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APPARATUS FOR RESHRINKING METAL BELL AND FRAME RINGS TO FIT THE BELLS AND TUBES OF WIND INSTRUMENTS SUCH AS CLARINETS

Filed June 11, 1958

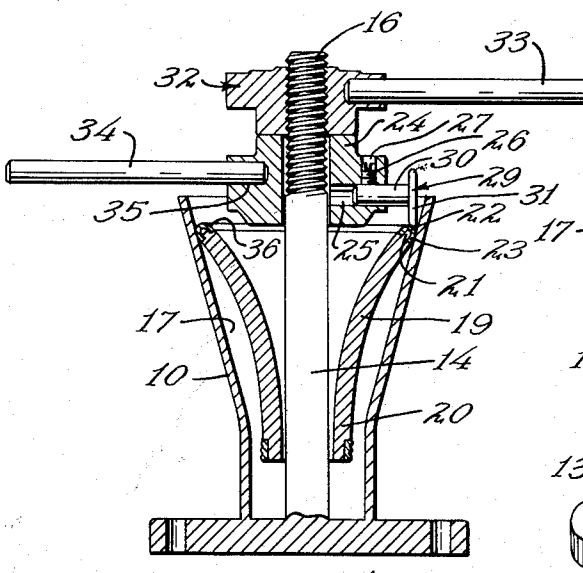


FIG. 1

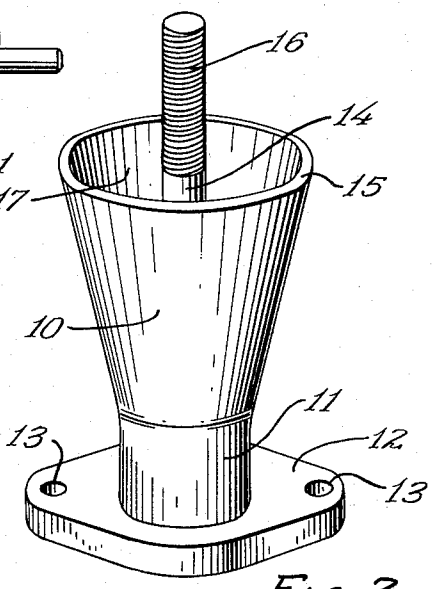


FIG. 2

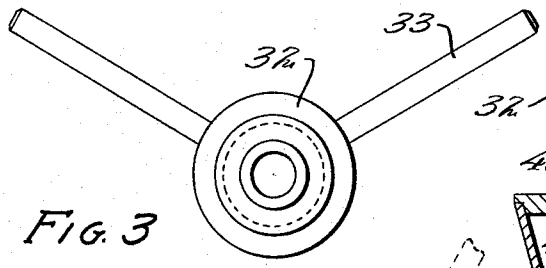


FIG. 3

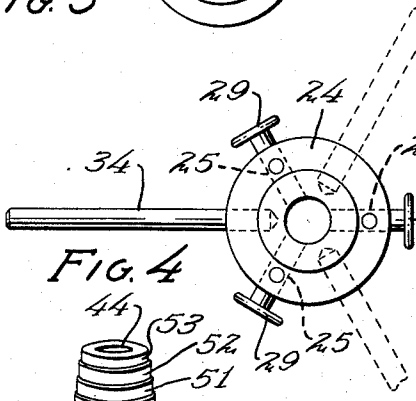


FIG. 4

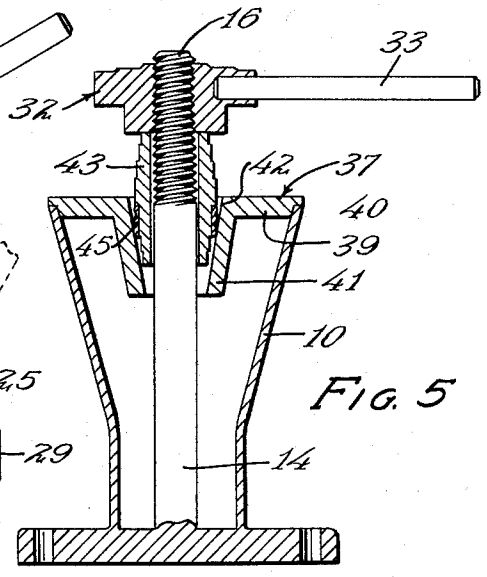


FIG. 5

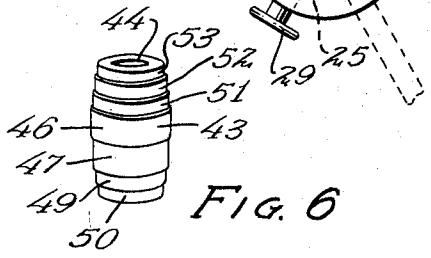


FIG. 6

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# APPARATUS FOR RESHRINKING METAL BELL AND FRAME RINGS TO FIT THE BELLS AND TUBES OF WIND INSTRUMENTS SUCH AS CLARINETS

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5 Claims. (Cl. 153—48)

This application is a continuation-in-part of the applicant's previous application, Serial No. 511,470, filed May 19, 1955, now abandoned, for Metal Ring Shrinker for Musical Instruments.

This invention relates to an improvement in an apparatus for reshrinking metal bell and frame rings to fit the bells and tubes of wind instruments such as clarinets.

Clarinets are normally constructed with tubular wooden bodies which terminate at the outlet end in an outwardly flared wooden bell. In the use of the clarinet, the wood has a tendency to shrink. The tubular body portions and the wooden bell are normally reinforced by metal reinforcing rings which tightly encircle the portions to which they are attached at the time the clarinets are produced. Upon shrinkage of the wood portions of the instruments, these reinforcing rings become loosened and often become entirely detached from the wood. When detached, the rings not only fail to serve their intended purpose but also greatly detract from the appearance of the instrument. Continued use of the instrument with the reinforcing rings loose or disconnected creates a great likelihood of splitting the woden bodies, requiring expensive repairs or replacements.

An object of the present invention resides in the provision of a simple and effective apparatus for shrinking the various metal rings so that they will again fit the instrument. The device is so constructed that the rings encircling the mouth of the bell may be rolled to smaller dimensions while encircling a projecting rib at the end of the wooden bell and to thereby tighten the ring upon the bell. Means are also provided in the same apparatus for shrinking the diameter of the generally cylindrical rings which are normally used to encircle the small diameter end of the bell as well as other portions of the tubular wooden body forming the clarinet.

A feature of the present invention resides in the provision of an apparatus including a hollow conical or funnel shaped body into which the bell of a clarinet may be inserted, the tapered wall of the body accommodating bells of various diameters. Clarinet bells are not uniform in size or exact shaped and the mouth of the bell of one clarinet may be larger or smaller than the mouth of another clarinet. By providing a hollow tapered receptacle into which the bell may be inserted, the bells of various diameters may all be properly accommodated, the clarinet bells of smaller diameter merely extending farther into the receptacle than bells of larger diameter.

A further feature of the present invention resides in the provision of a rotary member pivotally supported for rotation about the axis of the cone shaped hollow receptacle and supporting a plurality of rollers in angularly spaced relation on substantially radially extending axes. These rollers are arranged on a common plane normal to the axis of rotation and are adjustably supported for adjustment in a radial direction. The rollers are designed to engage against the bell rings and to roll the bell rings into tighter contact with the projecting rim on the wooden bell upon which such rings are mounted.

Clarinet bells are usually provided at their large diameter end with a projecting rib projecting from the end of the bell and designed to accomodate a ring of substantially U-shaped cross section. When the wood shrinks, the U-shaped ring becomes loosened and may slip from the end of the bell. In order to correct the situation, the reinforcing ring is inserted upon the projecting rib, and the bell inserted in the hollow conical receptacle so that the outer surface of the ring engages the inner surface of the receptacle. The rotatable member having the rollers supported on radial axes is rotated over the surface of the ring acting to contract the ring and to tighten it upon the projecting rib.

A feature of the present invention resides in the fact that the rollers or wheels which are engageable with the ring at the mouth of the bell are radially adjustable so as to be useful in conjunction with rings of various diameters. By adjusting the position of these wheels or rollers, pressure may also be applied at various points of the periphery of the U-shaped ring so as to tighten the ring upon the projection at the mouth of the bell.

A further feature of the present invention resides in the provision of a means for adjusting the pressure with which the rollers engage the bell ring. If desired, the pressure may be gradually increased as the rollers are pressed against the ring so as to gradually change the shape thereof.

A further feature of the present invention resides in the fact that the same apparatus may also be used to shrink the size of rings used upon the small diameter end of the bell and which may also be used on other portions of the tubular body. As the wood shrinks, these rings become loosened and lose their reinforcing effect. An attachment is provided which is mounted upon the hollow tapered body and presents a hollow cone shaped body of smaller diameter. A mandrel is provided having stepped surfaces of varying diameter onto which the ring may be inserted. The ring fits loosely about the surface of the mandrel and as the mandrel and ring are forced down into the cone, the side of the ring is decreased until the ring fits tightly about the mandrel. This changes the diameter of the ring sufficiently so that once again it will frictionally engage the small diameter end of the bell or the other tubular part for which it is intended. The same means is employed for urging the mandrel into the cone as is used for applying pressure to the rollers for rolling the bell ring about the mouth of the bell.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

FIGURE 1 is a sectional view through the apparatus showing the manner in which the device is employed for tightening the bell ring about the mouth of the bell.

FIGURE 2 is a perspective view of the body of the device showing the general construction thereof.

FIGURE 3 is a top plan view of the pressure applying nut.

FIGURE 4 is a top plan view of the ring rolling device.

FIGURE 5 is a vertical sectional view through the apparatus when used to shrink smaller diameter rings.

FIGURE 6 is a perspective view of a mandrel which may be employed in combination with the smaller diameter rings.

The body of the apparatus includes a hollow conical receptacle **10** having a generally cylindrical base **11** which is integral with or secured to a base plate **12**. The base plate **12** is provided with spaced apertures **13** extending therethrough through which fastening screws or bolts may be inserted to attach the device to a work bench or the like. A shank **14** is also integral with or attached to the base plate **12** coaxially with the vertical axis of the hollow receptacle **10** and this shank **14** ex-

tends above the upper edge 15 of the receptacle 10 and is externally threaded as indicated at 16.

The receptacle 10 is provided with a conical inner surface 17 against which the large diameter end of the wooden clarinet bell 19 may seat. The bell 19 is inserted into the receptacle 10 with the small diameter end 20 of the bell encircling the shank 14. The bell 19 is provided with a generally circular projecting lip 21 which is of reduced thickness as compared to the thickness of the wood forming the bell. The reinforcing bell ring 22 is generally U-shaped in cross section and is designed to engage over the projecting lip 21. Obviously, when the wood shrinks, the ring is loosely engaged and if the shrinkage is sufficient, the ring will slip completely out of place.

As is indicated in FIGURE 1 of the drawings, the outer side 23 of the ring 22 bears against the tapered wall 17 of the receptacle 10 and downward pressure upon the ring has a tendency to bend the outer surface 23 of the ring against the outer side of the projecting lip 21. In order to provide this downward pressure, a collar 24 is provided which freely encircles the shank 14 and is provided with a series of radially extending openings 25 in angularly spaced relation about the periphery of the collar. Set screws 26 are provided in internally threaded apertures 27 intersecting the radial apertures 25, the apertures 27 usually extending parallel to the axis of the collar. The set screws 26 may be tightened or loosened to permit adjustment of the pressure applying rollers 29 which will now be described.

The rollers 29 include cylindrical shanks 30 which are of proper size to snugly fit into the radial apertures 25. The shanks 30 are provided at one end with coaxial circular discs 31 preferably having rounded peripheral surfaces. Strictly speaking, the members 29 do not roll as when they are adjusted and held in adjusted relation by the set screws 26 they are held from rotation. However, due to the circular shape of the discs 31 they serve in the capacity of rollers and merely slide over the surface of the ring 22 which they engage.

A pressure nut 32 is threaded upon the threaded end 16 of the shank 14 and includes one or more radially extending handles 33 by means of which the nut 32 may be tightened. The collar 24 is also provided with one or more operating handles 34 which fit into a selected radially extending socket 35 in the periphery of the collar 24 intermediate the apertures 25 which accommodate the roller shanks 30.

In order to shrink the ring 22 upon the projecting lip 21, the rollers 29 are adjusted to a desired radius to engage the U-shaped ring 22. The rollers 29 are urged against a desired portion of the ring 22 by the pressure nut 32 and the collar 24 is rotated by means of the handle 34 in order to slide the rollers 29 about the periphery of the ring. Downward pressure against the top of the ring tends to bend the outer side 23 of the ring against the outer surface of the lip 21. If desired, the rollers 29 may be adjusted to a smaller diameter to engage the inner side 36 of the ring 22, applying a downward pressure against the inner surface of the ring which is resolved into an outward force tending to urge the opposite sides of the ring 22 together. By properly locating the rollers 29, the outer side of the ring may be compressed inwardly by the tapered surface 17 of the receptacle 10 and if desired, the inner side 36 of the ring may be urged downwardly and outwardly by these same rollers 29 when arranged at a smaller radius.

As indicated in FIGURE 5 of the drawings, an adaptor 37 is provided for compressing rings of smaller diameter such as are used on the small diameter ends of the bells and as may be used on other tubular wooden portions of the clarinet body. The adaptor 37 includes a top disc 39 having a peripheral groove 40 in its undersurface designed to accommodate the upper end 15 of the receptacle 10. The groove 40 holds the disc 39 axially aligned with the receptacle 10. A tapered sleeve 41 extends downwardly from the disc 39 providing a frusto-conical or tapered inner surface 42 extending through the sleeve 41 and disc 39.

A mandrel 43 is provided with a central axial aperture 44 extending therethrough through which the shank 14 may extend. The ring 45 which is to be shrunk is inserted upon the mandrel 43. As will be noted in FIGURE 6 of the drawings, the outer surface of the mandrel 43 includes a relatively larger diameter center portion 46, a slightly smaller diameter portion 47 on one side of the center portion 46, and additional portions 49 and 50 of successively decreasing diameter adjoining the portion 47. On the opposite side of the center part 46 are also provided portions 51, 52 and 53 which are of successively smaller diameter. In preferred form, the diameter of the areas on one side of the center part 46 are not the same as the diameter of the similar portions on the opposite side of the center part 46. In other words, the portion 47 may be of a diameter smaller than the diameter of the center portion 46 but larger than the cylindrical portion 45 on the opposite side of center. Similarly, the diameter of the portion 49 may be smaller than the diameter of the portion 51 but greater than the diameter of the portion 52. The juncture between each of the stepped portions and the next adjoining portion forms a shoulder against which an edge of the ring 45 may abut. Accordingly, when the diameter of the ring 45 has been shrunk to snugly fit about one portion such as 47 of a mandrel, and if the ring is still not sufficiently small in diameter, the ring may be removed from the mandrel, and inserted upon the step which is next smaller in diameter on the opposite side of the mandrel. This arrangement is of advantage as the ring 45 could not be shrunk upon a portion of smaller diameter on the same end of the mandrel due to the fact that no shoulder would be provided in such a case for urging the ring downwardly.

Downward pressure upon the ring is provided by the pressure nut 32 on the threaded end 16 of the central shank 14. As the ring is urged downwardly onto the conical inner surface 42 of the sleeve 41, the periphery of the ring is urged inwardly so as to reduce the diameter thereof. If the ring is of substantial width as in the illustration shown in FIGURE 5, one side edge of the ring may be first compressed in diameter and the position of the ring may be inverted by removing the mandrel and inverting the ring so that the opposite edge of the ring may also be reduced in diameter.

It will be seen that a simple and effective means of shrinking the rings used upon clarinet bells is provided. The body of the receptacle may serve as a support for the reinforcing ring used to encircle the bell of the clarinet while the shrinking pressure is applied through the rollers 29. In this case, the ring is shrunk directly upon the projecting lip 21 of the clarinet bell as the outer bell rings are usually U-shaped in cross section as has been described. The same apparatus may be used to shrink the size of smaller rings which reinforce other portions of the bell or clarinet body. In such cases, the rings are first shrunk, and then frictionally applied to the clarinet body.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in an apparatus for reshrinking metal bell and frame rings to fit the bells and tubes of wind instruments such as clarinets, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A clarinet bell ring shrinking device for use with a clarinet bell having a peripheral projecting lip and a ring generally U-shaped in cross section and bracing the

projecting lip, the device including a receptacle having a substantially conical inner surface into which the clarinet bell may be inserted, a shank supported in coaxial relation to the inner surface of said receptacle, a collar rotatably supported upon said shank, angularly spaced means on said collar extending sufficiently therefrom in a radial direction to be engageable with the surface of said ring to urge the ring in an axial direction against said inner surface, and means on said shank for urging said collar toward the small diameter end of said surface.

2. The construction described in claim 1 and in which said angularly spaced means are radially adjustably supported by said collar.

3. The construction described in claim 1 and in which said angularly spaced means include radially slidable shanks having circular discs at their outer ends, the shanks being adjustably supported by said collar and said circular discs being engageable with said ring.

4. A clarinet bell shrinking device for use with a clarinet bell having a peripheral projecting lip at the large diameter end of the bell and a ring of substantially U-shaped cross section embracing said lip, the apparatus including a base, a receptacle supported by said base and having a substantially frusto conical inner surface, a shank projecting upwardly from said base coaxial with said frusto conical surface, said receptacle being of proper dimensions to accommodate the clarinet bell with the outer side of said ring engageable against the frusto conical surface, and means for applying axial pressure against said ring including a collar encircling said shank, angularly spaced means supported by said collar for movement in a radial direction, said angularly spaced means being of



sufficient radial length so as to be engageable with said ring, and means for urging said collar in an axial direction toward the small diameter end of said frusto conical surface to provide axial pressure against said ring tending to urge the outer surface of the ring against said projecting lip.

5. A clarinet bell ring shrinking apparatus including a hollow internally tapered receptacle into which the bell may be inserted, the tapered inner surface of the receptacle being engageable against the outer surface of a reinforcing ring of generally U-shaped cross section, and means rotatable about the axis of the bell and engageable against the reinforcing ring to urge the ring in an axial direction toward the smaller diameter end of the tapered surface, said means engageable against the ring including a collar, means rotatably supporting said collar for rotation about the axis of the ring, and angularly spaced means on said collar extending radially outwardly for engaging the ring.

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