United States Patent

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Winterthur, Switzerland
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[33] **Austria**
[31] **A 8043/66**

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[54] **METHOD AND APPARATUS FOR CLEANING OPEN-END SPINNING DEVICES**
19 Claims, 12 Drawing Figs.

[52] **U.S. Cl.** 57/56, 57/58.89, 57/156
[51] **Int. Cl.** **D01h 11/00**, D01h 7/00
[50] **Field of Search** 57/34, 34.5, 56, 57, 58.89, 58.91, 58.93, 58.95, 79, 156, 52

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Primary Examiner—Donald E. Watkins
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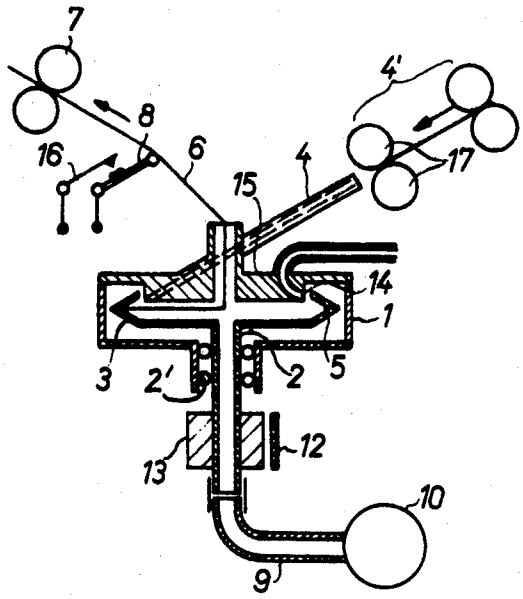
ABSTRACT: The fiber collecting surfaces are cleaned by an intensive brief stream of fluid such as air or cleaning solvent. A retractable brush is used with the solvent to aid in the removal of any dirt from the fiber collecting surface. The cleaning process is carried out automatically in response to the production of a certain yarn length or in response to a yarn break.



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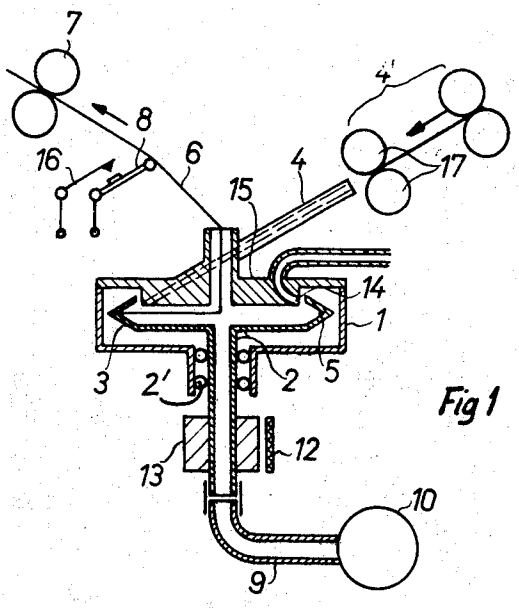

Fig 1

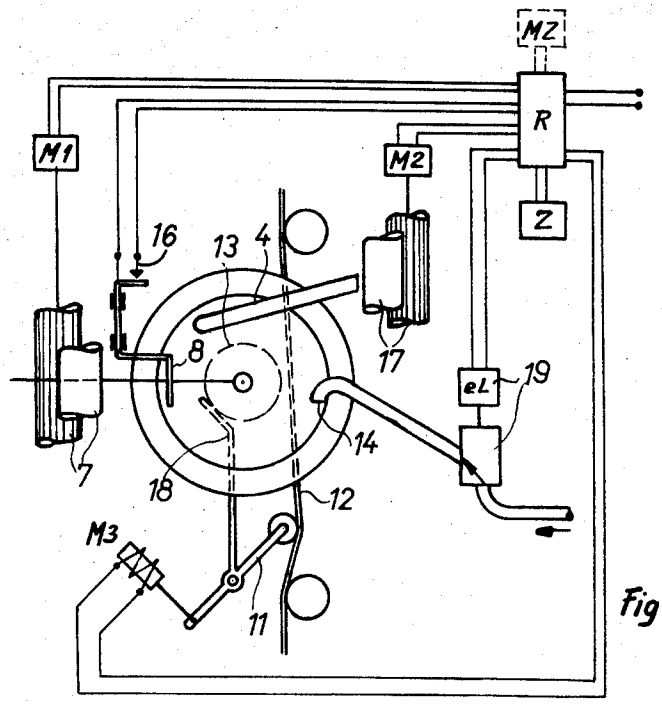

Fig 2

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Fig 3

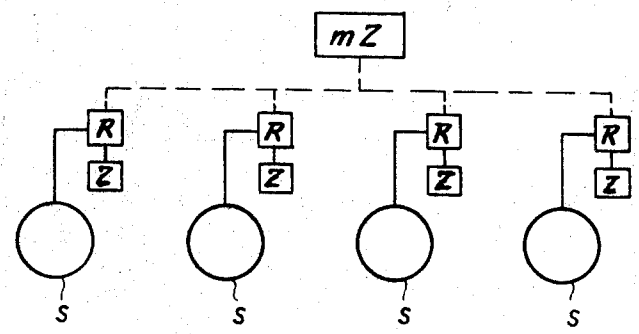
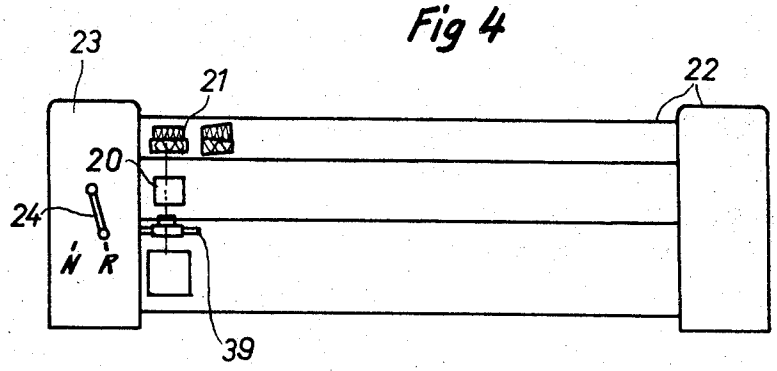


Fig 4



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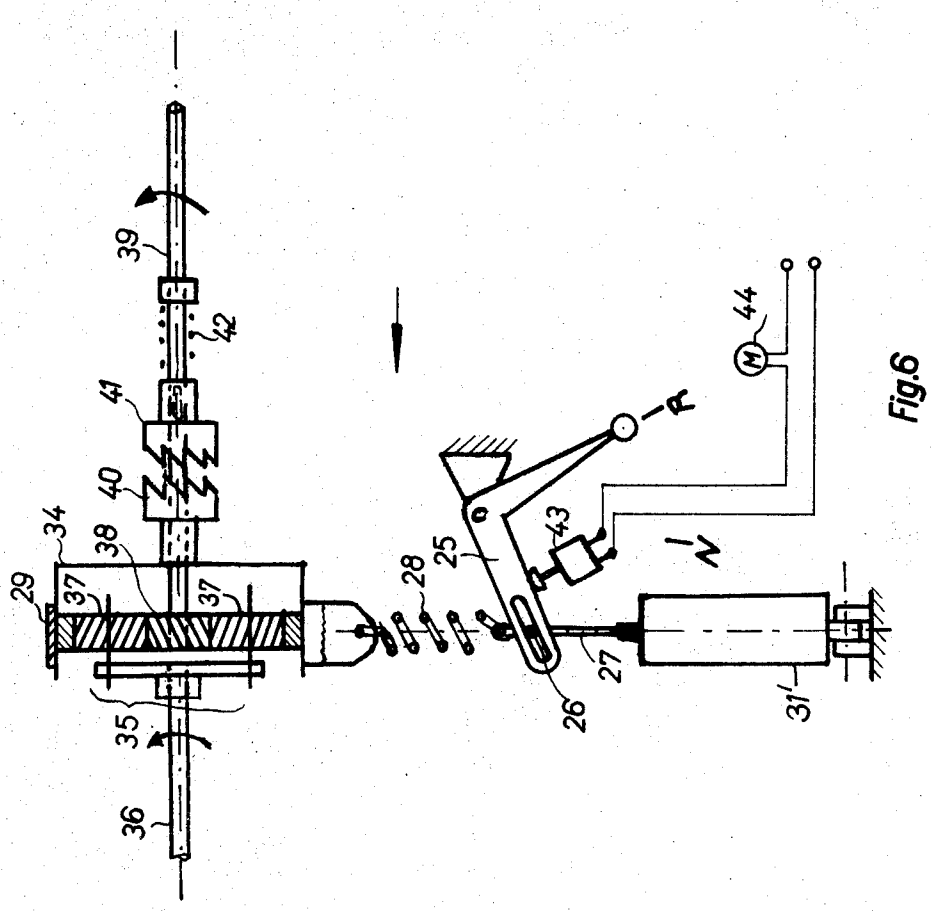

Fig.6

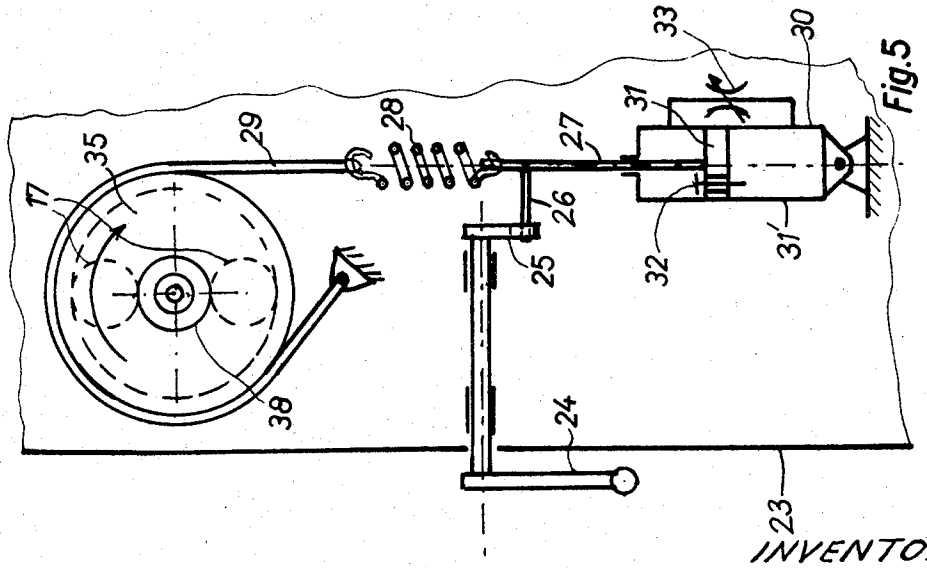

Fig.5

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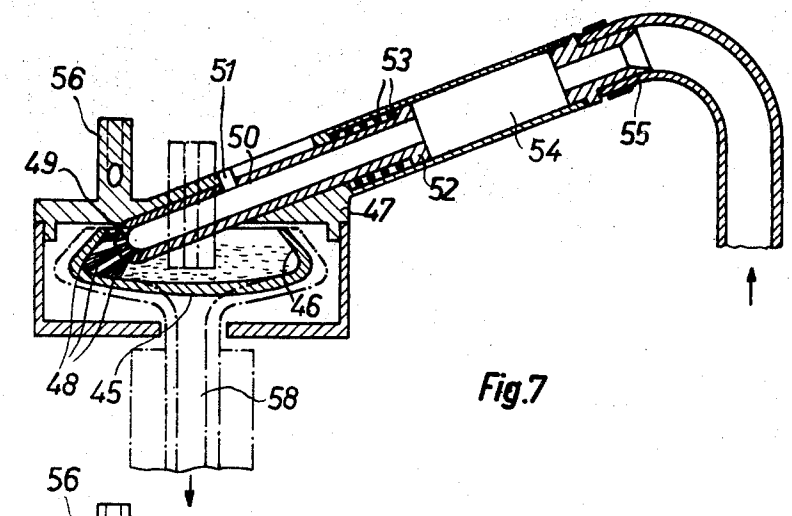

Fig.7

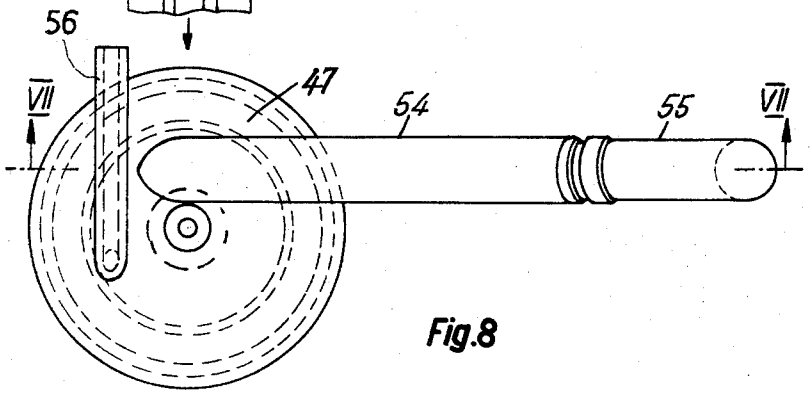

Fig.8

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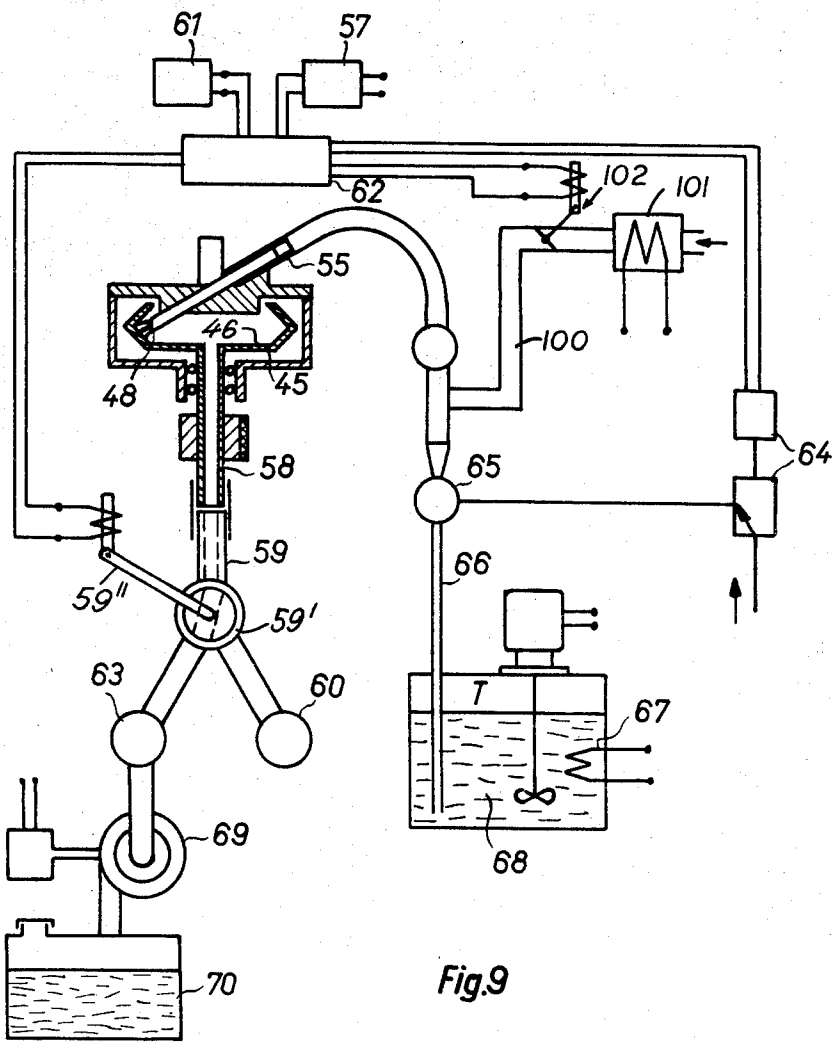

Fig.9

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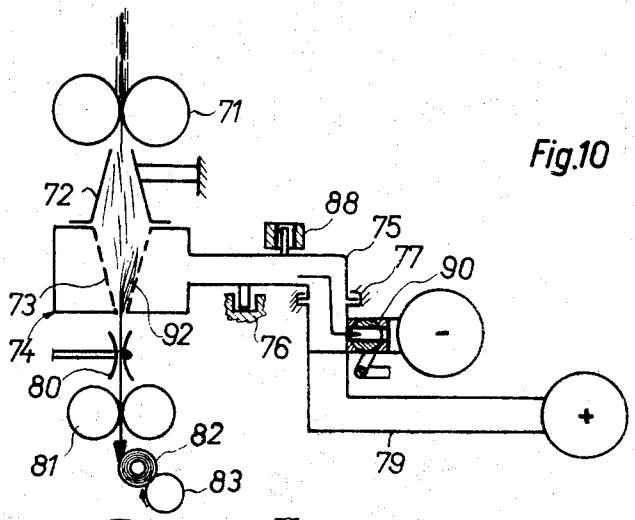

Fig.10

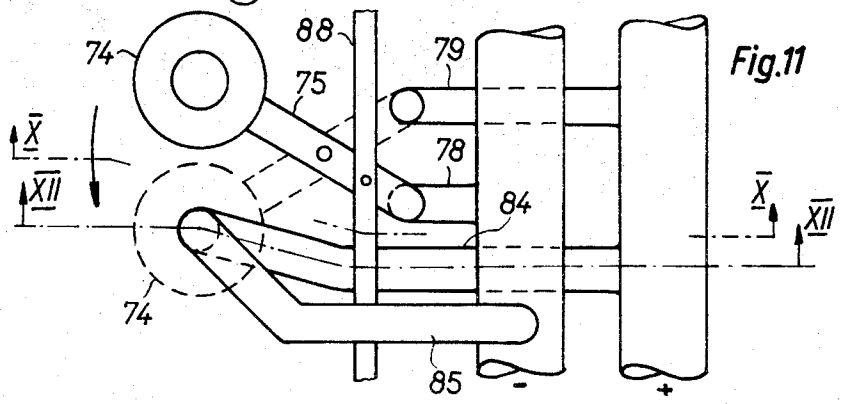

Fig.11

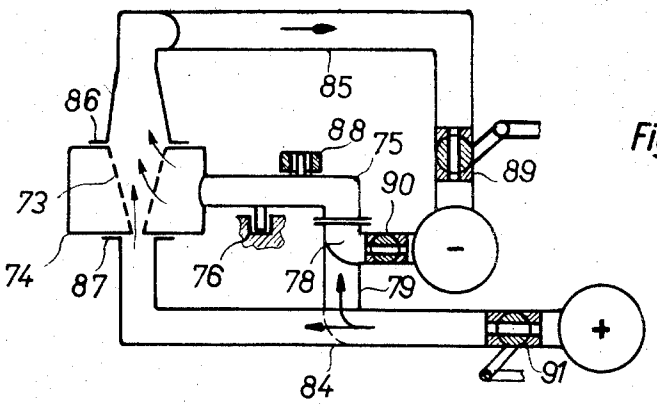

Fig.12

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METHOD AND APPARATUS FOR CLEANING OPEN-END SPINNING DEVICES

The invention relates to a method and apparatus for cleaning open end yarn spinning devices. More particularly, the invention relates to a method and apparatus for cleaning a stationary or rotatable fiber collecting surface of an open end yarn spinning device.

Generally in spinning staple fibers, the processed fiber material contains, in addition to the good fibers of finite length, impurities such as short fibers, fiber fragments, husk and leaf remnants, dust cotton wax, softeners, brighteners or other fatty substances. These impurities are generally not as troublesome for the cycle of the spinning process in the case of conventional ring spinning as in the case of open end spinning in which, in order to permit introduction of the twist, the fiber flow has to be interrupted.

In the open end spinning process, stationary or movable (preferably rotating) fiber collector surfaces are used to collect the supplied fibers which, ideally, are delivered in the form of single fibers or, in practice, are delivered in small tufts, in order to permit a continuous formation of a yarn. However, the high degree of disintegration of the material and the substantial speeds which result in high centrifugal forces, in many instances cause a rapid and intense soiling through the depositing of impurities on the fiber collector surfaces. Thus, upon the soiling of the collector surface reaching a certain extent yarn breaks become more frequent on these surfaces.

It was thus found that, for instance, in the spinning of carded cotton approximately 90 percent of the yarn breaks are attributable to soilings of the fiber collector surface. Further, it was found that cleaning of the particular point was necessary unless the rapid drop in the quality of the yarn which consequently occurred could be tolerated.

Especially in the case of rotating fiber collector surfaces, the impurities are concentrated on the fiber collector surfaces situated furthest away from the center of rotation and adhere thereto with various degrees of intensity depending on the raw material being processed. In the past, it had been necessary to remove these impurities by hand, which is cumbersome and time-consuming. Further, in most instances, the cleaning of these surfaces has been performed only after the poor appearance of the spun yarn has become conspicuous. Furthermore, in the manual cleaning of the surfaces by means of tools, it has been readily possible to cause damage inadvertently to the spinning device as well as injury to the personnel performing the cleaning operation.

Accordingly, it is an object of the invention to mechanize the cleaning of the fiber collecting surfaces of an open end spinning machine.

It is another object of the invention to facilitate and accelerate the cleaning of the fiber collecting surfaces of an open end spinning machine.

It is another object of the invention to automatically perform the cleaning of fiber collecting surfaces of an open end spinning machine independently of the occurrence of a yarn breakdown.

It is another object of the invention to reduce the possibility of damage and injury in cleaning open end spinning machines.

It is another object of the invention to intensively clean the fiber collecting surfaces of open end spinning machines.

Briefly, the invention provides a method for the cleaning of fiber collector surfaces of open end spinning machines which consists in eliminating deposited impurities by means of a brief, intensive and automatically actuated cleaning. The cleaning may be initiated after a degree of soiling has been reached which can no longer guarantee the yarn quality that is to be maintained or the cleaning may be initiated at predetermined intervals of normal yarn spinning operations. The cleaning agents utilized for the execution of the cleaning process are brought into contact with the fiber collector surface for a brief interval during which the surface is disengaged from the spinning process. The method is applicable irrespective of whether a stationary or rotating yarn collector surface is involved.

The apparatus of the invention includes a cleaning device which directs a substantially continuous stream of fluid onto the fiber collector surface of an open end spinning device to scour any dirt from the surface. In one embodiment, the stream of fluid constitutes a stream of compressed air while in another embodiment the stream constitutes a stream of cleaning solvent. In the latter case, the stream of cleaning solvent aids a brush which is retractably mounted to brush across the fiber collector surface.

The cleaning apparatus is actuated automatically in response to a yarn break caused by the accumulation of an excessive amount of dirt in the yarn or in response to the spinning of a set amount of yarn.

Further, the invention provides an apparatus wherein a length of yarn can be spun at a coarser quality at the end of a spinning operation in order to form the last outer windings of a bobbin in such a manner as to be readily removable. This apparatus includes a transmission which permits a changeover from a slow spinning speed to a faster spinning speed so that upon spinning faster, the fibers can take up some of the dirt adhering to the fiber collector surface and form a coarser yarn.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a cross-sectional view of an open end spinning device incorporating an apparatus of the invention;

FIG. 2 illustrates a schematic plan view of the structure of FIG. 1;

FIG. 3 schematically illustrates a plurality of spinning devices connected to a single yarn length counter;

FIG. 4 illustrates a front elevation of an entire machine having a plurality of open end spinning devices thereon;

FIG. 5 illustrates a side view of the drive head of the spinning machine of FIG. 4;

FIG. 6 illustrates a view of the drive head of FIG. 5 turned 90°;

FIG. 7 illustrates a view taken on line VII–VII of FIG. 8 of an open end spinning device incorporating a modified cleaning apparatus of the invention;

FIG. 8 illustrates a plan view of the structure of FIG. 7;

FIG. 9 schematically illustrates a view of a modified open end spinning device incorporating another cleaning apparatus of the invention;

FIG. 10 illustrates a view taken on line X–X of FIG. 11 of a modified open end spinning device utilizing another embodiment of the cleaning apparatus of the invention;

FIG. 11 illustrates a plan view of the structure of FIG. 10; and

FIG. 12 illustrates a view taken on line XII–XII of FIG. 11.

Referring to FIGS. 1 and 2, an open end spinning device of a yarn spinning machine includes a stationary housing 1 enclosing a rotatable rotor 2 having a fiber collecting surface 3 thereon. The rotor 2 is rotatably mounted in a suitable bearing 2' in the housing 1 and has a whorl 13 fixed at a lower portion which is driven tangentially by a belt 12. The housing 1 has a cover 15 which includes a delivery tube 4 for fibers and an outlet tube for a formed yarn. The delivery tube 4 is positioned with respect to the drawing rollers 17 of a drawing frame 4' to receive a supply of fibers from the roller 17. The fibers are deposited in the rotor 2 on the fiber collecting surface 3 in the form of a fiber ring 5 which is subsequently doffed under a twisting force into a yarn 6 by means of doffing rollers 7 downstream of the housing 1. A contact bridge element 8 is positioned between the housing 1 and the housing 1 and the doffing rollers 7 to contact the yarn 6 in an upwardly biased manner towards a contact 16 of a switching circuit of a relay R.

In addition, the rotor 2 which is hollowed communicates directly with a suction pipe 9 of a vacuum source 10 so that the fibers fed through the delivery tube 4 can be drawn into the rotor 2 under a suction force developed in the housing 1 by the suction source 10. Also, a lift-off means 11 is mounted adjacent the belt 12 to move against the belt 12 so as to disengage the belt 12 from the whorl 13 of the rotor 2 as shown in FIG. 2 for purposes as described below. The lift-off means 11 also includes a brake lever 18 which is adapted to engage the whorl 13 and is further connected into the relay R so as to be actuated by the relay R.

A cleaning apparatus includes a nozzle 14 which extends tangentially into the interior of the rotor 2 in a direction counter to the direction of rotation of the rotor 2 and is built into the cover 15 in connection with a source of compressed air (not shown). The relay R connects with a solenoid coupling M1 which is adapted to interrupt the drive of the doffing rollers 7, with a solenoid coupling M2 which is adapted to interrupt the drive of the drawing rollers 17, with a solenoid M3 which is adapted to activate the lift-off means 11, and with an electric valve 19 which is adapted to permit the passage of compressed air into the nozzle 14. Additionally, a time switch Z is incorporated in the relay R to control the length of time that the relay R is energized. Also, a yarn length counter MZ is incorporated in the relay R to energize the relay R after a set amount of yarn is formed, provided the relay R is not otherwise energized during the formation of the set amount of yarn.

In operation, in the event that a yarn break should occur in the rotor 2, the contact bridge element 8 rises as a result of a drop in yarn tension and closes the contact 16. This causes the relay R to become energized. Upon energization of the relay R, the solenoid couplings M1, M2 are uncoupled so as to idle the doffing rollers 7 and drawing rollers 17. Simultaneously, the solenoid M3 is energized by the relay R to pivot the lift-off means 11 so as to disengage the belt 12 from the whorl 13 and to move the brake lever 18 against the whorl 13 to bring the whorl 13 and rotor 2 to a stop. In addition, the relay R simultaneously actuates the electric valve 19 to permit compressed air to flow at a great speed through the nozzle 14 onto the fiber collecting surface 3 in a direction opposite to the normal direction of rotation of the rotor 2. Any impurities adhering to the surface 3 are thus cleansed from the surface 3 by the high speed air flow as the rotor 2 rapidly diminishes in speed. Since the exhaust pressure continues to prevail in the suction pipe 9, the impurities removed from the surface 3 leave the rotor 2 via the suction pipe 9.

Upon the onset of cleaning, that is, upon energization of relay R, the time switch Z is actuated. Following a predetermined interval, t_R, the time switch Z stops the supply of compressed air by closing the electric valve 19 via the relay R and actuates a starting cycle in reverse sequence of the stopping cycle. During the starting cycle, the contact 16 of the contact bridge element 8 in the relay circuit is broken.

If a yarn break does not occur, the length counter MZ automatically actuates the cleaning process after preset adjustable amount of yarn is produced. Obviously, in the event that a yarn break occurs, the length counter MZ is preferably reset to zero to prevent any premature actuation of another cleaning cycle.

Referring to FIG. 3, the length counter MZ can alternatively be used for a plurality of spinning devices S by connecting the spinning devices S in parallel to the length counter MZ. Thus, following the production of a predetermined amount of yarn set at the length counter MZ, and in accordance with a preestablished degree of soiling of the rotors, all the spinning devices are cleaned simultaneously. However, if a yarn break occurs at only one of these spinning devices S before the yarn production has achieved the quantity set on the length counter MZ, the cleaning cycle is initiated automatically, according to the example shown in FIGS. 1 and 2, at that spinning device. That is, the cleaning does not occur simultaneously at all spinning devices S but only at the one wherein the yarn break occurs.

Referring to FIGS. 4, 5 and 6, subject to certain prerequisites, the cleaning cycle can be selected in such a way as to coincide with the completed formation of the bobbins 21 wound on the spools above the various spinning devices 20. At this time, the machine 22 as a whole is ordinarily stopped. However, prior to the stoppage of the machine 22, a much coarser yarn which retains the same twist is wound onto the spools to form the last windings of the bobbins 21. In order to form the coarser yarn, the dirt deposited on the fiber collector surface is to a large extent rubbed off and spun into the yarn by a changeover on the operation of the machines. The resultant waste yarn is then wound onto the completed bobbins 21 as the outer spirals so as to be subsequently readily removed from the bobbins 21.

In order to effect the changeover the machine drive head 23 (FIG. 4) is provided with a shift lever 24 which can assume two positions R (cleaning) and N (normal operation). The interior of the drive head, insofar as the details are necessary, are shown in FIGS. 5 and 6. The shift lever 24 is rigidly connected with a slotted arm 25 which receives a pin 26 fixed on a piston rod 27 so as to reciprocate the piston rod 27 upon rotation. One end of the piston rod 27 is connected to a spring 28 which depends from a brake band 29. The opposite end of the piston rod is secured to an equalizer piston 31. The piston 31 is slidably disposed in a hydraulic cylinder 31' which is pivotally mounted on the frame of the machine and includes a valve 32 which opens upon descent of the piston 31. The cylinder 31' is filled with a hydraulic fluid and the two ends of the cylinder 31' are connected by means of a damper point 33 so that the fluid can flow between the ends upon raising of the piston 31. The brake band 29 is positioned over an internally geared outer ring 34 of a planetary gear 35 which is driven by means of a drive shaft 36 via two star wheels 37 that are in engagement, on the one hand, with the internal gearing of the outer ring 34 and, on the other hand, with an externally geared star wheel 38 of a shaft 39 which provides the drawing roller drive of the various spinning devices 20. A gear coupling half 40 is rigidly connected with the outer ring 34 of the planetary gear 35 and rotates freely on the shaft 39 whereas a gear coupling half 41 is rotatably fixedly mounted in a longitudinally displaceable manner on the shaft 39. A spring 42 is also mounted on the shaft 39 to urge the movable coupling half 41 into engagement with the other coupling half 40. A switch 43 is mounted so as to be actuated by the arm 25 in order to interrupt the current supply to the main drive motor 44 of the machine.

Upon placing lever 24 into cleaning position R (FIG. 6), the piston 31 is rapidly lowered into the lowest position, thereby tensioning the spring 28 and the belt 29. The outer ring 34 is immediately braked until stoppage and the shaft 39 starts to rotate faster in the same direction of rotation thereby urging the movable coupling half 41 toward the left as viewed in FIG. 6 into engagement with the coupling half 40. The feed of the spinning device is thereby increased corresponding to the gear ratio of the planetary gear, thus producing the desired coarser yarn. With the reversal of the lever 24 the switch 43 is simultaneously actuated to disconnect the main motor 44 so that only a short length of end section of soiled coarse waste yarn and impurities can be spun-in while the fiber collector surface runs at a reduced speed. Upon the release of the lever 24, the oil situated in the upper end of the cylinder 31' passes through the damping point 33 back into the lower end while the piston 31 moves slowly upward. This releases the spring pressure on the brake band 29 so that the outer ring 34 is released to permit resumption of the spooling of a yarn of standard yarn number.

Referring to FIGS. 7, 8 and 9, where a more intensive cleaning is needed as in the case where the processed fibers contain different brighteners or softeners, a cleaning device is situated on the inner fiber collecting surface 46 of a rotor 45. The cleaning device is mounted on the cover 47 of the spinning device and includes a retractable brush 48 which is mounted so as to be inserted into the rotor 45 to contact and detach any impurities from the fiber collecting surface 46. In order to

assist the bristles of the brush 48 in detaching the impurities, the brush 47 is provided with a hollow tubular portion 50 and a plurality of injection nozzles 49 at the tip of the tubular portion 50 between the bristles.

Referring to FIG. 7, the tubular portion 50 is slidably mounted in the cover 47 and is provided with a stop pin 51 which slides within a suitable slot in the cover 47 to arrest movement of the brush 48 into the rotor 45. The stop pin 51 is positioned so that the bristles of the brush 48 do not come too close to the fiber collecting surface 46 and, thus, excessive bristle wear and bristle breakage is substantially avoided. At the rear end, the tubular portion 50 is provided with a collar 52 which serves both as a piston surface within a guide tube 54 and a stop for a return spring 53. The guide tube 54 is provided at the rear end with a hose connection 55 for the introduction of a cleaning solvent into the tubular portion 50 under pressure. The guide tube 54 is further offset from the position of the fiber delivery tube 56.

The cleaning solvent used in cleaning the surface 46 is selected with regard to the material being processed. For example, the solvent may consist of an emulsion containing several components as well as mild abrasive particles which significantly assist the cleaning effect of the brush. The solvent may also have a purely physical as well as a chemical or physical-and-chemical combination effect.

Referring to FIG. 9, in order to supply cleaning solvent to the brush, the hose connection 55 is connected through an injector 65 to a supply line 66 which is submerged in a supply of solvent in a reservoir 68. The solvent can be heated in the reservoir 68 as by a heating coil 67. The injector 65 connects with a supply of compressed air via an electric valve 64 which is actuated by a control device 62. The control device 62 is activated by a counter 57 which is preset to a given period of time, the number of revolutions of rotor 45 or the quality of yarn. The magnitude of the preset counter valve depends on the amount of yarn soiling which can be tolerated without a need for stopping the spinning devices to clean the fiber collecting surface.

The hose connection 55 can further be connected to a duct 100 which is supplied by a flow of heated air from an external source. The air in the duct 100 is heated by passing through a heater 101 of known structure and subsequently through a flow control 102. The flow control 102 is connected to the control device so as to be activated upon actuation of the control device 62. This flow of heated air can be used to additionally heat the solvent passing through the hose connection.

The cleaning device further includes an exhaust duct 59 which is mounted in alignment with the hollow roller shaft 58 to communicate the interior of the rotor 45 with a fiber collector 60. The exhaust duct 59 includes a pivotal portion 59' which is adapted to be pivoted by a selector mechanism 59'' between communication with the fiber collector 60 or communication with a dirt collector 63. The selector mechanism 59'' is actuated, for example, through a solenoid, by a signal from the control device 62 in response to a signal from a speed guard 61. The dirt collector 63 is connected to a suction pump 69 in order to be placed under a vacuum pressure to facilitate the disposal of any impurities detached from the fiber collecting surface 46. The pump 69 is connected to a recovery tank 70 for delivery of the used cleaning solvent and exhaust air. In this tank, the air, dirt and cleaning solvent are separated and following a suitable reconditioning operation, the solvent is returned to the reservoir 68.

In operation, upon closing the counter 57 in response to the preset value, the speed of the rotor 45 is reduced by any suitable means (not shown).

Once there has been a sufficient drop in rotor speed, the fibers that remained in the rotor 45 are drawn off via the hollow rotor shaft 58 into the exhaust duct 59 and into the fiber collector 60 in view of the fact that the centrifugal forces are no longer adequate to allow a depositing of the fibers on the fiber collector surface 46. Then the speed guard 61 is actuated and, via the control element 62 which energizes the selective mechanism 59'', suction is switched over to the dirt collector 63. The control element 62 then opens the electric valve 64 which injects compressed air into the cleaning solvent line 66 via in the injector 65 and simultaneously draws off the cleaning solvent which can be heated from the reservoir 68. As a result, a hot spray reaches the brush 48 via the hose connection 55 and appears on the fiber collector surface 46 as a result of the prevailing overpressure. The pump 69 then delivers the used cleaning solvent and exhaust air into the recovery tank 70. Once the cleaning process has been terminated, the control element 62, through a time relay, disconnects the compressed air via the electric valve 64 and the spring 53 expands and pushes the brush 48 back into the cover 47.

Instead of the slidably guiding brush, a bellow extension can be used. Also, instead of the brush itself, a paring knife, scraper element or a rotating cleaning device, the rotary motion of which can be effected by contact with the fiber collector surface itself, can be used.

Referring to FIG. 10, a stationary open end spinning device can be provided with a cleaning device which relies on a flow of air to clean the fiber collecting surface.

For example, an open end spinning device which cooperates with a pair of delivery or drawing rollers 71 includes a feed pipe 72 of downwardly increasing width fixed to the machine frame and a stationary screen 73 of downwardly decreasing width within a spinning chamber 74. The chamber 74 is rigidly connected to a suction pipe 75 which is pivotably mounted in the frame 76 by means of a rod 88. The terminal flange 77 of the suction pipe 75 is adapted to coincide with a suction pipe 78 or a compressed air pipe 79 in either of the extreme pivoted positions. The suction pipe 78 leads to a vacuum source (not shown) which maintains a vacuum during spinning in the spinning chamber 74. In addition, a twisting element 80 and a pair of doffing rollers 81 are positioned beneath the spinning chamber 74 to twist and doff the fibers into a yarn. Also, a yarn winding station consisting of the bobbin 82 and drive roller 83 is positioned below the doffing rollers 81.

Referring to FIGS. 1 and 12, at the same level as the feed pipe 72 laterally offset with respect to one another, there is a circulation system made up of two ducts 84, 85. The duct 85 is provided with a port flange 84 on the level of the feed pipe aperture and the duct 84 with a flange 87 arranged at the level of the spinning chamber outlet. These two flanges thus face each other at such a distance that the spinning chamber 74 can, by pivoting of the pipe 75, be pushed into the position shown in broken lines in FIG. 11 (compare with FIG. 12). In view of the fact that the pipe 75 with flange 77 is turned by the rod 88 which is arranged alongside the machine, the flange 77 coincides with the duct 79 providing compressed air. It is understood that the suction and pressure ducts 78, 84, and 85 by reversal of the valves 89, 90, 91 incorporated therein are by means of a linkage (not shown) and in accordance with the respective position of the spinning chamber 74 brought into the position operationally corresponding to that of the spinning chamber.

In normal operation, fibers are fed via the delivery rollers 71 into the feed pipe 72 and from there onto the conical screen under the influence of the vacuum within the spinning chamber 74. At the lower point of the screen 73, the yarn made to rotate by the twisting element 80 is drawn out of the spinning chamber 74 and supplied to the takeup bobbin 82 further below. The open yarn end 92, through unrolling inside the screen 73, continuously spins-in the fibers supplied, and thereby cleans the screen surface to a certain extent. Following a certain period, the removal of firmly adhering residues nevertheless proves inevitable.

The switchover from normal operation (FIG. 10) to cleaning (FIGS. 11 and 12) takes place by a swivel motion of the spinning chamber 74 in the frame 76 around the axis in direction indicated by the arrow (FIG. 11) through means of the rod 88. The rod 88 simultaneously serves a plurality of

spinning devices. Thereafter, following disconnecting of the delivery rollers **71**, as by reversing by comparison with normal operation, compressed air is fed, with the valve **90** opened, from the duct **75** through the screen **73** to suck off the detached dirt particles upwardly into the duct **85**. At the same time, a flow of compressed air passes axially via the valve **91** from the duct **84** through the screen **73**, as indicated by the arrow in FIG. **12**.

Instead of forcing compressed air through the spinning chamber **74**, an increased vacuum can be created on the suction side to obtain the cleaning, for instance, by generating a higher vacuum pressure by means of an increase in speed in the suction fan.

I claim:

1. A method of cleaning fiber collector surfaces in open end spinning devices comprising the steps of doffing a yarn from the fiber collector surface at a predetermined tension, detecting a decrease in said predetermined tension resulting from a yarn break, and removing deposited impurities under a brief intense automatically actuated scouring force from the fiber collector surface in response to the detection of the decrease in said predetermined tension.

2. A method of cleaning fiber collector surfaces of open end spinning devices comprising the steps of doffing a predetermined length of yarn from the fiber collector surface, winding up the predetermined length of doffed yarn to form a bobbin, and removing deposited impurities under a brief intense automatically actuated scouring force from the fiber collector surface prior to completion of said winding up step by forming a length of coarser yarn at the end of the predetermined length of yarn in order to spin in the impurities.

3. A method as set forth in claim **2** which further includes the steps of supplying fibers to the fiber collector surface for doffing into the yarn at a predetermined rate, and subsequently increasing the rate of supplying fibers to the fiber collector surface simultaneously with said step of removing deposited impurities.

4. A method as set forth in claim **2** wherein the coarser yarn is wound as an outer layer on the bobbin.

5. A method of cleaning fiber collector surfaces in open end spinning devices comprising the steps of doffing a yarn from the fiber collector surface, recording the length of yarn being doffed from the fiber collector surface during doffing and removing deposited impurities under a brief intense automatically actuated scouring force from the fiber collector surface in response to the recording of a predetermined length of doffed yarn.

6. A method as set forth in claim **5** which further comprises the steps of detecting a decrease in yarn tension in the doffed yarn during doffing resulting from a yarn break, and simultaneously interrupting said recording step and initiating said removing step in response to the detection of a decrease in yarn tension.

7. A method of cleaning fiber collector surfaces in open end spinning devices comprising the steps of rotating the fiber collector surface, doffing a yarn from the rotating fiber collector surface, recording the number of revolutions of the fiber collector surface during rotation thereof, and removing deposited impurities under a brief intense automatically actuated scouring force from the fiber collector surface in response to the recording of a predetermined number of rotations of the fiber collector surface.

8. A method as set forth in claim **7** which further comprises the steps of detecting a decrease in yarn tension in the doffed yarn during doffing resulting from a yarn break, and simultaneously interrupting said recording step and initiating said removing step in response to the detection of a decrease in yarn tension.

9. A method as set forth in claim **1** wherein said step includes the conveying of a flow of air through the fiber collector surface.

10. A method as set forth in claim **9** wherein said step further includes the conveying of a second flow of air axially and centrally through the fiber collector surface.

11. A method as set forth in claim **1** which further comprises the steps of doffing a predetermined length of yarn at said predetermined yarn tension from the fiber collector surface, detecting the decrease in said predetermined yarn tension during doffing, and initiating said removing step in response to a chronological occurrence of the detection of said decrease in yarn tension and the completion of said doffing step.

12. In combination with an open end spinning device having a fiber collector surface; a cleaning apparatus including means for directing a flow of fluid against said fiber collector surface to remove adhered impurities therefrom; a sensing means mounted outside said surface for detecting the yarn tension of a yarn spun from said surface, and means connected between said sensing means and said cleaning apparatus to actuate said cleaning apparatus in response to the detection of a decrease in yarn tension.

13. The combination as set forth in claim **12** which further comprises a plurality of delivery rollers for feeding fiber to said surface, a pair of doffing rollers for doffing yarn from said surface, first means for driving said delivery rollers and said doffing rollers, and means for simultaneously deactivating said first means and actuating said cleaning apparatus.

14. In combination with an open end spinning device having a fiber collector surface; a cleaning apparatus including means for directing a flow of fluid against said fiber collector surface to remove adhered impurities therefrom; a recording means for recording the length of yarn spun from said spinning device, said recording means being connected to said cleaning apparatus for actuating said cleaning means in response to the recording of a predetermined length of yarn.

15. The combination as set forth in claim **14** wherein said fiber collector surface is mounted on a rotatable rotor, and said recording means is connected to said rotor to count and record the number of revolutions thereof.

16. The combination as set forth in claim **12** wherein said fiber collector surface is rotatably mounted and said spinning device includes first means for rotating said fiber collector surface, and further comprises means for simultaneously deactivating said first means to stop said fiber collector surface and actuating said cleaning apparatus.

17. In combination with an open end spinning device having a fiber collector surface; a plurality of delivery rollers outside said surface for feeding fibers thereto, first means connected to said delivery rollers for rotating said delivery rollers at a first speed, and second means connected between said delivery rollers and said first means for rotating said delivery rollers at a second speed greater than said first speed to produce a coarser yarn whereby a change in the speed of the yarn causes a mechanical scrapping of the fiber collector surface to spin in impurities from said collector surface.

18. The combination as set forth in claim **17** which further comprises a plurality of delivery rollers for feeding fibers to said surface, and means for alternately increasing and decreasing the speed of said delivery rollers to vary the coarseness of the yarn formed in said spinning device.

19. A method of cleaning fiber collector surfaces in open end spinning devices comprising the steps of doffing a yarn from the fiber collector surface, recording time during doffing, and removing deposited impurities under a brief intense automatically actuated scouring force from the fiber collector surface in response to the recording of a predetermined interval of time.