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Peters, Jr. et al.

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[54] PITCH CHANGE LIMITING DEVICE FOR STRINGED MUSICAL INSTRUMENTS

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[52] **U.S. Cl.** **84/312**, 84/304

[51] **Int. Cl.** **G10d 3/14**

[58] **Field of Search** 84/304, 312, 313, 454, 455

[56] **References Cited**

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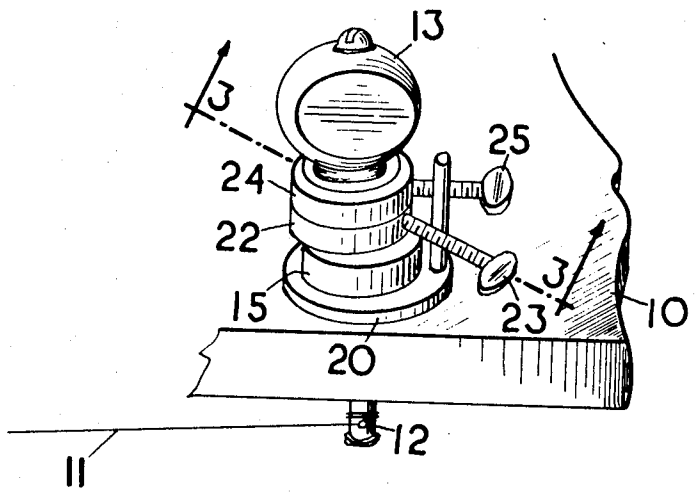
[57] **ABSTRACT**

A pitch changing device for string instruments comprising an adapter cylinder rigidly mounted on the tuning key shaft, an upper ring rotatably mounted on the adapter cylinder, a lower ring rotatably mounted on the upper ring, and a limit stop rigidly mounted on the instrument head. The device enables the user to limit the rotational motion of the tuning key shaft to a predetermined angular value.

4 Claims, 7 Drawing Figures



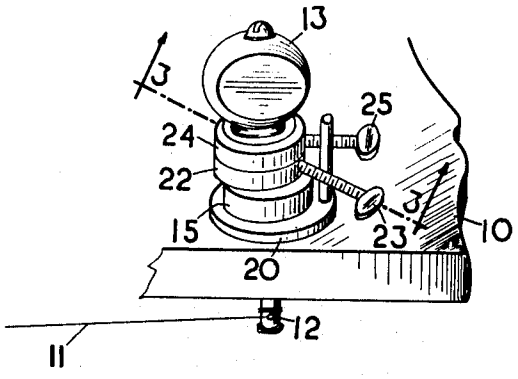


FIG. 1

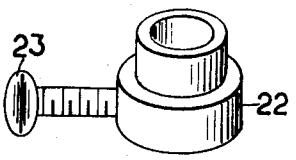


FIG. 4

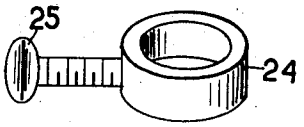


FIG. 5

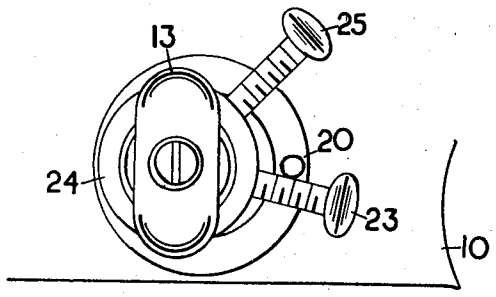


FIG. 2

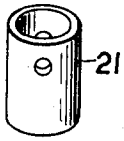


FIG. 6

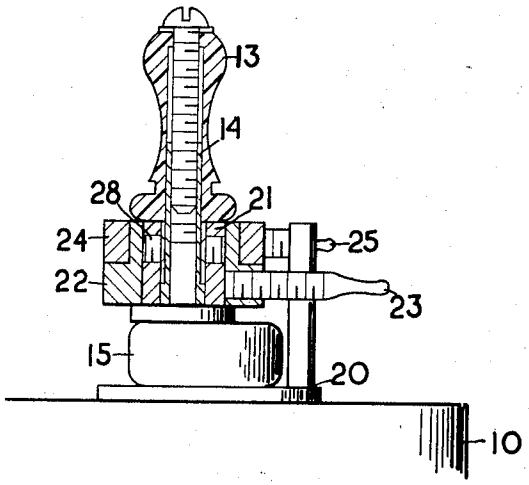


FIG. 3

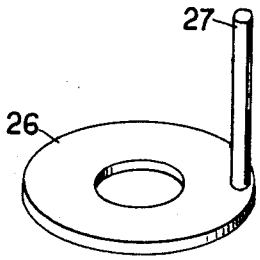


FIG. 7

PITCH CHANGE LIMITING DEVICE FOR STRINGED MUSICAL INSTRUMENTS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The field of art to which the invention pertains includes the field of pitch changing devices for stringed musical instruments.

2. Description of the Prior Art

In playing a stringed musical instrument it is desirable to be able to change the pitch of a particular string, making it either higher or lower, while playing the instrument. Thus, if a particular string is plucked, and then the pitch is raised by increasing the tension on the string, a whining or sliding effect is produced. The same effect can be produced when lowering the pitch by decreasing the string tension.

There have been some attempts to produce a device which would accomplish the foregoing results, for example, as disclosed in U.S. Pat. Nos. 2644360 and 3000253. These attempts provide a means in addition to the standard tuning peg for altering the tension in a string and thereby changing its pitch. While these devices accomplish the desired result, they are unsightly, unwieldy, and require the addition of a complicated mechanism to the instrument.

SUMMARY OF THE INVENTION

The present invention provides a simple device that is readily attachable to the tuning key shaft of a stringed musical instrument. This invention provides a device whereby the user is able to change the pitch of a particular string between predetermined notes while playing the instrument. This makes possible the production of sliding or whining musical effects.

The device also provides the user with a means of readily changing the tuning of a stringed musical instrument. For example, when a device is employed on each of the string tuning keys, the tuning can be changed from G to D by rotating the tuning keys until the proper limit stop is contacted.

The invention is so constructed that the range of pitch change can be determined and set by the user. Once the range is set, the string can be tuned to the correct pitch with respect to the other strings of the instrument without affecting the range of pitch change set by the player.

Furthermore, this invention provides a device which can be readily installed on the tuning peg of a stringed musical instrument, is simple to operate, and economical to manufacture.

In accordance with this invention, a device is provided for limiting the rotational motion of a musical instrument tuning key shaft to a predetermined angular value and comprises an adapter cylinder rigidly mounted on the tuning key shaft, an upper ring rotatably mounted on the adapter cylinder, a lower ring rotatably mounted on the upper ring, and a limit stop rigidly mounted on the instrument head.

The adapter cylinder provides an axis for rotation of the upper ring in the event the tuning key shaft is not circular and does not provide a suitable axis for rotation. If the tuning key shaft is circular and does provide a suitable axis for rotation, the adapter cylinder is not necessary, and the upper ring may be mounted directly on the tuning key shaft. The upper ring is rotatably mounted on the adapter cylinder and is provided with a thumb screw for the purpose of locking it to the adapter cylinder. The upper ring thumb screw also serves to contact the limit stop and prevent further rotation of the tuning key shaft. The lower ring is rotatably mounted on the upper ring, and is provided with a thumb screw for the purpose of locking the lower ring to the upper ring. The lower ring thumb screw also acts to contact the limit stop and prevent further rotation of the tuning key shaft.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the device mounted on the tuning peg of a stringed musical instrument.

FIG. 2 is a top plan view of the device mounted on the tuning peg of a stringed musical instrument.

FIG. 3 is a partial section view on the line 3—3 of FIG. 1, in the direction of the arrows.

FIG. 4 is a perspective view of the upper ring.

FIG. 5 is a perspective view of the lower ring.

FIG. 6 is a perspective view of the adapter cylinder.

FIG. 7 is a perspective view of the limit stop.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, numeral 10 indicates a conventional stringed instrument head. One end of the string 11 is connected to the string pin 12. The other end of the string 11 is connected to the tailpiece of the instrument in the conventional manner. The string pin 12 is connected to and controlled by the tuning key 13 through the tuning key mechanism 15. The tension in the string 11, and therefore the pitch of the string 11, is controlled by rotation of the string pin 12, causing the string 11 to wind onto or unwind from the string pin 12.

With particular reference to FIGS. 1 and 3, our invention comprises, in general, a limit stop 20 rigidly mounted on the instrument head 10, an adapter cylinder 21 rigidly mounted on the tuning key shaft 14, an upper ring 22 rotatably mounted on the adapter cylinder 21 and provided with a thumb screw 23 which serves to lock the upper ring 22 to the adapter cylinder 21 and to contact the limit stop 20, and a lower ring 24 rotatably mounted on the upper ring 22 and provided with a thumb screw 25 which serves to lock the lower ring 24 to the upper ring 22 and contact the limit stop 20.

The limit stop 20, shown in FIG. 7, is made from a light gauge American Standard plain washer 26 by drilling a hole through the face of the washer 26, and brazing or otherwise fastening a metal stop rod 27 into the hole, so that the stop rod 27 extends perpendicular to the face of the washer 26 from one side, and is flush with the opposite face. The limit stop 20 is positioned between the tuning key mechanism 15, and the instrument head 10 and is held in place by the tuning key mechanism 15, as shown in FIG. 3.

The adapter cylinder 21, shown in FIG. 6, is a hollow cylinder constructed of metal or other suitable material. The inside diameter of the adapter cylinder 21 is such that the adapter cylinder will fit over the tuning key shaft 14. The outside diameter of the adapter cylinder 21 is such that the cylinder walls will be of suitable thickness and rigidity to withstand the forces exerted on it when the upper ring 22 is locked in place, and will provide a sufficient number of threads for the locking set screws 28. The length of the adapter cylinder 21 is the same as the upper ring 22. In order to lock the adapter cylinder 21 in place, two threaded holes are provided on opposite walls of the adapter cylinder 21, located on the same diameter, to accommodate locking set screws 28. The length of the set screws 28 must be such that with the adapter cylinder 21 locked in place, the heads of the set screws 28 do not protrude beyond the outside diameter of the adapter cylinder 21. Furthermore, the holes for the locking set screws 28 must be positioned such that the upper ring thumb screw 23 will not come into contact with the threaded holes. The adapter cylinder 21 is necessary only for a tuning key shaft 14 which is not circular. The adapter cylinder 21 provides an axis for rotation of the upper ring 22 and a bearing surface for the upper ring thumb screw 23 in lieu of such an axis and surface being available on the tuning key shaft 14.

The upper ring 22, shown in FIG. 4, consists of two concentric cylinders having a common inner diameter and different outer diameters, and is constructed of metal or other suitable material. The inside diameter of the upper ring 22 is such that it can be rotatably mounted on the adapter cylinder 21, or if the tuning key shaft 14 is circular, on the tuning key shaft 14. The outer wall of the lower half of the upper ring 22 provides the mounting axis for the lower ring 24. The outside diameter of the lower half of the upper ring 22 is such that the cylinder walls will be of suitable thickness and rigidity to withstand the

forces exerted on it when the lower ring **24** is locked in place. The outside diameter of the upper half of the upper ring **22** is the same as the outside diameter of the lower ring **24**, so that when the lower ring **24** is rotatably mounted on the upper ring **22**, a cylinder of constant outside diameter results, as shown in FIGS. **1** and **3**. The length of the upper half of the upper ring **22** is such that it will accommodate a threaded hole of suitable size to accommodate the upper ring thumb screw **23**. A threaded hole is located centrally on the upper half of the upper ring **22**, and extends radially through the wall of the upper ring **22**. The purpose of this hole is to allow the upper ring **22** to be locked to the adapter cylinder **21** by means of the upper ring thumb screw **23**.

The lower ring **24**, as shown in FIG. **5**, is a hollow cylinder constructed of metal or other suitable material. The inside diameter of the lower ring **24** is such that the lower ring **24** may be rotatably mounted on the lower half of the upper ring **22**, as shown in FIG. **3**. The outside diameter of the lower ring **24** is such that the cylinder walls will be of suitable thickness and rigidity, and will provide sufficient threads for the lower ring thumb screw **25** to insure that the threads will not strip out when the lower ring thumb screw **25** is tightened. The length of the lower ring **24** is such that it will accommodate a threaded hole of suitable diameter to accommodate the lower ring thumb screw **25**. A threaded hole is located centrally on the length of the lower ring **24**, and extends radially through the wall of the lower ring **24**. The purpose of this hole is to accommodate the lower ring thumb screw **25** which is used to lock the lower ring **24** to the upper ring **22**. The length of the lower ring **24** is the same as the length of the lower half of the upper ring **22**, as shown in FIG. **3**.

In operation, the limit stop **20** is rigidly mounted on the head **10** of the instrument as shown in FIG. **3**, is such a position that the upper ring thumb screw **23** and the lower ring thumb screw **25** may come in contact with it, and thus limit the motion of the tuning key shaft **14**. The adapter cylinder **21** is rigidly mounted on the tuning key shaft **14**, being locked in place with the set screws **28**. The upper ring **22** is rotatably mounted on the adapter cylinder, and the lower ring **24** is rotatably mounted on the upper ring **22**, as shown in FIG. **3**.

With this arrangement, the range of pitch change is determined by the relative positions of the upper ring thumb screw **23** with respect to the lower ring thumb screw **25**, as shown in FIG. **2**. The range is set by tuning the string **11** to the low note of the range, locking the upper ring **22** to the adapter cylinder **21** in such a position that the upper ring thumb screw **23** is in contact with the limit stop **20**. The string **11** is then tuned to the upper note of the range, and the lower ring **24** is locked in a position such that the lower ring thumb screw **25** is in contact with the limit stop **20**.

To illustrate the use of the device, assume that the string **11** is normally tuned to the high note of the range, and that the user wishes to produce a sliding effect by adjusting the pitch to the low note of the range. With the string **11** tuned to the high note, the lower ring thumb screw **25** is in contact with the limit stop **20**. While playing the instrument, the user plucks the string **11** in the conventional manner, and then rotates the tuning key **13** until the motion is stopped by the upper ring thumb screw **23** contacting the limit stop **20**, thus lowering the pitch of the string **11** to the lower note of the range.

Should it be necessary to tune the string so that it has the proper pitch in relation to the other strings on the instrument, it is only necessary to loosen the upper ring thumb screw **23**, retune the string **11** to the proper pitch, and then retighten the upper ring thumb screw **23** so that the lower ring thumb screw **25** is again in contact with the limit stop **20**. This procedure does not change the relative position of the upper ring thumb screw **23** with respect to the lower ring thumb screw **25**, and therefore the range of pitch change remains the same.

What is claimed is:

1. In a stringed musical instrument having a tuning key and a string connected to said tuning key, the improvement comprising, a body supporting said key for rotational movement, limit stop means mounted on said body, rotational stop means mounted on said key for interacting with said limit stop means to confine the rotational motion of said tuning key to a predetermined angular arc, and means for adjusting at least one of said stop means to selectively change said angular arc.

2. The device of claim **1** including means of adjusting said angular arc.

3. In a tuning key for stringed musical instruments in combination, a limit stop rigidly mounted on said instrument, an inner annular body rigidly mounted on the rotatable shaft of said tuning key, an upper annular body rotatably mounted on said inner annular body and having means to lock said upper annular body to said inner annular body and contact said limit stop, and a lower annular body rotatably mounted on said upper annular body and having means to lock said lower annular body to said upper annular body and contact said limit stop.

4. In a tuning key for stringed musical instruments in combination, a limit stop rigidly mounted on said instrument, an adapter cylinder rigidly mounted on the rotatable shaft of said tuning key, an upper ring rotatably mounted on said adapter cylinder and having a thumb screw to lock said upper ring to said adapter cylinder and contact said limit stop, and a lower ring rotatably mounted on said upper ring and having a thumb screw to lock said lower ring to said upper ring and contact said limit stop.

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