

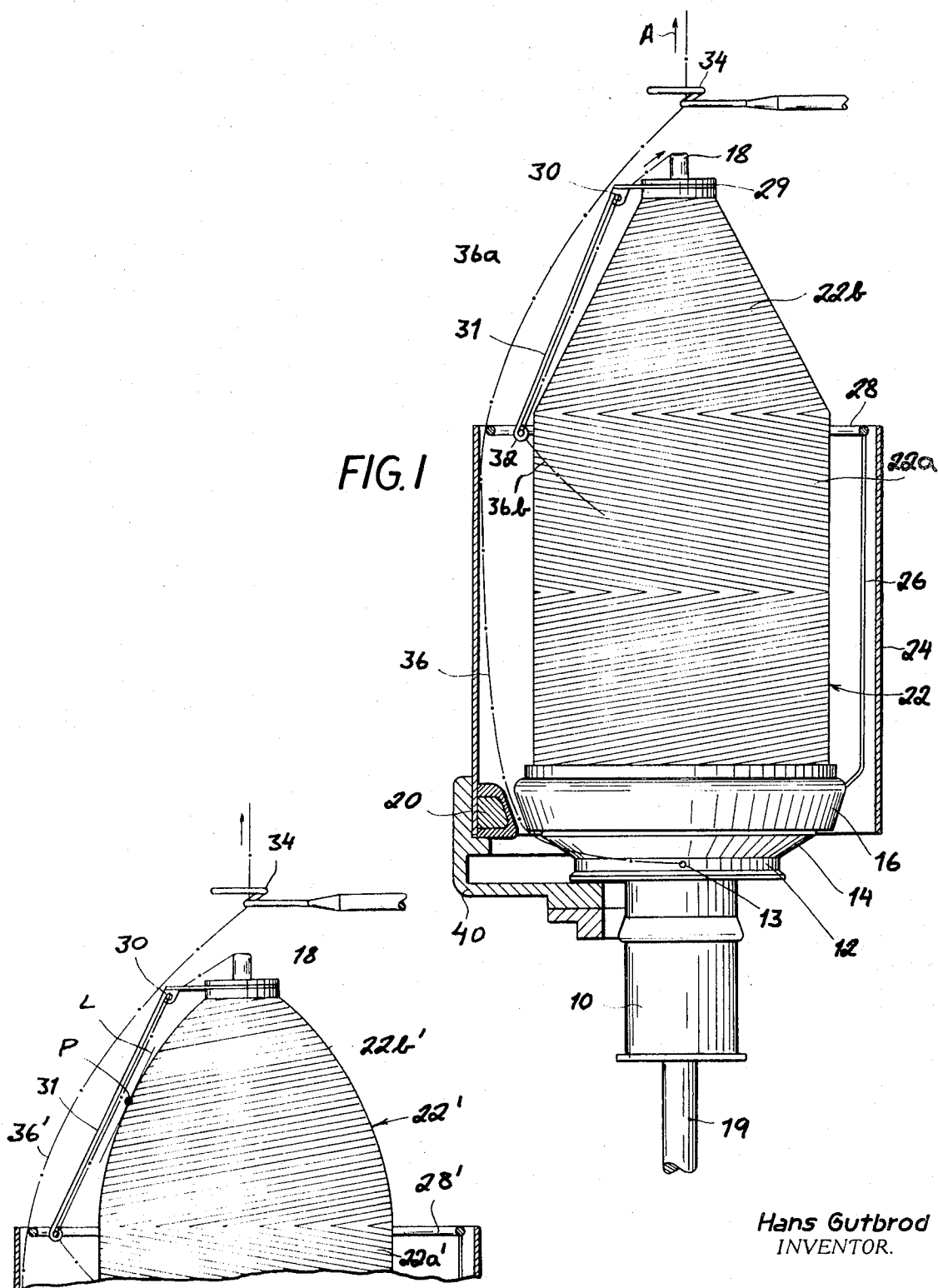
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UNWINDING ARRANGEMENT FOR YARN PACKAGES

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UNWINDING ARRANGEMENT FOR YARN PACKAGES

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5 Claims

ABSTRACT OF THE DISCLOSURE

To unwind a thread from a yarn package, confined in a balloon-limiting stationary sleeve, with optimum space utilization, the top of the yarn package projecting above the sleeve tapers frustoconically to define with the surrounding thread balloon a narrow channel within which the thread drawn off the package is guided to the top of a tubular spindle shaft.

My present invention relates to a thread-drawing apparatus as used, for example, in double-thread twisting or spinning machines wherein a multiplicity of yarn packages or spools mounted on a bank of spindles are to be unwound for the building of bobbins with threads supplied by two or more of those yarn packages.

The unwinding of the thread from a yarn package is conventionally accomplished with the aid of a spindle-mounted outrigger arm carrying an eye on its free end, with the thread passing upwardly through that eye into a thread-guiding loop or the like positioned axially above the spindle. As disclosed in commonly assigned application Ser. No. 818,481, filed jointly by Aloys Treus and me on Apr. 23, 1969, now U.S. Pat. No. 3,552,111, the thread drawn off the yarn package by the rotating arm first passes downwardly through the hollow spindle and exits at the bottom thereof, underneath the yarn package, before rising alongside the package toward its ultimate destination. With the yarn package held stationary on a platform which may be immobilized with the aid of one or more magnets on an adjoining base, the ballooning thread portion rising from the spindle outlet may be confined by a fixed sleeve mounted on that base.

In the arrangement described in the copending application referred to, the outriggering arm extends substantially radially from the spindle at the top of the sleeve, thereby limiting the height of the yarn package to approximately that of the sleeve. The yarn package, moreover, is surrounded by a stationary can which is nearly as high as the sleeve and defines therewith an annular channel for the revolving rising thread. Any increase in the height of the yarn package would require a raising of the arm as well as an upward extension of the can to maintain the separation between the balloon thread and the thread drawn off the spool, especially in case of a rupture. At the same time the thread-deflecting loop or other element above the spindle must be similarly raised to flatten the balloon and to prevent undue friction between the thread and the can.

The object of my present invention, therefore, is to provide an improved arrangement of this general type wherein the available space is better utilized for accommodating a yarn package or spool so that, given a certain distance between a spindle mount and a thread-drawing point, the length of thread continuously drawn from such spool will be a maximum.

This object is realized, pursuant to my present invention, by the use of a spool having a substantially cylindrical bottom portion and an adjoining top portion of

progressively decreasing diameter, the thread being drawn off this spool by an arm or similar guide element extending from the upper end of that top portion to substantially the junction of the two spool portions to form a guide path which includes an acute angle with the spindle axis. With the top portion tapering frustoconically, the guide path may be a line generally parallel to a generatrix of the frustocone; if that spool portion is bulb-shaped or convex so as to approximate the configuration of an adjoining part of the balloon surface, the line should be parallel to one which is tangent to a generatrix of the bulb at an intermediate level.

With the thread positively guided on its way to the spindle top at two or more points, the danger of entanglement in the event of a rupture is reduced. Instead of a surrounding can, therefore, a simple ring substantially at the level of the lower end of the linear guide path may be used to hold off the ballooning thread portion. The balloon-confining sleeve, if present, can terminate at the same level, thus at or near the junction of the cylindrical and tapering or bulb-shaped portions of the yarn package.

The invention will be described hereinafter in greater detail with reference to the accompanying drawing in which:

FIG. 1 is an elevational view, partly in section, of an apparatus for unwinding thread from a yarn package with tapering top portion, according to the invention, and

FIG. 2 is a fragmentary view of a similar apparatus using a yarn package with a convex upper portion.

In FIG. 1, I have shown part of a stationary base 40 receiving a sleeve 24 which is coaxially traversed by a tubular spindle 18 having a downward extension 19, the latter being rigid with a belt pulley 10 and being journaled in a manner not further illustrated for rotation by a driving belt engaging this pulley. Spindle 18 is rigid with a throw-off disk 14 beneath a platform 16 which contains at least one armature attracted by a magnet 20 on base 40, whereby the platform is held against rotary entrainment. A yarn package 22, having a cylindrical bottom portion 22a and an upwardly diverging top portion 22b of frustoconical configuration, is removably seated in a cup-shaped recess of platform 16. Spindle 18, which is freely rotatable inside the spool 22, also carries a head 29 closely overlying the top of the yarn spool and supporting an arm 31 with an upper eye 30 and a lower eye 32. Disk 14 has a cylindrical downward extension formed with a radial bore 13 constituting an outlet for a thread 36 which passes at 36a, in a balloon just beyond the orbit of arm 31, through a loop 34 toward a traction roller or the like as indicated by an arrow A. This thread is originally drawn at 36b off the yarn package and successively traverses the eyes 32 and 30, entering the spindle 18 from above and exiting from it at the orifice 13. The rising thread portion 36a is held out of contact with the arm 31 by a stationary ring 28, supported at the level of the top of sleeve 24, which is also substantially the level of the junction of portions 22a and 22b, by one or more rods 26 extending upwardly from platform 16.

Owing to the position of the lower eye 32 near the junction of the two spool portions, the thread unwound from the spool can reach this eye from any part of the spool surface.

In FIG. 2 I have shown a modified spool or yarn package 22' with a cylindrical bottom portion 22a' and a convex bulb-shaped top portion 22b'. The thread 36', drawn off the spool by an apparatus identical with that of FIG. 1, balloons along a curve similar to that of the convex spool surface. Between this spool surface and the orbiting thread 36', thread guide 31 extends along a line which is parallel to a line L tangent to the spool at a point P on an intermediate level, i.e. between the top and the bottom of spool portion 22b'.

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The yarn package 22 or 22' can be made in several ways known per se. Thus, the axial stroke of a traveler or other thread guide in a conventional bobbin-building machine can vary in length, or the axial speed of that thread guide can be increased in the region of the upwardly converging spool portion. Spools so wound are sometimes referred to as being of milk-bottle shape.

I claim:

1. In a thread-drawing apparatus including a tubular spindle traversing a spool of thread to be unwound, and a thread guide axially positioned above said spindle, the improvement wherein said spool has a substantially cylindrical bottom portion and an adjoining top portion of progressively decreasing diameter, said spindle being provided with a rotatably mounted arm extending obliquely from the upper end of said top portion to substantially the junction of said top and bottom portions at a close distance from the peripheral surface of said top portion, said arm being provided with an upper eye proximal to the spindle top and with a lower eye substantially at the level of said junction, thereby forming a straight guide path for thread coming off said spool and passing successively through said lower and upper eyes into said spindle, said guide path including an acute angle with the spindle axis, said spindle having a lower end formed with an outlet for said thread upon insertion thereof into said spindle from above whereby the thread can pass outside the spool from said outlet to said thread guide; and a stationary ring spacedly surrounding the path of said lower eye for engagement from without by a part of said thread rising from said outlet to said thread guide.

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2. The improvement defined in claim 1, further comprising a stationary sleeve spacedly surrounding said bottom portion and said ring for confining a balloon formed by the rising part of said thread.

3. The improvement defined in claim 1 wherein said top portion is frustoconical, said arm being generally parallel to a generatrix of the frustococone.

4. The improvement defined in claim 1 wherein said top portion is bulb-shaped, said arm being parallel to a line tangent to a generatrix of the bulb at an intermediate level thereof.

5. The improvement defined in claim 1, further comprising a magnetically arrested supporting platform for said spool and a throw-off disk rigid with said spindle below said platform, said outlet being formed in said disk.

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