(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 473 388 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.11.2004 Bulletin 2004/45

(51) Int Cl.[7]: **D01H 5/72**, D01H 5/26

(21) Application number: **04380069.7**

(22) Date of filing: **30.03.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(30) Priority: **30.04.2003 ES 200301064 U**

(71) Applicant: **Pinter, S.A.**
08251 Santpedor (Barcelona) (ES)

(72) Inventor: **Figuls Prat, José**
08251 Santpedor (Barcelona) (ES)

(74) Representative: **Duran Moya, Carlos et al**
DURAN-CORRETJER
Còrsega, 329
(Paseo de Gracia/Diagonal)
08037 Barcelona (ES)

(54) Fibre condensing device for spinning machines

(57) The device comprises, at the outlet of the final pair of rollers (4) of a spinning machine draw-frame, a tubular element (20) which is parallel to the axis of said rollers (4), is connected to a source of vacuum, and is provided with multiple transverse grooves (7), on which there runs a band (9) provided with small perforations for receiving, in turn, through its face remote from said tube, the sliver (5) leaving the draw-frame, and performing the transverse condensing of said sliver (5) as it adapts to the empty grooves (7) through the perforated band (9), the tubular element (20) having a gently curved structure in the adaptation region of the perforated band (9), and is characterised in that it comprises a drive cylinder (13) inside the perforated band (9), which receives a tangential upper roller (14), which has resilient characteristics and of which the drive cylinder (13) is actuated by a longitudinal shaft common to the various drawing units of the machine.

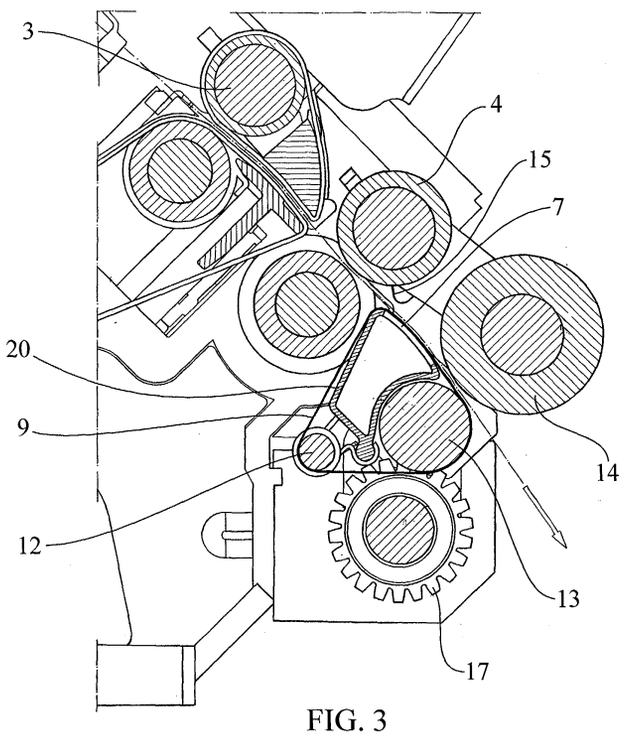

FIG. 3

EP 1 473 388 A2

Description

[0001] The present invention relates to a device for condensing the fibres in the sliver in spinning machines, having significant characteristics of novelty and inventive step.

[0002] The device to which the present invention relates is intended to condense the fibre sliver that issues from the draw-frame in spinning machines, significantly reducing the effect of fibres protruding from the sliver, which create the effect known as "hairs" due to faults in the condensing of the sliver.

[0003] By means of the device according to the present invention, improved condensing of the fibres that make up a sliver is possible, and this significantly increases the quality of the yarn produced.

[0004] To achieve more regular and better quality yarns, the present invention provides a system for condensing after drawing and before twisting, by means of an aerodynamic arrangement, of which the degree of condensing depends on the quantity and diameter of the holes in a band or "bag" transporting the bundle of fibres, of which the perforated bag is subjected to suction through one or more grooves, in such a way that, after being drawn and before being twisted, the fibres are placed above the perforated bag which travels at a speed somewhat higher than said first line cylinder or forming cylinder, performs condensing drawing with slight tension of the fibres and helps to orient them longitudinally. One or more grooves that are straight or inclined in the direction of the fibres are connected to a suction source creating a transverse force that condenses the fibres deposited above the perforated bag.

[0005] The width of the fibres is reduced by means of this arrangement, and this reduces and almost eliminates the so-called spinning triangle, and orients and integrates the fibres uniformly in the cross section of the yarn, thus improving the arrangement of the fibres, reducing the quantity of unintegrated fibres, reducing hairiness or fluffiness, reducing variation in the diameter of the yarn through less loss of fibres through suction, and reducing points that are thin, thick, etc. Hence, a cleaner, more regular and better quality yarn may be obtained through the application of the present invention.

[0006] Following the condensing device of the present invention, the yarn will be twisted, allowing a yarn with very advantageous properties for the spinning process and for the subsequent processes of dyeing, weaving, etc. to be obtained.

[0007] As an explanatory and non-limiting example, the accompanying drawings will assist understanding of the present invention.

[0008] Fig. 1 is a diagrammatic view of the arrangement of rollers of said first, second and third lines in a conventional drawing system.

[0009] Fig. 2 is a diagrammatic view similar to Fig. 1 of a condensing device according to the present invention.

[0010] Fig. 3 is a diagrammatic cross section of the device according to the present invention.

[0011] Fig. 4 is a cross section of the actual device according to the invention.

[0012] Fig. 5 is a perspective view of the actual device according to the invention, from the driving side.

[0013] As illustrated in the figures, in a conventional draw-frame the entering fibre bundle 1 is received by a first roller 2 rotating at low speed, then passes to the second rollers 3 rotating at a slightly higher speed than the roller 2 and performing with respect thereto what is known as preliminary drafting, and then passes to a third roller 4 revolving at a much higher speed of approximately 12 to 80 times the speed of the roller 2 performing the main drawing. The sliver 1 has been reducing to a much narrower, sufficiently parallel sliver 5. On leaving the nip of the roller 4 said spinning triangle 6 is formed, of which the vertex has been produced by the twisting of the yarn 8.

[0014] The present invention provides for the arrangement, after the conventional roller 4, of a condensing device which is formed as shown diagrammatically in Fig. 2 by means of a tubular element 20 connected to a source of vacuum, and has transverse grooves that are inclined or straight 7, single or multiple, and are covered by a band 9 provided with micro-orifices, all of which is shown in more detail in Fig. 3 et seq., so the suction which is produced in the tubular element 20 and transmitted by the single or multiple grooves 7 contributes to condensing of the sliver, making it parallel and preventing the protrusion of transverse fibres, so the spinning triangle, from the point 10 from which the yarn is subjected to twisting 11, is reduced to a minimum value. The tubular element 20 has a concave side adapted externally to a part of the drive cylinder.

[0015] As shown in Fig. 3, the tubular element 20 is of a specific, substantially trapezoidal form, having in its upper gently curved side the grooves 7 over which there runs the perforated band, also called perforated bag 9, which is tensioned and guided by a longitudinal bar 12 provided with small longitudinal recesses, as can be seen in said Fig. 3, for housing the band or bag 9, which is actuated by the cylinder 13. While a roller covered with synthetic rubber 14 rests on the perforated band or bag 9 through the pressure applied by the spring 15.

[0016] The cylinder 13 has a toothed pinion 16 which meshes with the transmission wheel 17 of a transmission shaft 18. Said shaft 18 is connected to the following section of the spinning machine, running along the whole length thereof. A servomotor will actuate the shaft 18, allowing its speed to be changed to achieve optimum condensing drawing. The pinion 16 and the wheel 17 are enclosed inside a surrounding case or housing 19 to prevent the entry of dirt, and guarantee lubrication. In some applications these gears can be replaced by toothed wheels at 45º to perpendicular shafts when there is not enough space to install the shaft 18 beneath the cylinder 13 and it must be placed behind the drawing

entry cylinder.

[0017] As will be seen, through the arrangement of elements described, effective condensing of the fibres in the sliver in spinning machines can be achieved, producing the substantial advantages indicated at the beginning.

[0018] In particular, in the device according to the invention, the driving shaft takes its power directly from the drive shaft of the unit, which helps avoid mechanical problems of breakage of the shaft used in the draw-frames for the normal driving of the rollers, if the device according to the invention is to be incorporated into spinning machines that are already in operation.

[0019] A further important advantage of the device according to the present invention is the low sensitivity of the precise diameter of the levelling rollers, since precision of levelling is not required, given the general arrangement of the device.

[0020] Similarly, as it has an independent actuating shaft, it is possible to adjust the condensing drawing to the most appropriate values.

Claims

1. Device for condensing fibres in spinning machines that comprises, at the outlet of the final pair of rollers of a spinning machine draw-frame, a tubular element which is parallel to the axis of said rollers, is connected to a source of vacuum and is provided with multiple transverse grooves, on which runs a band provided with small perforations and in turn receiving, through its face remote from said tube, the sliver leaving the draw-frame, and performing the transverse condensing of said sliver as it adapts to the empty grooves through the perforated band, the tubular element having a gently curved structure in the adaptation region of the perforated band, **characterised in that** the device comprises a drive cylinder inside the perforated band, which receives a tangential upper roller, which has resilient characteristics and of which the drive cylinder is actuated by a longitudinal shaft common to the various drawing units of the machine.

2. Device for condensing fibres in spinning machines, according to claim 1, **characterised in that** the perforated band is mounted in contact with the part of the tubular suction element that has the grooves, with a peripheral region of the drive cylinder, and with a bar for tensioning and guiding said band.

3. Device for condensing fibres in spinning machines according to claim 2, **characterised in that** the bar for tensioning and guiding the perforated band has successive staggered regions to receive the successive belts of the drawing devices of the spinning machine, in which the device is incorporated.

4. Device for the condensing of fibres in spinning machines according to claim 1, **characterised in that** the tubular element has a concave side adapted externally to a part of the drive cylinder.

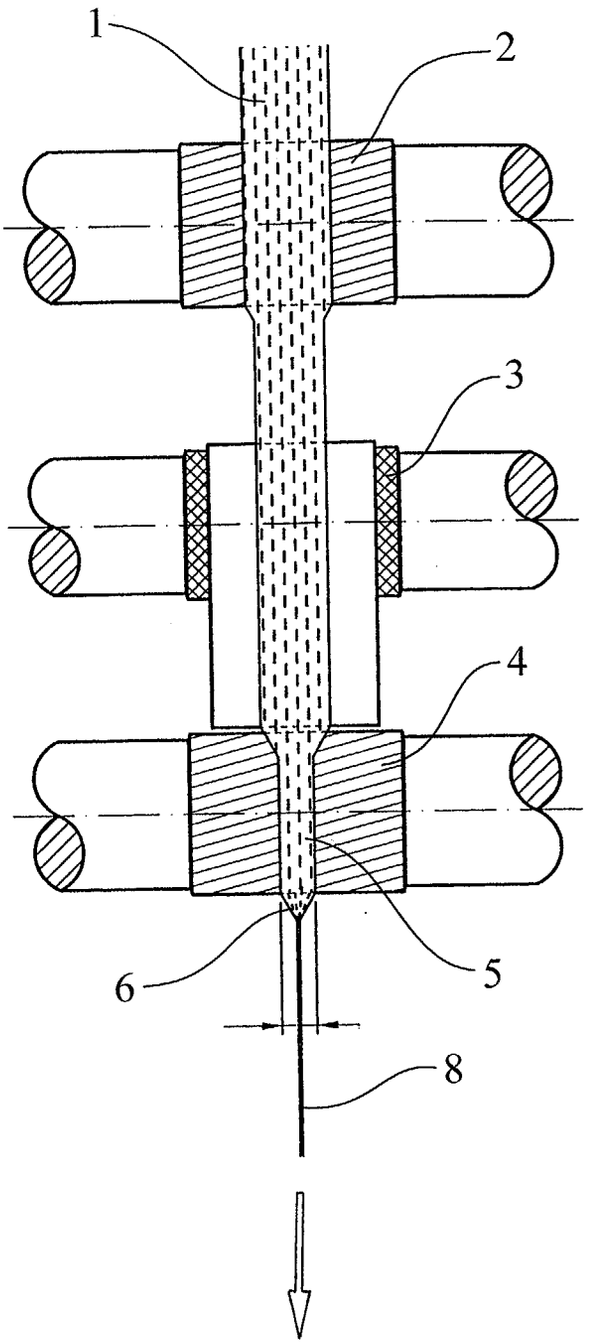

FIG. 1

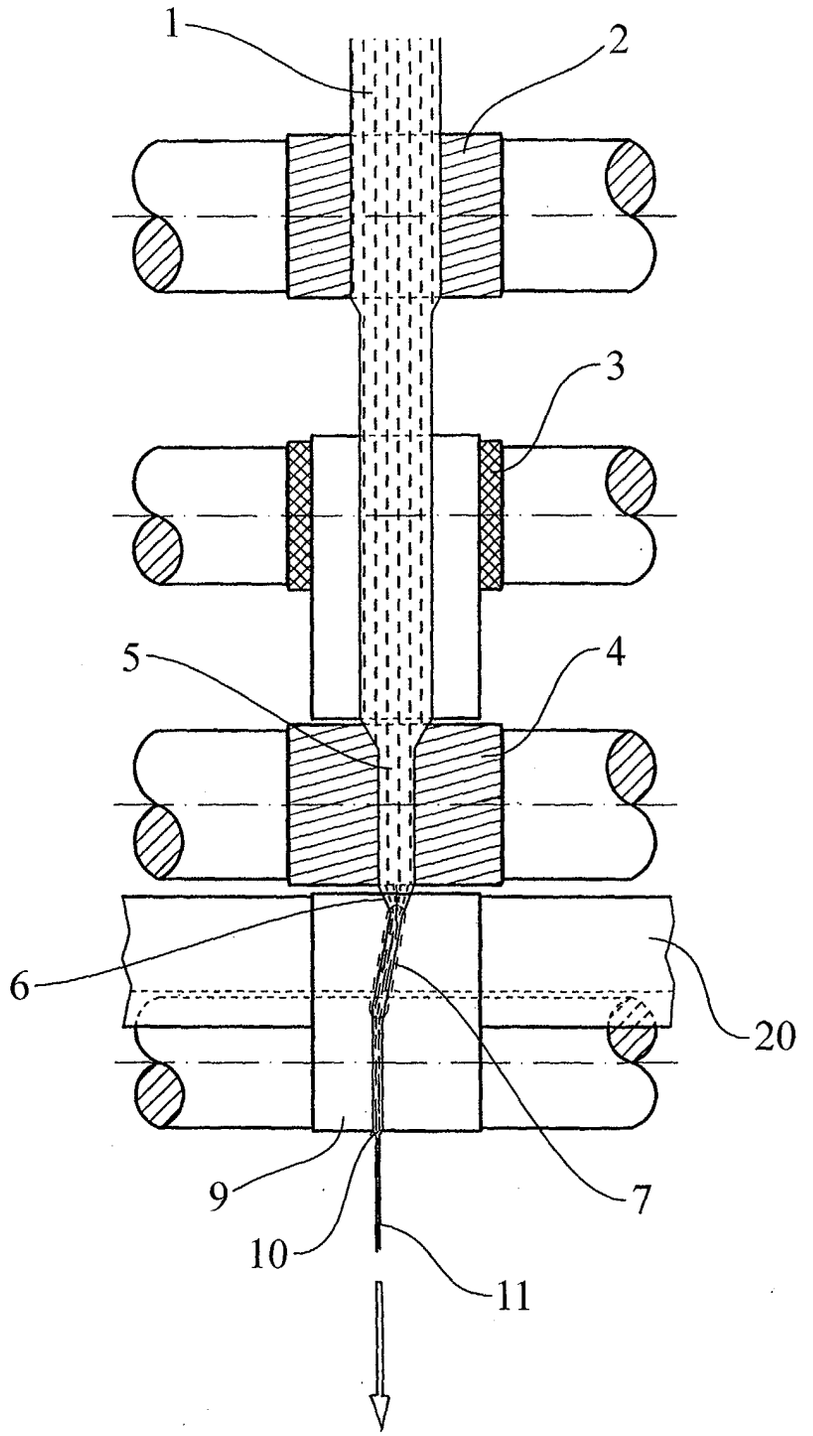

FIG. 2

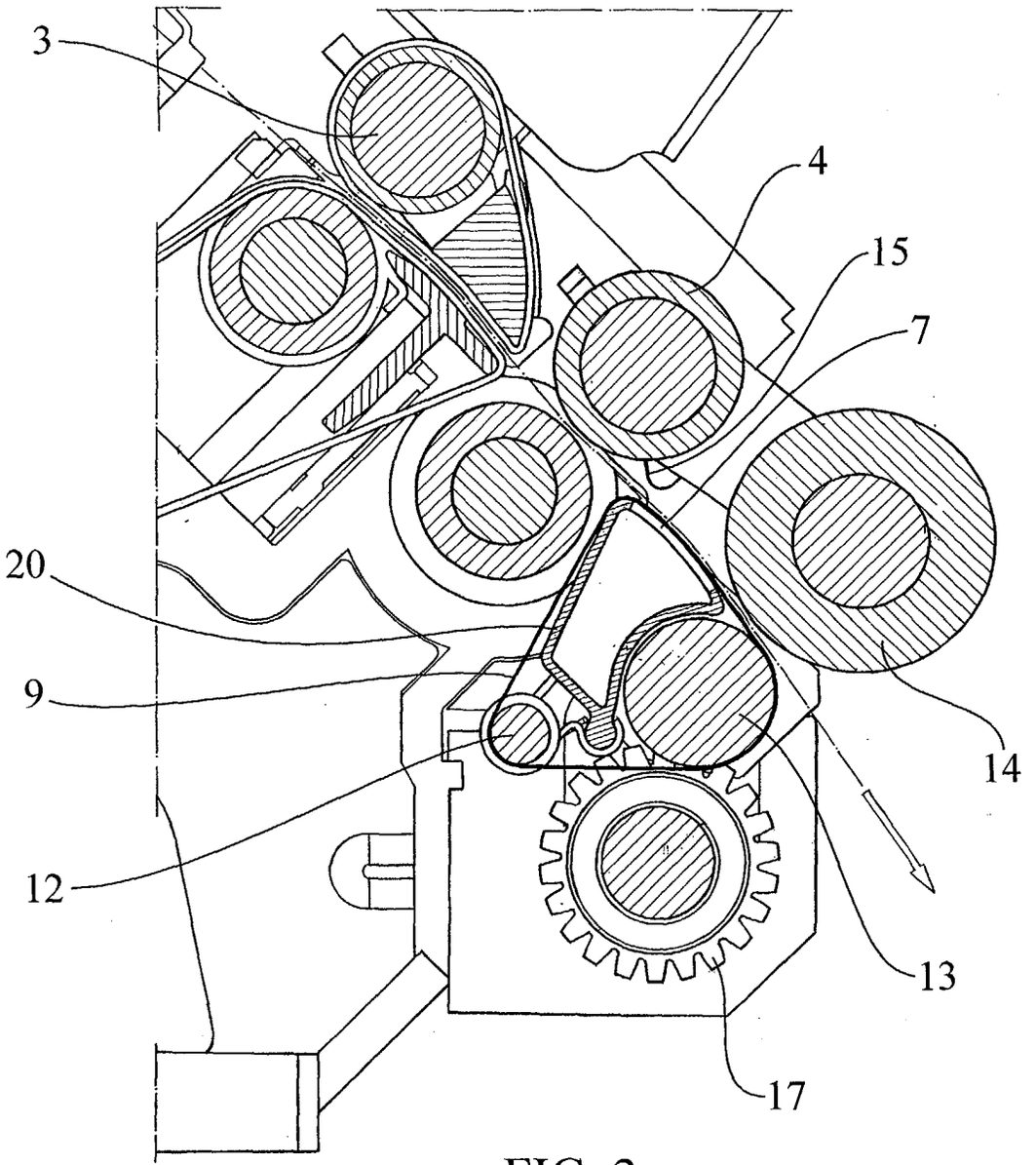

FIG. 3

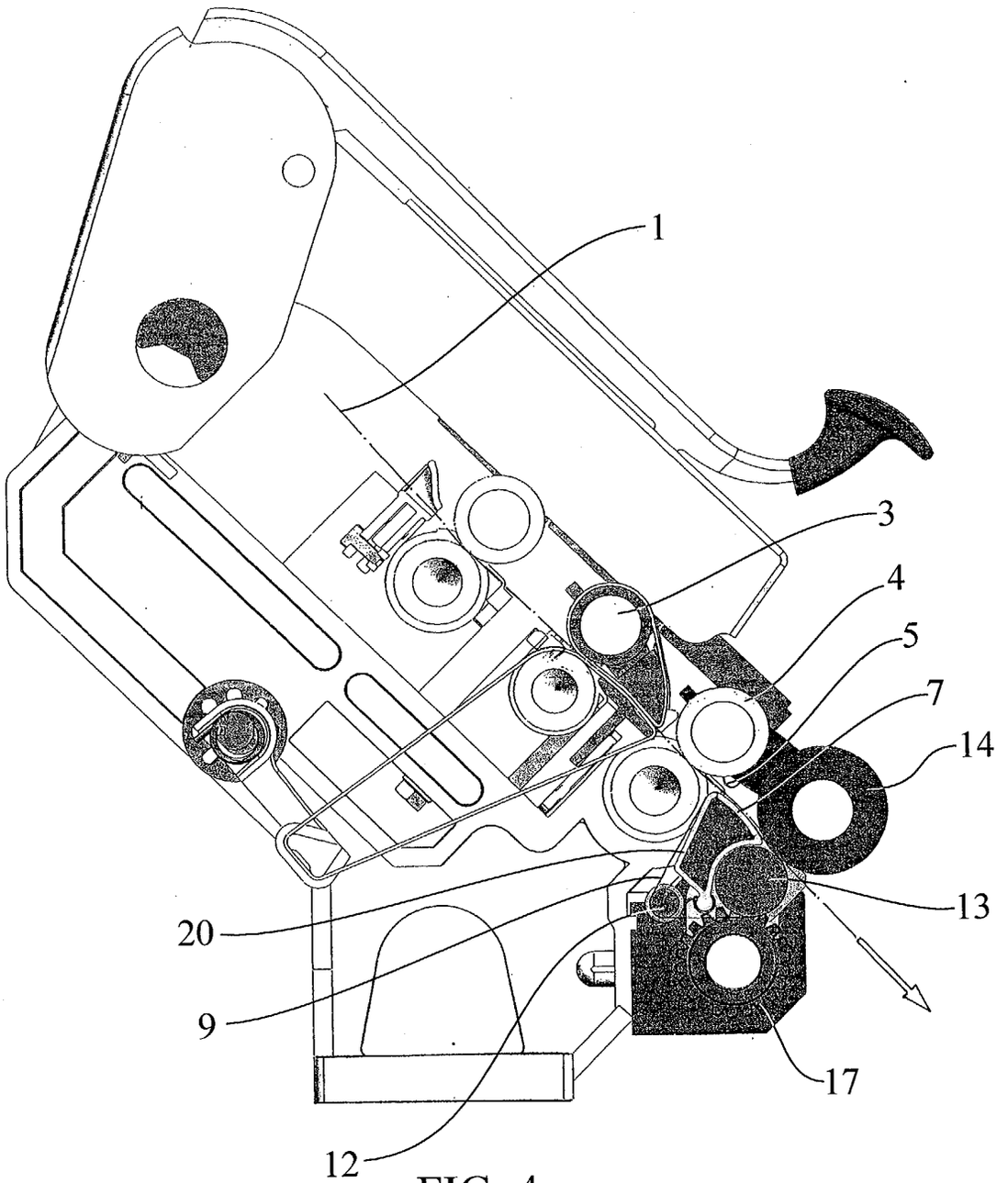

FIG. 4

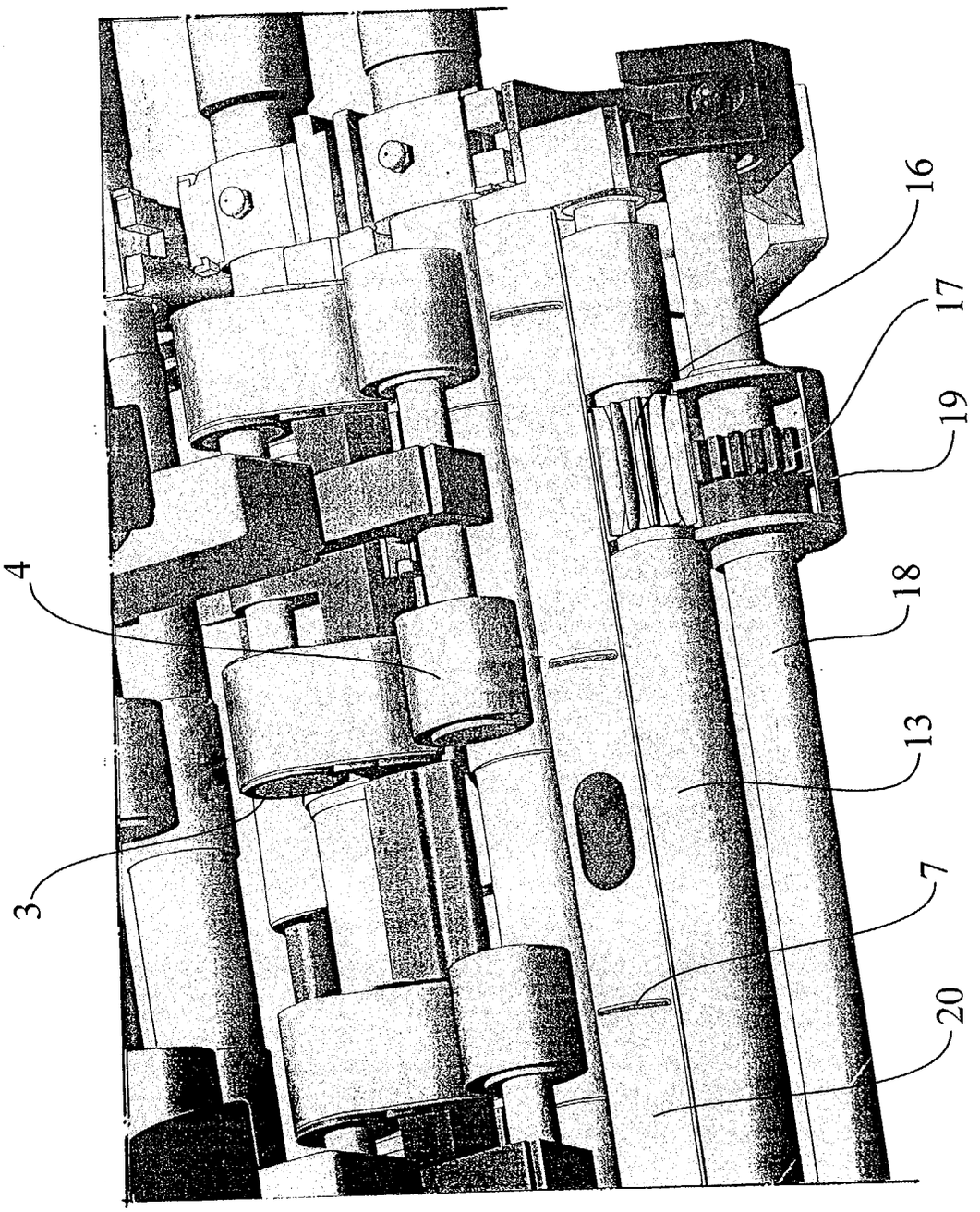

FIG. 5