Jan. 2, 1968 S. LIVINGSTONE 3,361,381

WINDING CORE

Filed Nov. 22, 1966

Fig. 1

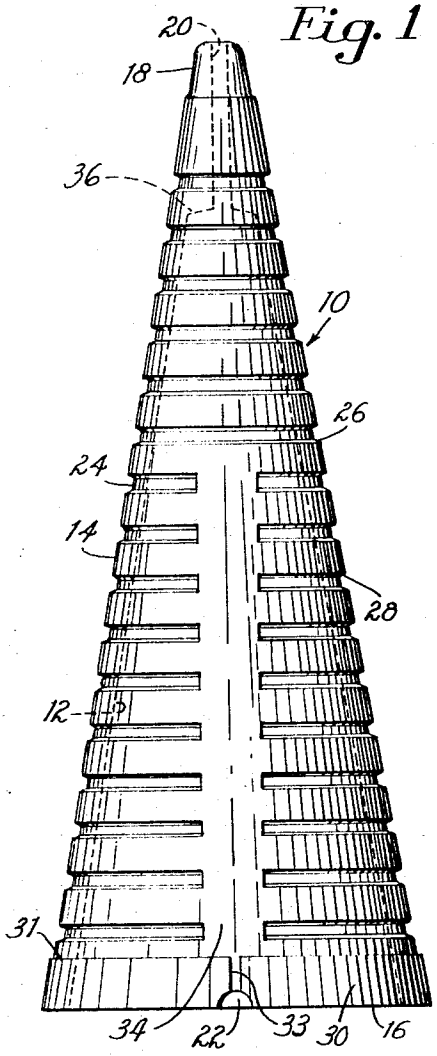


Fig. 3

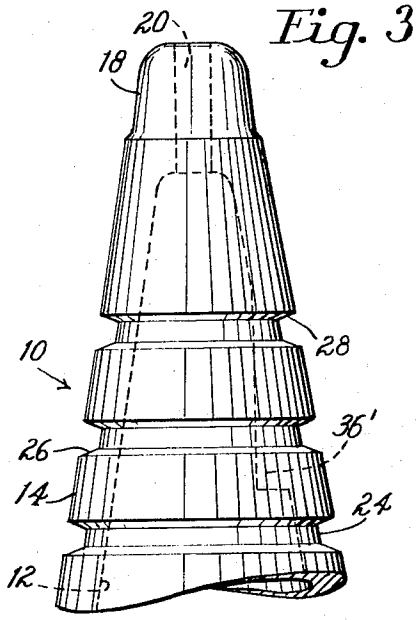


Fig. 4

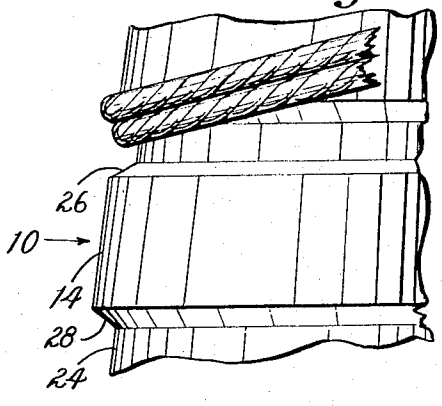
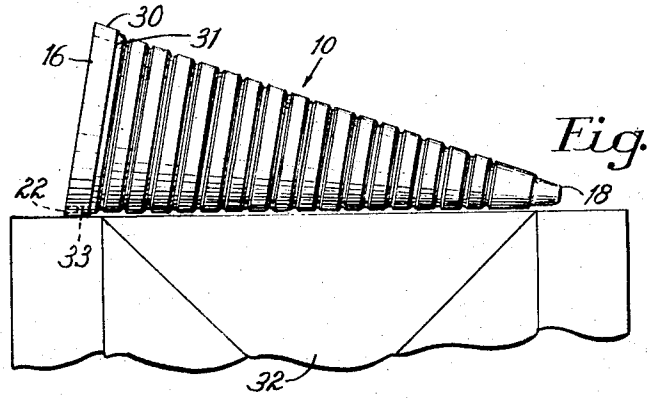


Fig. 2



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WINDING CORE

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ABSTRACT OF THE DISCLOSURE

A conical winding core for yarn having a raised driving band with a cutaway portion for yarn, an internal boss to prevent locking of nested cores, a grooved exterior to prevent yarn sloughing and an ungrooved thumb strip to permit easy stripping of the yarn from the core.

This application is a continuation-in-part of application Ser. No. 470,025, filed July 7, 1965, now abandoned.

This invention relates to plastic conical winding cores for yarn, of the type on which yarn is traverse wound in relatively widely spaced oblique turns and from which yarn is removed by high speed snatching or unwinding axially of the core with automatic transfer between successive cores being unwound, and in particular to the surface configuration of such cores.

Primary objects of the invention are to provide an improved plastic winding core having an exterior surface particularly configured to prevent sloughing of the innermost layer of yarn just before transfer to a new core, to minimize yarn damage and breakage (e.g. by preventing the tangling of closely spaced windings next to the core surface, and by eliminating pinching of the yarn between the core and the winding drum), and to prolong core life. Other objects are to provide such a core that can be easily stripped of yarn after partial unwinding, and to provide an interior surface configuration that prevents friction locking of nested cores.

The invention features a series of circumferential grooves spaced along the outer surface of the core, with at least the groove wall facing away from the nose of the core, and preferably both walls, being inclined at about 45° to the core axis. The ratio of groove width to intergroove spacing is at least about 20%. A raised band at the base of the core contacts the winding drum to prevent the wearing down of the grooved surface, and is preferably grooved to receive the length of yarn that passes thereover. An ungrooved thumb strip extends perpendicular to the grooves and allows thumb stripping of yarn laps. An internal boss adjacent the core nose prevents friction locking of nested cores.

Other objects, features, and advantages will appear from the following description of a preferred embodiment of the invention, taken together with the drawings in which:

FIG. 1 is an elevation of a winding core according to the invention;

FIG. 2 is an elevation of a core supported against a winding drum;

FIG. 3 is an elevation, partially broken away, of another embodiment of the invention; and

FIG. 4 is an enlarged view of a portion of the core surface with several windings of yarn thereon.

Referring now more particularly to the drawings, there is shown in FIG. 1 a conically shaped winding core **10** having inner and outer surfaces **12** and **14** extending from base **16** to nose **18**. Hole **20** passes axially through the nose. Notch **22** appears in the perimeter of base **16**.

Circumferential grooves **24** surround the core in spaced fashion, beginning near base **16** and continuing most of the way to nose **18**. Each groove has walls **26**, **28**, respectively facing away from the base and the nose, and each

facing outwardly from the core and inclined at about 45° to the core axis. The width of the grooves is substantially less than the spacing between adjacent grooves.

Raised drum contact band **30** surrounds the core at its base, and provides the sole contact of the core with the revolving winding drum **32** during winding operations (see FIG. 2). Groove **33** extends across band **30** from notch **22**, perpendicular to groove **24**. The standard core support mechanism (not shown) holds the nose out of contact with the drum. Optionally, a raised band may be provided at the nose. In either case, wearing down of grooved surface **14** is prevented and core life is increased.

Ungrooved thumb strip **34** extends perpendicular to grooves **24** from the top edge **31** of band **30** about halfway up the core toward nose **18**. Strip **14** is flush with the ungrooved portions of surface **14**. Laps of yarn can thus be quickly removed from the core after partial unwinding, if desired (as where a break occurs near the end of a spool) by simply sliding the thumb along strip **34**. Optionally, a second thumb strip can be provided at the opposite side of the core.

The interior of the core adjacent nose **18** is left partially filled to provide a boss **36** therein. Alternatively, (FIG. 3) the boss may take the form of projection **36'**, on the inner wall of the core adjacent the nose. In either case, boss **36** or **36'** extends far enough toward base **16** to prevent friction locking (and resulting surface wear) of adjacent nested cores.

In a typical core of the invention, having an overall length of 7 inches and a taper of about 9°, the grooves **24** may be .02" deep, 3/32" wide (at surface **14**) and spaced (at surface **14**) by 3/8". The depth of boss **36** (i.e., of hole **20**) may be 0.4".

In operation, a yarn pigtail is inserted through hole **20**, carried through notch **22** and groove **33** and wound by hand for a few turns around the middle of surface **14**. The core is then lowered to the winding drum, contacting it only at band **30**. Yarn is traverse wound at an angle to the grooves, with some 6 or 7 turns per cone length. Groove **33** prevents the yarn from being pinched between the core and the drum; yarn damage and eventual breakage during unwinding is thus avoided. The winding tension depresses the yarn acrossing the grooves at an angle, thereby preventing sloughing of the final turns during unwinding and transfer. If the yarn is wound without traversing during the start-up phase of the winding until the cone is up to speed, successive turns will, if they slip into grooves **24**, build up slanting walls **26** (see FIG. 4), rather than tangling with each other; locking and breakage during unwinding and transfer is thus further avoided. The 45° slant of walls **28** permits unwinding axially of the core of the last wraps of yarn without scuffing on a sharp edge and without changing tension.

Other embodiments (e.g., converting groove **33** into a slotted extension of notch **22**) will occur to those skilled in the art and are within the following claims.

I claim:

1. In a hollow plastic conical winding core for yarn and the like having a base, a nose and an outer surface specially configured to prevent yarn sloughing, that improvement comprising a raised drum contact band extending circumferentially about said core at its base, said band having a cut away portion extending across its width, said portion providing sufficient space to admit said yarn, whereby the outer surface of said core is adapted to remain out of contact with the drum during winding operations and yarn passing across said band through said portion is not pinched against said drum.

2. In a hollow plastic conical winding core for yarn and the like having a base, a nose and an outer yarn receiving surface specially configured to prevent yarn sloughing, that improvement comprising a boss located

inside the core adjacent said nose, said core having an internal configuration for receiving the major portion of the yarn receiving surface of a similar core to the limit imposed by said boss, said boss extending toward said base sufficiently far to prevent the friction locking with an adjacent identical core when nested.

3. The winding core of claim 1 wherein a multiplicity of circumferential grooves are located in spaced fashion on the outer surface of the core over most of the axial extent of the core, each said groove having a first wall facing away from said base and a second wall inclined at approximately 45° to the central axis of the core and facing outwardly from the core and away from said nose, the width of each said grooves being substantially less than but at least 20% of the spacing between adjacent grooves, whereby said grooved surface prevents yarn sloughing while allowing the unwinding axial of the core of all laps of yarn without scuffing.

4. The winding core of claim 2 wherein a multiplicity of circumferential grooves are located in spaced fashion on the outer surface of the core over most of the axial extent of the core, each said groove having a first wall facing away from said base and a second wall inclined

at approximately 45° to the central axis of the core and facing outwardly from the core and away from said nose, the width of each said grooves being substantially less than but at least 20% of the spacing between adjacent grooves, whereby said grooved surface prevents yarn sloughing while allowing the unwinding axial of the core of all laps of yarn without scuffing.

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