Oct. 1, 1940. W. W. NELSON 2,216,601

MEANS FOR FASTENING AND TUNING MUSICAL INSTRUMENT STRINGS

Filed June 17, 1939

Fig. 1

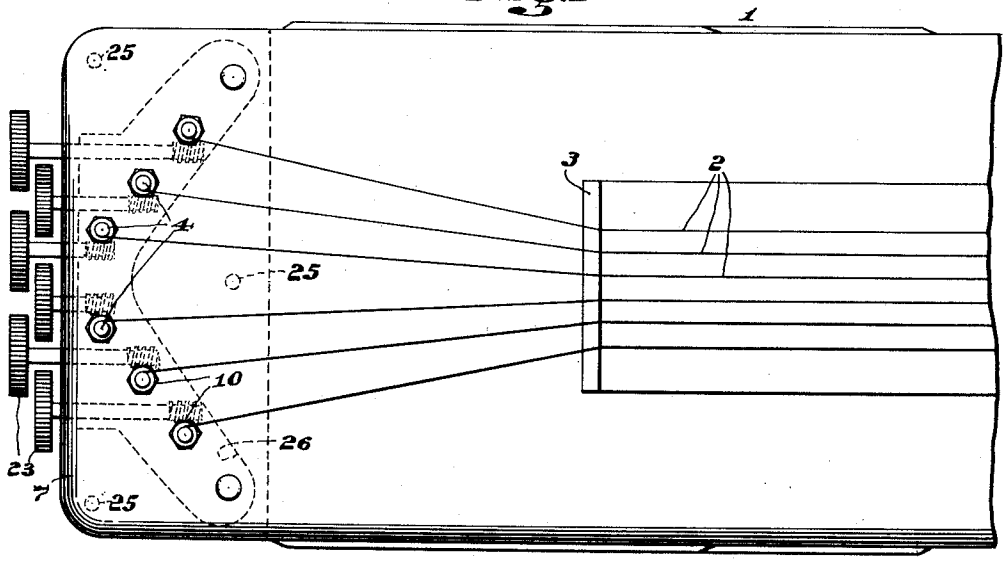


Fig. 2

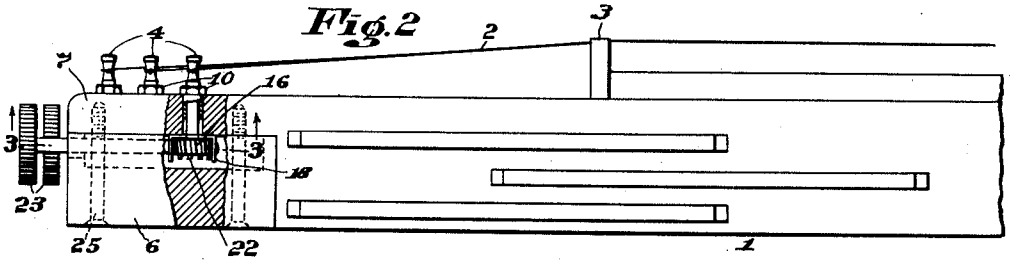


Fig. 3

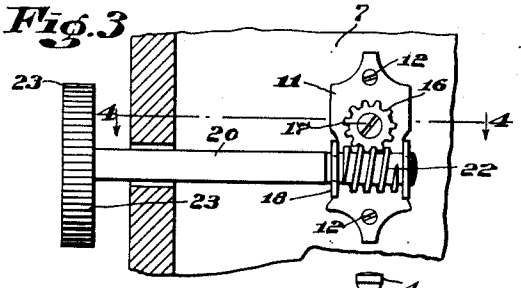


Fig. 6

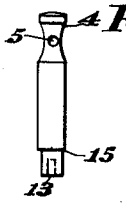


Fig. 5

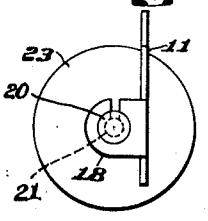


Fig. 4

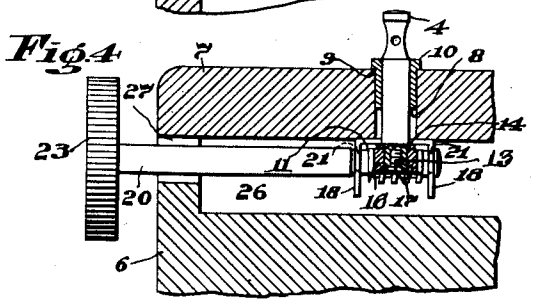
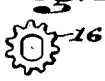


Fig. 7



Fig. 8



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MEANS FOR FASTENING AND TUNING MUSICAL INSTRUMENT STRINGS

William W. Nelson, Cambridge, Mass.

Application June 17, 1939, Serial No. 279,731

3 Claims. (Cl. 84—297)

The invention relates to an improved means for fastening and tuning musical instrument strings, and the essential object of the invention is to make the tuning of the strings more convenient and accessible to the player, especially for instruments played when lying in a horizontal position.

A further object of the invention is to improve the tonal qualities of the instrument by providing means for tuning the strings capable of fine adjustment, and one which will maintain itself without slippage.

The invention can best be seen and understood by reference to the drawing in which such portion only of the instrument is shown as is necessary for a proper understanding of the invention.

Fig. 1 is a plan view.

Fig. 2 is a side elevation partly in section.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 3.

Figs. 5 and 6 are elevations of details of construction.

Fig. 7 is an end plan of elements shown in Fig. 6.

Fig. 8 is a side elevation of one of the elements shown in Fig. 5.

Referring to the drawing: 1 represents the body of the instrument over which the strings 2 are laid. The strings are grouped in properly spaced order by extension over a bridge 3 from which the strings are brought down and fastened to a plurality of posts 4. Each string is fastened to its post by extension through an opening 5 in the post, after which the free end of the string is caught on to the body of the string in the usual manner. The strings are drawn taut and tuned to the proper pitch by the turning of the posts which effects winding of the strings thereon.

A block 6 is cut from the end of the body beneath where the posts are located, leaving a top shell 7 through openings 8 in which the posts in vertical arrangement pass with extension above and below said openings. The top end of each one of the openings 8 is lined with a bushing 9 within which the post turns. The bushing is exteriorly threaded to turn into the opening and is provided with a head 10 by which it may be turned. This head, when the bushing is properly seated, bears against the top surface of the shell.

Secured to the inner side of the shell 7 at the point of each post opening is a plate 11 which is secured to the shell by screws 12. The end 13 of the post with reduced diameter passes through an opening 14 in this plate with bearing to turn within the opening and with shoulder 15 on the post bearing against the plate around the opening. The end 13 of the post passing through the opening in the plate is squared, and pressed thereon is a worm wheel 16 held in place by a screw 17 the shank of which is inserted to fit into the end of the post and its head countersunk into the hub of the worm wheel countersunk into the end of the post. The side of the gear engages the inner side of the plate 11 in opposition to the shoulder 15 on the post whereupon the post becomes affixed to the plate to turn thereon without endwise displacement.

The worm wheel 16 and post 4 to which the wheel is secured are turned by a worm 22 borne by a shaft 20, the wheel and post being turned as the shaft is turned. The worm carrying shaft 20 extends tangentially to the worm wheel and is mounted to turn within bearings 18 on the plate 11. These bearings are preferably integral with the plate, being parts out-turned from the body of the plate, and are spring bearings which enter grooves 21 in the shaft. Thus the shaft is mounted to turn without endwise displacement and the worm brought into proper working relation to the worm wheel. The spring bearings also afford frictional impedance to the turning of the shaft.

Each of the shafts 20 bears upon its end a wheel 23 for turning it. The peripheral edge 24 of this wheel is preferably milled in order to facilitate its turning.

The shafts 20 are of such length as to extend outwardly beneath and beyond the edge of the shell 7 so that the wheels on the ends of the shafts will lie outside the shell adjacent an edge thereof either at the side of the shell, or, preferably as shown, may lie adjacent the end of the shell. The preferable extension of the shafts is such, however, that all will extend in the same general direction so that all the wheels 23 borne by them, and by which they are turned, will collectively occupy a position adjacent one edge of the instrument in convenient reach of the player. The extension and general location of the shafts is, also, preferably such that the wheels will occupy a staggered arrangement with the periphery of each wheel overlapping others adjacent to it, thus enabling all the wheels to be located within as small a space as possible, but without interfering with easy access to any one of the wheels for turning it.

During the mounting of the posts and their equipment with the means for effecting their

turning the block 6 has been removed from the body of the instrument, after which the block is re-applied to said body and fastened thereto or to the shell 7 by means of screws 25. The block is cored to provide a chamber 26 within which the mechanism for turning the posts is contained with spaced openings 27 out of this chamber through which the shafts 23 extend.

The means thus shown and described is capable of fine adjustment in the tuning of the instrument strings. Any adjusted fastening for any string will be maintained without slippage for the mechanism itself, consisting in part as it does of a worm gear, is resistant to slippage, and slippage is further prevented by the tensional retention of the shaft which bears the worm that engages the worm wheel.

I claim:

1. A musical instrument having a body with strings, and posts to which said strings are secured and by the turning of which posts the strings are tuned, said body of the instrument including a shell portion through openings in which the posts in vertical arrangement pass with extension above and below said openings, each of said posts having combined therewith a bearing within which the post turns, a plate on which the post rests and through an opening in which the post extends with end projection beyond said plate, a worm wheel on the end of the post thus projecting, means for fixing the wheel to the post, an operating shaft extending tangentially by said wheel and beyond an edge of said body, a worm on said shaft in operative engagement with said wheel for turning said wheel and post as the shaft is turned, and bearings borne by said plate within which said shaft turns.

2. A musical instrument having a body with strings, and posts to which said strings are secured and by the turning of which posts the strings are tuned, said body of the instrument including a shell portion through openings in which the posts in vertical arrangement pass with extension above and below said openings, each of said posts having combined therewith a bearing within which the post turns, a plate on which the post rests and through an opening in which the post extends with end projection beyond said plate, a worm wheel on the end of the post thus projecting, means for fixing the wheel to the post, an operating shaft extending tangentially by said wheel and beyond an edge of said body, a worm on said shaft in operative engagement with said wheel for turning said wheel and post as the shaft is turned, bearings borne by said plate within which said shaft turns, and means exerting frictional impedance to the turning of said shaft.

3. A musical instrument having a body with strings, and posts to which said strings are secured and by the turning of which posts the strings are tuned, said body of the instrument including a shell portion through openings in which the posts in vertical arrangement pass with extension above and below said openings, each of said posts having combined therewith a bearing within which the post turns, a plate on which the post rests and through an opening in which the post extends with end projection beyond said plate, a worm wheel on the end of the post thus projecting, means for fixing the wheel to the post, an operating shaft extending tangentially by said wheel and beyond an edge of said body, a worm on said shaft in operative engagement with said wheel for turning said wheel and post as the shaft is turned, and means for mounting said shaft, including spring bearings on said plate within which said shaft turns and which bearings offer frictional impedance to the turning of said shaft.

WILLIAM W. NELSON.