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THREADING ARRANGEMENT FOR SPINNING AND TWISTING MACHINES

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FIG. 1

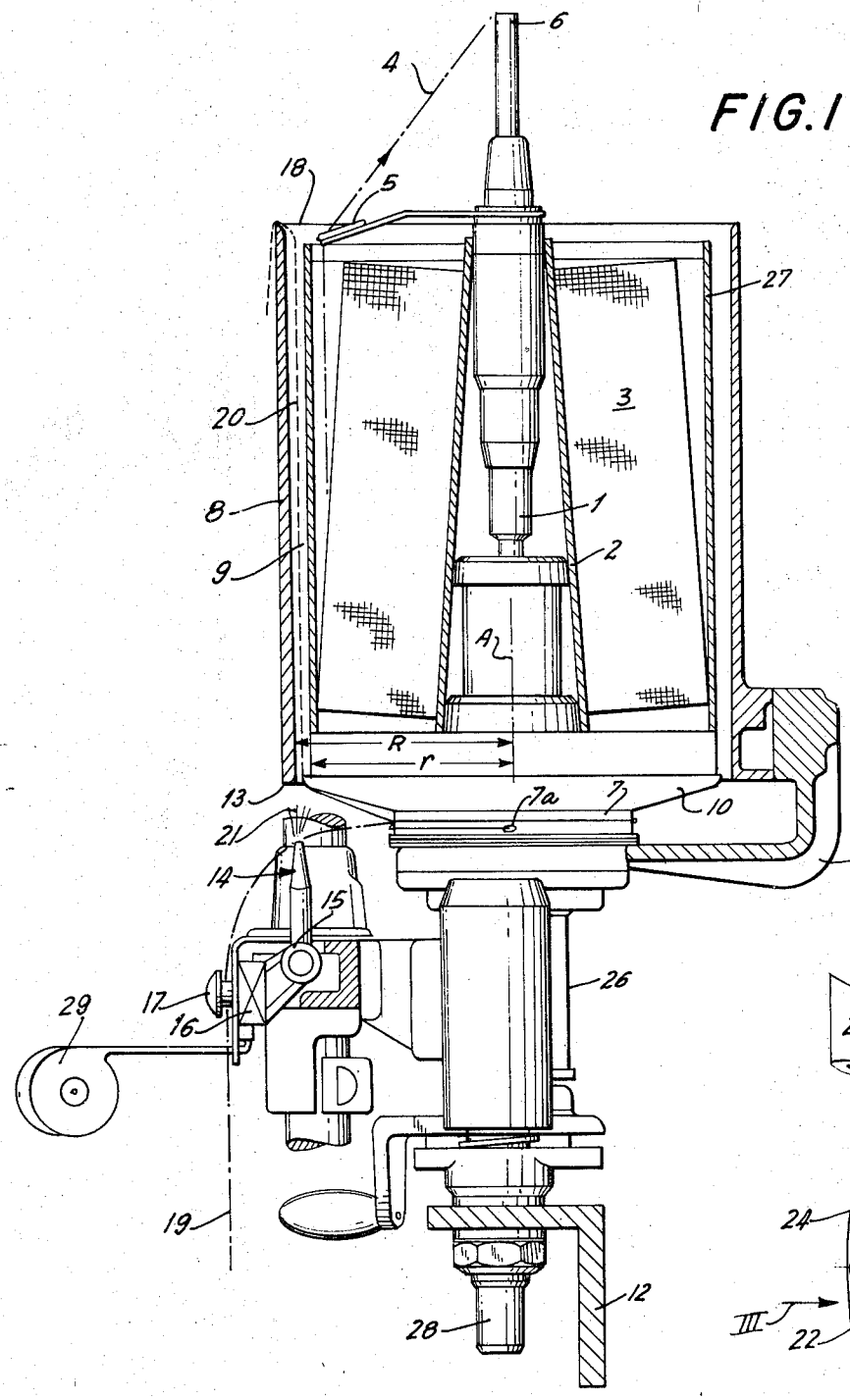
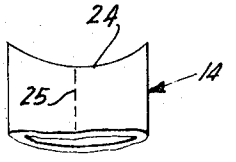



FIG. 2



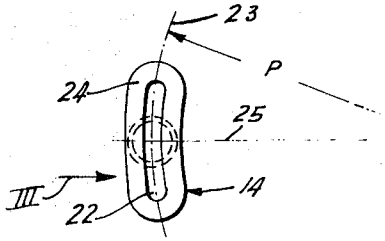




FIG. 3

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# THREADING ARRANGEMENT FOR SPINNING AND TWISTING MACHINES

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U.S. Cl. 57—58.49 10 Claims

## ABSTRACT OF THE DISCLOSURE

A thread spinning or twisting apparatus wherein a thread is drawn up off a yarn package wound on a hollow core, then passed axially down through the core and twisted by a flyer rotating about the core axis and beneath the yarn package. The thread is finally led axially up between the package and a circumferentially continuous (unbroken and uninterrupted) sleeve coaxial therewith and forming therewith an annular balloon-confining space. A threading arrangement comprising an upwardly directed concave nozzle actuatable by a knee or foot valve directs a gas stream up in the space between the package and the sleeve to project the thread therethrough.

Our present invention relates to thread twisting or spinning apparatus, and, more particularly, to a threading arrangement for such devices.

A very common type of thread spinning apparatus makes use of a nonrotatable yarn or thread package wound on an elongated hollow core mounted above a rotatable flyer.

Surrounding this flyer and package is a balloon-confining sleeve, usually provided with a slit and defining a narrow annular gap between itself and the yarn package. The thread is pulled off the package, and then fed through a braking device in the hollow core and through a radial bore in the flyer. Thereafter it winds one or more times around a storage drum on the flyer and passes radially outwardly and thence upwardly through the gap to form its balloon. Thereupon it passes through a thread guide, is combined with a second thread from another yarn package and is picked up as twisted thread on a bobbin or the like.

When loading a yarn package into such an apparatus, the threading of the yarn or thread up between the package and the sleeve is time consuming and difficult.

One solution to this problem has been to provide the sleeve with the substantially vertical slit mentioned earlier so that even nonskilled operating personnel can quickly and easily thread the device. However, such a slit scrapes the thread in its balloon and causes a rather wasteful and dangerous build up of dust.

It is therefore the principal object of our present invention to provide a thread twisting apparatus which overcomes this disadvantage.

More generally speaking, it is an object of our invention to provide simple threading means for a thread twisting apparatus of the character described.

We attain the above and other objects in accordance with features of our invention, by providing a thread twisting apparatus with a threading arrangement including a nozzle which directs a gas stream upwardly between the yarn package and sleeve. To thread the yarn through the device, the operator lays it over the nozzle and it is then simply blown up through the sleeve when the control valve is triggered.



According to a further feature of our invention the nozzle has an elongated nozzle opening having an arcuate shape with the same center of curvature as the space between the yarn package and the sleeve and a radius of curvature

$$\rho=\left(\frac{R-r}{2}\right)+r$$

or

$$\rho=\frac{R+r}{2}$$

where $r$ is the inner radius of the annular space and R is the outer radius thereof (and the inner radius of the balloon-controlling sleeve).

Yet another feature of our invention provides for an upwardly concave nozzle in which the thread can easily be caught before threading. In all cases, the sleeve is circumferentially continuous and uninterrupted and is, therefore, free from the slit mentioned earlier.

A particular advantageous feature of our invention is that a valve is provided between a source of compressed air, such as a compressor, and the nozzle. This valve, which can be actuated by the knee or foot of the machine operator to thread the apparatus, is preferably of the self-holding type and remains in the "open" position until closed by the operator, thereby allowing free use of the operator's hands.

Because of the above-described and other features of our present invention, our thread-spinning or twisting apparatus presents very little difficulty to thread, thereby cutting operation costs substantially. These features, objects, and advantages will be more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a vertical section through a thread twisting apparatus according to our present invention;

FIG. 2 is a detail top view of the nozzle of the apparatus shown in FIG. 1; and

FIG. 3 is a side view of the nozzle taken in the direction of arrow III of FIG. 2.

As shown in FIG. 1, a yarn package **3** wound on a hollow, frustoconical core **2** is set on a spindle **1** lying along an axis A. A thread **4** from the package **3** runs through a thread guide **5** rotatable on the spindle **1** and led into an upper end **6** of this spindle **1**. A thread tensioning or braking device as described in the commonly assigned patent application Ser. No. 810,464, filed Mar. 26, 1969, by Aloys Greive and Aloys Treus and entitled "Method of and Apparatus for Spinning and Treating Thread," or as in U.S. Pat. No. 2,718,363, serves to tension the thread **4** for constant regularity of twist. In general, the apparatus may be the double-thread twisting type described in this patent.

A flyer rotatable about the axis A consisting of a storage drum **7** below the spindle **1** and an upwardly diverging frustoconical throw-off disk **10** of greater diameter than the package **3** are integrally connected with a rotatable pulley **26** which is rotatably mounted on a shaft **28** fixed on a support **12** and which can be a drive arrangement as described in the commonly assigned application Ser. No. 814,065, filed Apr. 7, 1969, by Aloys Greive and entitled "Belt-Type Drive Arrangement for Spinning Machines and the Like." The thread **4**, after passing through the spindle **1**, passes radially out through a radial bore or eye **7a** in the drum **7**, winds around it several times, and then rises in a balloon-confining space **9** between a lower edge **13** and an upper edge **18** of a slightly frustoconical sleeve **8** and a can **27** surrounding and containing the package **3**. The sleeve **8** is circumferentially continuous and free from any threading slit.

The yarn package **3** is prevented from rotating by magnets as in the above-cited Pat. No. 2,718,363, and the sleeve **8** also is nonrotatable. Thus, only the flyer **7**, **10** rotates.

A nozzle **14**, connected via a conduit **15** and a valve **16** to a compressor **29** is nonrotatably fixed below the lower edge **13** of the sleeve **8** and directs a gas stream **21** upwardly in the space **9** along a generatrix of the sleeve. As better shown in FIGS. 2 and 3 this nozzle **14** has a nozzle opening **22** with a curvature **23** centered on the axis of the space **9** and a radius of curvature

$$\rho=\frac{R+r}{2}$$

where R is the inner radius of sleeve **8** and *r* is the inner radius of the space. The upper surface **24** of the nozzle is cylindrically concave upwardly to prevent a thread from sliding off prior to threading (see FIG. 2).

When a new, full yarn package **3** needs to be placed over the spindle **1** to replace a used-up one, the following procedure is followed:

The core **2** is dropped over the spindle **1** and the thread **4** guided through the eye **5** by hand and through the spindle **1** and brake by means of a conventional threading wire. Then the thread or filament is laid over the nozzle **14** as shown by the dot-wash line **19** in FIG. 1, and **25** in FIGS. 2 and 3. Then a button **17** or similar operating means is actuated by the foot, knee, or leg of the operator to open the valve **16**. This sends a blast of air at a pressure of between **3** and **6** atmospheres up in the space **9** to thread the filament along the position shown by dashed line **20**. A further actuation of the button **17** closes the valve. Thence the thread **4** is fed to some suitable take-up device, such as a bobbin. The valve **16** is of the self-holding type so that, once opened, it remains open until closed by the operator.

Such a threading arrangement is particularly useful with so-called fan brakes in the spindle. In this case the thread end of the yarn package is merely placed in the top of the spindle and suction created by the rotating flyer pulls it through the spindle.

In practice many such devices are mounted in banks on a common support **12** under the control of one operator. In such a system with simple threading a suizable increase in efficiency is realised.

We claim:

**1.** In a thread spinning or twisting apparatus wherein a thread is drawn off a yarn package wound on an upright hollow core then passed axially in one direction through the core and twisted by a flyer rotating about the axis and finally led axially in the opposite direction up between the package and a balloon-controlling upright sleeve coaxial with and spacedly surrounding the package to form an annular balloon-confining space therearound, the improvement which includes a threading arrangement for said apparatus, comprising nozzle means adjacent the bottom of said space for directing a gas stream in said opposite direction between said package and said sleeve for projecting said thread axially through said space.

**2.** The improvement defined in claim **1** wehrein said nozzle means further comprises a nozzle having an elongated upwardly directed nozzle opening.

**3.** The improvement defined in claim **2** wherein said nozzle opening is curved and has a radius of curvature corresponding to the average radius of said space and centered on said sleeve.

**4.** The improvement defined in claim **3** wherein said nozzle has an upwardly directed cylindrically concave surface.

**5.** The improvement defined in claim **1** wherein said nozzle means includes a source of compressed gas, and upwardly directed nozzle, conduit means interconnecting said nozzle and said source, and valve means in said conduit means for blocking fluid flow in same.

**6.** The improvement defined in claim **5** wherein said valve means has an open and a closed position, said valve means being self-locking in the open position.

**7.** The improvement defined in claim **5** wherein said valve means includes a valve and means for actuation of said valve by the leg of the operating person.

**8.** The improvement defined in claim **1** wehrein said flyer and said nozzle are disposed below said core.

**9.** The improvement defined in claim **8** wherein said flyer comprises a substantially cylindrical drum and a throw-off disk both coaxial with said core, said drum being formed with a radial bore communicating with the interior of said core.

**10.** The improvement defined in claim **9** wherein said disk is frustoconical and converges downwardly toward said drum and has an outer periphery with a diameter greater than the diameter of said yarn package and less than the diameter of said sleeve.


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