Aug. 30, 1938. H. A. HARLIN 2,128,460

NECK STRUCTURE FOR STRINGED INSTRUMENTS

Filed Oct. 10, 1936

Fig. 1

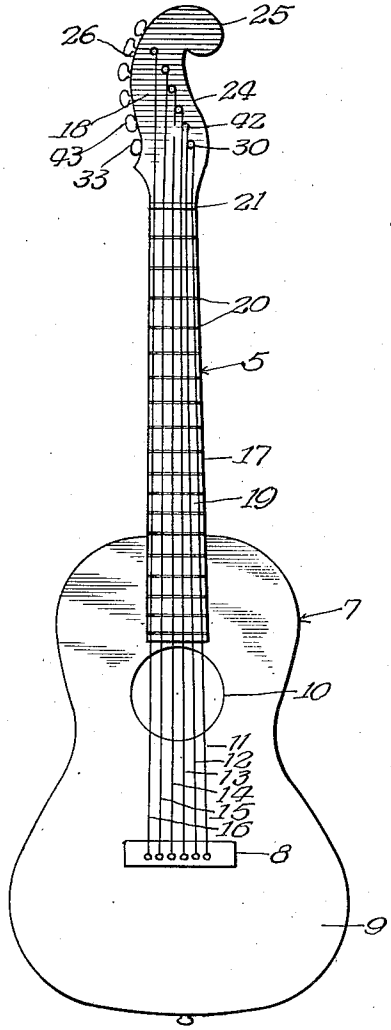


Fig. 2

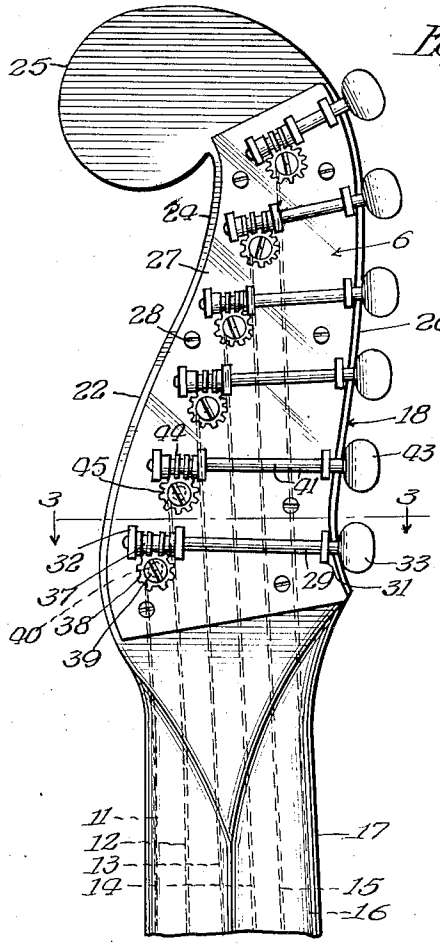


Fig. 3

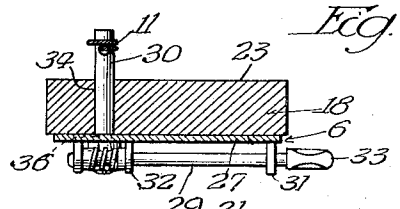
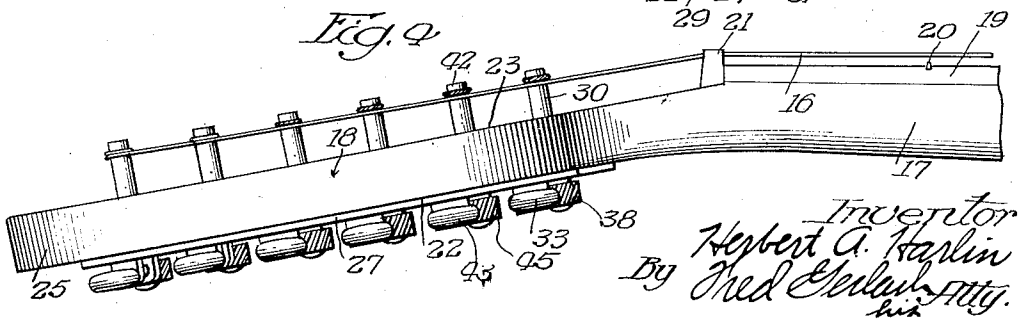


Fig. 4



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NECK STRUCTURE FOR STRINGED INSTRUMENTS

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1 Claim. (Cl. 84—306)

The present invention relates generally to neck structures. More particularly the invention relates to that type of neck structure which is designed for use with, and to form a part of, a stringed instrument such as a guitar and comprises as the component parts thereof (1) an elongated neck which embodies an enlarged head part at its outer end and means at its inner end for attachment to the body of the instrument and is adapted to underlie, and embodies a fret-equipped finger board for, the strings of the instrument; and (2) a tuning head which is associated with the enlarged head part of the neck and comprises as a tuning medium for each string a key-equipped shaft, a spindle at right angles to the shaft and with a string anchoring aperture therethrough, and a worm and worm gear driving connection between the shaft and the spindle whereby the spindle is caused to turn for string tuning purposes in response to turning of the key on the shaft.

One object of the invention is to provide a neck structure of this type which is an improvement upon and permits of more ready tuning than previously designed neck structures of the same general character by reason of the fact that the tuning head embodies a mounting plate against the bottom face of the enlarged head part of the neck and the key-equipped shafts which constitute a part of the tuning media for the strings of the instrument with which the neck structure is associated are mounted in bearing brackets on the bottom face of the mounting plate in such manner that the keys thereof all project beyond one side of the enlarged head part of the neck and hence may be readily and expeditiously manipulated by the player of the instrument in connection with tuning of the instrument.

Another object of the invention is to provide a neck structure of the last mentioned character in which the mounting plate of the tuning head extends complete across the bottom face of the enlarged head part of the neck and serves to reinforce the head part and prevent it from splitting in response to any distortion or stress resulting from the tension of the strings.

Another object of the invention is to provide a neck structure of the type and character under consideration in which the spindles which extend at right angles to the key-equipped shafts and form with the latter and the worm and worm gear driving connections the tuning media for the strings, are carried by, and extend upwardly from, the mounting plate and are positioned equidistantly apart and in a series extending diagonally with respect to the neck.

A further object of the invention is to provide a neck structure of the aforementioned type in which the outer extremity of the enlarged head part of the neck is shaped to form a hook which extends laterally in a direction directly opposite to that of the keys and permits the instrument with which the structure is used to be hung from a music rack.

A still further object of the invention is to provide a neck structure which is not only of new and improved construction and permits of ready tuning of the strings but also may be manufactured at a low and reasonable cost and is pleasing as well as ornamental in appearance.

Other objects of the invention and the various advantages and characteristics of the present neck structure will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the claim at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a front view of a guitar with a neck structure embodying the invention;

Figure 2 is a bottom view of the enlarged head part of the neck showing in detail the character and arrangement of the mounting plate and also the manner in which the key-equipped shafts are arranged and located on the underside of the plate;

Figure 3 is a sectional view on the line 3—3 of Figure 2; and

Figure 4 is an elevational view of the key side of the structure.

The neck structure which is shown in the drawing constitutes the preferred embodiment of the invention. It consists of an elongated neck 5 and a tuning head 6 and is adapted for use with, and to form a part of, a guitar or like stringed instrument. The guitar which is shown in Figure 1 comprises a body 7 and a tail piece 8. It is of the "Hawaiian" variety and is adapted to be played either while supported on the knees or on a cord extending around and depending from the player's shoulders. The guitar body 7 is hollow and embodies a sounding board 9 with a sound hole 10 in the upper portion thereof. The tail piece 8 extends transversely across, and is fixed to, the lower portion of the sounding

board of the guitar body 7 and embodies a longitudinal series of equidistantly spaced pegs 8a for a group of strings 11, 12, 13, 14, 15 and 16. These strings extend upwardly from the pegs 8a across the sound hole 10 in the sounding board 9, and then over and lengthwise of the neck 5, and are adapted, as well understood in the art, to be plucked by the fingers in order to produce musical sound effects.

The neck 5 of the neck structure consists of a shank part 17 and a head part 18. These two parts are formed of a single piece of wood and are positioned one in longitudinal alignment with the other. The shank part 17 is centrally positioned with respect to, and projects from, the upper or small end of the guitar body 7 and embodies a finger board 19 on the top face thereof. This board is formed separately from the neck and has a longitudinal series of frets 20. The latter underlie the guitar strings and extend transversely across the finger board. The inner or lower end of the shank part 17 of the neck overlies and is fixedly secured to the upper or small end of the sounding board 9 of the body 7. The outer or upper end of the shank part is provided with an extension nut 21. This nut, as shown in Figure 3, projects above and extends parallel to the frets. The outer ends of the strings, that is, the ends that are remote from the tail piece 8, extend over the extension nut 21, as shown in Figure 4, and are applied to the tuning head 6, as hereinbefore described. The head part 18 of the neck 5 extends downwardly and outwardly at a small angle with respect to the shank part of the neck and embodies a flat bottom face 22, and a flat top face 23. The side portion of the head part 18 which is remote from the player during use of the guitar is cut away or shaped to form a finger gripping side surface 24 and a hook 25. The surface 24 extends diagonally with respect to the shank part 17 of the neck 5 and is adapted to have the player's fingers wrapped therearound when the guitar is lifted at the beginning or conclusion of a musical rendition. The hook 25 projects outwardly from and extends at substantially right angles to the finger gripping side surface 24 and constitutes the outer extremity of the head part 18 of the neck. It extends away from the player of the guitar and permits the guitar to be supported on a music rack, peg, or like supporting medium when it is not in use. In addition to forming a supporting means for the guitar, the hook 25 serves as a stop at the outer end of the finger gripping side surface 24 for preventing the player's fingers from slipping outwards with respect to the surface when the guitar is carried or lifted. The opposite side portion of the head part 18, that is, the portion which is disposed directly adjacent to the player when the guitar is in use, is shaped or formed so that it includes a convexly rounded side surface 26. The lower or inner end of this surface extends substantially parallel to the finger gripping side surface 24 at the opposite or other side portion of the head part 18 and the outer or upper end of the side surface 26 joins and forms a part of the outer side surface of the hook 25.

The tuning head 6 is associated with the head part 18 of the neck 5 and comprises a mounting plate 27 and a device on the mounting plate for adjusting the tension of each of the strings. The plate 27 is in the form of a metal stamping and is fixedly secured by screws 28 to the flat bottom face 22 of the head part 18 of the neck. The far or outer side margin of the plate is curved conformably to, and is spaced slightly inwards of, the finger gripping side surface 24 of the head part 18, and the opposite side margin of the plate, that is, the margin that is directly opposite the player of the guitar when the latter is being played, is curved conformably to, and spaced slightly inwards of, the side surface 26. By reason of the fact that the mounting plate 27 is substantially coextensive with the flat bottom face 22 of the head part of the neck the head part is reinforced or strengthened throughout and is not likely to split in response to any distortion or stress resulting from the tension of the strings.

The device for adjusting the tension of the string 11 comprises a shaft 29 and a spindle 30. The shaft 29 extends transversely across the inner or lower end of the mounting plate 27 and is carried by a bearing bracket 31 at one end thereof and a pair of laterally spaced bearing brackets 32 at its other end. The bracket 31 is located adjacent to the convexly rounded side surface 26 on the so-called inner side of the head part 18 of the neck and the bearing brackets 32 are located at the opposite side of the head part 18 that is adjacent to the inner end of the finger gripping side surface 24. The shaft 29 is rotatably supported by the bearing brackets and embodies a key 33 at one end thereof for turning purposes. This key is fixedly secured to the shaft and, as shown in the drawing, is located adjacent to, and projects outwardly of, the inner or lower end of the side surface 26 of the head part 18. The spindle 30 extends at right angles to the shaft 29 and extends through and is journaled in a hole 34 in the head part 18 and a hole 35 in the mounting plate. The two holes are coaxial and disposed between and a slight distance beneath the bearing brackets 32. The upper end of the spindle 30 has a transverse hole 36 therein whereby the tuning end of the string 11 may be inserted therethrough and then wrapped or twisted therearound for anchoring purposes. A worm 37 and a worm gear 38 serve to rotate the spindle 30 for string tuning purposes in response to rotation of the shaft 29 by the key 33. The worm 37 is formed as an integral part of the shaft 29 and is disposed between the bearing brackets 32. The worm gear 38 meshes with and is driven by the worm 37 and is secured by a screw 39 around and in fixed relation to a reduced stem 40 on the lower end of the spindle 30. As shown in Figure 3, the stem 40 extends through the hole 35 in the mounting plate 27. When the key 33 is turned in one direction the shaft 27 together with the worm 37 and the worm gear 38 serves to rotate the spindle 30 so as to wind and thus tighten the string 11. When the key 33 is turned in the other direction the shaft 29 and the worm and worm gear operate to turn or rotate the spindle 30 reversely and thus to loosen the string 11.

The device for tuning or adjusting the second string of the string group, that is, string 12, is located directly outwards of the tuning device for the string 11 and comprises a shaft 41 and a spindle 42. The shaft 41 extends substantially parallel to the shaft 29 and embodies a key 43 at one end thereof and a worm 44 at its other end. It is journaled or supported in the same manner as the shaft 29 and operates when turned and through the medium of a worm gear 45 in mesh with the worm 44 and on the lower end of the spindle 42 to turn such spindle. The key 43 is located outwardly of the key 33 and is positioned adjacent to and outwardly of the convexly rounded side surface 26 of the head part 18. The

spindle 42 is located outwardly of and in an inwardly offset position with respect to the spindle 30 and embodies an aperture in the upper end thereof for anchoring the tuning end of the string 12. Because of its location the spindle 42 holds the string 12 in spaced relation with the string 11.

The tension adjusting or tuning devices for the third, fourth, fifth and sixth strings, that is, the strings 13, 14, 15 and 16 are exactly the same in construction, design and mode of operation as the devices for the first and second strings of the string group, that is, the strings 11 and 12. The keys for turning the spindle rotating shafts of the tuning devices for the strings 13, 14, 15 and 16 are located adjacent to, and project outwardly from, the convexly rounded side surface 26 of the head part 18 of the neck. Because all of the keys are located adjacent to this surface instead of three on one side of the head and three on the other, tuning of the guitar is facilitated. Furthermore, all of the keys are adapted to be turned in the same direction when it is desired to increase the tension of the strings and it is not necessary to reach under or over the head part of the neck to adjust or turn keys on the outer or far side of the head part 18. The tuning device for the string 13, that is, the third string of the string group is located outwards of the shaft 41 and its string adjusting spindle is located in inwardly offset relation with respect to the spindle 42 so that the string 13 is spaced to one side of and inwards of the string 12. The tuning device for the fourth string of the string group, that is, string 14, is located outwardly of the tuning device for the third string and its spindle is located outwardly of, and in inwardly offset relation with the spindle of the last mentioned tuning device. The tuning devices for the strings 15 and 16, that is, the fifth and sixth strings of the guitar, are located beneath the outer end of the mounting plate 16 and their spindles are inwardly offset with respect to the other spindles so that the strings 15 and 16 are spaced laterally apart. The spindles of the various tuning devices, as shown in Figure 2, are in alignment with one another and form a straight series which extends diagonally with respect to the shank part 17 of the neck. As the result of this arrangement and the fact that the spindles are spaced equidistantly apart, the strings are arranged in side by side relation and are spaced equidistantly apart. By reason of the fact that the tuning keys are located adjacent to the near side of the head part 18 and the tuning ends of the strings are connected to the upper ends of the spindles of the tuning devices, it is not necessary for the player in tuning the guitar to bring his or her hand into contact with the twisted or wrapped ends of the strings and damage or injury to the hand is thus avoided. Due to the fact that the key-equipped shafts of the tuning devices are each supported by three bearing brackets, the tuning head as a whole is sturdy in design and injury or bending of the shafts is thus precluded.

The herein described neck structure is characterized by the fact that the keys for effecting tuning of the strings are all located at one side of the enlarged head part of the neck and hence tuning is materially facilitated. The structure is further characterized by the fact that it embodies on the head part of the neck a laterally projecting hook and also a finger gripping side surface which extends substantially parallel to the series of spindles. Due to the construction and arrangement of the parts of the tuning head 6 the neck structure may be manufactured at a low and reasonable cost and is both ornamental and novel in appearance.

Whereas the neck structure has been described as being adapted for use in connection with a guitar it is understood that it may be used in connection with other stringed instruments and also that by increasing or decreasing the number of tuning devices of the tuning head it may be used with instruments having more or less than six strings. It is also to be understood that the invention is not to be restricted to the details set forth, since these may be modified within the scope of the appended claim, without departing from the spirit and scope of the invention.

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

A neck structure for a stringed instrument, comprising an elongated neck adapted to underlie the strings of the instrument and having at the inner end thereof means for attachment to the instrument body and at its other end a laterally enlarged head part with a flat bottom face and one side thereof shaped to form a diagonal finger-gripping side surface and a laterally extending undercut instrument supporting hook at the outer end of said surface, and a tuning head associated with the head part and consisting of a mounting plate fitting against and shaped substantially correspondingly to said flat bottom face of the head part and provided with transversely extending sets of depending bearing brackets, winding spindles for the strings, extending vertically through said head part and the plate and arranged in a straight series in close proximity to and substantially parallel with said diagonal finger gripping side surface, spindle turning shafts journaled in the bearings and provided with turning keys all positioned outwardly of and adjacent to said other side of the head part, and worm and worm gear connections between the shafts and the lower ends of the spindles.

HERBERT A. HARLIN.