

United States Patent

[11] 3,583,141

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[73] Assignee Electrospin Corporation
Columbus, Ohio
[32] Priority Dec. 23, 1968
[33] Switzerland
[31] 19358/68

[54] RADIALLY CLAMPING GRIPS
9 Claims, 3 Drawing Figs.

[52] U.S. Cl. 57/59,
57/77.3
[51] Int. Cl. D01h 7/00,
D01h 13/04
[50] Field of Search 57/34, 51,
51.5, 59, 60, 77.3, 77.33, 77.4, 77.45, 106

[56]

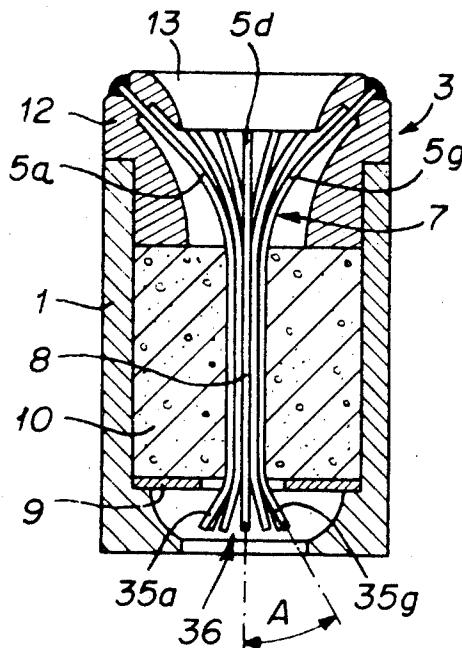
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2,908,132	10/1959	Klemm	47/59X
3,270,491	9/1966	DeLangen	57/77.45
3,372,537	3/1968	Poull et al.	57/59
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Primary Examiner—Donald E. Watkins
Attorneys—John R. Bronaugh, George R. Powers and Floyd S. Levison

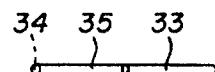
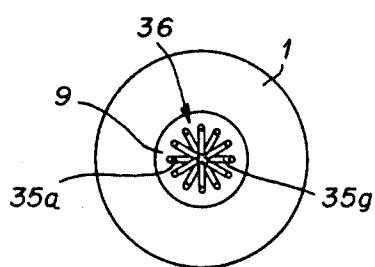
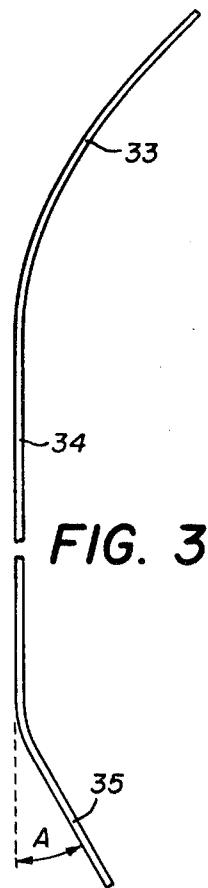
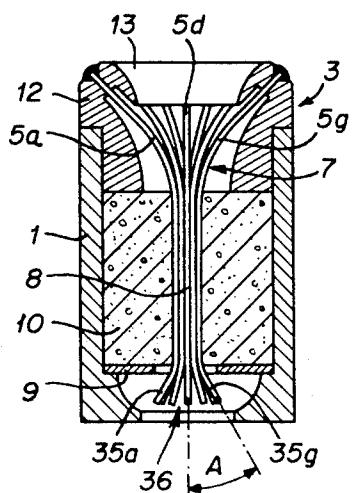
ABSTRACT: A centrally apertured rotatable yarn gripping device for resiliently radially clamping a length of spun yarn while permitting its movement axially through the central aperture, the device having improved means to allow radial expansion of the central aperture to allow insertion of the end of a length of yarn from either end.



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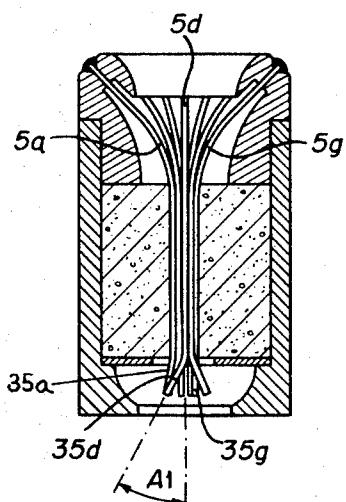


FIG. 5

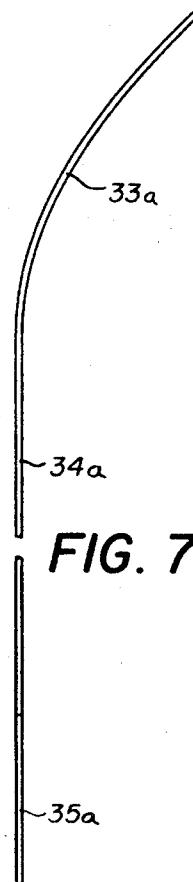


FIG. 7

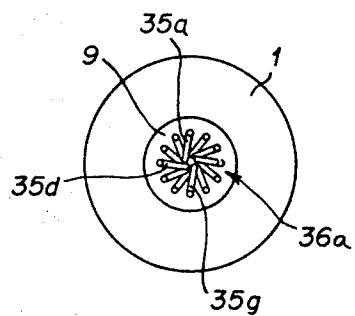


FIG. 6

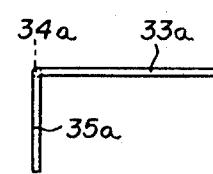


FIG. 8

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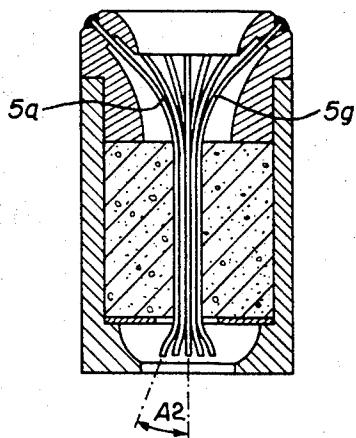


FIG. 9

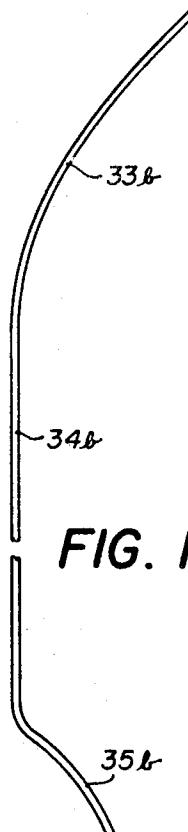


FIG. 11

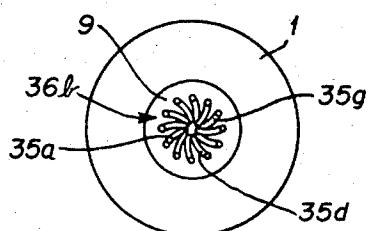


FIG. 10

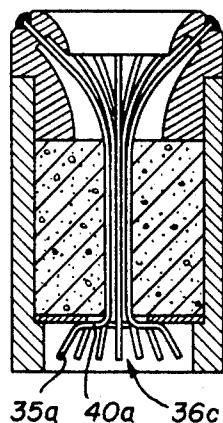


FIG. 13

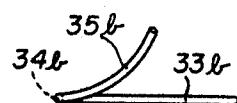


FIG. 12

RADIALLY CLAMPING GRIPS

BACKGROUND OF THE INVENTION

This invention pertains to radially clamping yarn grips of the type disclosed in U.S. Pat. No. 3,372,537 which serve to secure a length of yarn angularly therein while allowing the yarn to slide axially and which in one preferred form includes a rigid cylindrical body formed with an axial bore and a plurality of radially clamping filaments housed within the bore. The clamping filaments are distributed equiangularly around the axis of the grip body and are arched to form a bow-net of circular cross section whose narrow end is prolonged to form a bundle. The clamping grip has a resilient sleeve surrounding the bundle which is made of deformable material having a high elastic damping coefficient, the combination being so arranged that the object being gripped can slide axially from the bow-net toward the bundle of filaments and outwardly of the clamping grip.

With clamping grips of the prior art such as those disclosed in the above-stated patent, at the end of the bundle the flexible filaments are either cut off short or bent radially to prevent the bundle from moving out of the sleeve. The second arrangement as shown in FIG. 5 of that patent has the further advantage of keeping the fibers projecting beyond the surface of the yarn being produced from catching on the filament ends. With both of the clamping grips disclosed, the bundle of filaments cannot be opened, or can only be opened with difficulty from the rear or outlet end, that is from the end remote from the bow-net, for example with a tool able to pry apart the flexible filaments which form the bundle. Such an operation may be necessary, *inter alia*, to engage a yarn in the grip when access to the front thereof is difficult, a not infrequent situation when a grip of this kind is fitted to a textile machine, such as an open end spinning machine of the type disclosed in U.S. Pat. No. 3,411,284 issued Nov. 19, 1968 to Corbaz et al. for "Method and Apparatus for Spinning Textile Fibers."

SUMMARY OF THE INVENTION

This invention provides an improvement, making it readily possible for radial expansion of the central aperture formed by the bundle of filaments from the rear or outlet end. This improvement is characterized in that the central through aperture formed by the flexible filaments of the clamping member is of diverging form at each end, the end of each filament at the outlet end being outwardly in an oblique direction in relation to the axis of the bundle, so that the bent ends together form an outlet bow-net which extends the bundle toward the rear.

It is the general object of this invention to devise a radially clamping grip for use in spinning yarn in an open end spinning machine which can be easily opened from the outlet end for purposes of insertion of the end of a length of yarn for piecing-up the spun yarn.

It is a further object to devise a radially clamping grip which is suitable for use with automatic piecing-up apparatus for open end spinning machines where access through the outlet end is required.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be described by reference to a preferred embodiment thereof and three modifications as shown in the accompanying figures of drawing, wherein:

FIG. 1 is a view in longitudinal section of the first embodiment,

FIG. 2 is a rear end view of FIG. 1,

FIGS. 3 and 4 are enlarged views in side and end elevation respectively of an element visible in FIGS. 1 and 2,

FIGS. 5 and 6 are views in longitudinal section and rear elevation respectively of the second embodiment,

FIGS. 7 and 8 are enlarged views in side and end elevation respectively of an element visible in FIGS. 5 and 6,

FIGS. 9 and 10 are views in longitudinal section and rear elevation respectively of the third embodiment,

FIGS. 11 and 12 are enlarged views in side and end elevation respectively of an element visible in FIGS. 9 and 10, and

FIG. 13 is a view in longitudinal section of a modification of the first embodiment of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Now referring to FIGS. 1 and 2, a grip similar to that in said U.S. Pat. No. 3,372,537 is shown with a cylindrical body 1, its 10 clamping member 3 having an inlet crown 12 of curvilinear funnel shape 13, and a set of flexible filaments 5a to 5g etc. The number of filaments may vary, however, in the present instance 12 are shown. Each flexible filament has a forward part 15 which is arched so that they together form an inlet bow-net being extended by a straight bundle 8. The bundle 8 of filaments is clamped by a sleeve 10 made of a deformable material having a high damping coefficient and which is engaged between the crown 12 and a bearing washer 9 which rests on the base of the cylindrical body 1. In accordance with the 20 present invention, the rear or outlet ends 35a to 35g etc. of each of the filaments 5a to 5g etc. are bent radially in relation to the axis of the bundle 8 so that these bent ends together form an outlet bow-net 36 of conical shape having an opening angle A of less than 90°. FIGS. 3 and 4 show the shape taken 25 on by one of the filaments, for instance filament 5g of FIG. 1. This latter filament comprises an arched portion 33 belonging to the inlet bow-net 7, a centrally positioned straight part 34 belonging to the bundle 8, and a rear or outlet end 35 which is 30 so bent relatively to the straight part 34 as to form therewith an angle A which is always less than 90° and which is preferably less than 45°. In this first embodiment, the rear or outlet end 35 is bent in the same plane as the arched portion 33. The filaments thus define a coaxial aperture through the 35 grip which aperture is of uniform cross section throughout its central region and of divergent progressively greater cross section toward its opposite ends. This aperture is resiliently radially expansible and contractable to permit insertion of a length of yarn therein and to resiliently retain such yarn.

40 The presence of the divergent outlet bow-net 36 facilitates the introduction into the grip, from the rear or outlet end thereof, of any rigid member, e.g. a tubular tool containing a yarn which it is proposed to engage in the grip as is fully explained in copending application Ser. No. 881,357, filed Dec. 45 2, 1969.

The second embodiment, shown in FIGS. 5—6, differs from the first only in that the rear or outlet ends 35a to 35g etc. of the flexible filaments 5a to 5g etc. are bent in a plane other than the plane of the arched portions. This is shown in an enlarged scale in FIGS. 7—8 which show the rear or outlet end 50 35a bent in a plane which includes the axis of the straight portion 34a, but is perpendicular to the plane containing the arched portion 33a. The angle A1 formed by the rear end 35a with the axis of the straight portion 34a, i.e. the opening angle 55 A of the outlet bow-net 36a is here again less than 90°, and preferably less than 45°.

In the third embodiment shown in FIGS. 9—10, the rear or outlet ends 35a to 35g etc. have a double bend by being 60 twisted in a conical helix, traced on a cone of opening A2, as is apparent from FIG. 9; consequently the outlet bow-net 36b as shown in FIG. 10 consists of curvilinear rear ends. In this embodiment each of the flexible filaments has the shape shown in FIG. 11—12, the rear or outlet end 35b being twisted in a conical helix and portions 33b and 34b being similar to portions 33 and 34 in FIG. 3.

The flexible filaments can be bent in the formation shown in FIGS. 1, 5 and 9 after being first bent at right angles in order to bear on the washer 9. FIG. 13 shows the flexible filaments 70 with a 90° prebend 40a which precedes the angular bend 35a similar to that of FIG. 1. This arrangement forms a conical outlet bow-net 36c. This embodiment, however, although it enables the bundle to be opened, for instance by means of a tubular tool, does not allow the latter to be introduced into the bundle, since the 90° bend forms an abutment. The same ap-

plies if the bends in accordance with the other embodiments are adapted after an initial 90° bend. The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

I claim:

1. In a discontinuous yarn spinning machine, a rotatable yarn gripping device for resiliently radially clamping the end of a length of yarn while allowing axial sliding motion of the yarn therethrough, said device comprising
 - a. a rotatable body having means defining a central through aperture with an inlet end, an outlet end, and a central section,
 - b. said aperture defining means being radially expansible and contractable to vary the diameter of said through aperture and resiliently biased toward its contracted configuration,
 - c. the inlet and outlet ends of said aperture defining means being of divergent form relative to said central section to facilitate insertion of the end of a length of yarn into said central section through the outlet end of said through aperture.
2. The device as set forth in claim 1, wherein said aperture defining means includes a plurality of flexible filaments each having an arched portion forming an inlet bow-net and a central portion forming a bundle, and the end of each said flexible filament opposite said arched portion being bent outwardly in

relation to the axis of said body to combine in forming an outlet bow-net.

3. The device as set forth in claim 2 wherein each of said flexible filaments in forming said outlet bow-net is bent in the same plane as the said arched portion of the filament to which it belongs.
4. The device as set forth in claim 2 wherein each of said flexible filaments in forming said outlet bow-net is bent in a plane other than that of the said arched portion of the filament to which it belongs.
5. The device as set forth in claim 3 wherein that portion of each said flexible filament which forms said outlet bow-net is straight.
6. The device as set forth in claim 4 wherein that portion of each said flexible filament which forms said outlet bow-net is straight.
7. The device as set forth in claim 3 wherein that portion of each said flexible filament which forms said outlet bow-net is arched in a plane curve.
- 20 8. The device as set forth in claim 4 wherein that portion of each said flexible filament which forms said outlet bow-net is arched in a plane curve.
9. The device as set forth in claim 2 wherein each of said flexible filaments in forming said outlet bow-net is twisted in a 25 conical helix.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,583,141 Dated June 8, 1971

Inventor(s) MAURICE POULL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 46, before "outwardly" insert -- bent --.

Signed and sealed this 2nd day of November 1971.

(SEAL)

Attest:

EDWARD M.FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents