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TUNING HEAD FOR STRINGED INSTRUMENTS

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Fig. 1

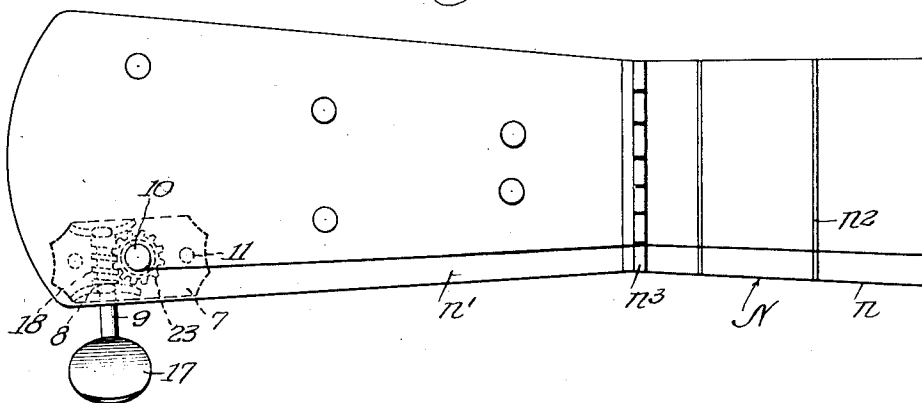


Fig. 2

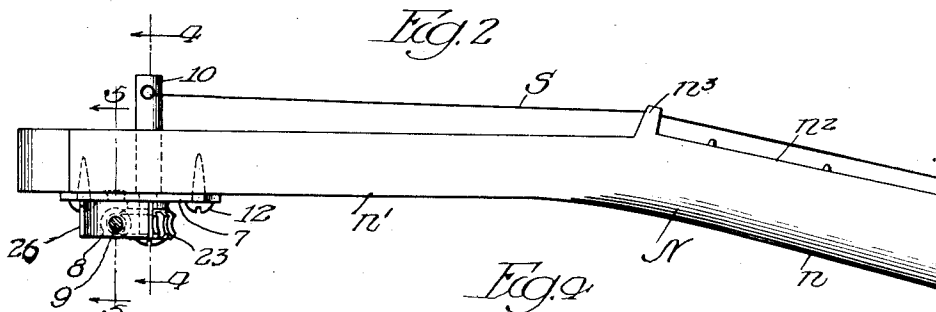


Fig. 3

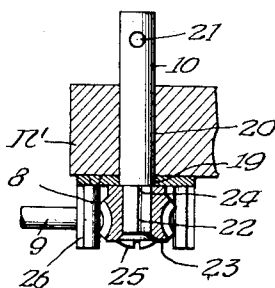
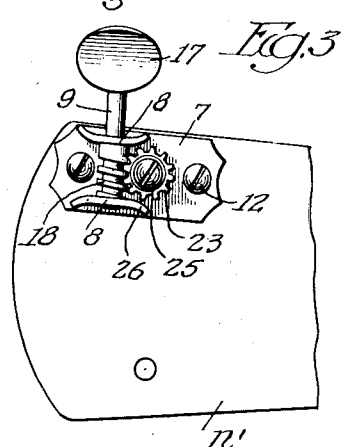


Fig. 6

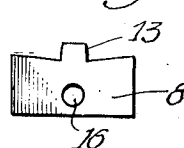
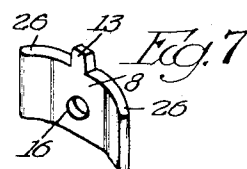
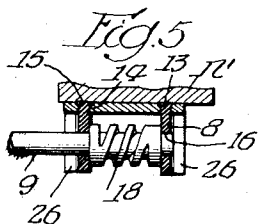


Fig. 5



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TUNING HEAD FOR STRINGED INSTRUMENTS

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3 Claims. (Cl. 84—306)

The present invention relates generally to tuning heads for stringed instruments such, for example, as guitars, mandolins and banjos. More particularly the invention relates to that type of tuning head which is mounted on the outer end of the neck of the instrument with which it is used, and comprises a mounting plate, a pair of plate metal brackets which are mounted on the plate in laterally spaced relation and have aligned bearing forming holes therein, a shaft which extends through and is journaled in the holes in the brackets and has a key for turning purposes at its outer end and a worm on the portion thereof between the brackets, a spindle which extends transversely through the mounting plate and embodies a string anchoring aperture in one of its ends, and a worm wheel which is mounted on the other end of the spindle, meshes with the worm and forms with the worm a driving connection whereby the spindle may be rotated for string tuning purposes by turning of the shaft by way of the key.

In a tuning head of this type it has been found in practice that the end thrust to which the key-equipped shaft is subjected during a string tuning or adjusting operation sometimes is so great that it causes the brackets to bend outwards into a non-parallel position. As soon as the brackets become bent or distorted in this manner the shaft either binds in the bearing forming holes in the brackets and makes tuning extremely difficult or back-lash between the shaft and the brackets occurs with the result that no movement of the spindle takes place when the shaft is initially turned in connection with a tuning operation and it is hence substantially impossible to obtain a fine or accurate adjustment or tuning of the string with which the spindle is associated.

One object of the invention is to provide a tuning head of the type under consideration which is an improvement upon previously designed tuning heads of the same general character by reason of the fact that it includes simple and novel means for preventing outward bending or distortion of the brackets in response to end thrust of the shaft during a tuning operation to the end that binding of the key-equipped shaft and back-lash are entirely eliminated.

Another object of the invention is to provide a tuning head of the last mentioned character in which the means for preventing outward bending or distortion of the plate metal brackets in response to end thrust of the shaft resulting from a tuning operation comprises wings which are

formed integrally with and are bent outwardly with respect to the ends of the brackets and abut against the mounting plate.

A further object of the invention is to provide a tuning head of the type and character hereunder consideration in which the faces of the wings which abut against the mounting plate are so inclined that when the brackets are secured or fixed to the mounting plate the wings have a tendency to tilt them towards one another into abutment with the ends of the worm on the key-equipped shaft.

A still further object of the invention is to provide a tuning head which is generally of new and improved construction and may be manufactured at a low and reasonable cost.

Other objects of the invention and the various advantages and characteristics of the present tuning head 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 claims 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 plan view of the neck of a stringed instrument to which is applied a tuning head embodying the invention;

Figure 2 is a side view of the neck showing the improved tuning head in side elevation;

Figure 3 is an inverted bottom or plan view of the tuning head showing the manner in which the mounting plate is secured to the neck and the arrangement and design of the wings which constitute the means whereby the brackets are prevented or precluded from being bent outwards as a result of the end thrust to which the key-equipped shaft is subjected during a string tuning or adjusting operation;

Figure 4 is a vertical sectional view on the line 4—4 of Figure 2;

Figure 5 is a vertical sectional view on the line 5—5 of Figure 2;

Figure 6 is a front view of one of the plate metal blanks of which the brackets for supporting the key-equipped shaft are formed; and

Figure 7 is a perspective view showing one of the finished or completed brackets prior to attachment to the mounting plate.

The tuning head which is shown in the drawing constitutes the preferred embodiment of the invention. It is adapted for use with a stringed

instrument having a neck N and comprises as the main or essential parts thereof a mounting plate 7, a pair of brackets 8, a shaft 9 and a spindle 10. The neck N is shown in the drawing as being of the type which is used in connection with a guitar, and embodies a shank part n and a head part n^1 . These two parts are positioned one in longitudinal alignment with the other and the shank part embodies a fretted finger board n^2 on the top face thereof. The portion of the head part which is joined to the shank part embodies an extension nut n^3 across which a string S extends.

The mounting plate 7 is in the form of an elongated metallic stamping. It fits flatly against the bottom face of the head part of the neck N and embodies holes 11 at its ends. Screws 12 pass through these holes and into the head part n^1 , as shown in Figure 2, and serve to hold the mounting plate in fixed or attached relation with the neck N.

The brackets 8 are formed of plate metal and depend from one end of the mounting plate. They are positioned in laterally spaced or opposed relation along the side margins of the mounting plate and have integral upstanding ears 13 along the central portions of their upper margins. These ears, as shown in Figure 5, extend through holes 14 in the mounting plate and are riveted or beaded over at the upper ends thereof as at 15 so as to cause the brackets to be permanently or fixedly attached to the mounting plate. Circular holes 16 are formed in the central portions of the brackets 8. These holes are axially aligned and form bearings for the shaft 9.

The shaft 9 extends through and is journaled in the bearing forming holes 16 in the central portions of the brackets 8 and is arranged so that one end thereof projects outwardly of the mounting plate 7 and beyond the adjacent or contiguous side margin of the head part n^1 of the neck N. A key 17 is fixedly secured to the outer or projecting end of the shaft 9 and is adapted to be gripped by the fingers in connection with turning of the shaft for string tuning purposes. The inner end of the shaft, that is, the portion between the brackets 8, is shaped to form a worm 18. This worm is larger in diameter than the outer end of the shaft and the ends thereof abut against the inner faces of the brackets 8 so that the shaft is held against endwise displacement with respect to the brackets and the mounting plate.

In assembling the tuning head the brackets 8 are mounted on the shaft 9 prior to application or mounting of the key 17 and so that they abut against the ends of the worm 18. Thereafter the upstanding ears 13 along the central portions of the upper margins of the brackets are inserted into the holes 14 and then riveted or beaded over so as permanently to effect connection of the brackets to the mounting plate. After connection of the brackets to the plate the key 17 is fixedly secured in any suitable manner to the outer or projecting end of the shaft 9.

The spindle 10 extends at right angles to the key-equipped shaft 9 and projects through and is journaled in a pair of aligned circular holes 19 and 20. These holes are formed respectively in the mounting plate 7 and the head part n^1 of the neck N and are the same in diameter. The upper end of the spindle projects above the top face of the head part of the neck, as shown in Figures 2 and 4, and embodies a transverse aper-

ture 21 which serves as an anchoring medium for the neck end of the string S. The lower end of the spindle is laterally offset with respect to the worm 18. It projects downwardly beyond the mounting plate 7 and is in the form of a reduced polygonal stem 22. A worm wheel 23 is mounted on this stem and is secured against endwise displacement with respect to the spindle by means of a shoulder 24 and a screw 25. The screw extends into an internally threaded socket in the outer or lower extremity of the stem 22 and the shoulder 24 is positioned adjacent to the inner or upper end of the stem. The worm wheel 23 meshes with the worm 18 on the shaft 9 and forms a driving connection whereby the spindle may be rotated in response to turning of the shaft by way of the key 17. When the spindle is rotated in one direction as the result of turning of the shaft by the key 17 it operates to tighten the string S by winding it around its upper or projecting end. When the spindle is reversely rotated as a result of a reverse turning or manipulation of the key 17 the string is unwound from the spindle and its tension is thus lessened. By turning the key 17 in one direction or the other tuning of the string S may be effected.

In order to prevent the brackets 8 from being bent or distorted outwards as the result of the end thrust to which the key-equipped shaft 9 is subjected in connection with a string tuning operation, the brackets are provided at the ends thereof with out-turned wings 26. These wings are formed as integral parts of the brackets and extend outwards at approximately an angle of 30°. The upper portions of the wings fit flatly against the bottom face of the mounting plate 7 with the result that the brackets are effectively held against transverse tilting and cannot be bent or distorted outwards when pressure is applied thereto by the worm 18. By preventing outward bending or distortion of the brackets the shaft cannot become bound in the bearing forming holes 16 in the brackets. Furthermore, back-lash between the shaft and the brackets is eliminated and consequently there cannot be any lost motion between the shaft 9 and the spindle and the spindle responds immediately to turning of the shaft and permits of a fine tuning of the string S. Each bracket with its end wings is formed from a plate metal blank of the type which is shown or exhibited in Figure 6 of the drawing. The blank after being punched or stamped is bent so that the wings 26 extend outwards at the desired angle. The upper faces of the end portions of the blanks from which the brackets and wings are formed are cut away so that such faces are inclined downwards in the direction of the ears 13. By cutting away the upper faces of the end portions of the blanks in this manner the upper faces of the wings 26, that is, the faces which abut against the bottom face of the mounting plate 7, are inclined and tend when brought into abutment with the mounting plate as the result of beading or riveting over the ears 13 to tilt the brackets 8 inwards so that they engage the ends of the worm 18 with a spring action. As a result of this spring action there is no end play of the key-equipped shaft 9 with respect to the brackets and back-lash is thus avoided. Because of the downward inclination of the upper faces of the wings in the direction of the ears 13 the wings are of slightly greater height than the brackets and hence when the studs 13 are riveted

in place with respect to the holes 14 the wings serve effectively to strut the brackets.

The herein described tuning head not only is extremely efficient due to the fact that backlash between the shaft and the bracket is effectively eliminated but also may be manufactured at a low and reasonable cost inasmuch as the wings 26 are formed as integral parts of the brackets 8 and may be formed and shaped in connection with stamping of the brackets.

Whereas a single tuning head has been described in connection with the neck N it is to be understood that the head is adapted for use in connection with other tuning heads of like design. 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 claims, 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:

1. As a new article of manufacture, a tuning head for the neck of a stringed instrument, comprising a mounting plate, a pair of laterally spaced separately formed comparatively thin plate metal brackets mounted fixedly and in edgewise manner on the plate and having aligned bearing-forming holes therein, a shaft journaled in the holes and having a turning key at one end thereof and a worm mounted on said shaft and positioned between and abutting against the brackets, a string winding spindle extending at right angles to the shaft and having mounted thereon a worm wheel in meshing relation with the said worm whereby it is connected to be rotated by the shaft, and wings engaging said plate and connected to the ends of the brackets and extending angularly and outwardly in opposite directions with respect to said worm for preventing outward bending or deflection of said brackets as the result of end thrust of the worm when the shaft is turned by manipulation of the key for spindle rotating purposes.

2. As a new article of manufacture, a tuning head for the neck of a stringed instrument, comprising a mounting plate, a pair of laterally spaced separately formed comparatively thin plate metal brackets mounted fixedly and in

edgewise manner on the plate and having aligned bearing-forming holes therein, a shaft journaled in the holes and having a turning key at one end thereof and a worm between and abutting against the brackets, a string winding spindle extending at right angles to the shaft and having a worm wheel in meshing relation with the worm whereby it is connected to be rotated by the shaft, and wings engaging said plate and formed integrally with and extending angularly and outwardly in opposite directions with respect to said worm from the ends of the brackets and arranged to strut the brackets and prevent them from being bent or deflected outwards as the result of end thrust of the worm when the shaft is turned by manipulation of the key for spindle rotating purposes.

3. As a new article of manufacture, a tuning head for the neck of a stringed instrument, comprising a mounting plate with a pair of holes therethrough, a pair of laterally spaced separately formed comparatively thin plate metal brackets positioned in edgewise manner on the plate and having aligned bearing-forming holes in the central portions thereof and also having centrally disposed ears along the plate engaging edges thereof extending through the holes in said plate and riveted over so as fixedly to secure the brackets to the plate, a shaft journaled in the holes and having a turning key at one end thereof and a worm between and abutting against the brackets, a string winding spindle extending at right angles to the shaft and having a worm wheel in meshing relation with the worm whereby it is connected to be rotated by the shaft, and wings engaging said plate at the ends of the brackets extending angularly and outwardly in opposite directions with respect to said worm and serving to strut the brackets and prevent them from being bent or deflected outwards as a result of end thrust of the worm when the shaft is turned by manipulation of the key for spindle rotating purposes and having the plate engaging faces of said wings inclined in the direction of the brackets so that the brackets when secured to the plate by riveting over of the ears tend to tilt towards the ends of the worm and engage the latter with a spring action.

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