June 19, 1951 J. E. KLUSON 2,557,877

TUNING HEAD FOR STRINGED MUSICAL INSTRUMENTS

Filed Oct. 7, 1949

Fig. 1

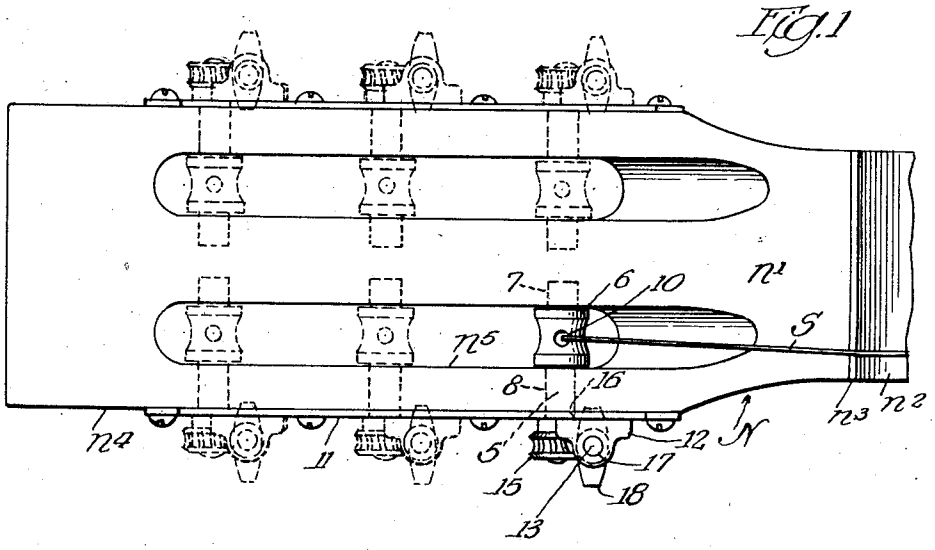


Fig. 2

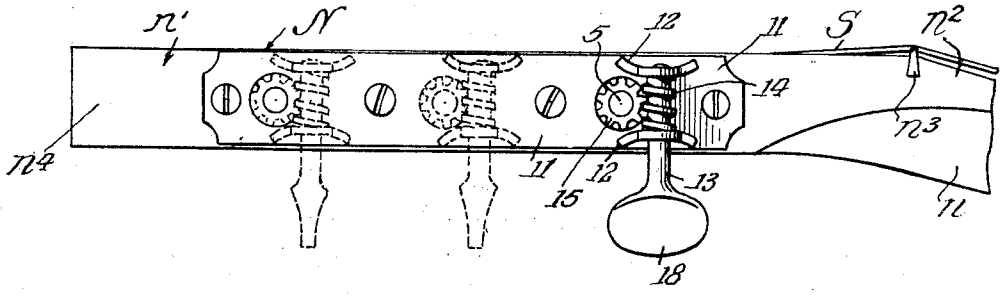


Fig. 3

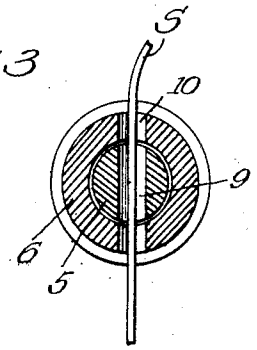
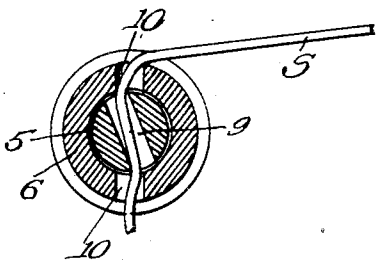


Fig. 4



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TUNING HEAD FOR STRINGED MUSICAL INSTRUMENTS

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2 Claims. (Cl. 84—306)

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The present invention relates generally to tuning heads for stringed musical 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 rotatable spindle, one portion of which is exposed and has a transverse aperture for receiving the adjacent end of one of the strings of the instrument, and another portion of which is provided with means whereby the spindle may be rotated in one direction or the other in order to adjust or vary the tension of the spring.

In connection with use of a tuning head of the aforementioned type it is customary when attaching the adjacent end of the string to the spindle first to insert the string end completely through the transverse aperture in the spindle of the head and then after wrapping the string around the apertured portion of the spindle so as to form a plurality of loops to insert the free or projecting end of the string under one of the loops in order to connect the string to the spindle. In practice it has been found that this method or mode of connecting the string to the spindle of the tuning head is subject to certain objections. In the first place connection of the string to the spindle requires extreme care and is quite laborious. Secondly, it is necessary to use an extremely long string in order to permit the end thereof that is adjacent the tuning head to be wrapped or looped several times around the apertured portion of the spindle. Thirdly, the connection between the string and the spindle of the head is not in most instances truly fast and hence when the spindle is turned so as to increase the tension of the spring there is a marked tendency of the string to slip at its point of connection with the spindle.

The principal object of this invention is to provide a tuning head which is an improvement upon, and eliminates the objections to, previously designed tuning heads. In general, the present tuning head comprises in addition to the spindle and spindle turning means, a sleeve which surrounds and is freely rotatable with respect to the exposed apertured portion of the spindle, has a pair of diametrically opposite string receiving holes and is adapted, after insertion of the adjacent end of the string through its holes and the aperture in the spindle and in response to string-tightening turning of the spindle, to coact with the spindle in such manner that the adjacent end of the string is firmly clamped between

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the inner ends of the holes in the sleeve and the ends of the aperture in the spindle. By employing a sleeve of this character connection of the string to the spindle of the tuning head is greatly facilitated, it is unnecessary to employ an unusually long string with the tuning head, and the ultimate connection between the string and the apertured portion of the spindle is so positive that slippage of the string with respect to the spindle during turning of the latter for string tightening purposes is completely avoided.

A further object of the invention is to provide a tuning head which is generally of new and improved construction and effectively and efficiently fulfills its intended purpose.

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 illustrating in detail the construction and design of the means for rotating or turning the spindle in one direction or the other in order to adjust the tension of the string with which the tuning head is associated;

Figure 3 is a vertical transverse section illustrating the cross sectional design and construction of the central portion of the sleeve of the tuning head and showing the string after the end thereof that is adjacent the tuning head is inserted through the holes in the sleeve and the aperture in the spindle, but before the spindle is turned relatively to the sleeve in order to effect clamping of the string between the inner ends of the holes in the sleeve and the ends of the aperture in the spindle; and

Figure 4 is a similar section showing the spindle after it has been turned relatively to the sleeve in order to effect clamping of the adjacent end of the string between the inner ends of the holes in the sleeve and the ends of the aperture in the spindle.

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 as its principal parts or components comprises a spindle 5, a sleeve 6, and turning means for the spindle. The neck N is shown in the drawing as being of the type that 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 threaded finger board n^2 on its top face. The portion of the head part that is joined to the shank part embodies a so-called extension nut n^3 across which a string S extends. One end of the string is suitably attached to a tail piece (not shown) on the body of the instrument with which the tuning head is used and the other end of the string, i. e., the end that overlies the head part n^1 of the instrument neck N, is attached to the tuning head. The latter, as well understood in the art, serves as a medium or instrumentality for adjusting or varying the tension of the string S. The head part n^1 of the neck N embodies a flat side face n^4 and is provided with a longitudinally extending, open top and open bottom slot n^5. The latter, as shown in Figure 1 of the drawing, is disposed directly inwards of the side face n^4.

The spindle 5 of the tuning head is formed of steel or any other suitable hard, rigid material. It is cylindrical as shown in the drawing and extends tranversely across the slot n^5 in the head part of the neck. The inner end of the spindle is journalled or rotatably mounted in a hole 7 in the portion of the neck head part that defines the inner side of the slot n^5. The outer end of the spindle is journalled in, and extends completely through, a hole 8 which is aligned with the hole 7 and extends between, and through, the side face n^4 of the neck head part n^1 and the outer side of the slot n^5. The portion of the spindle 5 that extends across the transverse slot n^5 is provided with a cylindrical, open ended transverse aperture 9 through which the adjacent end of the string S is adapted to be inserted. When the adjacent end of the string is anchored or attached to the apertured portion of the spindle as hereinafter described and the spindle is turned in a counterclockwise direction as viewed in Figure 2 of the drawing the tension on the string is increased. Clockwise turning of the spindle as viewed in Figure 2 serves to reduce the tension of the string.

The sleeve 6 coacts with the apertured portion of the spindle 5 to attach, connect or anchor the adjacent end of the string S to the spindle. It has a truly cylindrical inner periphery and is loosely mounted on the apertured portion of the spindle to the end that the spindle is free to rotate relatively to the sleeve. The sides of the longitudinally extending slot n^5 in the neck part of the instrument neck N coact with the ends of the sleeve to hold the sleeve against the axial displacement with respect to the spindle. Preferably the outer periphery of the sleeve is concave. In its central portion the sleeve 6 is provided with a pair of diametrically opposite cylindrical holes 10. The latter are the same in diameter as the transverse aperture 9 in the spindle and are adapted in connection with attachment of the adjacent end of the string S to the spindle to be brought into registry or alignment with the aperture as shown in Figure 3. When it is desired to connect or attach the adjacent end of the string to the spindle the loosely mounted sleeve 6 is turned relatively to the spindle until the holes 10 therein are in registry or alignment with the aperture 9. Thereafter the adjacent end of the string is inserted completely through the holes and aperture, as shown or illustrated in Figure 3. After proper insertion of the adjacent end of the string S through the holes and aperture the spindle 5 is turned in a counterclockwise direction as viewed in Figure 2. This results in the spindle turning initially relatively to the sleeve and results in the end of the string being firmly clamped between the inner ends of the holes 10 and the ends of the aperture 9, as shown in Figure 4. After clamping of the adjacent end of the string between the inner ends of the holes 10 and the ends of the aperture 9 further counterclockwise turning of the spindle causes the sleeve to rotate with the spindle and results in the string S being wound around the concave outer periphery of the sleeve 6. When it is desired to release the adjacent end of the string from attached relation with the spindle the spindle is turned in a clockwise direction relatively to the sleeve until its aperture 9 is in alignment or registry with the holes 10 in the sleeve. This serves to unclamp or release the string so that it may be readily removed from the spindle by pulling it from the aperture 9 and the holes 10. By having the aperture 9 extending completely through the spindle and employing two holes 10 in the sleeve the adjacent end of the string S when applied or attached to the spindle is clamped at two points and hence it is so positively connected to the spindle that slippage of the string cannot occur when the spindle is turned in a counterclockwise direction to effect tightening of the string. By having the outer periphery of the sleeve concave insertion of the neck end of the string through the holes in the sleeve in the aperture in the spindle is materially facilitated by reason of the fact that the curved or concave surface around the hole into which the neck end of the string is first inserted serves to guide said end of the string into such hole.

Any conventional or suitable means may be employed for turning the spindle 5 for string adjusting purposes. The means shown or illustrated in the drawing consists of a mounting plate 11, a pair of brackets 12, a shaft 13, a worm 14 and a worm gear 15. The mounting plate 11 is fixedly secured by screws or other attaching devices to the side face n^4 of the head par n^1 of the neck N and embodies a hole 16 which is aligned with, and the same in diameter as, the hole 8 and has the outer end of the spindle 5 projecting through it. The brackets 12 are positioned in vertically spaced relation and are connected to, and project outwards from, the mounting plate 11. They are located at one side of the hole 16 in the mounting plate and have centrally disposed aligned holes 17 in which one end of the shaft 13 is journalled. The other end of the shaft embodies a key 18 whereby the shaft may be turned or rotated. The worm 14 is formed on the portion of the shaft 13 that extends between the brackets 12. The worm gear 15 meshes with the worm 14 and is suitably fixedly secured to the outer end of the spindle 5. When the key 18 is turned in one direction the worm and worm gear serve to turn the spindle 5 in one direction and when the key is turned in the opposite direction the worm and worm gear operate to effect reverse turning or rotation of the spindle.

The herein described tuning head effectively and efficiently fulfills its intended purpose and is essentially characterized by the fact that it in-

cludes the sleeve 6 around the apertured portion of the spindle. The sleeve, as previously pointed out, coacts with the spindle firmly to anchor to the spindle the adjacent end of the string with which the tuning head is employed. By providing the sleeve as a part of the tuning head attachment of the string to the spindle is facilitated and the string when applied is secured to the spindle in a fast or positive manner. The sleeve makes it possible to utilize a comparatively short string in view of the fact that attachment of the string to the spindle does not necessitate wrapping or looping the string around the spindle to a great extent. The tuning head is essentially simple in design and hence may be produced at a low cost.

The invention is not to be understood as 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 designed to have attached thereto one end of a string of a stringed musical instrument and comprising a rotatably mounted spindle embodying turning means therefor, having one portion truly cylindrical and provided with a diametric aperture for receiving said one end of the string, and adapted when turned in one direction to increase the tension of the string and when turned in the opposite direction to decrease the tension of the string, and a sleeve with a truly cylindrical inner periphery, extending loosely and rotatably around said one portion of the spindle, provided with a transverse hole adjacent one end of the aforementioned aperture, having associated therewith means for positively holding it against axial displacement in either direction relatively to the spindle, and adapted, after insertion of said one end of the string through the hole and into the aperture and in response to turning of the spindle in said one direction and relatively to the sleeve, to coact with the spindle in such manner that said one end of the string is firmly clamped between the inner end of the hole and said one end of the aperture.

2. As a new article of manufacture, a tuning head designed to have attached thereto one end of a string of a stringed musical instrument and comprising a rotatably mounted spindle embodying gear variety turning means therefor, having one portion truly cylindrical and provided with a diametric aperture for receiving said one end of the spring, and adapted when turned in one direction to increase the tension of the string and when turned in the opposite direction to decrease the tension of the string, and a sleeve with a truly cylindrical inner periphery extending loosely and rotatably around said one portion of the spindle, provided with a concave outer periphery and in addition a transverse open ended hole in its portions of minimum thickness and adjacent one end of the aperture, having associated therewith means for positively holding it against axial displacement in either direction relatively to the spindle, and adapted, after insertion of said one end of the string through the hole and into the aperture and in response to turning of the spindle in said one direction and relatively to the sleeve, to coact with the spindle in such manner that said one end of the string is firmly clamped between said inner end of the hole and said one end of the aperture.

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The following references are of record in the file of this patent:

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