Dec. 8, 1942. G. PROELSDORFER 2,304,597

MUSICAL INSTRUMENT STRING TENSIONING MEANS

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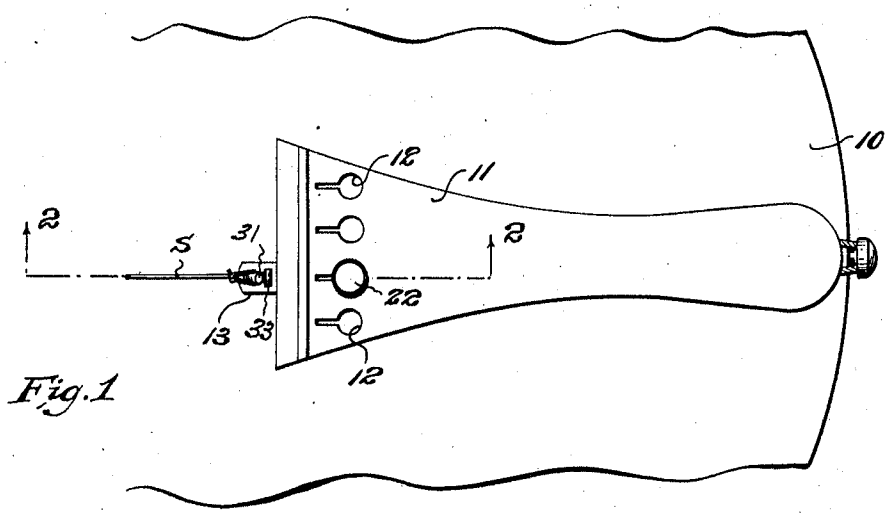


Fig. 1

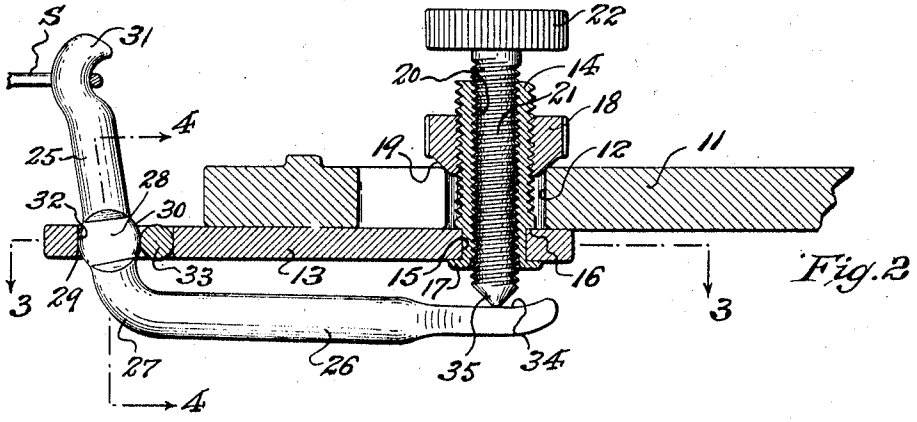


Fig. 2

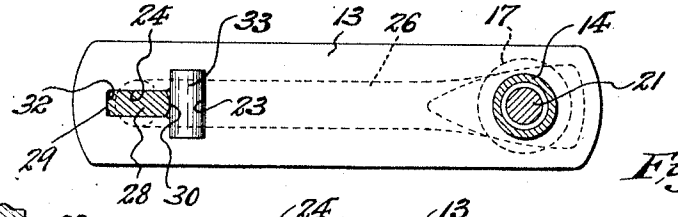


Fig. 3

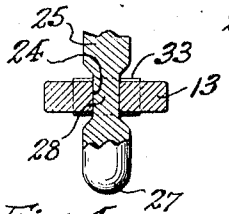


Fig. 4

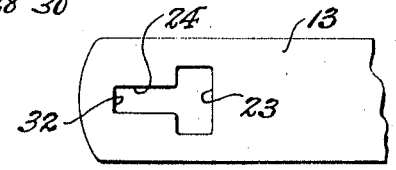


Fig. 5

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MUSICAL INSTRUMENT STRING TENSIONING MEANS

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3 Claims. (Cl. 84—297)

This invention relates to improvements in means for tensioning strings of stringed musical instruments, such e. g. as violins, cellos, guitars and the like; and the invention has reference, more particularly, to an improved tensioning device for application to a tail-piece of a stringed musical instrument to which the anchored end of a string may be attached, whereby, upon manipulation of the tensioning device a very accurate final tuning of the attached string may be attained.

Tensioning devices of the general kind involved in the instant invention, as heretofore known, have comprised a pivoted bell-crank lever fulcrumed on a bracket plate which is affixed to the instrument tail-piece, the tail end of a string being attached to the upstanding arm of said bell-crank lever, and manipulatable means being provided for rocking the bell-crank lever so as to apply a tensioning pull upon the string attached thereto. In some forms of tensioning devices of this kind, the bell-crank lever is fulcrumed on a pivot pin carried by the bracket-plate, such construction requiring very accurate drilling of both the bell-crank lever and bracket-plate, which involved difficult and time consuming operations both as to the drilling and assembling of these elements in view of the small size of the parts operated on. Attempts have heretofore been made to avoid use of a pivot pin, and necessity for the difficult drilling and assembling operations such use involved; and to this end it has been proposed to slot the bracket plate to receive a flattened fulcruming section with which the bell-crank lever was provided, the bracket plate being slit longitudinally through its slotted part, whereby the same could be expanded for the insertion of the said flattened fulcruming section, and then squeezed together again, so as to embrace the latter. In practice, however, this solution does not seem to be altogether satisfactory, largely for the reason that a close fit and embrace of the bracket plate about fulcruming section of the bell-crank lever is both difficult to attain and maintain, with the consequence that a tendency of the bell-crank lever to wobble and shift under the strain of the string tensioned thereby occurred, with risk of altering the string tension and resultant loss of accurate tuning.

Having these faults of previous tensioning devices in view, it is an object of the present invention to provide an improved tensioning device construction, and especially improved means for mounting, fulcruming and assembling the bell-crank lever in connection with the bracket plate, without necessity for use of a pivot pin and involved drilling operations, and whereby a firm rocking support of the bell-crank lever free from looseness and tendency to wobble or shift is provided.

Other objects of the present invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

An illustrative embodiment of the present invention is shown in the accompanying drawing, in which:

Fig. 1 is a fragmentary plan view of a violin, including its tail-piece, and showing a string tensioning device according to this invention operatively mounted on the latter; Fig. 2 is a longitudinal sectional view, taken on line 2—2 in Fig. 1, but drawn on a greatly enlarged scale; Fig. 3 is a horizontal sectional view, taken on line 3—3 in Fig. 2; Fig. 4 is a transverse vertical section, taken on line 3—3 in Fig. 2; and Fig. 5 is a fragmentary plan view of the bell-crank lever fulcruming end portion of the bracket plate of the device.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

Referring to the drawing, the reference character 10 indicates a portion of the rear end of a violin, to which is attached, in the usual manner, its tail-piece 11. Said tail-piece 11 is provided with the usual key-hole slots 12 ordinarily employed for anchoring the strings of the instrument.

The novel tensioning device according to this invention comprises a bracket plate 13. Upstanding from the rear end portion of said bracket plate 13 is an externally screw-threaded post 14. Said post 14 is provided at its lower end with an anchoring portion 15 of reduced diameter, adapted to be inserted through an opening provided through the rear end portion of said bracket plate to receive the same, until stopped by the shoulder 16 which foots upon the upper surface of said bracket plate. The free end of said anchoring portion is extended and riveted over, as at 17, against the underside of said bracket plate, thus rigidly securing the post 14 in upstanding relation to said bracket plate.

In applying the bracket plate to the tail-piece 11, the post 14 is inserted upwardly through a key-hole slot 12 of the latter, so that the bracket plate abuts the underside of said tail-piece to extend longitudinally and forwardly therealong.

Said bracket plate is of such length that its forward end portion projects freely beyond the forward extremity of said tail-piece. To secure the bracket plate in such operative assembled relation to the tail-piece, a fastening nut 18 is screwed onto the upper end portion of the post, and turned home against the top of the tail-piece with clamping effect. Preferably the lower end of said nut 18 is provided with an inverted conical portion 19 which enters the circular portion of the key-hole slot 12, thus further stabilizing the bracket plate from displacing shift from its proper assembled relation to said tail-piece. Said post 14 is provided with an internally screw-threaded bore 20 to extend axially therethrough, and threaded through said bore is an adjusting screw 21, to the upper end of which is affixed a knurled head 22 by which the same may be manipulated.

Formed in the freely projecting forward end portion of said bracket plate 13 is a T-shaped slot comprising a transverse slot portion 23 and a longitudinal slot portion 24 extending forwardly therefrom.

The metallic bell-crank lever of the device comprises a substantially vertical upper arm 25 and a substantially horizontal lower arm 26. Adjacent to and somewhat above the elbow 27 which connects said arms, the metal of the upper arm is swaged or otherwise worked to form a laterally reduced and flattened fulcrum section 28 having a forward arcuate edge portion 29 and a rearward arcuate edge portion 30, the curvature of which form arcs of a common circle described from the center of said fulcrum section 28. The thickness width of said fulcrum section 28 is sized to correspond to the width of the longitudinal slot portion 24 of the T-shaped slot with which the bracket plate 13 is provided. Said upper arm 25 of the bell-crank lever is preferably of circular cross sectional shape, and the free end portion of said upper arm 25 is formed to provide a shallow hook-like formation 31, to which the tail end of the instrument string S to be tensioned is suitably attached or coupled. The space provided at the intersection of the transverse and longitudinal slot portions 23 and 24 of the T-shaped slot provided in the bracket plate 13 is large enough to permit of end wise insertion of the upper arm 25 of the bell-crank lever therethrough. In assembling the bell-crank lever with the bracket plate, said upper arm 25 of the former is inserted upwardly through the T-shaped slot of the latter, until the flattened fulcrum section 28 is opposed to the longitudinal slot portion 24, whereupon said fulcrum section 28 is pushed forward into said longitudinal slot portion 24 until its forward arcuate edge portion 29 bears against the forward closed end 32 of said slot portion. The sides of said longitudinal slot portion 24 closely hug the opposite faces of the inserted fulcrum 28, so that the latter may be closely embraced by and yet slidingly engage said slot portion sides without permitting lateral looseness or play in the movement of the bell-crank lever as thus supported. The forward arcuate edge portion 29 provides a fulcrum point which abuts and moves on the closed end wall 32 of said longitudinal slot portion 24. In order to retain such moving and fulcruming contact of said forward arcuate edge portion 29 with the slot end wall 32, a cylindrical locking pin or key 33 is provided. This pin or key 33 is forced into the transverse slot portion 23 of the T-shaped slot, the same being sized to tightly fit within the same so as to be wedged thereinto, and thus firmly and strongly held against accidental displacement. Said pin or key presents the forward side of its cylindrical surface in contact with and tangent to the rearward arcuate portion 30 of the fulcrum section 28, and thus bears upon the latter throughout the scope of the rocking movement of the bell-crank lever so as to guide the movements of said fulcrum section 28 while nevertheless preventing relative separation of the fulcruming forward arcuate edge portion 29 and the slot end wall 32 upon which it bears.

By virtue of the above described fulcruming construction, the bell-crank lever although free to swing on the bracket plate is nevertheless firmly and securely embraced and held against all looseness and play between the same and the supporting bracket plate, and consequently no wobbling or accidental shift is permitted which, if allowed to occur, might relax or otherwise disturb the tension which has been applied to the attached string by manipulative adjustment of the bell-crank lever.

The horizontal lower arm 26 of the bell-crank lever extends rearwardly below the underside of the bracket plate 13, so that its free end portion, which may be suitably provided with a flattened and preferably somewhat concave upper bearing face 34, is opposed to the extremity 35 of the adjusting screw 21.

In manipulating the device, when the adjusting screw 21 is turned down through the post 14 its extremity 35 will engage and thrust downwardly upon the arm 26 of the bell-crank lever, thus rocking the latter on its fulcruming connection with the bracket plate so as to swing rearwardly the upper arm 25, thereby stressing the string S longitudinally to a desired adjusted and precise degree of tension.

The novel fulcruming connection provided by this invention assures a firm pivotal support for the bell-crank lever, free from looseness, play or wobbling, and since the integrity of the bracket plate is not interrupted by slits or other weakening factors, its operative embrace of bell-crank lever undergoes no risk of relaxation and consequent loosening by reason of spreading of parts thereof. Furthermore, the operations of assembling the bell-crank lever and bracket plate, and the final insertion of the locking pin or key 33, are all capable of being quickly and easily carried out with a minimum of labor.

Having described my invention, I claim:

1. In a string tensioning means for musical instruments, a bracket-plate having means at its rear end portion for attaching the same to and for extension from an instrument tail-piece, said bracket-plate having a T-shaped slot formed therein adjacent to its forward end, a string supporting bell-crank lever having a flattened fulcrum section bounded by front and rear arcuate edge portions, the curvature of which form arcs of a common circle, said fulcrum section being entered in the longitudinal portion of said T-shaped slot so as to be closely embraced by the sides of the latter and with one arcuate edge portion thereof bearing on the end wall of said slot portion, a key element imbeddingly wedged into the transverse portion of said T-shaped slot so as to bear tangentially upon the other arcuate edge portion of said fulcrum section, whereby to retain the latter in the pivoting embrace of said longitudinal slot portion, and means to rockingly

adjust said bell-crank lever to tension the string supported thereby.

2. In a string tensioning device for musical instruments, an adjustable string anchoring bell-crank lever and a bracket plate to pivotally support the same, said bracket plate having a T-shaped slot, said bell-crank lever having a flattened fulcrum section entered in the embrace of the longitudinal portion of said slot, a key element imbeddingly wedged in the transverse portion of said slot, and said fulcrum section having oppositely directed arcuate edge portions, the curvature of which form arcs of a common circle, one said edge portion bearing on the end wall of the longitudinal portion of said slot, and the other said edge portion bearing on said key element.

3. In a string tensioning device for musical instruments, an adjustable string anchoring bell-crank lever and a bracket plate to pivotally support the same, said bracket plate having a T-shaped slot, said bell-crank lever having a flattened fulcrum section entered in the embrace of the longitudinal portion of said slot, a key element imbeddingly wedged in the transverse portion of said slot, and said fulcrum section having oppositely directed arcuate edge portions, the curvature of which form arcs of a common circle, one said edge portion bearing on the end wall of the longitudinal portion of said slot, the other said edge portion bearing on said key element, means to affix said bracket plate to the tailpiece of a musical instrument, and means carried by said bracket plate to rockingly adjust said bell-crank lever to tension the string attached thereto.

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