May 15, 1928. 1,669,823

A. D. GROVER

TUNING PEG FOR STRINGED MUSICAL INSTRUMENTS

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Fig. 1.

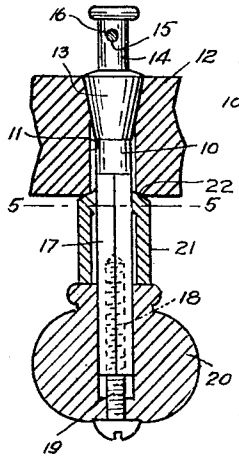


Fig. 2.

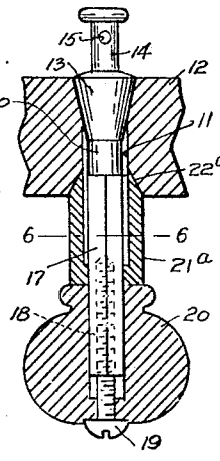


Fig. 3.

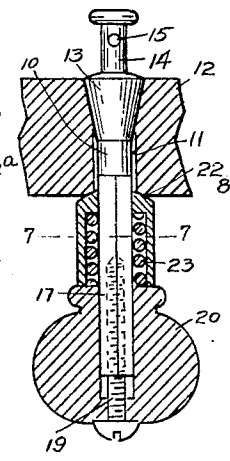


Fig. 4.

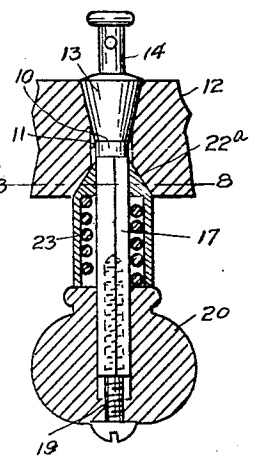


Fig. 5.

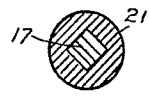


Fig. 6.

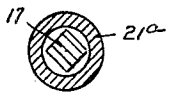


Fig. 7.

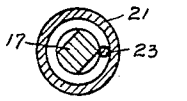


Fig. 8.

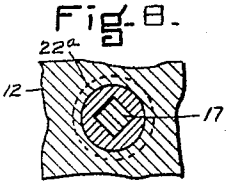


Fig. 9

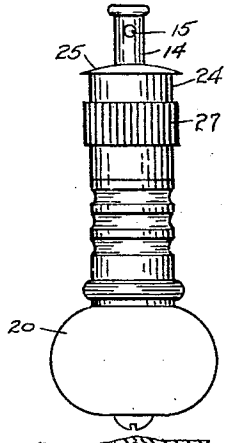


Fig. 10.

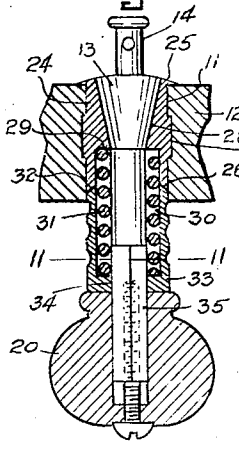


Fig. 12.

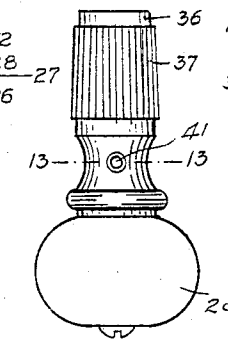
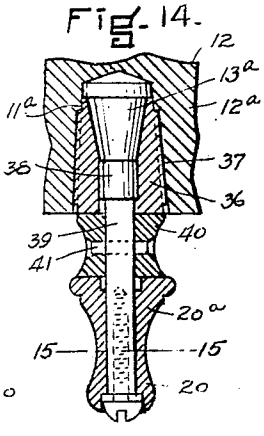


Fig. 14.



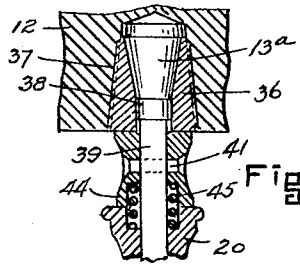


Fig. 11.

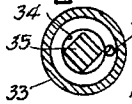


Fig. 15.

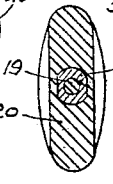


Fig. 13.



Fig. 16.

INVENTOR.

Albert D. Grover.

by Otto Munn

his Atty.

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A. D. GROVER

TUNING PEG FOR STRINGED MUSICAL INSTRUMENTS

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Fig. 17.

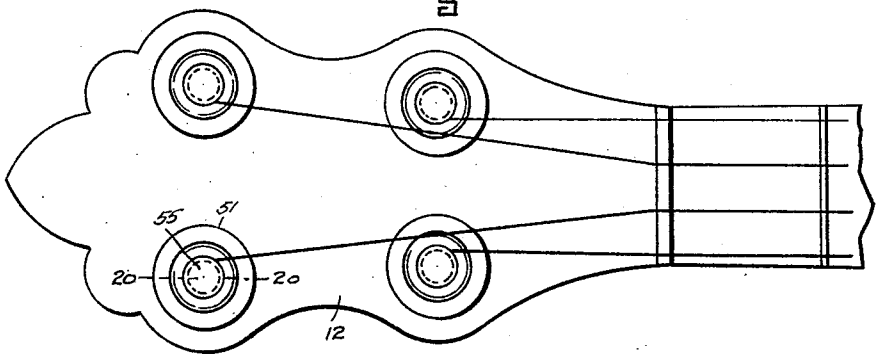


Fig. 18.

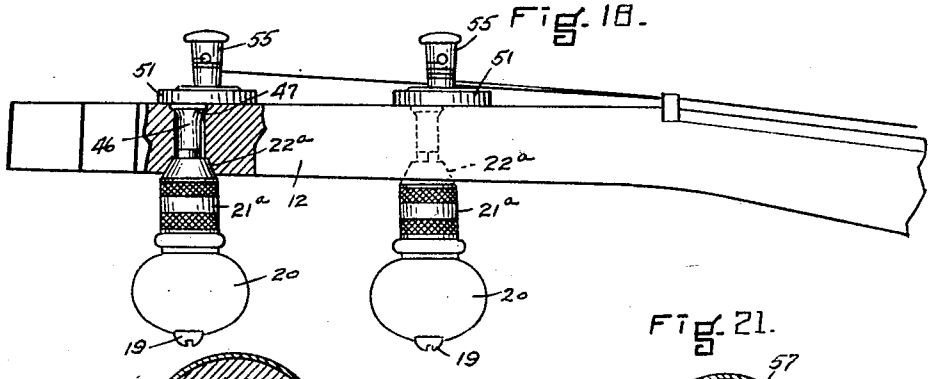


Fig. 19.

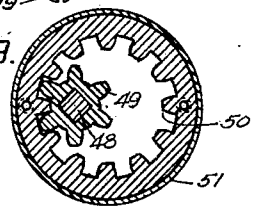


Fig. 21.

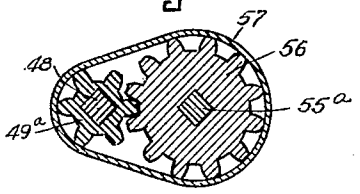


Fig. 20.

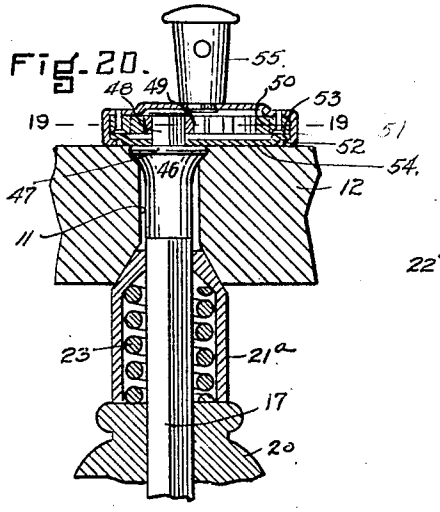
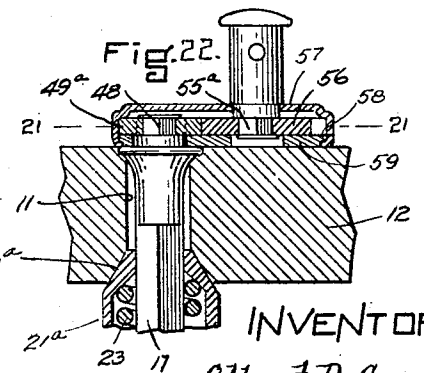


Fig. 22.



INVENTOR.
Albert D. Grover,
by Otto Munn
his Atty.

Patented May 15, 1928. 1,669,823

UNITED STATES PATENT OFFICE.

ALBERT D. GROVER, OF LONG ISLAND CITY, NEW YORK.

TUNING PEG FOR STRINGED MUSICAL INSTRUMENTS.

Application filed February 16, 1923. Serial No. 619,371.

My invention relates to improvements in stringed musical instruments and more particularly to tuning pegs therefor, of the type in which parts are provided with tapered friction surfaces which adjust themselves axially in the peg head of the instrument to hold the pegs from rotating under the strain of the tensioned strings.

The principal object of the invention is to provide a simply constructed and efficiently operated device of this character which is applicable to the various types of stringed instruments and which will firmly hold the tension of a string at any pitch.

Among the generally accepted means used for operating a tuning peg in connection with metal strings requiring very delicate adjustment, is the worm and gear construction in which the worm is revolved, turning the gear and locking the latter in any position. In this construction the string stud is attached to the gear while the thumb button is attached to the worm, the ratio of movement between the two members being substantially 1 to 8. Consequently the adjustment of the string stud is very slow in its action, and considerable time and a great number of revolutions of the thumb button are required to effect an adjustment of the string to pitch. In order to overcome this objectionable feature the present invention contemplates the use of a train of gears comprising a pinion and a gear, the former being capable of being locked against movement by the frictional engagement of the tapered parts of the peg with a relatively fixed element of the instrument, thereby locking the gear supporting the string stud in any adjusted position. The gear ratio in the present arrangement may be widely varied to meet the requirements of any type of stringed instrument or variety of string.

Several forms of the invention are illustrated in each of which the peg shank is provided with a tapered surface to operate axially thereof and effect a frictional engagement with the peg head of the instrument, and in which the peg is further provided with a cup shaped frictional member embracing the shank and adapted to impinge upon the peg head to hold the tapered surface of the shack in contact with the peg head.

In the accompanying drawing, wherein several forms of the invention are illustratively exemplified, Figure 1 is a substantially longitudinal sectional view of a peg embodying my improved conically shaped end construction of the cup member and string stud; Figure 2 is a similar view of the same showing the tapered portion of the cup disposed at a greater inclination and imbedded to its full length in the neck piece; Figures 3 and 4 are views similar to Figures 1 and 2, respectively, showing springs disposed within the cup members; Figures 5, 6, 7 and 8 are transverse sectional views taken on the sectional lines of Figures 1, 2, 3 and 4, respectively; Figure 9 is an elevational view of a self contained tuning peg; Figure 10 is a longitudinal sectional view through the peg shown in Figure 9; Figure 11 is a substantially transverse sectional view taken on the line 11—11 of Figure 10; Figure 12 shows an elevational view of the fifth peg for a banjo and Figure 13 is a transverse sectional view of the same taken on the line 13—13 of the preceding figure; Figure 14 is a substantially longitudinal sectional view on the line 14—14 of Figure 12 and Figure 15 is a sectional view through the thumb piece on line 15—15 of Figure 14; Figure 16 is a sectional view of a peg similar to Figure 12, showing a spring construction; Figure 17 is a plan view of the neck of an instrument showing the peg head provided with geared pegs; Figure 18 is a side elevational view of the pegs and parts of the neck of the instrument broken away; Figure 19 is a transverse sectional view of the gear casing and gears taken on the line 19—19 of Figure 20 which is a longitudinal sectional view taken on line 20—20 of Figure 17; and Figures 21 and 22 are sectional views of a gear controlled peg showing a slightly modified form of construction.

Referring to the drawings and particularly to Figure 1 thereof, 10 denotes the shank of the peg which passes through the usual opening 11 in the peg head 12 of the instrument. The shank 10 has a conically shaped enlargement 13, which increases in diameter towards the top and is adapted to be driven axially into frictional engagement with the wall of the opening 11, the wall being slightly countersunk to conform more or less to the contour of the enlargement 13. Beyond the portion 13 the peg is formed with an extension or string stud 14 having the usual hole 15 for receiving the end of the string 16.

Projecting below the shank 12 is a square spindle 17 having a threaded bore 18 drilled to a substantial depth into the lower end thereof to receive the screw 19 of a thumb button 20. Between the button 20 and the under adjacent face of the peg head 12 is disposed a cup shaped member 21, the cross sectional area of bore of the latter being substantially greater than the cross sectional area of the square spindle 17 passing therethrough. The upper end of the cup is tapered to be forced against the wall of the opening 11. The opening through this tapered portion is square to closely embrace the square spindle 17, as clearly illustrated in Figure 5. It will be clear from Figure 1 that the opening in the thumb button 20 is square to a point well into the body of the button, the remaining length of the opening or bore being round and of reduced diameter so that when the peg is assembled the end of the spindle 17 extends to a point short of the end of the square opening and by further adjustment of the screw 19 in the reduced portion of the opening the tapered surfaces of both the shank and cup may be drawn towards each other and into closer frictional engagement with the peg head.

In the modified form of Figures 2 and 6, the cup member 21^a is provided with a restricted square opening at its lower end adjacent the thumb button 20, and the opposite end thereof is provided with a tapered end 22^a of greater inclination than the similar surface 22 of the cup member 21 shown in Fig. 1. In this construction the lower portion of the opening 11 is slightly countersunk to establish a surface against which the end 22^a may be frictionally engaged.

The forms of Figures 3 and 7, and 4 and 8, are substantially the same as those shown in Figures 1 and 5, and 2 and 6, respectively, except that in both forms the cup members 21 and 21^a are provided with increased bores so as to receive coiled springs 23 between the restricted ends of the cup members and the adjacent surface of the thumb buttons 20. The springs 23 embrace the square spindles 17 and tend to normally force the cup members and tapered surface of the shank into closer contact with the walls of the openings in the peg heads. The use of such spring members 23 is particularly essential where the wood in the peg head happens to be slightly green and later becomes dry and shrinks whereupon the peg becomes loosened if no means are provided to take up the play between the peg and the peg head. Therefore, by the use of the springs 23 the cup members are constantly urged against the peg head at one side while the shank of the peg is pulled downwardly to force the tapered portion 13 against the wall of the opening. Such yieldable pressure drawing the two parts together against the intermediate fixed element will automatically adjust the parts to any variation which may take place in the peg head.

In the embodiment of my invention shown in Figures 9 to 11 the opening 11 in the peg head is provided with a lining or sleeve 24, which is driven into the opening, and which comprises a cylindrical member having a flanged head 25 at its upper end and an inwardly beveled lower end indicated 26. The sleeve or thimble 24 is prevented from turning in the opening by means of a knurled external band 27 disposed at the midportion thereof and adapted to bite into the adjacent surface of the opening. The tapered portion or enlargement 13 of the shank 10 is seated in a similarly tapered countersunk opening 28 disposed at the upper end of the thimble and terminating in a shoulder 29 midway of the length thereof and leading to an enlarged bore 30 to receive one end of a coiled spring 31. The lower beveled end 26 of the thimble projects downwardly through the opening 11 to a point short of the plane of the under surface of the peg head and seated against this beveled edge is the oppositely beveled edge 32 of a cup member 33. The cup 33 loosely embraces the shank of the peg and is closed at its lower end and provided with a square opening 34 to receive the square spindle 35. The bore of the cup 33 is identical with that of the thimble 24 into which it opens to receive the opposite or lower end of the spring 31 which seats against the closed end thereof. The tendency of the spring 31 in this arrangement, as in the other forms of the invention, is to constantly exert a downwardly directed pressure against the cup which in turn transfers this pressure to a pull on the spindle 35 to bring the enlargement 13 into constant contact with the wall of the opening 28. The practical advantage of this particular construction is in the fact that the peg may be assembled independently of the peg head of the instrument.

In Figures 12 to 15, I have shown my invention embodied in a so-called 5th tuning peg used with a banjo instrument, the thimble 36 in this case being tapered and provided with a knurled external surface 37. The thimble 36 is driven into a tapered opening 11^a in the peg head 12^a, where it is prevented for turning. The shank 38 in this construction carries a round spindle 39 having flattened opposite surfaces to be embraced by openings of similar cross section disposed in a thumb button 20^a and thimble 40 arranged between the button and the under adjacent surface of the tapered thimble 36. The tapered upper end 13^a of the shank is seated against the wall of a countersunk tapered opening in the upper elevation of the thimble 36. The mid thimble 40 is provided with a transverse opening

41 coinciding axially with an opening 42 in the spindle 39 adapted to receive the string 43.

In Figure 16, the general construction resembles that shown in Figures 12 to 15, except that the adjacent elevations of the thumb button 20[a] and thimbles 40 are provided with enlarged bores 44 in which a coiled spring 45 is disposed, the purpose of the spring 45 being to draw the tapered enlargement at the ends of the shank into constant frictional engagement with the fixed thimble 36.

In the forms illustrated in Figures 17 to 22, the features of my invention are shown in combination with a geared peg with which the string stud may be turned more slowly than will the thumb button. Referring to the construction of the cup member shown particularly in Figure 20, it will be seen that the design and arrangement are similar to those shown and described in connection with Figures 4 and 8, the only difference being that the shank 10 is provided with an enlargement 46 terminating in a bead 47 which seats in an opening cut in the upper surface of the peg head 12. Beyond the bead 47, the peg is formed with an extension 48, square in cross section and adapted to carry a pinion 49 in mesh with an internal gear 50. The gear 50 comprises an annular rack integral with a cup shaped member 51 having a marginal internal lower flange 52 which underlies and is guided by an upturned flange 53 of a fixed circular plate 54. The plate 54 is attached to the peg head 12 and is provided with an opening through which the part 48 projects. The cup member 51 besides being riveted to the internal gear 50 is provided with a center opening in which is mounted the string stud 55, the latter being slightly tapered outwardly towards the top.

In the modification shown in Figures 21 and 22, the construction and arrangement of the gearing and string stud are slightly changed. The arrangement comprises a pinion 49[a] carried by the square extension 48, the pinion being held in mesh with a gear 56 which in turn is loosely disposed in a fixed casing 57 embracing both gears, and which carries a string stud 55[a]. The stud 55[a] projects through an opening in the top wall of the casing 57, and is provided with a bearing collar which bears in the said opening to support the stud in upright position. The casing 57 is provided with an open lower side which carries a marginal strip held beneath a flange 58 of a plate 59 secured to the peg head.

In each form the tuning peg has the characteristic tapered enlargement in the shank portion, the tapered portion being disposed against a similarly shaped opening either in the peg head itself or in a fixed thimble carried by the peg head. The general operation throughout the invention is intended to pull the tapered enlargement of the shank either directly or yieldably and axially against a fixed element and by the sheer frictional engagement of the two parts the spindle carrying the string stud is prevented from turning by the weight of the tensioned string wound thereabout.

It has been found in banjo construction in particular that the wire strings employed are very sensitive and are more or less difficult to tune to accurate pitch by means of the ordinary pegs. This is due, as previously pointed out, to the ratio of movement between the thumb button and the attaching end of the string. By means of the present construction, as disclosed in Figures 17 to 22, the pinion is locked by the tapered shank and in turn the driven gear is likewise locked in any position.

The advantage of tapering the string stud 55 in Figure 20 is apparent when it is explained that as the stud is rotated the string will naturally wind up first about the smallest portion of the stud, an operation which will give still finer adjustment of pitch than otherwise possible with the uniform parallel walls of the other studs.

Having described my invention what I claim and desire to secure by Letters Patent is:—

1. In a tuning peg for stringed musical instruments, the combination of a driving shank and an oppositely disposed driven shank, said shanks extending in opposite directions in parallel planes and being offset axially with respect to each other, and a gear train operating the driven shank from the driving shank.

2. A geared tuning peg for stringed musical instruments comprising two rotary shanks in opposite directions and in parallel planes, a pinion for one shank, and a gear for the other shank in mesh with said pinion.

3. A geared tuning peg for stringed musical instruments, comprising two rotary shanks one thereof for the string and the other for thumb adjustment, said shanks extending in opposite directions and in parallel planes, a pinion gear for the thumb shank, a relatively large gear for the string shank in mesh with the pinion, and friction means for maintaining the gears in mesh.

4. A geared tuning peg for stringed musical instruments, comprising a rotary shank adapted to receive a string, a gear wheel carried by said shank, a second rotary shank extending in opposite directions and in a plane parallel with that in which the first mentioned shank extends, said second shank carrying a thumb piece, a gear wheel carried by said second shank and meshing with the gear wheel of the first shank, and a spring

coiled about the second shank and operating to urge the second shank axially to force engagement of the gear wheel against a fixed portion of the tuning peg.

5. A geared tuning peg for stringed musical instruments, comprising two rotary shanks extending in opposite directions and in parallel planes, one thereof for the string and the other for thumb adjustment, a pinion for one shank, and an internally toothed gear ring the teeth of which mesh with said pinion.

6. In a tuning peg for stringed musical instruments, the combination of shank members and intermeshing gears carried thereby of spring means for urging axial movement of one shank with respect to the other.

In testimony whereof I affix my signature.

ALBERT D. GROVER.