

[54] SPINNING UNIT FOR OPEN END SPINNING MACHINE

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[22] Filed: **Mar. 9, 1972**

[21] Appl. No.: **233,095**

[30] Foreign Application Priority Data

Mar. 26, 1971 Czechoslovakia 71/2211

[52] U.S. Cl. 57/58.95, 57/58.89

[51] Int. Cl. D01h 1/12

[58] Field of Search 57/58.89, 58.95

[56]

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Primary Examiner—John Petrakes

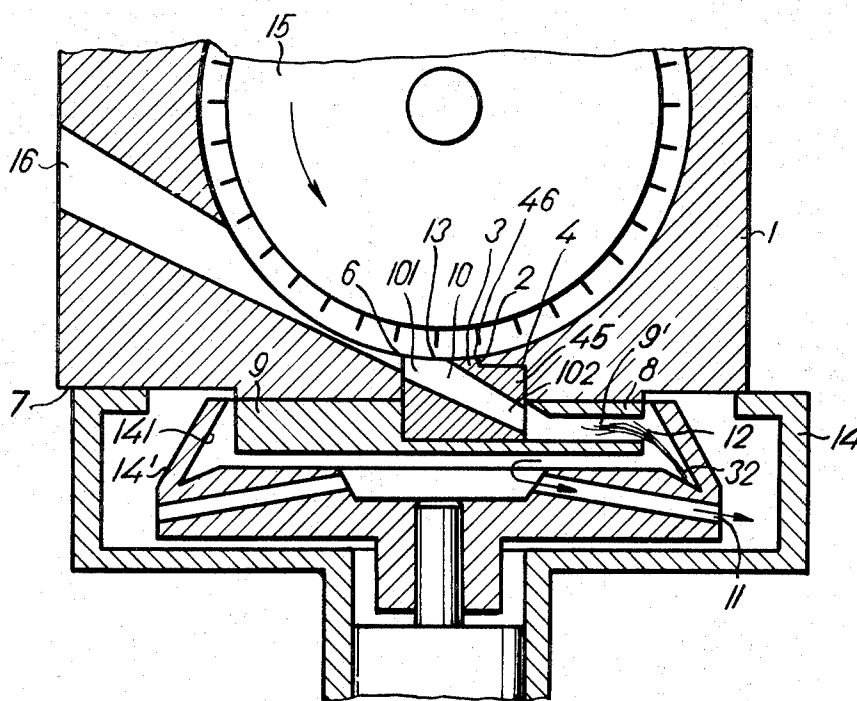
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[57]

ABSTRACT

A spinning unit for use in textile machines, particularly open end spinning machines, comprises a carding roller and a spinning chamber. A supply channel is provided for fibers travelling from the carding roller to the spinning chamber. A yarn withdrawal channel is provided through which yarn is withdrawn from the spinning chamber. At least one detachably mounted expandable wear portion is provided, defining at least part of one of the channels.

12 Claims, 8 Drawing Figures



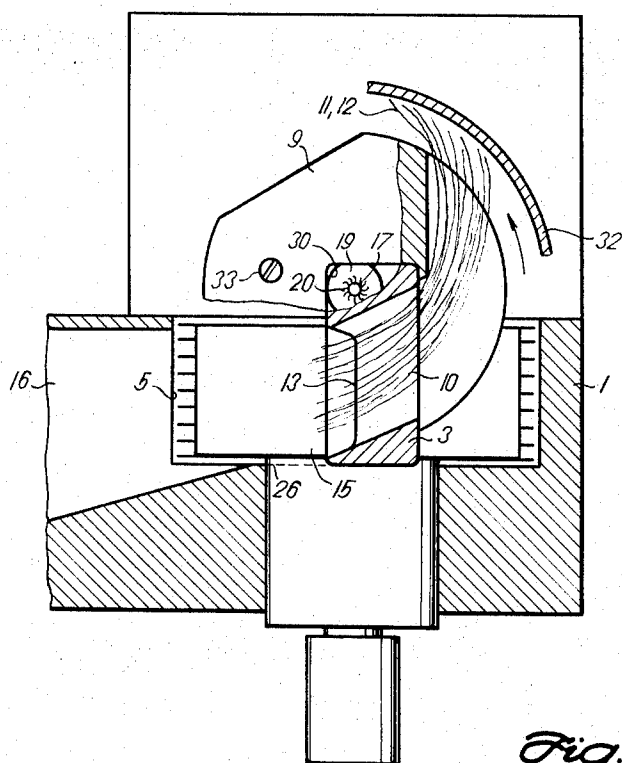


Fig. 1.

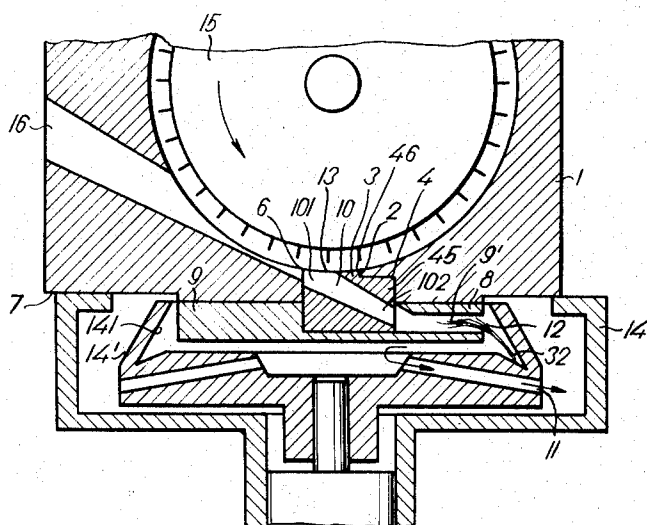


Fig. 2.

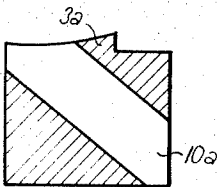


Fig. 2a.

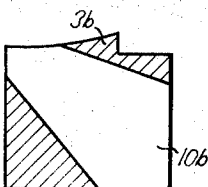


Fig. 2b.

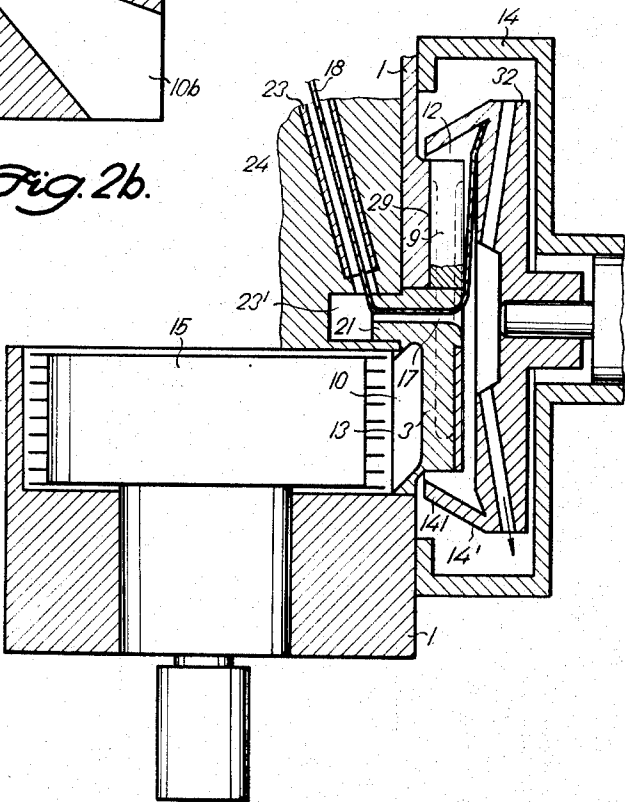


Fig. 3.

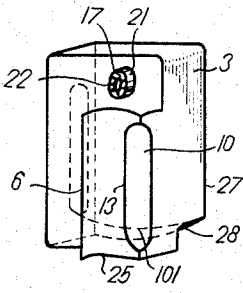


Fig. 4.

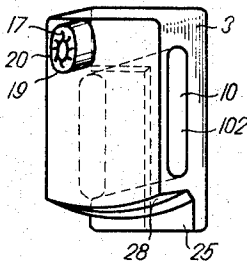


Fig. 5.

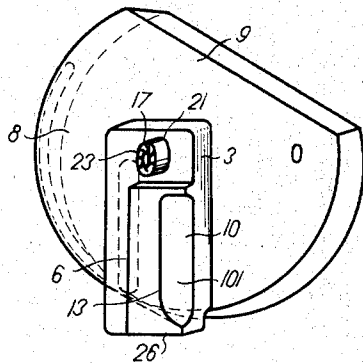


Fig. 6.

SPINNING UNIT FOR OPEN END SPINNING MACHINE

BACKGROUND OF THE INVENTION

The present invention relates to spinning units for spinning machines, and more particularly to spinning units for open end spinning machines.

Open end spinning machines generally comprise a carding chamber including a carding roller mounted for rotation, and a spinning chamber for spinning separated fibrous material into yarn. A supply channel or the like conventionally guides fibrous material separated in the carding chamber towards the spinning chamber.

With such arrangements, the supply channel in particular will usually have a mouth opening towards the carding roller, and this mouth will be defined at least in part by an edge portion. At least parts of such edge portion are usually very sharp, and constitute a so-called fiber-separating edge. Fibrous material which has been separated by the carding roller will enter the supply channel, usually moved along by a current of air, passing of course through the mouth of the channel. Accordingly, a substantial portion of the separated fibers entering the supply channel will pass across edge portions of the supply channel mouth, and in particular will pass across the so-called fiber-separating edge.

With such an arrangement, it follows that edge portions of the supply channel mouth, and particularly the fiber-separating edge will be very much subject to wear. Specifically, the repeated impact against such relatively sharp edge portions of fibrous material, often including impurities such as shell fragments and the like, will quick result in damage to such edge portions. The damage may comprise a general wearing-away, but more disadvantageously occurs in the formation of notches and chinks in these edge portions.

Such notches and chinks present a very great hazard. Clearly, fibrous material passing across the damaged edge portions will often be caught and retained, with relatively quick formation of so-called fiber agglomerates. These fiber agglomerates can very soon clog the supply channel or, after they have built up to a certain extent, may become dislodged and be delivered to the spinning chamber. They may, in that case, become actually incorporated into the finished yarn or, as another possibility, may indirectly affect the yarn quality by clogging the spinning chamber, causing breakages, or otherwise interfering with the spinning operation.

This situation is of course intolerable. Unfortunately, the damage done to the edge portions of the supply channel mouth, as well as to other yarn-contact portions of the spinning unit, is usually irreparable, there being thus no choice but to replace the entire or at least very substantial portions of the spinning unit. Obviously, the financial loss involved is significant.

Various attempts have been made to overcome this situation, these having for their general aim an increase in the lifetime of those yarn-contact portions most subject to wear. These well-known attempts have succeeded to a certain extent in prolonging the useful lifetime of the spinning unit components, but nevertheless do not represent a success. The expensive replacement of the spinning unit body is merely delayed, not eliminated, and the cost of the metallurgical improvements, and the like, is not justified.

A very similar difficulty exists with respect to the withdrawal of finished yarn from the spinning chamber of the spinning unit. Conventionally, the unit is provided with a yarn-withdrawal channel through which the finished yarn is withdrawn, and this channel is usually in part defined by yarn-contact surface portions which are greatly subject to wear. With such withdrawal channel and surface portions as have heretofore been provided, it has often been necessary to discard substantial portions of the spinning unit because of an irreparable damage suffered by relatively small surface portions.

SUMMARY OF THE INVENTION

It is accordingly one object of the present invention to overcome the disadvantages of the prior art outlined above.

It is another object of the present invention to provide a spinning unit in which the problems of wear of yarn-contact and fiber-contact surface portions are decisively dealt with in an economical manner.

In pursuit of these objects, and others which will become apparent hereafter, the invention contemplates, in one embodiment, a spinning unit for use in textile machines, particularly open end spinning machines, comprising carding means for separating fibrous material, spinning chamber means for converting separated fibrous material into yarn, and channel defining means communicating with the carding means and spinning chamber means and defining a fiber supply channel through which fibers travel from the carding means to the spinning chamber means, and further defining a yarn withdrawal channel through which yarn is withdrawn from said spinning chamber means, the channel defining means including at least one detachably mounted expendable wear portion defining at least part of one of said channels.

With the arrangement according to the invention, yarn-contact portions which are most disadvantageously subject to wear may easily and economically be replaced, without discarding large portions of the spinning unit body.

In addition, there is the important possibility for an actual increase of wear-resistance. In particular, it is possible to make the detachably mounted expendable wear portion or portions from a material other than that used for other parts of the spinning unit.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view of a spinning unit according to the present invention;

FIG. 2 is another sectional view of the spinning unit illustrated in FIG. 1

FIGS. 2a, 2b illustrate in fragmentary sectional detail view modifications of the detachably mounted expendable wear portion illustrated in FIG. 2;

FIG. 3 is a further sectional view of the spinning unit illustrated in FIG. 1,

FIG. 4 is a first view of a detachably mounted expendable wear portion of the spinning unit according to the invention;

FIG. 5 is a second view of the wear portion shown in FIG. 4; and

FIG. 6 illustrates the wear portion of FIG. 5 together with an additional component of a spinning unit according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIGS. 1 and 2, it will be seen that the spinning unit according to the invention comprises a housing 1 defining a card chamber 5. Mounted within the carding chamber for rotation by non-illustrated drive means is a carding roller 15 provided on its peripheral surface with needles, or other suitable carding means.

The housing 1 for the carding roller adjoins a spinning chamber whose housing is generally designated by numeral 14. The spinning chamber proper is designated by numeral 14' is mounted for rotation in the housing 14, and comprises a fiber collecting surface 32 onto which separated fibrous material is deposited and from which a yarn is continuously withdrawn. These features of the spinning chamber do not form part of the invention.

It will be seen that a plurality of channels and passages for fibrous material and for yarn is provided. In this particular embodiment, a feed passage 16 extends substantially tangential to the periphery of carding roller 15 and communicates with the atmosphere at its widest end portion. In conventional manner, an underpressure of air is maintained in the spinning chamber 14', and this underpressure produces an inward rush of air from the atmosphere through the wider end of feed passage 16. Carding roller 15 rotates in the direction of the arrow in FIG. 2, and separated fibers engaged by the carding roller needles will, as they pass into the feed passage 16, be doffed by the incoming stream of air. Dofted fibers will thereupon be advanced by such air stream through the subsequent portion of feed passage 16 in direction towards the spinning chamber. Specifically, the fibers 12 will advance through supply channel 10, through guide passage 9, along so-called sliding wall 141 of the rotating spinning chamber 14', and finally be deposited onto the collecting surface 32 of the spinning chamber. In conventional manner, the deposited fibers will be converted into yarn 18 and withdrawn through yarn-withdrawal channel 17 (FIGS. 1, 3), and thence through withdrawing tube 23 (see FIG. 3).

With further reference to FIGS. 1-3 it will be seen that the detachably mounted expendable wear portion according to the invention is generally designated by reference numeral 3. FIG. 2 shows clearly that wear portion 3, which in accordance with the invention forms part of the channel defining means defines a supply channel 10 constituting an extension of feed passage 16, through which fibers travel from the carding roller to the spinning chamber. FIGS. 1 and 3 show clearly that the wear portion 3 also defines a yarn withdrawal channel 17 through which finished yarn is withdrawn, and into which yarn may also be fed during piecing operations.

The configuration of wear portion 3 may be seen most clearly in FIGS. 4 and 5. In FIG. 4, the outlet end

of withdrawal channel 17, with outlet flange 21, is visible, whereas in FIG. 5 the inlet end of channel 17, with inlet flange 20, can be seen. The inlet portion of channel 17 is seen (in FIG. 3) to be provided with a mouth of generally trumpet-shaped configuration, to facilitate entry into the channel of finished yarn. The discharge outlet of channel 17 (see FIGS. 3, 4) is also provided with a rounded-off portion, to facilitate deflection of yarn travelling therethrough.

Referring to FIG. 2, it will be seen that the housing 1 of the carding arrangement is provided with recessed portions in part receiving and retaining the detachably mounted wear portion 3. In particular, it will be noted that portion 3 is accommodated within a recessed portion generally designated by numeral 2, and that recessed portion 2 is configured to include a flange portion 4. A flange 8 is provided on wall 7 of housing 1, and is of generally circular configuration, in the illustration. Connected to flange 8 by means of screws 33, or in any suitable manner, is a dismountable guide means 9, best seen in FIG. 6. With reference to FIG. 2, it is noted that guidemeans 9 defines a guide passage 9' which constitutes an extension of feed channel 10.

Adjoining the spinning chamber 14' there is provided a monitoring means 24 (see FIG. 3) provided with an entrance chamber 23' and a withdrawing tube 23.

Advantageously, wear portion 3 may be made of a highly abrasion-resistant material, such as steel, plastic of the polyamide type, sintered alumina, sintered glass, or another suitable material. The configuration of portion 3, in the illustrated construction, is such that it bears against the edge 46 of opening 2, and also bears against flange portion 4. Furthermore, in FIG. 2, its lower part (as seen in that Figure) bears against the inner wall of guide means 9.

With regard to the supply channel defined by wear portion 3, it will be seen that the channel 10 of FIG. 2 has a transverse cross-section which decreases in direction towards the spinning chamber. The wear portion of FIG. 2a defines a similar channel 10a, which has a substantially constant transverse cross-section in direction towards the spinning chamber, whereas FIG. 2b shows another such supply channel 10b which diverges in direction towards the spinning chamber. From FIGS. 4 and 5 it can be clearly seen that the wear portion 3, in the embodiment of FIG. 2, defines a supply channel 10 whose transverse cross-section is of substantially slot-shaped configuration.

As will be evident, the supply channel 10 is so oriented as to constitute an extension of the feed passage 16. In addition, in FIG. 2, the supply channel 10 has a mouth (best seen in FIGS. 4 and 6) defined by an edge portion of the wear portion 3, this edge portion including the so-called fiber-separating edge 13, which in conventional constructions is the portion of the spinning unit most subject to wear.

In the interests of simple construction, and as shown in FIG. 2, it is advantageous to configure the wear portion 3 so that its outlet 10² is substantially coplanar with the wall 45 of recessed portion 2. It hardly need be explained, of course, that such configuration is not absolutely necessary.

Likewise, it is advantageous for the sake of compactness and simplicity to provide a single wear portion 3 defining both supply channel 10 and withdrawal channel 17, as in the embodiment illustrated. In such case, it is desirable that the respective directions of channels

10 and 17 define between themselves an acute angle.

Finally, it is noted that side 25 (FIGS. 4, 5) of the wear portion 3 bears against part 26 of carding chamber housing 1, where also the inlet of channel 10 is located, while the other side 27 of wear portion 3 is provided with a rounded-off recess 28 which closes the inlet part 29 of housing 14 of spinning chamber 14' by bearing against such part.

It will be appreciated from the foregoing that the invention comprehends a number of advantageous concepts and features. Likewise, a very specific illustration has been provided, for the sake of clear disclosure. However, numerous modifications of the disclosed embodiment may be made. Indeed, the invention may be realized in ways quite different from that shown.

It is emphasized that the wear portion 3 need not constitute a single member defining both channels 17 and 10. Separate wear portions may be provided for each channel. One wear portion may define one channel and part of a second channel, while a second wear portion defines the remainder of the second channel. Likewise a plurality of wear portions may be provided, each defining only part of a channel. Obviously, by resorting to such variations, it will be possible to remove only those portions which have actually become worn or damaged to an extent rendering them useless, while not removing other portions which though detachably mounted and expendable have not yet been sufficiently worn.

Also, the relative disposition of carding chamber and spinning chamber depicted need not be resorted to; arrangements having an entirely different configuration are included within the scope of the invention concept, especially if they comprise detachably mounted expendable wear portion such as those described. The relative directions of yarn and fiber travel are merely exemplary.

Finally, it is specifically noted that the inventive concept is by no means limited in its usefulness to open-end spinning machines, nor even to spinning machines in general. The concepts of the invention may advantageously be applied wherever problems of isolated wear exist similar to those discussed. Certainly, with respect to spinning machines having a configuration other than that illustrated, it is realized that parts other than the supply and withdrawal channels may be subject to wear. Accordingly, the invention specifically contemplates providing such other spinning unit parts too, in the form of detachably mounted expendable wear portions.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a spinning unit for use with open end spinning machines.

Without further analyses, the foregoing will so fully reveal the gist of the present invention that others can be applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

We claim:

1. A spinning unit for use in textile machines, particularly open end spinning machines comprising carding means for separating fibrous material; spinning chamber means for converting separated fibrous material into yarn; and channel defining means communicating with said carding means and spinning chamber means and defining a fiber supply channel through which fibers travel from said carding means to said spinning chamber means, and further defining a yarn withdrawal channel through which yarn is withdrawn from said spinning chamber means, said channel defining means including at least one discrete detachably mounted expendable wear portion defining at least part of at least one of said channels.

2. A spinning unit as defined in claim 1, said carding means including a carding chamber, a carding roller mounted for rotation in said chamber, and a feed passage in part defined by the periphery of said carding roller and extending along a given direction, and wherein said supply channel extends along said given direction and forms a continuation of said feed passage, said detachably mounted expendable wear portion defining at least part of said supply channel.

3. A spinning unit as defined in claim 1, said carding means including a carding chamber and a carding roller mounted for rotation in said carding chamber, said supply channel having a mouth opening towards said carding roller, and wherein said expendable wear portion defines at least part of said supply channel and includes an edge portion defining said mouth of said supply channel, at least part of said edge portion constituting a fiber-separating edge.

4. A spinning unit as defined in claim 1, said expendable wear portion defining at least part of said supply channel, said supply channel having a transverse cross-section of substantially slot-shaped configuration.

5. A spinning unit as defined in claim 4, said transverse cross-section being substantially constant along the length of said supply channel.

6. A spinning unit as defined in claim 4, said transverse cross-section decreasing in direction from said carding means to said spinning chamber means.

7. A spinning unit as defined in claim 4, said transverse cross-section diverging in direction from said carding means to said spinning chamber means.

8. A spinning unit as defined in claim 7, at least one of said carding chamber housing and guide means being provided with recessed portions receiving and retaining said expandable wear portion.

9. A spinning unit as defined in claim 1, said expendable wear portion defining at least part of said supply channel; said carding means comprising a housing defining a carding chamber; and further comprising dismountable guide means detachably mounted on said carding chamber housing and at least in part defining a guide passage extending in direction from said carding means towards said spinning chamber means and constituting an extension of said supply channel.

10. A spinning unit as defined in claim 1, said expendable wear portion defining at least part of said yarn withdrawal channel, and said yarn withdrawal channel having an at least substantially circular cross-section.

11. A spinning unit as defined in claim 1, said supply channel extending substantially in a first direction and said yarn withdrawal channel extending substantially in

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a second direction defining with said first direction an acute angle.

12. A spinning unit as defined in claim 1, said expendable wear portion defining at least part of said supply channel; said carding means comprising a housing 5 defining a carding chamber, said housing being provided with at least one recessed portion defined at least

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in part by a wall portion having a general plane, said expendable wear portion being at least in part received in said recessed portion, and said supply channel having an outlet and an edge portion defining said outlet, said edge portion lying in said general plane.

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