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(21) Application No. 7756/77 (22) Filed 24 Feb. 1977  
 (31) Convention Application No.  
 187 854 (32) Filed 10 March 1976 in  
 (33) Poland (PL)  
 (44) Complete Specification published 21 May 1980  
 (51) INT. CL.<sup>3</sup> D01H 1/12  
 (52) Index at acceptance  
 D1D AEB



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

(71) We, CENTRALNY OSRODEK BADAWCZO-ROZWOJOWY MASZYN WLOKIENNICZYCH, 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 peripheral zone where forming and twisting of 20 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 periphery. The yarn produced is discharged 30 through a channel provided in a cylindrical insert bounding one side of the chamber.

The rate of spinning in the process is 35 proportional to the peripheral velocities within the zone where said fibre whirl ring is formed. The shape of the chamber and the introduction of the air streams contiguous to the wall of the chamber leads to the formation of a strong whirl core or vortex in the centre of the chamber to the detriment of the distribution of the field of 40 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 50 the whirl core or vortex and improve the 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 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 60 whirl core 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 65 from the whirl core or vortex, thereby to restrict the flow into the whirl core or vortex of air particles whirling at high velocities.

Also according to the present invention, 70 we provide 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 75 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 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 5 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 10 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 15 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 20 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 25 kinetic energy is reduced and the air-stream direction is changed to axial with consequent decrease in the annular components 30 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 35 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 40 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 45 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 50 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 55 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 60 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 65 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 75 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 80 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 85 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 90 where a whirling fibre ring is formed in 95 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 100 yarn from loose fibres, substantially as hereinbefore described with reference to the accompanying drawing.

4. A device for the pneumatic spinning 105 of yarn from loose fibres, substantially as hereinbefore described with reference to the accompanying drawing.

FITZPATRICKS,  
Chartered Patent Agents,  
14-18 Cadogan Street,  
Glasgow. G2 6QW.  
and  
Warwick House,  
Warwick Court,  
London. WC1R 5DJ.

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COMPLETE SPECIFICATION

1 SHEET

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

