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(54) METHOD AND DEVICE FOR THE PNEUMATIC
 SPINNING OF YARN

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 NICZYCH, a State Enterprise organised and
 existing under the laws of Poland, of ul.
 5 Wolczanska 55/59, 90-608 Lodz, Poland,
 do hereby declare the invention, for which
 we pray that a patent may be granted to
 us, and the method by which it is to be
 performed, to be particularly described in
 10 and by the following statement:

This invention relates to a method and a
 device for the pneumatic spinning of yarn
 from natural or synthetic fibres.

The process of pneumatic spinning which
 15 has hitherto become familiar, consists in
 supplying fibres into a stationary spinning
 chamber wherein air jets cause the fibres
 to form a sort of whirling ring and to
 attain an appropriate velocity in a peri-
 20 pheral zone where forming and twisting of
 yarn takes place by collecting the fibres
 from said whirling ring thereof.

The existing equipment for pneumatic
 spinning of yarn consists of a cylindrical,
 25 non-rotational or stationary chamber into
 which the fibres are introduced and set into
 rotational motion by means of air streams
 sucked into the chamber through ducts or
 passages arranged in the chamber peri-
 30 phery. The yarn produced is discharged
 through a channel provided in a cylindrical
 insert bounding one side of the chamber.

The rate of spinning in the process is
 proportional to the peripheral velocities
 35 within the zone where said fibre whirl ring
 is formed. The shape of the chamber and
 the introduction of the air streams con-
 tiguous to the wall of the chamber leads to
 the formation of a strong whirl core or vor-
 40 tex in the centre of the chamber to the
 detriment of the distribution of the field of
 velocities, the velocities at the chamber wall
 being reduced with consequent reduction in
 the velocity of the whirling ring, and a
 45 large proportion of the whirling air does

not take part in the spinning process, i.e.
 the spinning of the fibres in the ring borne
 by the whirling air ring.

The object of the present invention is to
 bring about a reduction in the intensity of
 the whirl core or vortex and improve the
 50 distribution of the field of velocities,
 especially in favour of an increase in the
 velocities at the chamber wall.

According to the present invention we
 55 provide a method of pneumatically spin-
 ning yarn from loose fibres, comprising
 establishing a ring of fibres in an air-
 stream whirling next to the inner walls of
 a stationary spinning chamber to create a
 60 whirl core or vortex, and urging the swirled
 air flow along the wall of the spinning cham-
 ber in the axial direction by means of a
 system of axial channels below the level of
 the ring of fibres and partially blanked off
 65 from the whirl core or vortex, thereby to
 restrict the flow into the whirl core or vor-
 tex of air particles whirling at high veloci-
 ties.

Also according to the present invention,
 70 we provide a device for the pneumatic spin-
 ning of yarn from loose fibres, comprising
 a stationary cylindrical spinning chamber, a
 cylindrical insert closing said chamber from
 one of its ends and provided with a yarn
 75 discharge channel, a source of vacuum com-
 municating with the other end of said
 chamber, ducts to supply air, and a channel
 to deliver fibres at the periphery of said
 chamber, a disk centred on the longitudinal
 80 axis of said chamber beneath the level
 where a whirling fibre ring is formed in
 operation of the device to restrict the flow
 into the whirl core, and axially-directed air
 guide vanes in the suction side of the
 85 chamber below said disk.

With the air flow being forced along the
 chamber wall, the swirling air flow within
 the whirl core or vortex is weakened and
 thus the yarn spinning rate is increased. 90

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawing, which is a longitudinal section through a device for the pneumatic spinning of yarn from loose fibres.

Referring now to the drawing, a device for the pneumatic spinning of yarn from loose fibres comprises a stationary cylindrical spinning chamber 1 closed from one of its ends by a cylindrical insert 2 which is provided with an axial channel 3 to discharge yarn 4, and at the other of its ends communicating with a vacuum source (not shown) via a suction conduit. At its periphery, the chamber 1 has supply air ducts 6, which extend tangentially to the inner surface of the chamber 1 and can be located in any section of the chamber, and a fibre delivery channel 7 which also extends tangentially to the inner surface of the channel 1. Inside the chamber 1, beneath the yarn spinning level, there is provided a disk 8 which is centred on the longitudinal axis of the chamber 1. Beneath this disk 8 there are arranged at the air suction side in the chamber axially-directed guide vanes 9 by means of which the consumption of kinetic energy is reduced and the air-stream direction is changed to axial with consequent decrease in the annular components of the velocity and increase in the axial components of velocity. In the channels formed between adjacent guide vanes 9, kinetic energy changes to potential energy or pressure. In effect, loss of flow is reduced as is the pressure difference necessary for enforcement of flow through the spinning chamber. In the absence of such guide vanes, the total energy of the annular components of velocity is dissipated and converted to heat.

The method of yarn spinning by means of the device just described consists in sucking air into the chamber 1 and making it whirl inside the chamber. The fibres delivered into the chamber through the channel 7 are set into rotational motion by the sucked air stream and produce a ring 10 of fibres rotating next to the inner wall of the chamber 1. As the sucked air stream meets the disk 8, the flow into the whirl core or vortex of air particles whirling at high velocities is restricted, and the air particles moving at high peripheral velocities will be urged along the chamber wall in the axial direction and thus reduce the whirl-producing effect.

To start spinning, a length of yarn is introduced via the channel 3 into the chamber 1, and after having been set into rotational motion therein, this length gathers fibres from the whirling ring 10 and twists them, whereupon the spun yarn 4 is discharged from the chamber.

Reference is made to our co-pending patent applications nos. 8052/77 (Serial No. 1 567 682), 8957/77 (Serial No. 1 567 683, and 9114/77 (Serial No. 1 567 684).

WHAT WE CLAIM IS:—

1. A method of pneumatically spinning yarn from loose fibres, comprising establishing a ring of fibres in an air-stream whirling next to the inner walls of a stationary spinning chamber to create a whirl cove or vortex, and urging the swirled air flow along the wall of the spinning chamber in the axial direction by means of a system of axial channels below the level of the ring of fibres and partially blanked off from the whirl core or vortex thereby to restrict the flow into the whirl core or vortex of air particles whirling at high velocities.

2. A device for the pneumatic spinning of yarn from loose fibres, comprising a stationary cylindrical spinning chamber, a cylindrical insert closing said chamber from one of its ends and provided with a yarn discharge channel, a source of vacuum communicating with the other end of said chamber, ducts to supply air, and a channel to deliver fibres at the periphery of said chamber, a disk centred on the longitudinal axis of said chamber beneath the level where a whirling fibre ring is formed in operation of the device to restrict the flow into the whirl core, and axially-directed air guide vanes in the suction side of the chamber below said disk.

3. A method of pneumatically spinning yarn from loose fibres, substantially as hereinbefore described with reference to the accompanying drawing.

4. A device for the pneumatic spinning of yarn from loose fibres, substantially as hereinbefore described with reference to the accompanying drawing.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

