Nov. 2, 1965 J. A. O. SLOAN 3,215,019

MECHANICAL BANJO HEAD TIGHTENERS

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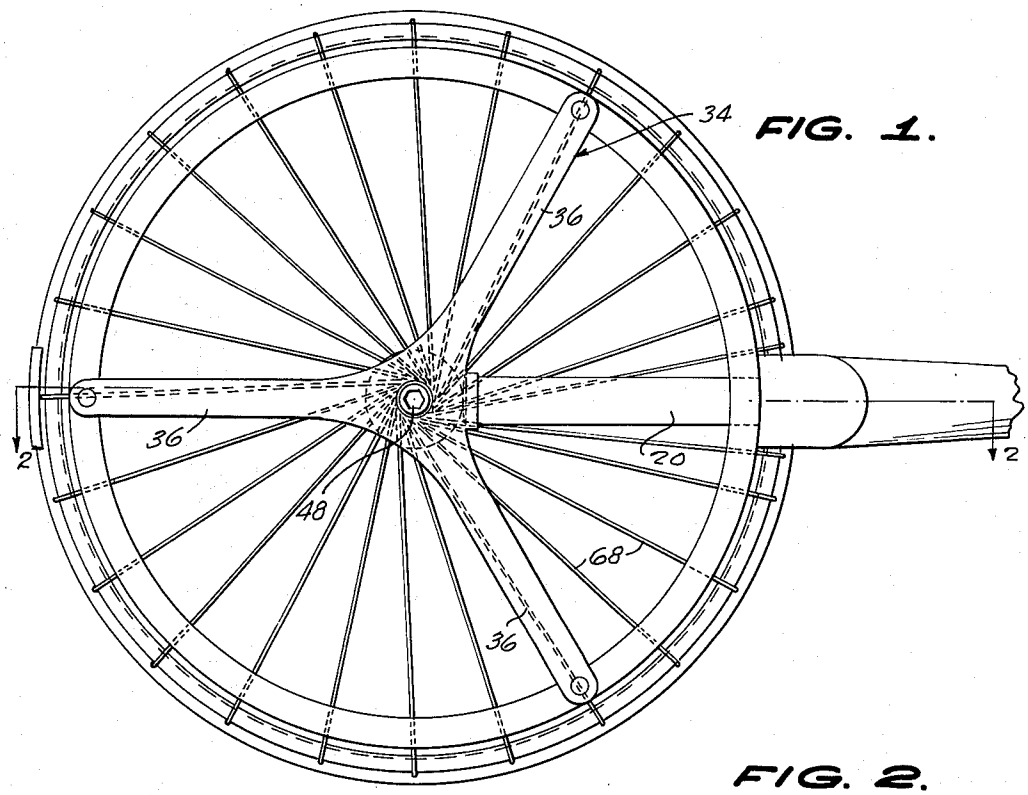


FIG. 1.

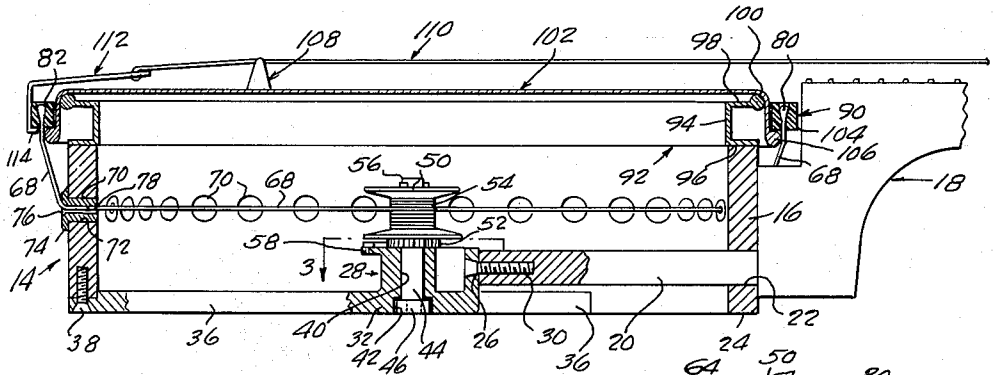


FIG. 2.

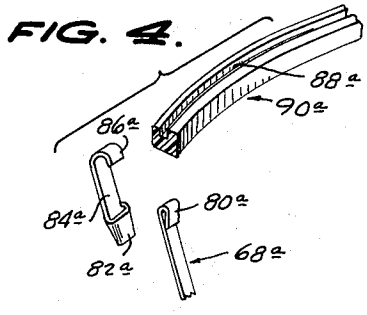


FIG. 4.

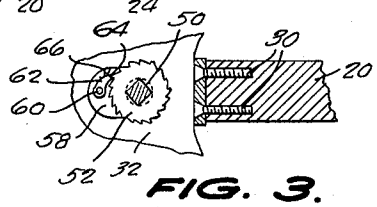


FIG. 3.

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FIG. 5.

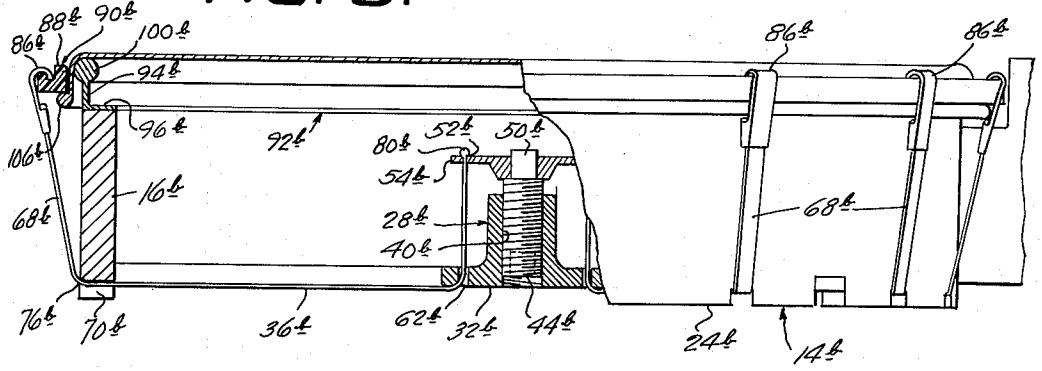


FIG. 6.

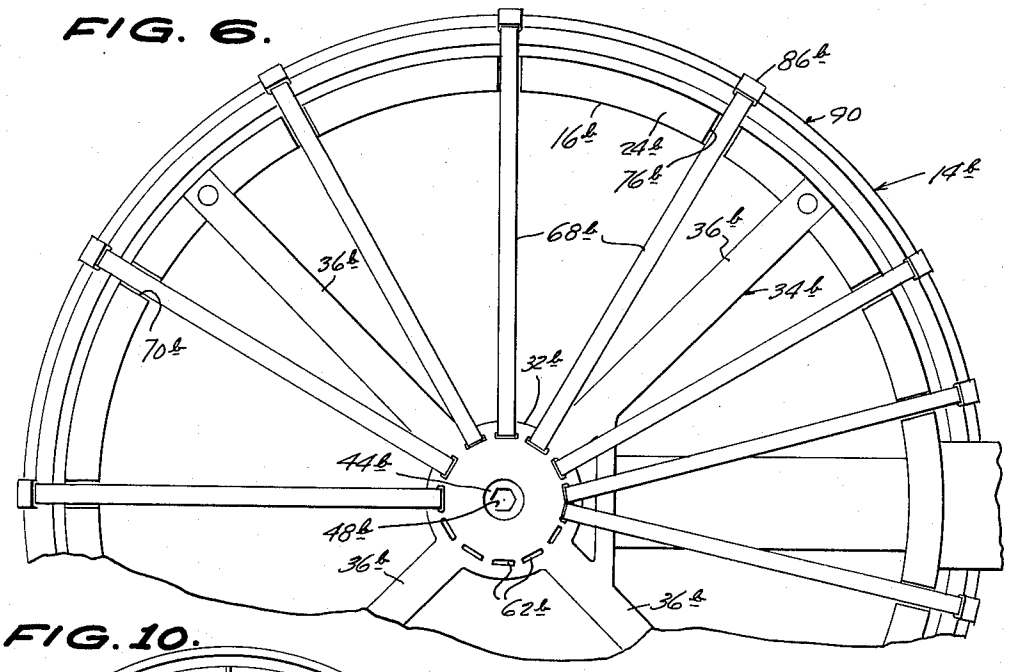


FIG. 10.

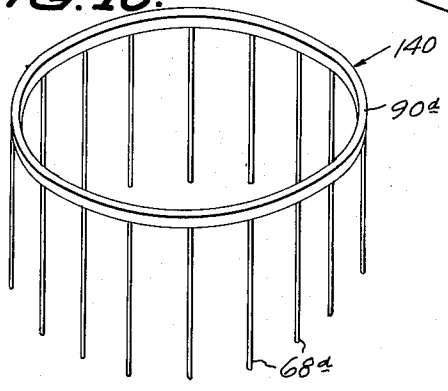
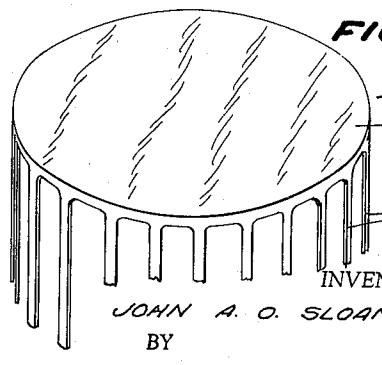


FIG. 11.



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FIG. 7.

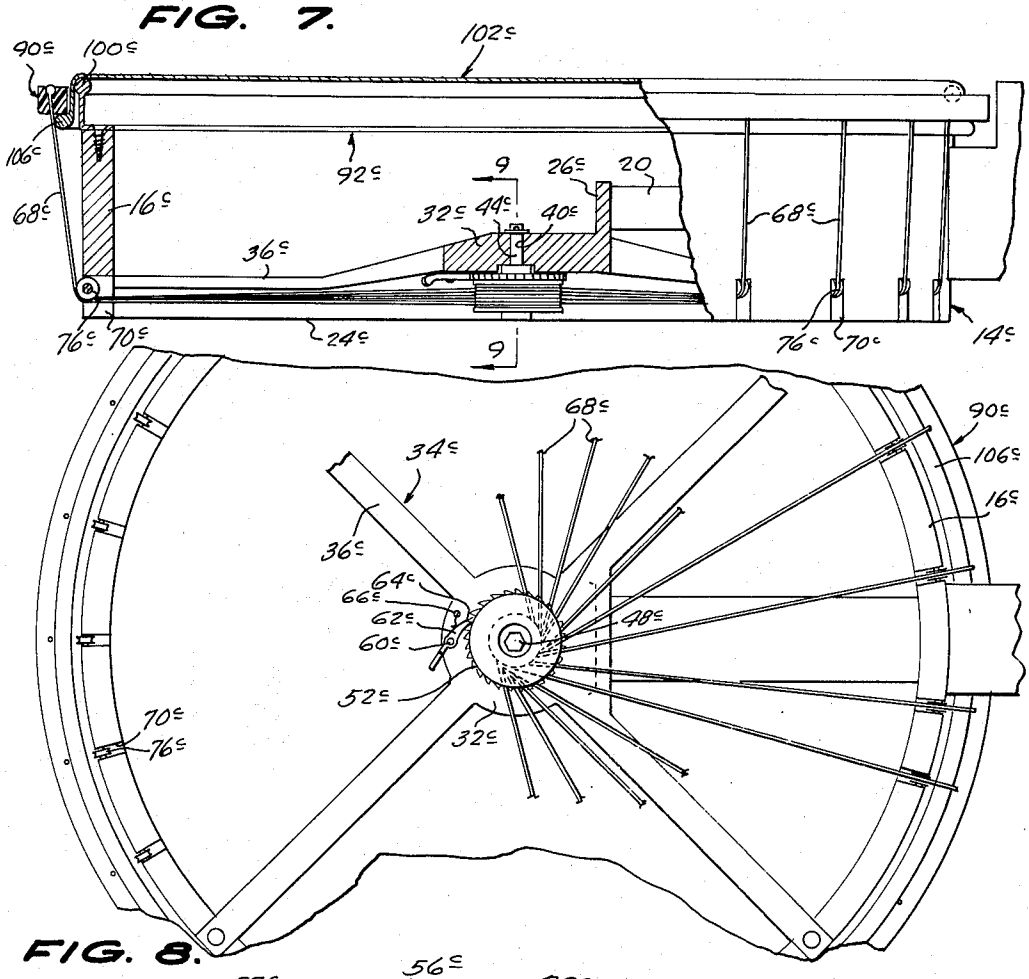


FIG. 8.

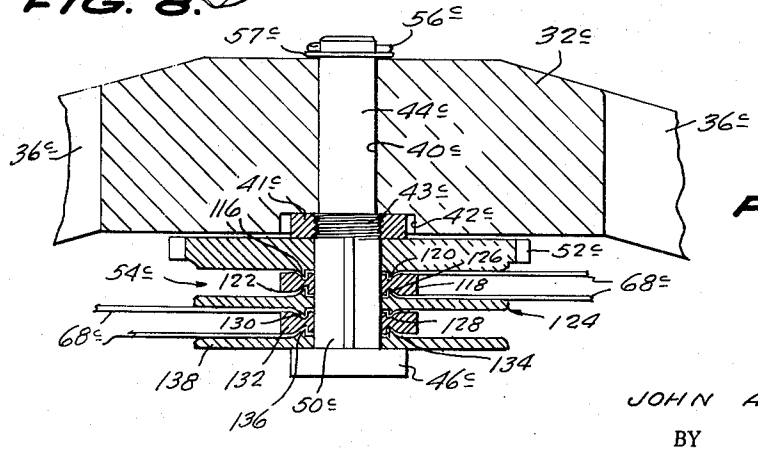


FIG. 9.

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3,215,019

MECHANICAL BANJO HEAD TIGHTENERS

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Filed July 12, 1963, Ser. No. 294,486
20 Claims. (Cl. 84—269)

This invention relates to novel mechanical banjo head tighteners, which are capable of being incorporated also in drums and the like.

The primary object of the invention is the provision of practical, efficient, easily installed, easily operated devices of the kind indicated, which in a single manual operation produces uniform tightening or loosening of the vellum of a banjo or other related musical instrument, which tightening and loosening operations correspondingly retunes the strings of the instrument and loosens the strings for storage of the instrument, respectively.

Another object of the invention is the provision of devices of the character indicated above, wherein replacement of vellums is a simple and quick operation involving only loosening and elevation of its pull-down ring for removal of a vellum, and replacing and tightening down of the pull-down ring on a new vellum.

A further object of the invention is the provision of devices of the character indicated above, wherein the pull-down ring is held down in place by means of cords of nylon or equivalent material of limited stretchability, which act to give the vellum enhanced elasticity and therefore wider amplitudes of vibrations, resulting in better response and tonal quality, and to protect the vellum against splitting due to variances in its tautness produced by changes in temperature and humidity.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, specific forms of the invention are set forth in detail.

In the drawings:

FIGURE 1 is a fragmentary bottom plan view of a banjo incorporating a device of the present invention;

FIGURE 2 is a vertical longitudinal section taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary horizontal section taken on the line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged exploded and fragmentary perspective view showing the means for securing a cord to the pull-down ring;

FIGURE 5 is a fragmentary side elevation, partly broken away and in section of another form of device of the present invention;

FIGURE 6 is a fragmentary bottom plan view of FIGURE 5;

FIGURE 7 is a view like FIGURE 5 of a further form of device of the invention;

FIGURE 8 is a fragmentary bottom plan view of FIGURE 7;

FIGURE 9 is an enlarged vertical transverse section taken on the line 9—9 of FIGURE 7;

FIGURE 10 is a perspective view of an assembly composed of a pull-down ring and integral cords; and

FIGURE 11 is a fragmentary perspective view of a drum head or vellum having integral cords.

Referring in detail to the drawings, and first to FIGURES 1 to 4 thereof, the device therein shown comprises an annular banjo casing **14** having a uniform thickness side wall **16**, to which is radially fixed a neck **18**, the neck having a longitudinal extension **20** extending through an opening **22**, in the side wall **16**, above the lower edge **24** thereof. The inner end of the extension **20** abuts the adjacent side of an upstanding lug **26** located at the adjacent side of a hub **28**, and is secured to the lug, as by means of screws **30**.

The hub **28** is preferably integral with and rises from the central part **32** of a spider **34** having three equally spaced radial legs **36**. The outer ends of the legs **36** are fixed, as by means of screws **38** to the casing sidewall **16**, at the lower edge thereof. It is to be noted that the invention contemplates making the sidewall **16** and the spider **34** of wood, or casting the same integral of lightweight metal, such as aluminum.

The hub **28** is formed with a perpendicular smooth bore **40**, which opens, at its lower end into a counterbore **42**. A rotary shaft **44** is engaged in the bore **40** and has an enlarged head **46** engaged in the counterbore **42**, the latter being formed with an axial polygon recess **48** adapted to receive a suitable implement for rotating the shaft **44**.

Above the hub **28**, the shaft **44** has a squared extension **50**, on which a ratchet wheel **52** is non-rotatably engaged. A flanged drum **54** is non-rotatably engaged on the extension **50** above and bears upon the ratchet wheel, and is held down in place, as by means of a cross pin **56** extending through the extension. The hub **28** has a horizontal lateral lug **58**, at its upper end, on which is pivoted, as indicated at **60**, a ratchet pawl **62**, having a pointed nose **64** which is engaged between teeth of the ratchet wheel by a spring **66**, secured to the lug **58** and bearing against the outer side of the pawl, whereby the drum **54** can be rotated only in a clockwise direction, as seen in FIGURE 3.

A multiplicity of cords **68**, in this instance in the form of flat tapes are secured to and wound around the drum **54**, and extend horizontally and outwardly therefrom, in equally spaced relationships. The cords **68** are preferably of nylon or other similarly suitable material of limited stretchability, not affected by changes in temperature and humidity, which characteristic enables the cords to compensate for changes in the tautness of a drum head or vellum, due to changes in temperature and humidity, which the cords serve to tension.

The cords **68** slide through equally circumferentially spaced, preferably plastic grommets **70**, secured in holes **72**, formed in the casing sidewall **16**, at a midheight point thereof. The grommets **70** have enlarged heads **74**, on their outer ends, which abut the outer surface of the sidewall. These heads, as shown in FIGURE 2, have rounded, enlarged diameter openings **76**, communicating with the bores **78** of grommets, which provide rounded friction-reducing surfaces contacted by the cords **68**.

The cords **68** have wedges **80**, on their outer or upper ends, which are adapted to be engaged downwardly in downwardly tapering openings **82** in a pull-down ring **90**, whereby the cords are operatively connected to this ring.

As shown in FIGURE 4, in another arrangement, on their outer ends, the cords **68***a* are formed with return bends **80***a* which serve as retaining wedges when downwardly engaged in vertical tubular and downwardly tapered receivers **82***a* on the inward sides and at the lower ends of vertically elongated flat shanks **84***a* which have inwardly and downwardly curved hooks **86***a*, on their upper ends. The hooks **86***a* are adapted to engage in an annular groove **88***a*, provided in the top of a pull-down ring **90***a*.

A laterally outwardly opening channel-shaped metal tone ring **92** has a vertical web **94**, a lower flange **96**, secured upon the upper edge of the casing sidewall **16**, and an upper flange **98**. The upper flange **98** has an upstanding cylindrical bead **100**, at its outer edge.

A head or vellum **102**, larger in diameter than the tone ring **92**, is stretched thereacross and has a pendant

peripheral portion **104**, having an outstanding cylindrical rib **106**, at its lower edge, on which the pull-down ring **92** bears. The vellum **102**, when made taut, bears only upon the bead **100**.

A bridge **108** rests upon the vellum **102**, and is overlaid by strings **110**, which are connected to a tail-piece **112**, having a hook **114**, on one end, which is engaged around and under the pull-down ring **90**.

With the above described arrangement, the vellum is adapted to be tightened by rotating the shaft **44**, by means of a suitable implement (not shown) until the desired degree of tautness of the vellum is obtained, by the resultant uniform effective shortening of the cords, and accompanying downward movement of the pull-down ring. This downward movement of the pull-down ring **90** is transmitted, through the hook **144** and the tail-piece **112**, so that the strings **110** are at the same time tightened to the same degree. This makes it possible to manually tune the strings **110**, while the vellum is in a normal tightened condition, and then relax the vellum, as for storage of the banjo, and at a later time retighten the vellum and simultaneously retune the strings, simply by rotating the shaft **44**. Relaxing of the tightness of the vellum and of the strings is done simply by reaching through the spider **34** and manually retracting the ratchet pawl **62** from the ratchet wheel **52**, and permitting the drum **54** to rotate in reverse direction.

The above described arrangement also makes removal and replacement of the vellum **102** quick and easy, by simply relaxing the cords **68**, lifting the pull-down ring **90** off the rib of the vellum, and removing the vellum from the tone ring **92**; and reversing these operations in installing a new vellum.

Another device of the present invention, shown in FIGURES 5 and 6, comprises an annular casing **14***b*, similar to that of FIGURES 1 to 3, but the remaining components are different. A tone ring **92***b* is of angle iron shape, having a horizontal flange **96***b* secured upon the upper edge of the casing sidewall **16***b*, and a vertical flange **94***b*, upon whose upper edge is fixed a cylindrical bead **100***b*, upon which a vellum **102***b*, similar to that of FIGURES 1 to 3, bears.

A pull-down ring **90***b*, similar to that shown in FIGURE 4, is used, in conjunction with cords **68***b* similar to those of FIGURE 4.

A spider **34***b* having four equally spaced radial legs **36***b* extends across the casing **14***b* and its legs are secured to the sidewall **16***b* at the lower edge thereof.

A perpendicular, centered hub **28***b* rises from the circular center **32***b* of the spider **34***b*, and is formed with an axial threaded bore **40***b*, in which is threaded a rotary shaft **44***b* having, in its lower end, a polygonal recess **48***b*, in which a suitable implement (not shown) is adapted to be engaged, for rotating the shaft **44***b*.

The threaded shaft **44***b* has a reduced diameter cylindrical axial boss **50***b*, on its upper end, on which is rotatably engaged a circular wheel **54***b*. The wheel **54***b* is formed, near its peripheral edge, with a plurality of equally circumferentially spaced holes **52***b*, corresponding in number to the number of cords **68***b* involved.

The center **32***b* of the spider **34***b* is formed with a ring of equally circumferentially spaced, circumferentially elongated slots **62***b*, the ring of slots **62***b* being vertically aligned with the ring of holes **52***b* of the wheel **54***b*.

The lower edge **24***b* of the casing sidewall **16***b* is formed with a plurality of equally circumferentially spaced notches **70***b*, corresponidng in number to the number of cords **68***b* involved, through which the cords are slidably engaged and from which the cords extend inwardly and horizontally to the spider center piece **32***b*. The outer ends of the bottoms of the notches **70***b* are rounded, as inidcated at **76***b*, to reduce frictional engagements of the cords.

The cords **68***b* pass upwardly through related ones of the spider slots **62***b*, and upwardly through related ones of the wheel holes **52***b*, and have enlargements **80***b*, on their upper ends, which bear securably upon the upper surfaces of the wheel **54***b*.

Tightening of the vellum **102***b* is accomplished by rotating the threaded shaft **44***b* in a direction to move the shaft upwardly. Rotation of the shaft **44***b*, in a direction to elevate the same, produces effective shortening of the cords **68***b*, accompanied by downward movement of the pull-down ring **90***b*, relative to the bead **100***b* of the tone ring **92***b*, which serves to tighten the vellum on the last.

To loosen the vellum **102***b* from a taut condition, the shaft **44***b* is rotated in a direction to move the same, and hence the wheel **54***b* downwardly.

The vellum **102***b* is easily and quickly removed and replaced, simply by relaxing the cords **68***b*, in the manner described, lifting the pull-down ring **90** off the rib **106***b* of the vellum, and lifting off the vellum, the reverse of these operations being performed to install another vellum.

A further form of device of the present invention is shown in FIGURES 7 to 9, and comprises an annular casing **14***c*, generally similar to those hereinabove described, whose sidewall **16***c* is surmounted by a tone ring **92***c*, similar to that of FIGURES 5 and 6, and has a pull-down ring **90***c*, similar to that shown in FIGURES 1 to 3, and connections of cords **68***c* thereto, like those of FIGURES 1 to 3.

The cords **68***c* pass downwardly from the pull-down ring **90** and are trained under pulleys **76***c*, located in notches **70***c*, formed in the lower edge **24***c* of the casing sidewall **16***c*.

A spider **34***c* having four radial legs **36***c* is secured to the sidewall **16***c*, at the lower edge thereof, and has an upwardly offset center piece **32***c*.

The extension **20** of the neck **18***c* of the banjo abuts a standard **26***c* on the adjacent side of the center piece **32***c*.

The center piece **32***c*, as shown in FIGURE 9, is formed with a central vertical bore **40***c*, in which a rotary shaft **44***c* is engaged, and is held up in place, as by means of a cross piece **56***c*, which bears upon a washer **57***c* engaged with the upper surface of the center piece. A counterbore **42***c* is formed at the lower end of the bore **40***c*, which receives a lock nut **41***c*, threaded, as indicated at **43***c*, on the shaft **44***c*.

The shaft **44***c* has an enlarged diameter downwardly extending extension **50***c*, having an enlarged diameter head **46***c*, on its lower end. Keyed on the extension **50***c*, between the lock nut **41***c* and the head **46***c*, is a drum assembly **54***c*, and above the assembly **54***c*, an enlarged diameter ratchet wheel **52***c*. A ratchet pawl **62***c*, is pivoted, as indicated at **60***c*, on the underside of the spider center piece **32***c* and has a pointed nose **64***c* engaged between adjacent teeth of the ratchet wheel, by means of a spring **66***c*, whereby retrograde rotation of the ratchet wheel is normally precluded.

The ratchet wheel **52***c* has, on its underside, a V-shaped ring **116**, smaller in diameter than an upper small diameter clamping disc **118**, which engages in a conformably shaped V-shaped groove **120**, in the upper side of the disc **118**. The disc **118** has a similar groove **122**, in its underside.

An upper larger diameter disc **124** underlies the small upper disc **118** and is formed with an upstanding V-shaped ring **126** which conformably engages in the groove **122** of the disc **118**. The disc **124** has a similar ring **128** on its underside, which conformably engages in a V-shaped groove **130** in the upper side of a lower small clamping disc **132**, which is similar in size to the upper small disc **118**.

The lower small disc **132** has a similar groove **134**, on its underside, which conformably receives a V-shaped

ring **136** on the upper side of a lower larger diameter disc **138**.

The inner ends of the cords **68***c* are inserted between engaged rings and grooves of the clamping discs, from top to bottom, and at points equally circumferentially spaced around the assembly **54***c*, as shown in FIGURES 7 to 9, with the cords chordally arranged relative to this assembly, as shown in FIGURE 8, with the lock nut **41***c* backed off, and the lock nut then tightened.

The shaft extension **50***c* has a polygonal recess **48***c*, in its lower end adapted to receive a suitable implement (not shown) for rotating the shaft **44***c*, and hence the drum assembly **54***c*, in a clockwise direction, as seen in FIGURE 8, whereby the cords **68***c* are wound around the drum assembly and thereby effectively shortened, and caused to pull the pull-down ring **90***c* downwardly and tighten the vellum **102***c*, on the tone ring bead **100***c*. The same ease and speed of replacement of the vellum **102***c*, described hereinabove, obtains with the device of FIGURES 7 to 9.

In FIGURE 10 is shown an assembly **140** of pull-down ring **90***d* and integral cords **68***d* fixed to the underside thereof. This assembly is devised for optional replacement of the related assembly disclosed in FIGURES 1 to 9.

In FIGURE 11 is shown an assembly **142** of a vellum **102***e* and cords **68***e*, attached to the lower edge of a pendant peripheral flange **142**. This assembly is also devised to replace the related components disclosed in FIGURES 1 to 9.

Although there have been shown and described preferred forms of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords.

2. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said connecting means comprising an outstanding rib on the peripheral portion of the vellum, a pull-down ring surrounding said peripheral portion and bearing upon said rib, the cords being directly connected to the pull-down ring.

3. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said connecting means comprising an outstanding rib on the peripheral portion of the vellum, a pull-down ring surrounding said peripheral portion and bearing upon said rib, the cords being directly connected to the pull-down ring, said cords being integrally connected to the lower end of the pull-down ring.

4. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cords being integrally connected to the lower edge of the peripheral portion of the vellum.

5. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cords being of material resistant to changes in temperature and humidity and of limited stretchability, and serving to compensate for changes in the tautness of the vellum produced therein by changes in temperature and humidity.

6. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cords being of material resistant to changes in temperature and humidity and of limited stretchability, and serving to compensate for changes in the tautness of the vellum produced therein by changes in temperature and humidity, the material of the cords being nylon.

7. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cords being of material re-

sistant to changes in temperature and humidity and of limited stretchability, and serving to compensate for changes in the tautness of the vellum produced therein by changes in temperature and humidity, the material of the cords being nylon, the cords being flat tapes.

8. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cords being of material resistant to changes in temperature and humidity and of limited stretchability, and serving to compensate for changes in the tautness of the vellum produced therein by changes in temperature and humidity, the material of the cords being nylon, the cords being round.

9. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a member rotatably mounted on the center piece of the spider, an element to which said other ends of the cords are connected, and means operatively connecting the member and the element and adapted to move the element in a direction relative to the center piece.

10. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a member rotatably mounted on the center piece of the spider, an element to which said other ends of the cords are connected, and means operatively connecting the member and the element and adapted to move the element in a direction relative to the center piece, and ratchet means mounted on the center piece for preventing retrograde rotation of said member.

11. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction.

12. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said extension being on the upper end of the shaft, the cords being secured to and wound around the drum means, said drum means being a flanged drum.

13. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said extension being on the upper end of the shaft, the cords being secured to and wound around the drum means, said drum means being a flanged drum, and grommets extending through the casing sidewall through which the cords run.

14. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said shaft being threadably journaled through the spider center piece, said extension extending upwardly from the shaft and being

smaller in diameter than the shaft, said drum means comprising a wheel supportably journaled on the extension, said wheel having a ring of holes around its peripheral edge, said center piece having a ring of circumferentially elongated slots concentric with the ring of holes, the cords being individually passed upwardly through the slots and secured in the holes.

15. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said shaft being threadably journaled through the spider center piece, said extension extending upwardly from the shaft and being smaller in diameter than the shaft, said drum means comprising a wheel supportably journaled on the extension, said wheel having a ring of holes around its peripheral edge, said center piece having a ring of circumferentially elongated slots concentric with the ring of holes, the cords being individually passed upwardly through the slots and secured in the holes, said sidewall having circumferentially spaced slots in its lower edge through which the cords are slidably engaged.

16. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said drum means non-rotatably mounted on the shaft extension, said extension having an enlarged head on its outer end and having a lock nut threaded thereon, said drum means comprising a plurality of superimposed discs on the extension between the head and the lock nut, adjacent discs having facing sides severally provided with interengaged outstanding rings and grooves, ends of the cords being inserted between adjacent discs and securably deformed by interengaged rings annd grooves.

17. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said drum means non-rotatably mounted on the shaft extension, said extension having an enlarged head on its outer end and having a lock nut threaded thereon, said drum means comprising a plurality of superimposed discs on the extension between the head and the lock nut, adjacent discs having facing sides severally provided with interengaged outstanding rings and grooves, ends of the cords being inserted between adjacent discs and securably deformed by interengaged rings and grooves at points equally circumferentially spaced around the discs.

18. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and the cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said cord shortening means comprising a vertical shaft journaled through the center piece and having an axial extension on one end thereof, ratchet means mounted on the center piece and operatively connected to the shaft for preventing rotation of the shaft in one direction, drum means mounted on said extension to which the cords are connected, and means for rotating the shaft in the opposite direction, said drum means non-rotatably mounted on the shaft extension, said extension having an enlarged head on its outer end and having a lock nut threaded thereon, said drum means comprising a plurality of superimposed discs on the extension between the head and the lock nut, adjacent discs having facing sides severally provided with interengaged outstanding rings and grooves, ends of the cords being inserted between adjacent discs and securably deformed by interengaged rings and grooves at points equally circumferentially spaced around the discs, the sidewall of the casing having equally circumferentially spaced notches in its lower edge, and pulleys mounted in the notches under which the cords are individually trained.

19. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece, a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted on the center piece of the spider and operatively connected to the other ends of the cords, said pull-down ring having circumferentially spaced vertical tapered holes therein, the cords having tapered elements on their ends engaged downwardly in said holes.

20. In a musical instrument, an annular casing comprising a sidewall having upper and lower edges, a spider extending across the casing and secured to the sidewall below its upper edge, said spider having a center piece,

a tone ring secured to the sidewall at the upper edge of the sidewall, said tone ring having an upstanding annular bead, a vellum larger in diameter than said bead and stretched thereacross, said vellum having a pendant peripheral portion, equally circumferentially spaced cords, means connecting the cords at one end to said peripheral portion, and cord shortening means mounted

on the center piece of the spider and operatively connected to the other ends of the cords, said pull-down ring being formed with an annular groove in its top, and said cords having hooks engaged in said groove.

No references cited.

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