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WINDING DEVICE FOR HEAT CURING COILED CORDS

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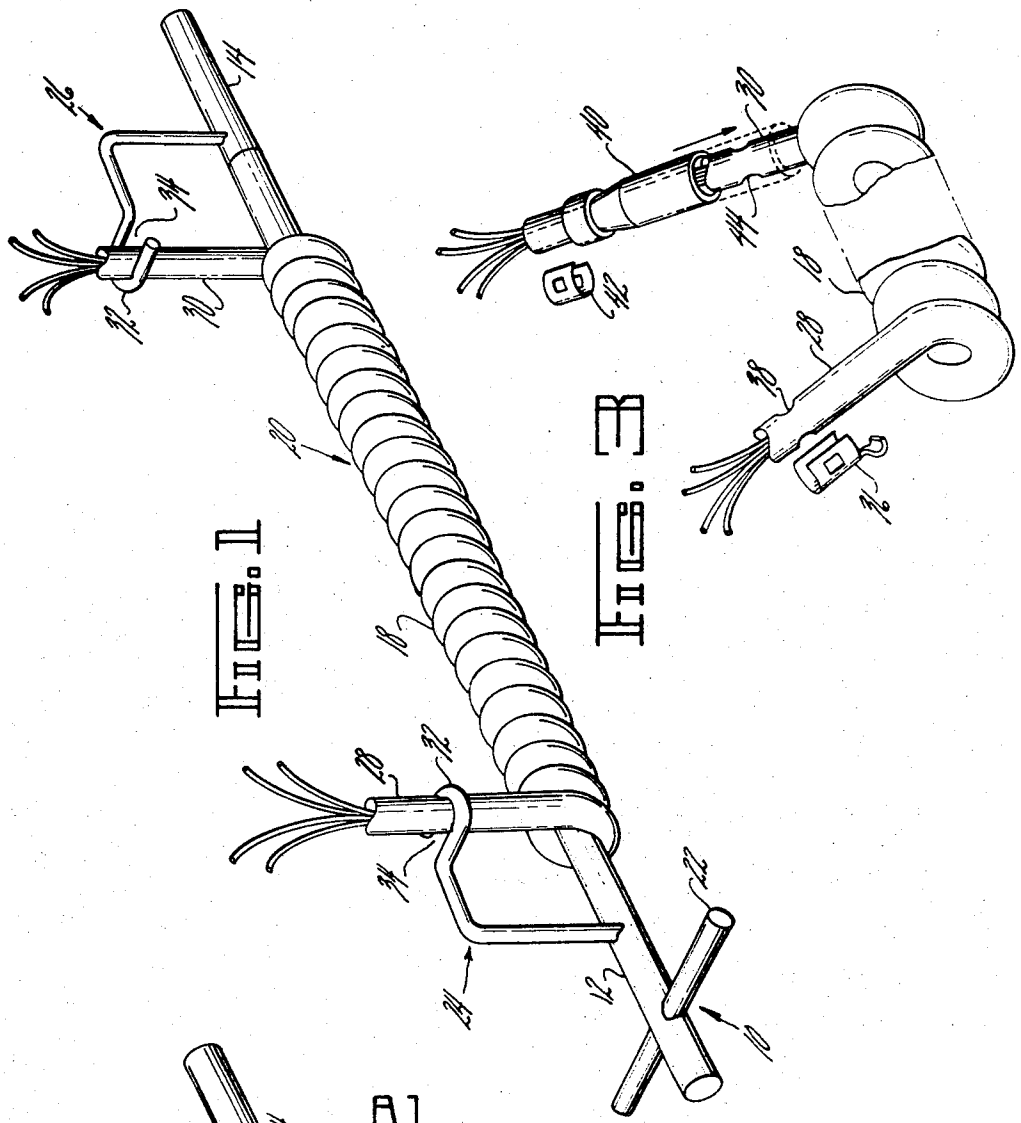


FIG. 1

FIG. 3

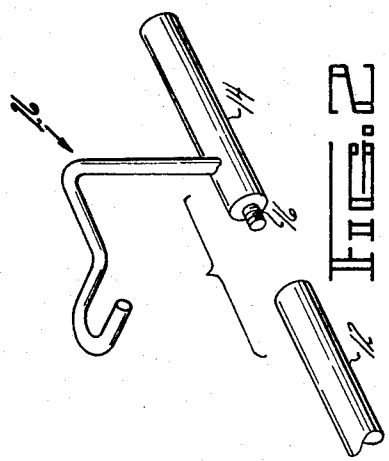


FIG. 2

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WINDING DEVICE FOR HEAT CURING COILED CORDS

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ABSTRACT OF THE DISCLOSURE

Winding device for heat curing expandable and retractable coiled cords comprising a winding arbor and axially spaced first and second bent wire holders having U-shaped cord engaging and securing portions spaced generally radially outwardly from the arbor to limit cord deformation and to locate cord deformation judiciously for subsequent concealment.

Background of invention

Telephone instruments, electric toasters, electric irons, etc. employ coiled cords of the type referred to and which include helical central or body portions of substantial axial length and integrally formed substantially straight terminal portions. The cords may serve as electric conductors, or the conductor may be omitted and cords of smaller dimension can be utilized as substitutes for key chains, etc. The outer or sheath portions of the cords may be formed of rubber, resilient synthetic resins as well as other materials and they exhibit the characteristics of surface deformability.

In the manufacture of coiled cords of the type mentioned, it has been a conventional practice to coil the cords upon a winding arbor having heads at opposite ends for securing terminal portions of the cords and thereby preventing unwinding of the cord from the arbor during subsequent heat curing operations. U.S. Patent No. 2,586,763 issued to C. H. Judisch entitled "Means for forming Extensible and Retractable Cords" discloses such an arbor with heads engageable with terminal portions of the cord immediately adjacent the end of the central or body portion thereof and throughout a limited dimension extending radially outwardly from the body portion and along the terminal portion of the cord.

In the heat curing operation, wherein cord carrying arbors are deposited in a furnace for curing and setting of the cords in helical form, it has been found substantially impossible under practical working conditions to eliminate all surface deformation of the cords in those areas on the terminal portions thereof engaged by the heads. That is, slight deformation or mutilation of the cords occurs on the terminal portions thereof adjacent the ends of the helical central or body portion and extends outwardly along the terminal portion throughout the area of engagement between the head and the terminal portion of the cord. Such deformation is acceptable on certain cords but on other cords subject to more rigorous quality control, even slight deformation renders the cords unacceptable.

Summary of the invention

It is the general object of the present invention to provide a winding device for coiling cords wherein deformation of terminal portions of the cords is minimized and is judiciously located for subsequent concealment by means of clips and/or other elements ordinarily applied to the cord terminal portions.

In fulfillment of this aim, an elongated winding arbor is provided of axial length greater than the helical body portion of a completed cord and of a diameter approximately equal to the desired internal diameter of such portion of the cord. Similar first and second holders respectively for opposite terminal portions of the cord are provided and the holders are secured to and supported by the arbor with at least one holder removable from the arbor and with the two holders in axially spaced relationship along the arbor corresponding approximately to the desired length of the helical or body portion of a completed cord. Each holder for a terminal portion of the cord has a cord securing portion which is spaced radially from the arbor a substantial distance and which is engageable with an associated terminal portion of a cord wound on the arbor only at such radially spaced location. Further, the cord securing portions of the holders serve to secure the cord terminal portions against unwinding movement in opposite directions and each such securing portion has a dimension which extends axially along the cord terminal portion for a limited distance no greater than three cord diameters whereby to minimize cord mutilation thereby during heat curing. In the preferred embodiment of the invention described hereinbelow, the axial extent of the cord securing portions of the holders is substantially less than three cord diameters and in fact somewhat less than one cord diameter.

Brief description of the drawing

FIG. 1 of the drawing is a perspective view illustrating a cord winding device comprising an arbor and axially spaced holders with a coiled cord wound helically about the arbor with opposite terminal portions thereof retained by the holders.

FIG. 2 is a fragmentary perspective view showing a portion of the arbor and a holder associated therewith, the said arbor portion being constructed in two sections which are detachable for removal of the holder from the remaining section of the arbor and the opposite holder.

FIG. 3 is a fragmentary perspective view showing a completed coiled cord, clips and a grommet associated with terminal portions of the cord.

Description of the preferred embodiment

Referring particularly to FIG. 1 a rotatable arbor is shown at **10** and comprises a first section **12** and a detachable second or end section **14**. Various means for detachment of the section **14** are contemplated within the scope of the invention, but it is the presently preferred form to provide a diametrically reduced and threaded portion **16** as shown in FIG. 2 and a complementary threaded bore in the contiguous portion of the arbor section **12**.

The arbor **10** is formed of a suitable metal for use in a heat curing operation and has an axial dimension in excess of the axial dimension of the helical central or body portion **18** of a cord **20** wound thereon. The external diameter of the arbor **10** is substantially equal to the desired internal diameter of the helical body portion **18** of the cord **20**. A small cross bar **22** may be provided adjacent the free end of the arbor section **12** for mounting in a chuck or the like and for effecting rotation of the arbor to wind a cord thereabout.

Similar first and second holders **24**, **26** secure substantially straight cord terminal portions **28**, **30** against unwinding movement in opposite directions and each holder includes a cord securing portion **32**. The cord securing portions of the holders are spaced radially from the arbor a substantial distance and are engageable with their associated terminal portions **28**, **30** to secure the same as stated and to thereby retain a coiled cord upon the arbor **10**. Each cord securing portion **32** is engageable with its associated cord terminal portion for a limited distance measured axially along the cord terminal portion to minimize the area of cord deformation during curing.

The cord securing portions **32** in no event engage the cord terminal portions along an axially extending area more than three cord diameters in length, and as shown, the area of engagement between the cord securing portions and the cord terminal portions is substantially less than one cord diameter as aforesaid.

While the cord holders may vary widely in form, they are preferably of bent wire construction as shown with inner portions respectively secured in and supported by the arbor sections **12** and **14**. Intermediate their end portions the holders are bent to extend generally axially inwardly with respect to the arbor **10** whereby to provide clearance for the winding of an end coil of a cord body portion **18** generally radially inwardly of the outer and cord securing portions **32, 32** of the holders. The said cord securing portions **32, 32** each take a generally U-shape configuration with openings **34, 34** for receiving cord terminal portions and for frictional gripping of the same.

Preferably, and as shown, each U-shaped member forming the cord securing portion **32** has an internal lateral dimension between its legs slightly smaller than the external diameter of the associated cord terminal portion. Thus, a slight surface deformation of the cord terminal portion occurs when the cord is urged under slight entry pressure into the opening **34** and the cord terminal portion is thereby positively secured against accidental or unintended displacement. While it is true that removal of one holder is contemplated by the invention, it is to be understood that removal of such holder in assembly with an arbor section is not essential to the practice of the invention. Thus, a one-piece arbor and a holder removable independently from the arbor falls within the scope of the present invention.

It will be apparent from the foregoing that a cord cured on the winding device of the present invention will have terminal portions deformed over a carefully limited axially extending area at a location spaced a substantial distance radially from the helical body portion **18** of the coil. In the manufacture of coiled cords it is a conventional practice to provide clips and other elements at such location on the terminal portions of coiled cords. Thus, it is possible to assemble the clips so as to conceal the deformed areas on the terminal portions of the cords and a completely uniform and unmarked cord terminal portion results.

In FIG. 3 a small clip **36** is shown in an open condition associated with the cord terminal portion **28**. As will be apparent, the clip **36** can be placed and closed over the deformed area **38** on the terminal portion to completely conceal such deformation. Similarly, a grommet **40** is shown associated with the cord terminal portion **30**. As will be apparent, the grommet **40** telescopically receives the outer end portion of the terminal portion **30** and is secured in position by means of a clip **42** whereby completely to conceal a deformed area **44** on the cord terminal portion.

We claim:

1. A winding device useable for heat curing expandable and retractable coiled cords which have deformable surface characteristics and which comprise helical body portions of substantial axial length and integral substantially straight terminal portions, said device comprising an elongated generally cylindrical rotatable winding arbor of a length greater than the helical body portion of a completed cord and of a diameter approximately equal to the desired internal diameter of such a portion of a completed cord, and similar first and second holders respectively for said terminal portions of a cord, said holders being secured to and supported by said arbor with at least one holder removable from the arbor and with the two holders in axially spaced relationship along the arbor corresponding approximately to the desired length of said helical body portion of a completed cord, each of said holders including a cord securing portion spaced radially from said arbor a substantial distance and engageable with an associated terminal portion of a cord wound on said arbor only at such radially spaced location, said cord securing portions of the holders serving to secure the cord terminal portions against unwinding movement in opposite directions and each of said securing portions having a dimension which extends axially along the cord terminal portion for a limited distance no greater than three cord diameters to minimize cord mutilation thereby during heat curing.

2. A winding device as set forth in claim **1** wherein said cord receiving portions of said holders each comprise cord terminal portion receiving openings adapted to receive and frictionally grip an associated cord terminal portion on entry of the same under slight pressure into the opening.

3. A winding device as set forth in claim **2** wherein said cord receiving portions of said holders each comprises a generally U-shaped member adapted to receive a cord terminal portion at its open end and having an internal dimension between its legs slightly smaller than the external diameter of the cord terminal portion whereby to effect limited surface deformation of and thereby positively secure the terminal portion.

4. A winding device as set forth in claim **3** wherein each of said holders takes the form of a bent wire member secured at an inner end portion to the arbor and defining said U-shaped element at an outer end portion.

5. A winding device as set forth in claim **4** wherein each of said holders is bent intermediate its ends to extend generally axially inwardly with respect to the arbor from its said inner end portion and to thereby provide clearance for the winding of an end coil of the body portion of a cord radially inwardly of its said U-shaped outer portion.

6. A winding device as set forth in claim **5** wherein said arbor is constructed in two sections with one of said sections in the form of a detachable end section which supports one of said holders and provides for the aforesaid removable characteristics thereof.

7. A winding device as set forth in claim **6** wherein said arbor sections are provided at contiguous end portions respectively with a threaded opening and a complementary diametrically reduced threaded projection.

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U.S. Cl. X.R.

242—85.1; 18—19

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