Jan. 22, 1957 W. LÜTTGEN ET AL 2,778,186

TEXTILE PROCESSING APPARATUS

Filed Nov. 21, 1951

2 Sheets-Sheet 1

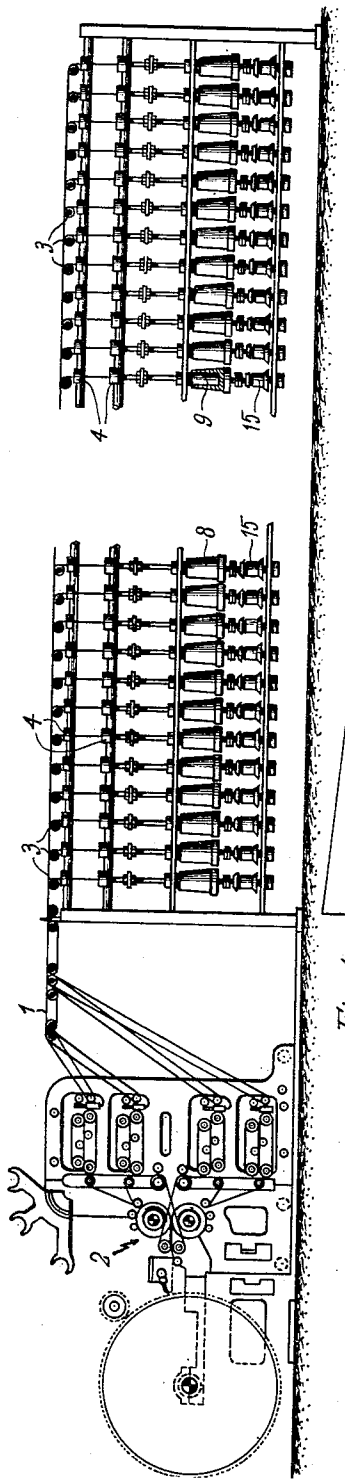



Fig. 1

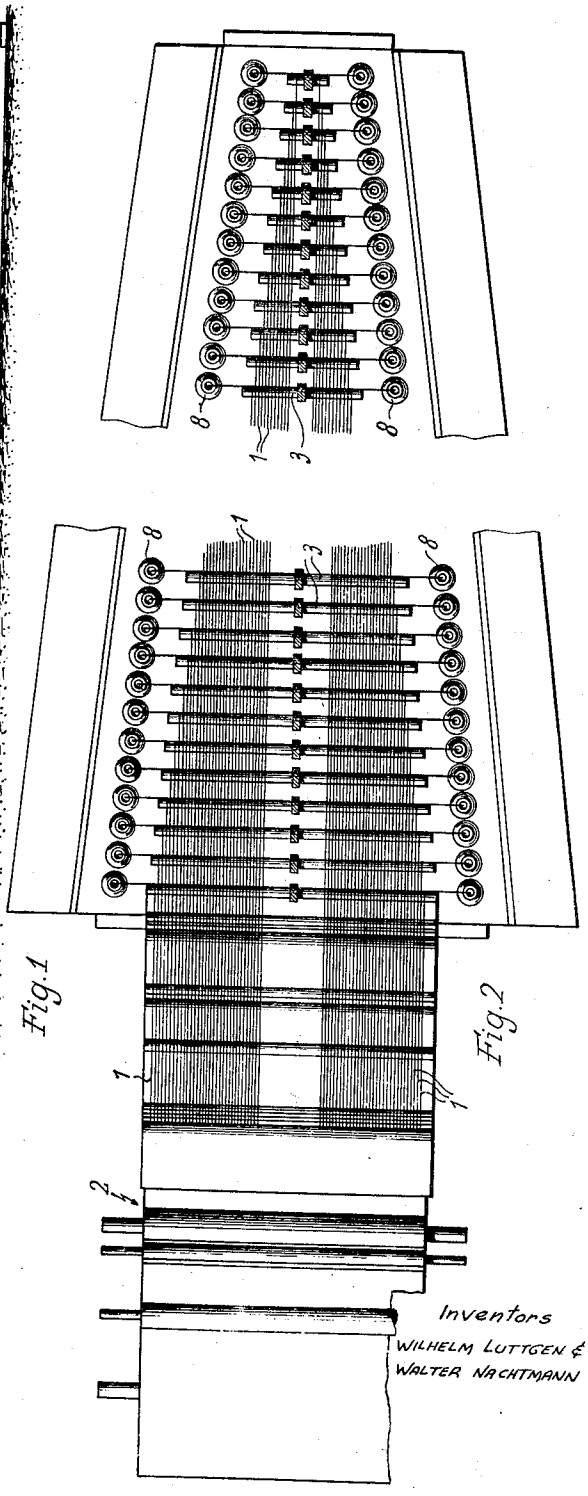



Fig. 2

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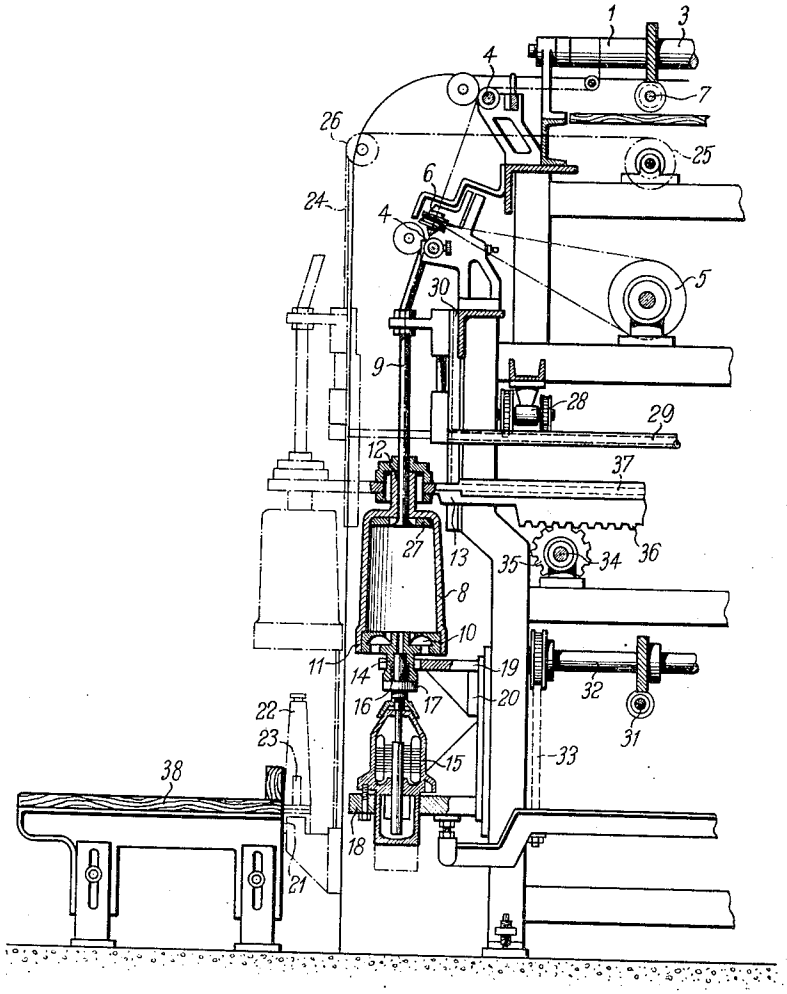



Fig. 3

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# TEXTILE PROCESSING APPARATUS

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6 Claims. (Cl. 57—50)

The present invention relates to a method and apparatus for processing textiles.

In known processes and apparatus for preparing yarns of any type, it is first necessary to card the raw material so as to produce rovings which are then wound on spools. These spools are then placed on a spinning machine where the rovings are further processed so as to produce yarns suitable for weaving, knitting, and the like. In such known processes and apparatus it is necessary for an attendant to take the spools from the carding machine and place them on the spinning machine, and, indeed, the major part of the working time of some attendants is consumed simply in replacing empty spools of the spinning machine.

One of the objects of the present invention is to greatly simplify the above described processes and apparatus.

Another object of the present invention is to greatly increase the efficiency and rate of production of the above-mentioned known processes and apparatus.

A further object of the present invention is to render processes and apparatus of the above type almost fully automatic so as to decrease the required attention of attendants to a minimum.

Yet another object of the present invention is to produce an apparatus capable of accomplishing all of the above objects and still being highly flexible so that the apparatus is capable of processing textiles of all types, whether they be natural or synthetic, or intended to produce yarns for weaving or knitting or yarns suitable for upholstery, tapestries, covers of all types, yarns for the cloth industry and felt industry, and yarns suitable for hand knitting.

With the above objects in view, the present invention mainly consists of a method which comprises the steps of carding the raw textile material so as to produce rovings, directly and continuously feeding these rovings to a spinning machine, and spinning the rovings in the spinning machine.

The present invention also mainly consists of an apparatus for processing textiles, this apparatus comprising a carding machine, a spinning machine, and guide means directly interconnecting the carding and spinning machines for continuously feeding rovings from the carding machine to the spinning machine. The spinning machine may have pairs of oppositely arranged spinning units which are located progressively nearer to each other in the direction away from the carding machine so as to provide a V-shaped arrangement having the wide end thereof located adjacent to the carding machine and having the narrow end thereof distant from the carding machine.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of



specific embodiments when rear in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic fragmentary, elevational view of one possible apparatus for carrying out the present invention;

Fig. 2 is a plan view of the structure shown in Fig. 1; and

Fig. 3 is a fragmentary, diagrammatic, elevational view of one side of the spinning machine, taken transversely thereof.

Referring now to the drawings, there is shown in Fig. 1, on the left hand side thereof, a carding machine and, on the right hand side thereof, a spinning machine. As is illustrated in Figs. 1 and 2, the rovings 1 travel from the distributor 2 of the carding machine to the guide means located between the carding and spinning machine. This guide means may simply be a plurality of horizontally mounted rollers arranged parallel to and in the same plane as the driven rollers 3 of the spinning machine. From the driven rollers 3 the rovings move continuously through the drawing mechanisms 4 of the spinning machine. These rollers 3 extend over the entire length of the spinning machine, and, as is apparent from Fig. 2, the rollers 3 are parallel to each other and of a progressively shorter length in the direction away from the carding machine.

From the drawing mechanisms 4, the threads pass through the reciprocated tubes 9 into the spinning bells 8 where they are wound in cross windings as a result of the centrifugal force which comes into play due to the speed of rotation and interior space of the spinning bells 8. These spinning bells 8 are each individually driven by a motor 15 which is operatively connected thereto.

As is shown in Fig. 2, the spinning bells 8 are arranged along two rows which converge towards each other in the direction away from the carding machine. In other words, the spinning machine comprises pairs of oppositely arranged spinning units which are located progressively nearer to each other in the direction away from the carding machine so as to provide the V-shaped arrangement shown in Fig. 2. As is apparent from Fig. 2, the rovings from the distributor 2 of the carding machine travel along straight lines on the top side of the spinning machine and are guided therefrom to the spinning bells 8.

As is apparent from Figure 3, the rollers 3 each have a worm wheel fixedly mounted thereon and driven by a worm mounted on the shaft 7 which is rotated. The worm is connected to all of the rollers 3 so that the latter all simultaneously rotate together at a predetermined speed which may be regulated by regulating the speed of rotation of shaft 7, in any known manner. As is shown in Fig. 3, a roving 1 travels downwardly over a roller 3 to a guide roller which directs the roving to the left hand side of the machine, as viewed in Fig. 3, where the roving is received in the drawing rollers of the double drawing mechanism 4, the roving travelling through a small spinning pipe 6, driven by a belt extending from the driven pulley 5, as is conventional in ring spinning machines. The thread passes from the drawing mechanism 4 to the interior of the tube 9 which has its lower end located within the spinning bell 8. The tube 9 is reciprocated in a vertical direction by the chain drive mechanism 28 connected to the telescoped spindle 29 which is itself connected to the tube 9 by a vertically extending member mounted for reciprocating sliding movement in the guide 30.

The spinning bell 8 is made out of two parts, in that it comprises the spinning bell 8 proper which is conically shaped and is open at its bottom end to receive the spinning bell floor portion 11, which is provided with openings 10 to provide a suction in the interior of the spinning bell upon rotation of the latter, the pulling of the

thread into the spinning bell being produced by this suction. The spinning bell 8 is provided at its upper portion with a neck 12 which is mounted for rotation by any suitable bearing in the support member 13, the tube 9 reciprocating within the neck 12.

The thread moving into the interior of the spinning bell 8 is thrown toward the wall thereof by the centrifugal force produced therein so that the reciprocating tube 9 feeding the thread into the bell 8 produces in combination therewith a cross wound body of thread which presses against the interior wall of the bell 8. The floor member 11 is provided with a foot portion 14 in order to connect the spinning bell 8 with its individual driving motor 15. A coil spring 16 bears at one end thereof against the flange member 17 fixed to the spindle of the motor and at the other end thereof against the floor member 11 so as to urge the latter into the spinning bell 8, and since the adjoining walls of bell 8 proper and floor portion 11 are conical, a wedge-like action is produced to rotate member 8 along with the rotating floor portion 11. The support 18 for the motor 15 is connected to a slide member 20 which has connected thereto the member 19 which is bifurcated at its left end, as viewed in Fig. 3, to engage a shoulder of member 14 so as to insure movement of the floor 11 toward and away from the bell 8, upon turning of shaft 31 and gear mechanism 32 which controls the chain member 33 connected to the floor portion 18. By this mechanism, the latter may be lowered and raised to lower and raise therewith the floor portion 11, motor 15 and the above-described apparatus interconnecting these latter two parts.

As shown in dotted lines in Fig. 3, the apparatus is provided with a rail member 21 mounted for vertical sliding movement by means of the mechanism 25 which moves a chain guided over roller 26 and connected to the rail 21. On the pin 23, located on rail 21, is mounted the spool supporting neck 22, and the changing of a full spool for an empty spool is simplified by the raising of the rail 21 so that an attendant on platform 38, located on opposite sides of the spinning machine, may conveniently change the spool.

All movements of the spool changing mechanism may be driven from a special motor which becomes energized as soon as the spinning proper is terminated. At this latter point, the shaft 34 is automatically rotated so as to rotate the gear 35 which meshes with the rack 36 to move the support member 13 to the left, as viewed in Fig. 3, along the guide rail 37 so as to locate the spinning bell in the dotted line position over the spool member 22, as shown in Fig. 3, the telescoped spindle 29 being thereby extended. Before this latter operation takes place the floor 11 is lowered from the bell 8, by the structure described above.

When the bell 8 is in the dotted line position shown in Fig. 3, the member 27, which is resiliently urged against the top of bell 8 by any suitable spring mechanism, is lowered by a lever and cam, for example, acting on member 27, against the action of such a spring mechanism, through the medium of a tube surrounding member 9 and connected to element 27, for example. This lowering of member 27 causes the wound thread located within the bell 8 and clinging to the walls thereof to be separated therefrom and fall onto the member 22, after which the bell 8 and its associated structure is moved back to the solid line position shown in Fig. 3, and the floor 11 is then again moved into engagement with the bell 8 so as to grip a portion of the thread between the adjoining surfaces of members 8 and 11, the projecting portion of this thread being cut on the exterior of the bell 8 before the latter is rotated.

The above described structure, shown in Fig. 3, is only intended to clarify the structure shown in Figs. 1 and 2, the present invention being directed to the latter rather than to the details shown in Fig. 3. However, the latter figure is believed to demonstrate that the present invention is capable of being carried out by a single row of spinning units located along one side of a spinning machine, as well as a double row arranged in a V-shape, as shown in Fig. 2.



With the above described apparatus, extremely high spindle speeds and low fiber stresses are obtained, so that a very high rate of production results. Also, thread breakage is reduced to a minimum, and idle machine time is very low, especially when relatively large windings are formed in the bells 8. A great saving in time and labor is produced by the elimination of any necessity for winding the rovings on spools and then mounting these spools on the spinning machine.

The starting and stopping of the entire apparatus may be controlled from a single switch, and the speed of thread movement together with the delivery rate can be correlated with the speed at which the spinning bells are driven by any suitable electrical apparatus. The speed of rollers 3 may be regulated gradually through a fairly large range of speeds so that the apparatus may be suited to any particular materials, while maintaining the rovings fed from the distributor 2 substantially untensioned.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of textile processing apparatus and method differing from the types described above.

While the invention has been illustrated and described as embodied in textile processing apparatus and method wherein rovings are fed continuously and directly to a spinning machine from a carding machine, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Textile processing apparatus, comprising in combination, a spinning machine comprising a plurality of pairs of spinning units located at the same elevation, arranged opposite to each other and located progressively nearer to each other as they approach one end of the spinning machine; and guide means operatively connected to said spinning machine for continuously guiding rovings from a carding machine directly to said spinning machine.

2. Textile processing apparatus, comprising in combination, a substantially V-shaped spinning machine having a wide end and a narrow end horizontally spaced from each other and including a plurality of spinning units located in a pair of vertical planes which converge toward each other as they approach said narrow end of said machine; and guide means operatively connected to said spinning machine for continuously guiding rovings from a carding machine directly to said spinning machine.

3. Textile processing apparatus comprising, in combination, a spinning machine comprising a plurality of guide rollers arranged substantially in a horizontal plane to receive rovings from a carding machine and to change the direction along which the rovings move, said guide rollers being parallel to each other and of progressively shorter lengths as they approach one end of said spinning machine, and the longer of each pair of adjacent guide rollers having its opposite ends located beyond the opposite ends of the shorter of said pair of guide rollers; and guide means operatively connected to said spinning machine for continuously guiding rovings respectively along straight lines

from a carding machine directly to said guide rollers of said spinning machine.

4. Textile processing apparatus comprising, in combination, a substantially V-shaped spinning machine comprising a plurality of guide rollers arranged substantially in a horizontal plane to receive rovings from a carding machine, said guide rollers being parallel to each other and of progressively shorter lengths as they approach one end of said spinning machine, and the longer of each pair of adjacent guide rollers having its opposite ends located beyond the opposite ends of the shorter of said pair of guide rollers, and a plurality of ring spinning units equal in number to twice the number of guide rollers and being respectively arranged adjacent the ends of all of said guide rollers; and guide means operatively connected to said spinning machine for continuously guiding rovings from a carding machine respectively along straight horizontal lines directly to said guide rollers of said spinning machine.

5. Textile processing apparatus comprising, in combination, a substantially V-shaped spinning machine comprising a plurality of guide rollers arranged substantially in a horizontal plane to receive rovings from a carding machine, said guide rollers being parallel to each other and of progressively shorter lengths as they approach one end of said spinning machine, and the longer of each pair of adjacent guide rollers having its opposite ends located beyond the opposite ends of the shorter of said pair of guide rollers, and a plurality of ring spinning units equal in number to twice the number of guide rollers and being respectively arranged adjacent the ends of all of said guide rollers in a pair of vertical planes which converge toward said one end of said machine, each of said spinning units including a spinning bell for centrifugally cross winding a spool of thread therein and means for guiding rovings respectively first vertically from said rollers and then to said bells, respectively; and guide means operatively connected to said spinning machine for continuously guiding rovings from a carding machine respectively along straight horizontal lines directly to said guide rollers of said spinning machine.



6. Textile processing apparatus comprising, in combination, a substantially V-shaped spinning machine comprising a plurality of guide rollers arranged substantially in a horizontal plane to receive rovings from a carding machine, said guide rollers being parallel to each other and of progressively shorter lengths as they approach one end of said spinning machine, and the longer of each pair of adjacent guide rollers having its opposite ends located beyond the opposite ends of the shorter of said pair of guide rollers, and a plurality of ring spinning units equal in number to twice the number of guide rollers and being respectively arranged adjacent and beneath the ends of all of said guide rollers in a pair of vertical planes which converge toward each other as they approach said one end of said machine, each of said spinning units including a spinning bell for centrifugally cross winding a spool of thread therein, means for guiding rovings respectively downwardly from said rollers to said bells, and means for automatically removing a spool from said spinning bell and for automatically starting the winding of another spool therein; and guide means operatively connected to said spinning machine for continuously guiding rovings from a carding machine respectively along straight horizontal lines directly to said guide rollers of said spinning machine.


**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 6,901 | Simmons | Jan. 16, 1832 |
| 65,650 | Crowell | June 11, 1867 |
| 302,750 | Lukens | July 29, 1884 |
| 611,108 | Drury | Sept. 20, 1898 |
| 763,378 | Drury | June 28, 1904 |
| 1,127,994 | Hill | Feb. 9, 1915 |
| 1,719,612 | Kenyon | July 2, 1929 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 2,026 | Great Britain | of 1876 |
| 16,115 | Great Britain | of 1888 |
| 447,980 | Germany | Aug. 5, 1927 |