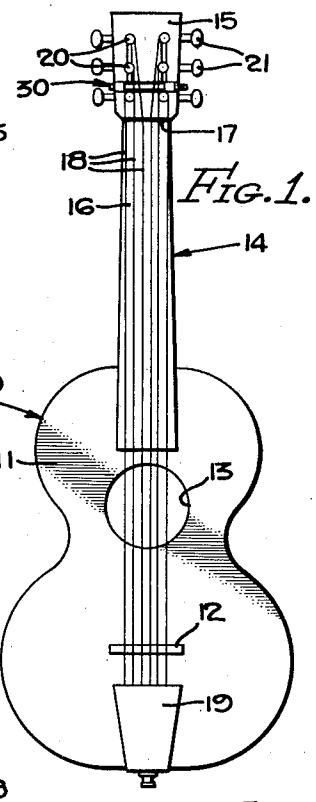


FIG. 1.

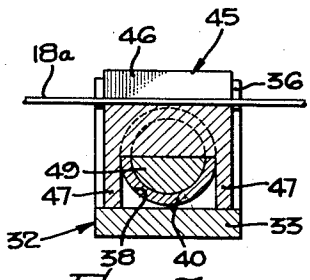


FIG. 3.

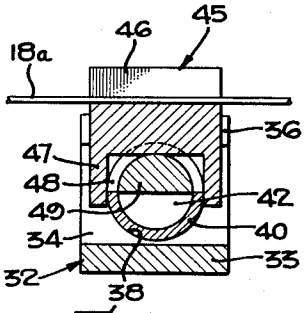


FIG. 4.

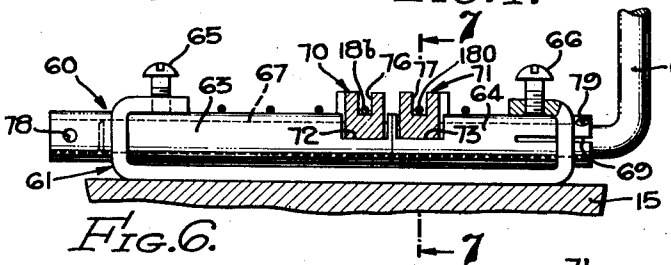


FIG. 6.

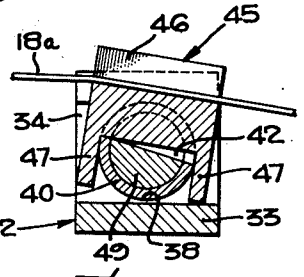


FIG. 5.

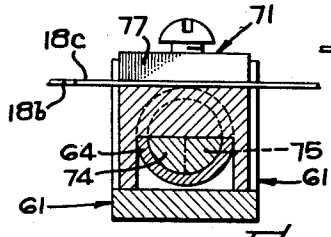


FIG. 7.

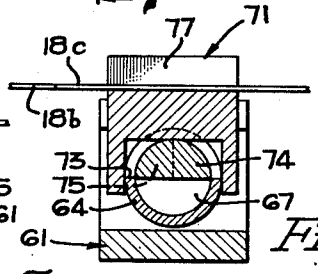


FIG. 9.

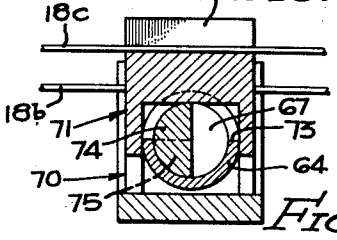


FIG. 8.

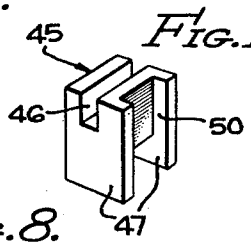


FIG. 10.

WALTER E. SMITH,
INVENTOR.

BY Lyon & Lyon

ATTORNEYS

Patented July 7, 1953

2,644,360

UNITED STATES PATENT OFFICE

2,644,360

PITCH CHANGING DEVICE FOR MUSICAL INSTRUMENTS

Walter E. Smith, Ventura, Calif.

Application February 23, 1950, Serial No. 145,806

12 Claims. (Cl. 84—312)

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This invention relates to attachments for musical instruments and is particularly directed to an improved device for changing the pitch of stringed musical instruments of the lute type.

One of the objects of this invention is to provide a novel device for changing the pitch of a string of a lute type musical instrument.

Another object of this invention is to provide a device for simultaneously changing the pitch of two or more strings of a lute type instrument.

Another object of this invention is to provide a device for changing the pitch of a pair of strings of a lute type musical instrument, which device has novel means for selectively acting upon the strings of the instrument to increase or decrease the tension of the strings.

Another object of this invention is to provide such a pitch changing device which may be readily installed on any conventional or Hawaiian type guitar.

A further object of this invention is to provide a device of this type which is of simple and rugged construction, and which is composed of relatively few parts economical to manufacture.

Other objects and advantages it is believed will be apparent from the following detailed description of preferred embodiments thereof when read in connection with the accompanying drawings.

In the drawings:

Figure 1 is a top plan view of a guitar showing a preferred embodiment of my invention mounted in operative position thereupon.

Figure 2 is an enlarged front elevation, partly in section, of a preferred embodiment of my invention.

Figure 3 is a sectional elevation taken substantially on the line 3—3 of Figure 2.

Figure 4 is a sectional view, similar to Figure 3, but illustrating the string engaging element in raised position.

Figure 5 is a sectional view, similar to Figure 3, illustrating the indexing sleeve in partially rotated position.

Figure 6 is a front elevation, partly in section, of a modified form of my invention.

Figure 7 is a sectional elevation taken substantially on the line 7—7 of Figure 6.

Figure 8 is a sectional elevation similar to Figure 7, but illustrating one of the string engaging elements in raised position.

Figure 9 is a sectional elevation similar to Figure 7, but illustrating both of the string engaging elements in raised position.

Figure 10 is a perspective view of one of the string-contacting elements.

Referring to the drawings, while the attachment embodying my invention is shown in connection with a conventional form of guitar, it is to be understood that it may be employed with other stringed instruments of the lute type.

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The guitar generally designated 10 is provided with the usual sounding board 11, bridge 12, central opening 13, neck 14 and neck head 15. The usual fret board 16 may be provided, at one end of which is the usual nut 17. A plurality of strings 18 extend from the tension bracket 19 over the bridge 12 and nut 17, and each of the strings 18 is connected to one of the tuning pegs 20. The usual keys 21, having a worm and wheel connection (not shown) with the pegs 20, are provided on the neck head 15.

In accordance with my invention I provide a pitch-changing unit, generally designated 30, which rests on the upper flat surface 31 of the neck head 15 and lies back of and against the first pair of tuning pegs 20, as shown in Figure 1. The unit 30 includes a base member 32 formed of a flat strip material and having an elongated bottom section 33, end members 34 and 35 integral therewith, and a pair of inwardly-directed tab members 36 and 37 integral with the end members. The end members 34 and 35 are provided with circular openings 38 through which is inserted an indexing sleeve 40. Slight clearance is provided between the openings 38 and the sleeve 40, so that the sleeve may be rotated therein. A set screw 41 is provided on the tab 37 so that the sleeve 40 may be secured with respect to the base member 32.

A cylindrical actuating bar 42 is maintained within the sleeve, one end of the bar being bent at an angle as shown to provide a lever 43 for the manual rotation of the actuating bar with respect to the sleeve. Means are provided to prevent free rotation of the bar with respect to the sleeve, and as shown in Figure 1, this means may include a pair of longitudinal slots 44 in the end of sleeve 40. By tightening the set screw 41, the slotted end of the sleeve may be caused to frictionally engage the adjacent periphery of the bar 42, thus permitting rotation of the bar in the sleeve only with the application of suitable force to the lever 43.

A string contacting element 45 is provided directly below the string 18a. The shape of this element is best illustrated in Figure 10, and as shown, it consists of a generally rectangular block having a string-engaging groove 46 in the top portion thereof and a pair of legs 47 adapted to straddle the sleeve 40. A transverse slot 48 is provided in the sleeve for the reception of the string contacting element. The actuating bar 42

is provided with a cam 49 which is longitudinally aligned with the slot 43 in the sleeve. As shown in the drawings, the cam 49 may be provided by cutting the bar transversely, leaving the bar semi-circular in cross-section at that point. A vertical groove 50, only slightly wider than the outside diameter of the sleeve, is provided in one end of the string-contacting element 45, so that the element may be maintained in proper alignment with respect to the sleeve. When the actuator bar 42 is rotated about its longitudinal axis a half turn from the position in Figure 3, the string contacting element is thereby caused to move from the position shown in Figure 3 to the position illustrated in Figure 4, thus increasing the tension in the string 18*a*.

In operation, the strings 18 are loosened, by turning the keys 21, sufficiently so that the unit 30 may be slipped into position with the string 18*a* in the groove 46. The strings 18 are then tightened to the position shown in Figure 2, so that they hold the unit 30 firmly in place, and then tuned by means of the keys 21.

The actuator bar 42 is rotated to the position shown in Figure 4, and the string 18*a* tuned to the desired pitch with the proper key 21. The bar 42 is then slowly rotated, lowering the string contacting member 45 until the tension in the string is reduced sufficiently to change the pitch the desired amount. The set screw 41 is then loosened to permit the indexing sleeve 40 to be rotated slightly to a position such as is shown in Figure 5, thus establishing the lower limit of vertical movement of the string contacting member. An aperture 51 may be provided in the sleeve 40, so that a key (not shown) may be inserted therein to facilitate the turning of the sleeve. When the device is properly indexed, as described above, the set screw 41 is tightened, and the instrument is ready to be played. With this arrangement certain chords not otherwise available may be played on the instrument. Two predetermined tunings of the string 18*a* may be provided, and either may be obtained at the will of the musician simply by moving the lever 43 up or down. Once the string has been tuned as described above, the pitch will remain true in either of these two positions since the unit 30 acts directly on the string to increase or reduce its tension a predetermined amount. Any undue wear of the string acted upon due to friction is avoided, since the string contacting element 45 moves in a substantial vertical path.

A modified form of my invention, adapted to act upon two strings, is illustrated in Figures 6 to 9. The unit 60 includes a base member 61 substantially similar to that described above, with a pair of axially-aligned indexing sleeves 63 and 64 held therein by means of set screws 65 and 66, respectively. The cylindrical actuating bar 67, provided with a lever 68, extends through both sleeves 63 and 64. A longitudinal slot or slots 69 may be provided in sleeve 64 to enable free rotational motion of the bar 67 to be restricted in the same manner as described above. A pair of string contacting elements 70 and 71, identical with the element 45 described above, are seated in transverse slots 72 and 73 in sleeves 63 and 64, respectively.

The actuating bar 67 is provided with a first cam 74 integral therewith which is aligned with the slot 73 in sleeve 64. The cam 74, substantially similar to the cam 49 described above, is semi-circular in cross-section. A second cam 75 is provided integral with the actuating bar 67 and is

aligned with the slot 72 in sleeve 63. This cam is formed by cutting transversely of the bar, leaving the bar in the cross-sectional shape of a quarter-circle at that point. By means of this arrangement, the element 71 alone may be caused to move upwardly, or both elements 71 and 70 may be moved upwardly simultaneously as shown in Figures 7 to 9.

In operation, the unit 60 is placed in position on the neck head 15, with the strings 18*b* and 18*c* in grooves 76 and 77 in the string contacting elements 70 and 71, respectively. The strings 18*b* and 18*c* may then be tuned in the two positions in the same manner as described above. It will be noted that the sleeves 63 and 64 may be rotated independently, apertures 78 and 79 being provided to facilitate this, in order to set the lower limits of travel of the elements 70 and 71.

With this arrangement, the instrument may be tuned so that any one of three tunings may be obtained merely by moving the lever 68 to any one of three positions. Figure 7 illustrates the string contacting elements in fully lowered position. It is to be understood that in order to obtain the desired low tuning of strings 18*b* and 18*c*, this position may be too low and if so, the indexing sleeves 63 and 64 may be turned to establish the desired limit. A second position is shown in Figure 8, with the actuating bar rotated 90 degrees. Here, only element 71 is raised, element 70 remaining stationary. The third position is shown in Figure 9, where the actuating bar is rotated 180 degrees raising both elements and thus increasing the tension in both strings.

While there has been described what is at present considered preferred embodiments of the present invention, it will be apparent to those skilled in the art that various modifications and changes may be made without departing from the essence of the invention, and it is intended to cover herein all such modifications and changes as come within the true scope and spirit of the appended claims.

I claim:

1. In a device for changing the pitch of a string of a lute type instrument, a base member, a sleeve mounted on said base member, said sleeve being provided with a transverse slot therein intermediate the ends thereof, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, and a string engaging element seated in said slot, said element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar.

2. In a device for changing the pitch of a string of a lute type instrument, a base member, a sleeve mounted on said base member, said sleeve being provided with a transverse slot therein intermediate the ends thereof, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, a string engaging element seated in said slot, said element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar, and means for rotating said actuating bar.

3. In a device for changing the pitch of a string of a lute type instrument, a base member, a sleeve adjustably mounted on said base member, said sleeve being provided with a transverse slot therein intermediate the ends thereof, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, and a string engaging element seated in said slot, said

element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar.

4. In a device for changing the pitch of a string of a lute type instrument, a base member, a sleeve mounted for axial rotation on said base member, said sleeve being provided with a transverse slot therein intermediate the ends thereof, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, a string engaging element seated in said slot, said element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar, and means for axially rotating said sleeve in a direction to limit the extent of motion of the string engaging element.

5. In a device for changing the pitch of a pair of strings of a lute type instrument, a base member, a pair of sleeves mounted on said base member, each of said sleeves being provided with a transverse slot intermediate the ends thereof, a single actuating bar extending through both of said sleeves, a pair of cams on said bar, one of said cams being aligned with each of the slots in said pair of sleeves, and a string engaging element seated in each slot, said elements adapted to be actuated by said cams in directions to change the tension in the strings upon rotation of said actuating bar, and said cams being positioned for selective actuation of said string-engaging elements.

6. In a device for changing the pitch of a pair of strings of a lute type instrument, a base member, a pair of sleeves mounted end-to-end on said base member, each of said sleeves being provided with a transverse slot intermediate the ends thereof, a single actuating bar extending through both of said sleeves, a pair of cams on said bar, one of said cams being aligned with each of the slots in said pair of sleeves, and a string engaging element seated in each slot, said elements adapted to be actuated by said cams in directions to change the tension in the strings upon rotation of said actuating bar, and said cams being positioned for selective actuation of said string-engaging elements.

7. In a device for changing the pitch of a pair of strings of a lute type instrument, a base member, a pair of sleeves adjustably mounted on said base member, each of said sleeves being provide with a transverse slot intermediate the ends thereof, a single actuating bar extending through both of said sleeves, a pair of cams on said bar, one of said cams being aligned with each of the slots in said pair of sleeves, and a string engaging element seated in each slot, said elements adapted to be actuated by said cams in directions to change the tension in the strings upon rotation of said actuating bar, and said cams being positioned for selective actuation of said string-engaging elements.

8. In a device for changing the pitch of a pair of strings of a lute type instrument, a base member, a pair of sleeves mounted for independent axial rotation on said base member, each of said sleeves being provided with a transverse slot intermediate the ends thereof, a single actuating bar extending through both of said sleeves, a pair of cams on said bar, one of said cams being aligned with each of the slots in said pair of sleeves, a string engaging element seated in each slot, said elements adapted to be moved by said cams in a direction to change the tension in the strings upon rotation of said actuating bar, and means for independently rotating said sleeves in directions to selectively limit the extent of motion of each of the string engaging elements.

9. In a device for changing the pitch of a string of a lute-type instrument, a base member having a pair of upstanding legs each provided with an opening, an indexing sleeve mounted for axial rotation in said openings, said sleeve being provided with a transverse slot therein intermediate the ends thereof, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, a string-engaging element seated in said slot, said element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar, and means for axially rotating said sleeve in a direction to limit the extent of motion of the string-engaging element.

10. In a device for changing the pitch of a string of a lute-type instrument, a base member having a pair of upstanding legs each provided with an opening, an indexing sleeve mounted for axial rotation in said openings, said sleeve being provided with a transverse slot therein intermediate the ends thereof, releasable means for locking the sleeve against rotation, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, a string-engaging element seated in said slot, said element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar, and means for axially rotating said sleeve in a direction to limit the extent of motion of the string-engaging element.

11. In a device for changing the pitch of a string of a lute-type instrument, a base member, a sleeve adjustably mounted on said base member, said sleeve being provided with a transverse slot therein intermediate the ends thereof, an actuating bar journaled in said sleeve, a cam on said bar aligned with the slot in the sleeve, and a string-engaging element seated in said slot and having a pair of legs straddling the sleeve, said element adapted to be moved by said cam in a direction to change the tension in the string upon rotation of said actuating bar.

12. In a device for changing the pitch of a pair of strings of a lute-type instrument, a base member, a pair of sleeves mounted for independent axial rotation on said base member, each of said sleeves being provided with a transverse slot intermediate the ends thereof, a single actuating bar extending through both of said sleeves, a pair of cams on said bar, one of said cams being aligned with each of the slots in said pair of sleeves, a string-engaging element seated in each slot, said elements adapted to be independently and selectively moved by said cams in directions to change the tension in the strings upon rotation of said actuating bar, and means for independently rotating said sleeves in directions to selectively limit the extent of motion of each of the string-engaging elements.

WALTER E. SMITH.

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