

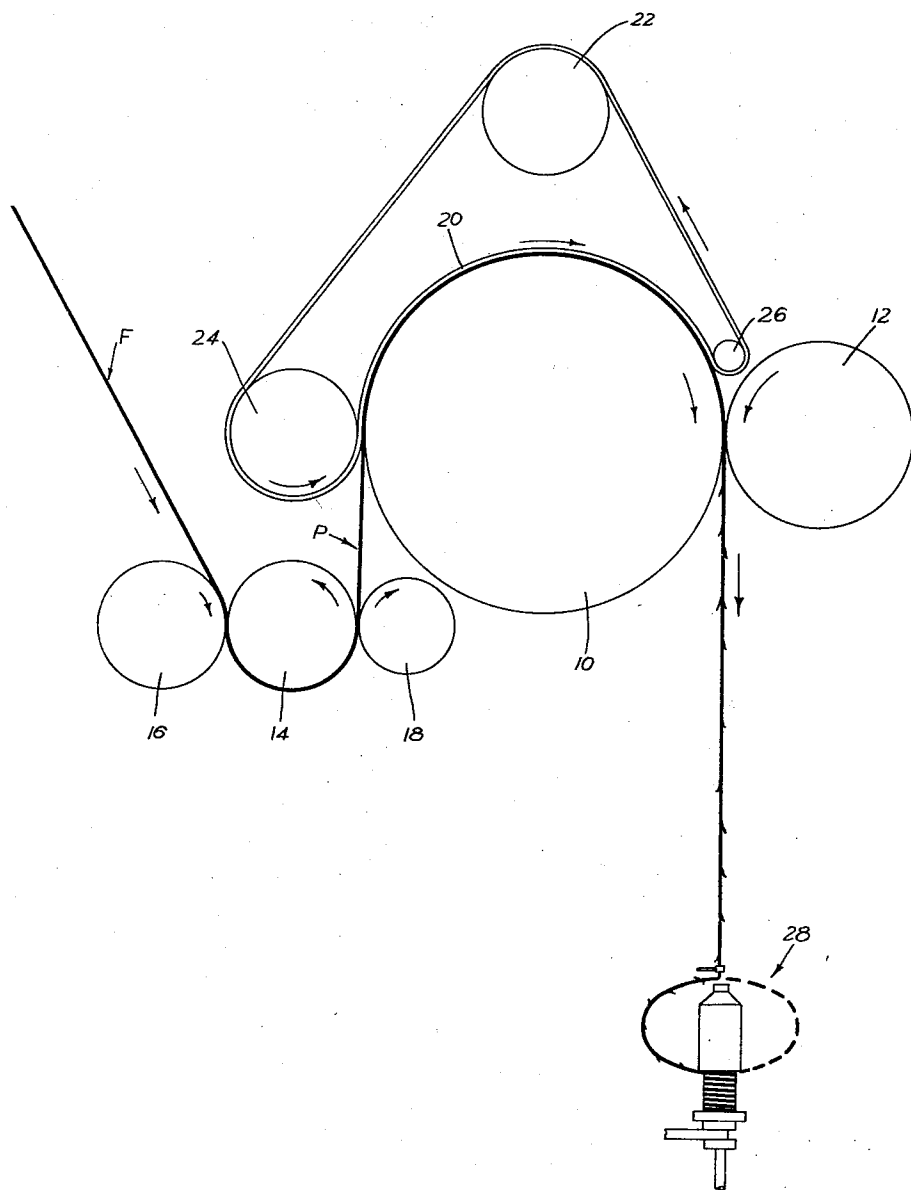
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DIRECT SPINNING MACHINE AND METHOD

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DIRECT SPINNING MACHINE AND METHOD

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4 Claims. (Cl. 57-2)

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My present invention relates to the production of spun rayon yarn from continuous rayon filaments.

In producing yarn from continuous filaments by the direct spinning process, it is desirable that the staple yarn fibers which are produced by rupturing the continuous filaments of the tow be as long as possible within practical limits. It is therefore an object of the present invention to provide a direct spinning machine which is operable to produce staple fibers of this character.

The above object of the invention and other objects ancillary thereto will be fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings, the single figure is illustrative of the machine and method of the present invention.

Referring to the drawings in detail, the machine comprises the front roll 10 and a companion pressure roll 12 which are rotated at the same linear or peripheral speed, and a set of back rolls 14, 16 and 18 which are rotated at the same linear or peripheral speed. The bundle or tow of continuous filaments, indicated at F, is drawn from a suitable supply (not shown) and passes between the back roll 14 and the companion rolls 16 and 18, respectively, to and between the pair of front rolls 10 and 12. Said front rolls 10 and 12 are rotated at a substantially greater peripheral surface speed than rolls 14, 16 and 18 whereby the filaments are tensioned and ruptured into staple fibers.

In accordance with the present invention, the front roll 10 is considerably larger than the front roll of the usual direct spinning machine, and means, preferably an endless flexible belt or web 20, is arranged to press the fibers against the peripheral surface of said roll. Said belt 20 is preferably formed of soft leather similar to that used on long draft spinning machines and is held in juxtaposition to roll 10 by guide pulleys 22, 24 and 26 which are non-driven but are free to rotate during the movement of the belt 20. It will be understood that the filaments of the tow are substantially parallel and that web 20 is wide enough to press the fibers against roll 10 for the full width of the tow. The pressure of belt 20 against the fibers on the roll 10 is not sufficient to break the filaments but is adjusted so that the fibers are held against the roll 10 so that during the operation of the machine the rupture of the filaments of the tow F occurs at about the

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point P located between the bight between rolls 14 and 18 and the point at which belt 20 passes between front roll 10 and belt roll 24. Belt 20 is in operative peripheral engagement against roll 10 for about half of the circumference of said roll, substantially as indicated in the drawings, so that when the fibers pass between the front roll 10 and the companion pressure roll 12 they are ruptured at about said point P. It will be readily understood that the filaments tend to break in the region indicated at P and hence the lengths of the fibers correspond substantially to the linear distance from the bight of rolls 10 and 12 to a point located between the bight of rolls 14 and 18 and the point at which belt 20 is held by roll 24 against front roll 10. It will be understood that belt rolls 24 and 26 may be mounted in any way for adjustment in order to adjust the pressure of said belt against the peripherally extending portion of roll 10. From the front rolls 10 and 12, the fiber staple passes to a spinning device 28, here shown as a cap spinner, but it will be understood that a ring spinning device, a flyer spinning device, or any other suitable spinning device may be used instead of the illustrated type of spinner.

In my application Ser. No. 640,727, filed January 12, 1946, now abandoned, I have shown a direct spinning machine in which the diameter of the front roll, which corresponds to the above-mentioned front roll 10, is about 3". In the present case, the diameter of the front roll 10 is preferably about 6". It will be understood, however, that although this dimension is presently preferred, it is to be considered as illustrative but without limitation in respect to the diameter of said roll. Also, it will be understood that while I have shown only one set of front rolls and back rolls and a companion belt 20, the machine may be provided with a plurality of sets of front and back rolls, companion pressure belts, respectively, and companion spinning devices as illustrated in said prior application.

Various changes in the details of construction and in the arrangement of parts may be made in the above described machine without departing from the underlying idea or principles of this invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In a machine for producing staple fibers from continuous filaments, said machine comprising two pairs of driven rolls which are operable to tension and rupture the filaments into the staple fibers, while said filaments pass from

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one of said pairs of rolls to the other of said pairs of rolls; a movable flexible web mounted in juxtaposition to one of the rolls of said other pair for pressing the fibers against the peripheral surface of said one of the rolls, said web being free of engagement with the other roll of said other pair.

2. In a machine for producing staple fibers from continuous filaments, said machine comprising two pairs of driven rolls which are operable to tension and rupture the filaments into the staple fibers while said filaments pass from one of said pairs of rolls to the other of said pairs of rolls, said last mentioned pair of rolls comprising one roll over which the fibers pass and a companion pressure roll; the combination with said one roll of a movable flexible web mounted in juxtaposition to said one roll for pressing the fibers against the peripheral surface thereof back of said pressure roll, the rear-most portion of said web in the direction in which said filaments pass being disposed forwardly of said one pair of rolls and the forward-most portion thereof being disposed back of said pressure roll whereby the lengths of said staple fibers correspond substantially to the linear distance from the bight of said other pair of rolls to a point between the bight of said one pair of rolls and said rear-most portion.

3. A machine for producing staple fibers from continuous filaments, comprising, in combination, a front pair of rolls and a back pair of rolls which are operable to tension and rupture the filaments as they pass from said back rolls to said front rolls, said front rolls comprising one roll over which said fibers pass and a pressure roll and means disposed between said back rolls and said pressure roll for pressing the fibers against the peripheral surface of said one roll during the movement of the fibers to said pressure roll, the rear-most portion of said means in the direction in which said filaments pass being disposed forwardly of said back pair of rolls and the forward-most portion thereof being disposed back of said

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pressure roll whereby the lengths of said staple fibers correspond substantially to the linear distance from the bight of said front rolls to a point between the bight of said back rolls and said rear-most portion.

4. A machine for producing staple fibers from continuous filaments, comprising, in combination, a front pair of rolls and a back pair of rolls which are operable to tension and rupture the filaments as they pass from said back rolls to said front rolls, said front rolls comprising one roll over which said fibers pass and a pressure roll, and means disposed between said back rolls and said pressure roll for pressing the fibers against the peripheral surface of said one roll during the movement of the fibers to said pressure roll, and a spinning device in advance of said pressure roll for spinning said fibers into yarn, the rear-most portion of said means in the direction in which said filaments pass being disposed forwardly of said back pair of rolls and the forward-most portion thereof being disposed back of said pressure roll whereby the lengths of said staple fibers correspond substantially to the linear distance from the bight of said front rolls to a point between the bight of said back rolls and said rear-most portion.

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