

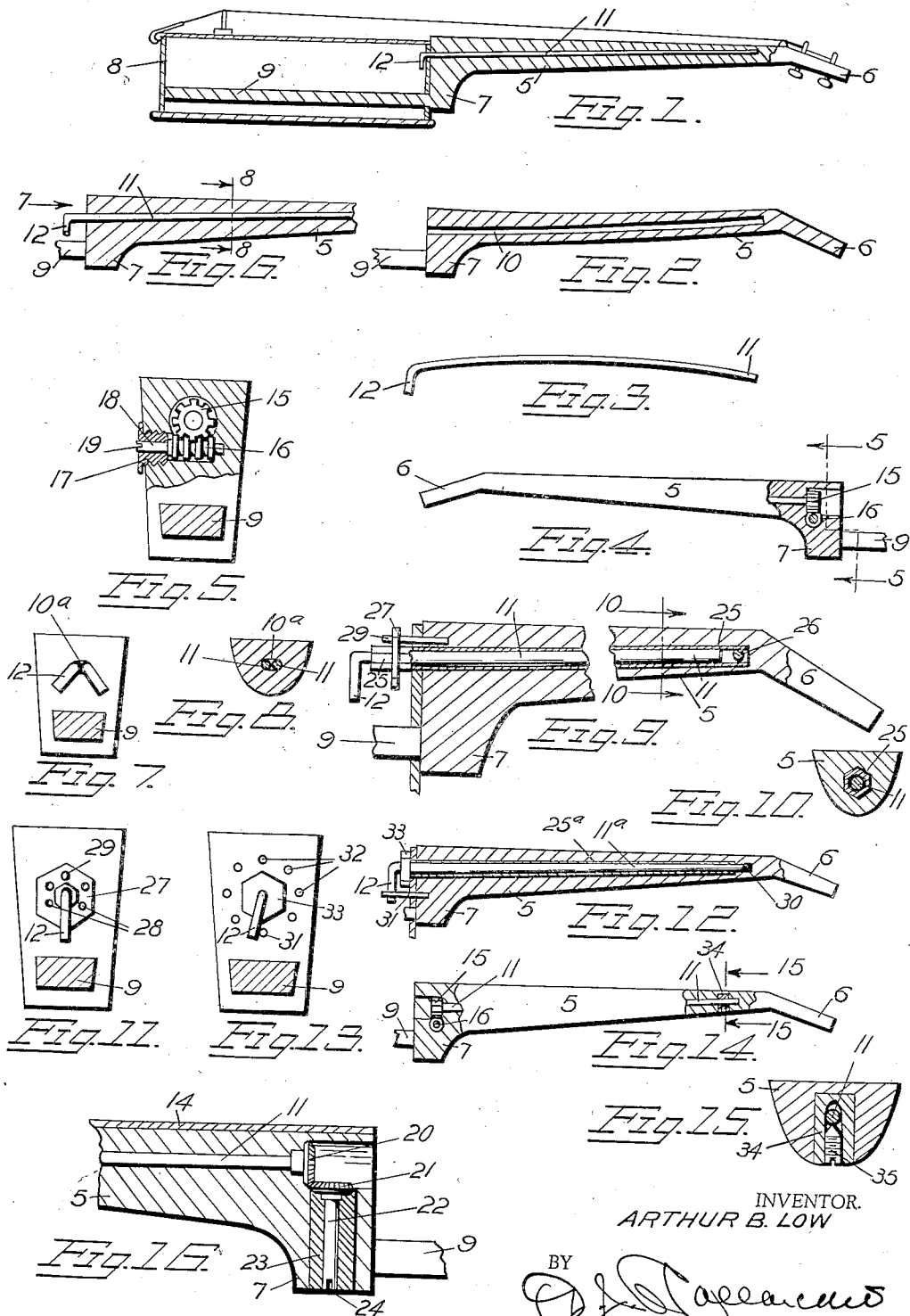
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NECK STRAIGHTENING DEVICE FOR MUSICAL INSTRUMENTS

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NECK STRAIGHTENING DEVICE FOR
MUSICAL INSTRUMENTS

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11 Claims. (Cl. 84-293)

This invention relates to improvements in necks for musical instruments, such as banjos and guitars.

It has been found that in musical instruments of the stringed type, provided with long wooden necks, the necks are liable to "warp" or bow due to the constant severe strains to which they are subjected from the strings. This occurs most frequently in moist climates, or when the instrument is transferred from a dry to a moist climate or vice versa.

When the necks get bowed it interferes in some degree with the playing of the instrument and is therefore objectionable.

It is the object of this invention to produce a simple and effective means for returning instrument necks to normal position after they have become bent or twisted by the action of the strains to which they are subjected and/or to climatic conditions.

Another object of this invention is to produce a device for straightening the necks of musical instruments that can be applied either at the factory or after the instrument has been in use for some time.

The above and other objects that may become apparent as the description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail and for this purpose reference will be had to the accompanying drawing in which the invention has been illustrated in its preferred form and in which

Fig. 1 is a longitudinal section of a banjo constructed in accordance with the invention;

Fig. 2 is a longitudinal section through a banjo neck showing the straightening device removed therefrom;

Fig. 3 is a side elevation of the straightening device;

Fig. 4 is a side elevation, partly in section, showing a worm gear drive for turning the straightening device;

Fig. 5 is a section taken on line 5-5, Fig. 4;

Fig. 6 is a fragmentary longitudinal section showing a slightly modified construction;

Fig. 7 is an end elevation of the device shown in Fig. 6;

Fig. 8 is a cross section taken on line 8-8, Fig. 6;

Fig. 9 is a longitudinal section showing a modification;

Fig. 10 is a cross section taken on line 10-10, Fig. 9;

Fig. 11 is an end view of the device shown in Fig. 9;

Fig. 12 is a longitudinal section showing a still further modification;

Fig. 13 is an end elevation of the device shown in Fig. 12;

Fig. 14 is a longitudinal section showing a further modification;

Fig. 15 is a section taken on line 15-15, Fig. 14; and

Fig. 16 is a fragmentary section showing a bevel gear drive.

In the drawing numeral 5 designates the instrument neck in all of the views. The end designated by numeral 6 contains the pegs for tensioning the strings while the end 7 is enlarged and attached to the resonating body 8 by any suitable means. The necks are usually provided with a brace bar 9.

Due to strains and climatic conditions, necks of stringed musical instruments frequently become bowed as shown in Fig. 2, where the top has been shown as concave; when this occurs the instrument becomes difficult to play.

An instrument neck made in accordance with this invention is provided with a hole 10 extending longitudinally therethrough and this hole is originally straight. A rod 11 of steel or any other resilient material such as spring brass is longitudinally bowed, as shown in Fig. 3, and is provided with a handle portion 12 that serves as a crank arm for turning the rod after it has been inserted into the hole. Rod 11 is inserted into the hole 10, as shown in Fig. 1, and since the hole is straight, the rod will straighten as it is inserted.

The bending strains set up by the action of the bowed rod in the straight hole produces a flexure of the neck which bows it in conformity to the bow of the rod and the extent of this flexure depends on the relative rigidity of the neck and the rod. In the drawing the plane of the curvature of the rod has been shown as lying in the axis of the handle 12.

It is obvious that by turning the rod in the hole the plane of the flexure will be rotated. When the rod, shown in Fig. 3, is inserted into the hole in the bowed neck shown in Fig. 2, the rod will produce a bending force that will remove the curvature from the neck when it is properly adjusted. It is evident that if the rod is so positioned that its plane of curvature lies parallel with the top surface of the neck it will tend to bend the neck sidewise and this is effectively resisted by the composition top 14 with which

such necks are provided and any small sidewise curvature that may be produced has been found to be unobjectionable. By turning the rod so that the convex side will be on top it tends to bow the neck upwardly a maximum amount and this component is controlled by angle that the plane of the curvature makes with the top of the neck.

In Figs. 6, 7, and 8 a modification has been shown in which the hole 10a is oblong and two rods are employed; by rotating these rods equally and in opposite directions all sidewise bending forces are neutralized.

In Figs. 4 and 5 a worm gear mechanism has been illustrated for turning the rod in place of the handle 12. The rod is provided with a worm wheel 15 and a worm 16 is rotatably mounted in a threaded bearing block 17 in the manner shown in Fig. 5. The worm shaft 18 is provided with a screw driver slot 19. In Fig. 16 a bevel gear mechanism has been shown for turning rod 11, and the end of the rod has a bevel gear 20 applied thereto and this cooperates with a similar gear 21 carried by shaft 22 which is mounted for rotation in tube 23 and provided with a screw driver slot 24.

It sometimes happens that the necks warp or twist as well as bend and although this is a less frequent occurrence, it is objectionable when it occurs and in Figs. 9 to 15, means have been illustrated for correcting a twist as well as a longitudinal bend.

In Figs. 9 and 10 a tube 25 has been shown as located in the hole 10 and its end secured against rotation by a pin 26. A washer 27 is slidably secured to the rear end of the tube and this is provided with a number of holes 28 arranged in a circle. A pin 29 is secured to the end of the neck and so positioned that it can enter any one of these holes. By twisting the tube until a sufficient torsional strain is produced to remove the twist in the neck and then sliding the washer forwardly until the pin enters one of the holes therein the twist will be removed. The rod 11 is inserted into the tube. In the drawing, tube 25 has been shown as hexagonal but this is not essential.

In Figs. 12 and 13, a reversal of the construction illustrated in Figs. 9, 10, and 11 has been shown. In this construction the rod 11a is straight and has its inner end held against turning by a pin 30, which projects through a hole in the end of the rod and through the neck in the same manner as pin 26 holds the tube 25 in Figure 9. By twisting the rod the necessary torsional strains for removing the twist from the neck can be produced. A pin 31 holds the rod 10a from untwisting, and can be positioned in any one of the holes 32. The tube 25a is bowed and takes the place of the bowed rod 11 and has its outer end provided with a hexagonal portion 33 by means of which it can be turned to effect the necessary straightening action.

In Figs. 14 and 15, a modification has been shown in which the rod 11 can be employed for removing a warp or twist as well as a bend from the neck. The rod is provided with the worm gear means for turning it, which has been shown in Figs. 4 and 5. The inner end of the rod projects through a metal block 34 and can be clamped against rotation in this block by a set screw 35. If a twist alone is to be removed, the inner end of the rod is clamped against rotation after which the worm device is operated to twist the rod sufficiently to remove the twist from the

neck. If the neck is both bent and twisted the bend is removed before the rod is clamped to the block 34, after which the set screw is tightened and the rod twisted in the proper direction to remove the twist from the neck.

From the above it will be apparent that I have produced a simple device by means of which the necks of banjos, guitars and other stringed instruments can be straightened, and untwisted when it becomes bent or twisted for any reason.

Attention is called to the fact that it is not essential to this invention, in its broadest aspect, that the resilient member 11, which is usually of metal but may be made of any suitable resilient material, shall be rotatable in the hole or opening, as it is possible to straighten the neck by drilling a hole and inserting a bowed resilient member of such strength and curvature that it will produce the required straightening force and insert this member in the opening so as to produce the necessary straightening effect. Instead of a solid rod, a tube can be used, as this has greater strength per unit weight than a solid member.

Having described the invention, what is claimed as new is:

1. A stringed musical instrument neck having a substantially straight hole extending longitudinally therethrough, a tube located in the hole, means for securing one end of the tube against rotation relative to the neck, and means at the other end of the tube for rotating it relative to the neck whereby torsional strains are produced which tend to twist the neck.

2. A stringed musical instrument neck having a substantially straight hole extending longitudinally therethrough, a tube located in the hole, means for securing one end of the tube against rotation relative to the neck, means at the other end of the tube for rotating it relative to the neck whereby torsional strains are produced which tend to twist the neck, a normally curved resilient metal rod located in the tube, and means for rotating the rod.

3. A stringed musical instrument neck provided with a substantially straight hole extending longitudinally therethrough, an elongated normally curved member of resilient material located in the opening for subjecting the neck to a flexing strain, and means for rotating the member in the hole whereby the plane of the flexing forces will be rotated about the center of the hole.

4. A stringed musical instrument neck provided with a substantially straight hole extending longitudinally therethrough, an elongated, normally, curved member of resilient material located in the opening for subjecting the neck to a flexing strain, and means comprising a worm gear drive for rotating the member in the hole whereby the plane of the flexing forces will be rotated about the center of the hole.

5. A stringed musical instrument neck provided with a substantially straight hole extending longitudinally therethrough, an elongated, normally curved member of resilient material located in the opening for subjecting the neck to a flexing strain, and means comprising a bevel gear drive for rotating the member in the hole whereby the plane of the flexing forces will be rotated about the center of the hole.

6. A stringed musical instrument neck provided with a substantially straight hole extending longitudinally therethrough, an elongated, normally curved member of resilient material located in the opening for subjecting the neck to a flexing

strain, and means comprising a crank arm for rotating the member in the hole whereby the plane of the flexing forces will be rotated about the center of the hole.

- 5 7. A stringed musical instrument neck provided with a substantially straight hole extending longitudinally therethrough, an elongated, normally curved member of resilient material located in the opening for subjecting the neck to a
10 flexing strain, means for rotating the member in the hole, and means located in the hole, in concentric relation to the curved member for applying torsional forces to the neck.

- 15 8. A neck for a stringed musical instrument having a hole extending in the direction of its length and a resilient member located in the hole, said member before it is inserted into the hole being curved relative to the longitudinal axis of the hole.

- 20 9. A stringed musical instrument neck provided with a straight hole extending longitudinally therethru, and a normally longitudinally curved member of resilient material located in the hole whereby the neck will be subjected to a bending
25 action.

10. A stringed musical instrument neck pro-

vided with a substantially straight hole of oblong cross section, extending longitudinally therethru, means for applying a bending force to the neck comprising two resilient, normally longitudinally curved members located in the hole, and manually operable means connected with each member for rotating it independently of the other member.

11. A stringed musical instrument neck having a substantially straight hole extending longitudinally therethru, means for applying a torsional strain to the neck, comprising an elongated member of resilient material located in the hole, means at one end of the member for holding it from rotating relative to the neck, means at the other
15 end of the member for rotating it relative to the neck to adjust the torsional strain, means for interconnecting the neck and torsion member, to retain the torsional strain, means for applying a force to the neck for bending it, comprising
20 a normally curved, elongated resilient member also located in the hole in the neck, and manually operable means connected with one end of said bending member to rotate it relative to the neck.

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25