Jan. 5, 1971 L. L. CHABOT 3,552,112

THREAD FORMING GRIPPER

Filed June 17, 1969

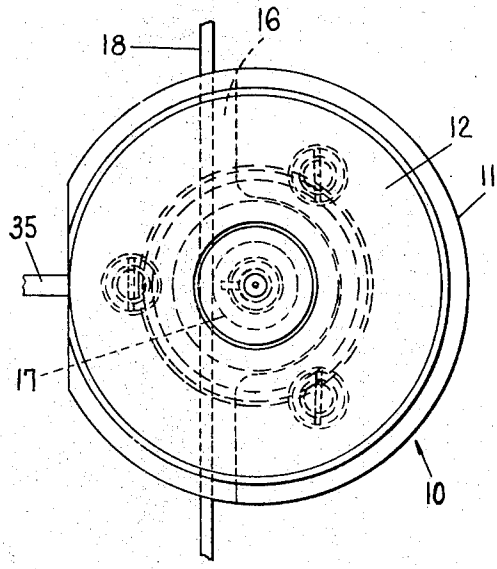
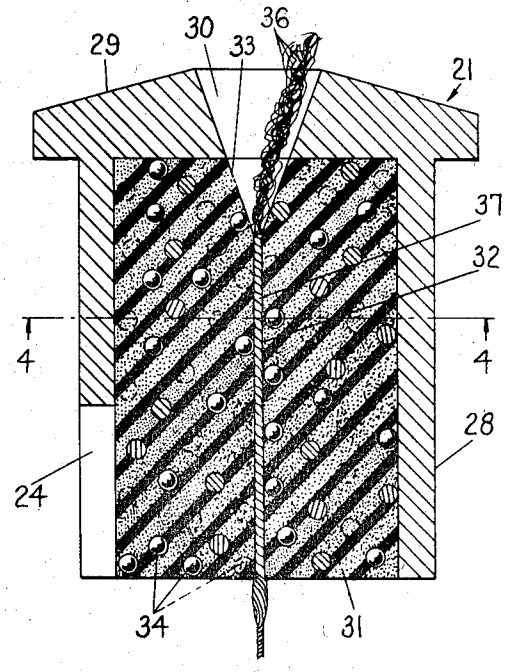


FIG. 2

FIG. 3



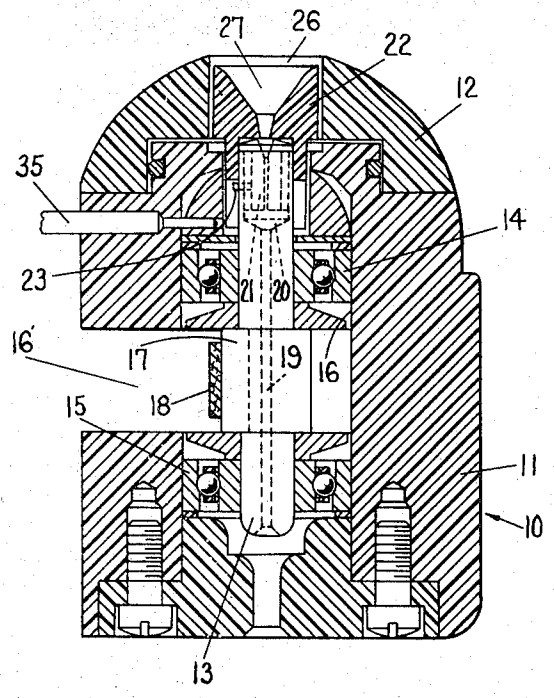


FIG. 1

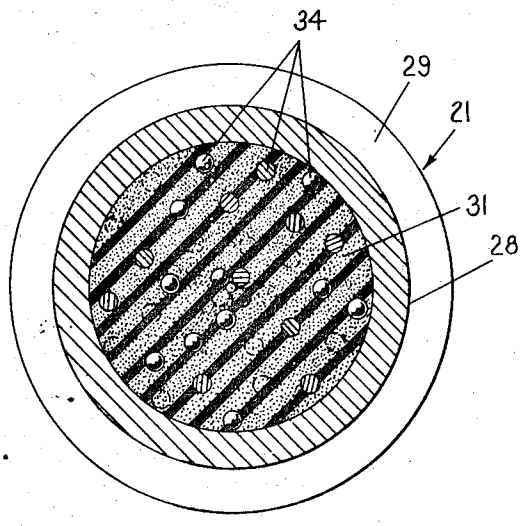


FIG. 4

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THREAD FORMING GRIPPER

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U.S. Cl. 57—77.4 9 Claims

ABSTRACT OF THE DISCLOSURE

A rotatable gripping member adapted to receive and spin textile fibers into thread including a resilient gripper having a multiplicity of gripping surfaces formed along the internal longitudinal extent of an axial bore extending therethrough and which receives the fibers into one end of the bore, spins them together and expels them at the opposite end as a continuous length of thread.

BACKGROUND OF THE INVENTION

The invention relates to an improvement in open type spinning frames and more particularly to a rotatable gripping member forming a part thereof into which fibers are guided and spun into thread.

Numerous forms and designs of rotatable gripping members comparable in outer configuration and size to that of the instant invention have been tried on open type spinning frames in an attempt to develop a gripping member having a desirable life expectancy and at the same time one which would spin high quality thread. A few such gripping members have been of the type utilizing opposed plates backed by sponge rubber, a vertical member within a gripper body having a vertically disposed helix groove about its exterior surface, also a pair of "U" shaped elements disposed in interlocking engagement which are movable toward and away from one another by centrifugal force. Even a hollow needle was tried by deforming it to an S or V shape and then molding it within a base material of polyurethane or the like.

A further form of gripping member comprises a plurality of centrally disposed and vertically extending wire members within a gripper body having the upper ends thereof disposed so as to form a funneled opening for receiving the fibers to be spun.

The rotatable gripping member according to the instant invention provides a positive means for receiving fibers to be spun as well as radially gripping them while spinning them into thread and at the same time causing the spun threads to move longitudinally through an axially directed opening in said member. The cooperating components of this gripper member are of such a type and so arranged that as well as providing a desired life expectancy thereof, it produces a very fine quality of thread that possesses a sufficient and acceptable amount of tensile strength.

SUMMARY OF THE INVENTION

The gripping member of the present invention is rotatably supported within a spindle housing unit that is removably attached to an open type spinning frame. The gripper includes a supporting body portion with a funneled opening on the top thereof for reception of fibers to be spun. The gripper itself is carried is carried within the body portion and is cylindrical in form. It is fabricated from a base material possessing suitable resilient characteristics.

An axially directed aperture extends through the gripper and the upper end thereof defines a funneled opening which is adapted to communicate with the funneled opening in the body portion thereby providing an extension of the latter opening.

A multiplicity of wear resistant particle elements are dispersed within the resilient base material with some at least thereof communicating with the axially directed aperture. Those particles which communicate with this aperture provide surfaces which during rotation of the gripper are adapted to receive and grip the fibers as they are spun into thread within the aperture as well as to assist in advancing said thread through the latter.

It is a specific object of the invention to provide a rotatable gripping member for use in open end spinning which will possess the qualities of relatively long life along with the ability to produce acceptable thread of desirable tensile strength.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in side elevation and partially in section of a spindle housing showing the gripping member according to the invention assembled therein. FIG. 2 is a plan view of the spindle housing shown in FIG. 1. FIG. 3 is a sectional view in side elevation of the gripping member showing the multiplicity of particle elements dispersed within the resilient base material, and FIG. 4 is a sectional view taken along line 4—4 in FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Now referring to the figures of drawing, enough of a spindle housing used in open end spinning is shown in FIG. 1 to serve as a basis for a detailed description of the invention applied thereto.

In FIG. 1 the spindle housing is identified generally by numeral **10** and includes a body portion **11** with a cap member **12** assembled to the upper end thereof.

A spindle **13** is rotatably supported within the body portion **11** by means of anti-friction bearings **14** and **15** which are fixed within a bore **16** of said body portion. The spindle adjacent its upper end is journalled in bearing **14** and adjacent its lower end in bearing **15**.

The body portion **11** as shown in FIG. 1 is provided with a horizontally extending opening **16'** which communicates with one side thereof. This opening is directed inwardly to the extent of exposing a portion of the spindle **13** adjacent its center which is of a larger diameter than its upper and lower shank portions extending therefrom that are journalled in bearings **14** and **15**.

This larger and generally centrally disposed portion of the spindle is depicted by numeral **17** and provides a means for its rotation through frictional contact with an endless belt **18**. Belt **18** is continuously rotated by pulley elements forming a part of the spinning frame not shown.

Spindle **13** has an axial bore **19** and the upper end thereof is counterbored as at **20** for receiving the gripping member according to the invention that is identified generally in FIGS. 1, 3 and 4 by numeral **21**.

A fiber receiving member **22** assembles on the upper end of the spindle **13** and is adapted to rotate with the latter by means of a key **23** (FIG. 1) which extends horizontally from a slot **24** (FIG. 3) in the gripping member **21** through a slotted opening in said spindle (not shown) and thence into a slot **25** provided in the lower end of said receiving member.

The upper end of the fiber receiving member is positioned within a central opening **26** provided in the cap member **12** and includes a funneled aperture **27** which is adapted to receive the fibers to be spun and present them to the gripping member **21**.

As shown in FIGS. 3 and 4, the gripping member **21** includes a cylindrical gripper body **28** with an integral tapered cap portion **29** forming one end thereof. This

tapered cap portion includes a centrally located opening **30** and being tapered as illustrated in FIG. 3 it provides a continuation of aperture **27** with which it communicates.

The gripper is depicted by numeral **31** in FIGS. 3 and 4 and being molded into cylindrical form from any suitable rubber-like resilient base material it is adapted to assemble within the gripper body **28**. This gripper is provided with an axially directed aperture or bore **32** extending therethrough with the upper end thereof terminating in a tapered opening **33** that is disposed in contiguous relation with the inner portion of opening **30**.

A multiplicity of wear resistant particles **34** (FIGS. 3 and 4) are dispersed within the base material with some at least thereof communicating with the bore **32**. Actually these wear resistant particles are molded within the base material and those which communicate with the bore **32** have a greater portion of their area bonded to said base material.

These wear resistant particles **34** are generally spherical in configuration and can be of metallic or non-metallic composition such as ceramics, steel spheres, glass, carborundum or the like.

Experimental trials of hollow ceramic Micro-Balloons manufactured by Emerson and Cummings Inc. of Canton, Mass. and of steel spheres manufactured by Kleine-Ferris Inc. of Boston, Mass. indicate such materials to be well adapted for obtaining the desired characteristics in a thread forming gripper. Such trials have also indicated that the most advantageous size of these wear resistant particles fall within the range of .000,030 inch to .100,000 inch diameters.

Although the drawing shows the wear resistant particles as being dispersed throughout the resilient base material, it is preferable that as many as possible be disposed so as to communicate with the axially directed aperture in the gripper and for substantially the complete longitudinal extent thereof.

In operation, an electrostatic field is set up above and in the area of the funneled aperture **27** of the fiber receiving member **22** by means of an electrode **35** as shown in FIG. 1. This electrostatic field aligns, guides and attracts the fibers shown at **36** (FIG. 3) toward and into the funneled aperture **27** of the fiber receiving member. The fibers continue on through opening **30** and into the tapered opening **33** of the gripper **31** and these by means of the rotary movement of said gripper become entangled with the end of a so-called seed yarn or thread **37** which was previously inserted into the bore **32** to facilitate starting and spinning of the fibers.

The wear resistant particles which communicate with the bore **32** provide surfaces for radially gripping the fibers as they are twisted and spun into thread and are also effective in causing the newly formed thread to be moved downwardly and beyond the lower end of the gripper and housing therefor where it is taken up by a suitable means.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

I claim:

1. A rotatable gripping member for receiving textile fibers and spinning them into thread comprising

(a) a gripper body,

(b) a cylindrical gripper of resilient base material adapted to be supported within said gripper body and including an axially directed aperture extending therethrough,

(c) a multiplicity of wear resistant particles dispersed within said cylindrical gripper with some at least thereof communicating with said axially directed aperture to provide gripping surfaces for twisting said fibers into thread as they pass therethrough.

2. The rotatable gripping member according to claim **1** wherein said gripper body includes a funneled end portion for receiving said fibers and directing them to said cylindrical gripper.

3. The rotatable gripping member according to claim **2** wherein one end of the axially directed aperture in said cylindrical gripper terminates in a configuration of conical dimensions and forms a continuation of the funneled end portion of said gripper body to provide a further fiber guiding surface.

4. The rotatable gripping member according to claim **1** wherein said multiplicity of said wear resistant particles are molded into said resilient base material.

5. The rotatable gripping member according to claim **4** wherein the wear resistant particles communicating with said axially directed bore have the greater portion of their external surfaces bonded to the base material.

6. The rotatable gripping member according to claim **1** wherein said wear resistant particles are metallic composition and of a generally spherical configuration.

7. The rotatable gripping member according to claim **1** wherein said wear resistant particles are of non-metallic composition and of a generally spherical configuration.

8. The rotatable gripping member according to claim **6** wherein said wear resistant particles are hollow and the diameters thereof fall within the range of .000,030 inch to .100,000 inch.

9. The rotatable gripping member according to claim **5** wherein said wear resistant particles communicating with said axially directed bore are disposed in close proximity one with the other along the longitudinal extent thereof.

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DONALD WATKINS, Primary Examiner

U.S. Cl. X.R.

57—58.89

Dedication

3,552,112.—*Leo L. Chabot*, Cumberland, R.I. THREAD FORMING GRIPPER. Patent dated Jan. 5, 1971. Dedication filed Mar. 23, 1977 by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

[*Official Gazette May 10, 1977.*]