

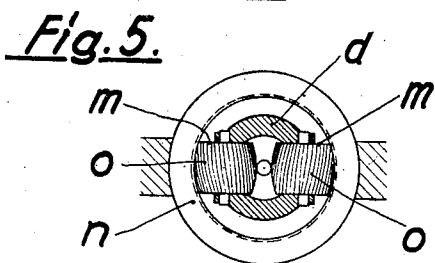
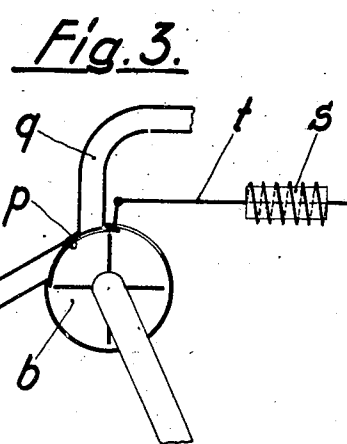
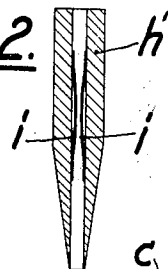
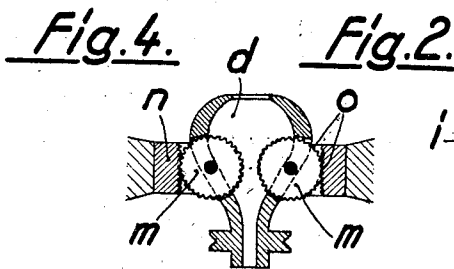
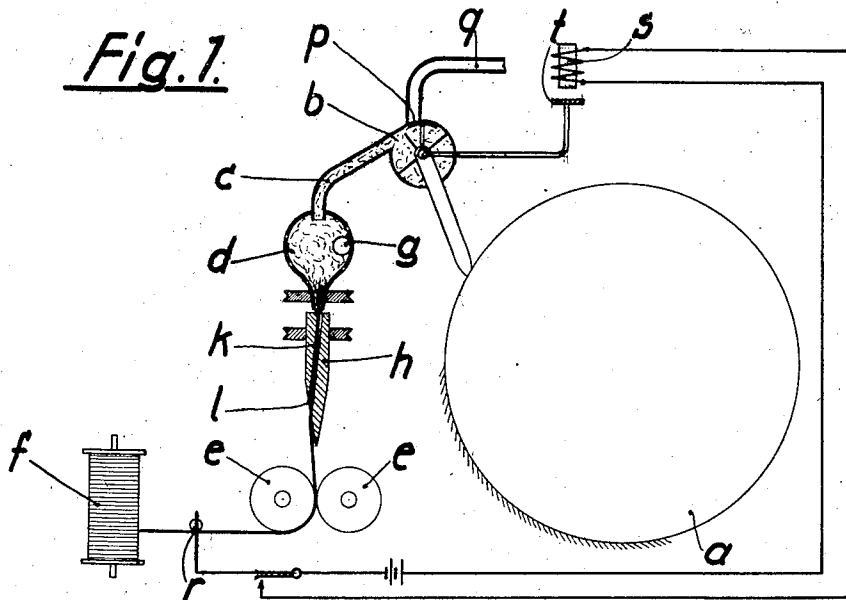
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W. GROSS

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SPINNING MACHINE

Filed March 13, 1928



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UNITED STATES PATENT OFFICE

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SPINNING MACHINE

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The present invention relates to a spinning machine which has a considerably increased output in comparison with the spinning machines hitherto known, inasmuch as the speed of the spinning process is considerably increased.

The low output of the spinning machines hitherto known is to be ascribed to the manner in which the rotation necessary for holding the fibres together is imparted to the yarn. Heretofore this has been done by causing either the finished yarn or the roving to rotate, which involved setting large quantities of yarn in rotation or where the yarn is worked in small quantities frequent stoppages of the machine for the purpose of removing the finished yarn and inserting fresh yarn was necessary.

According to the present invention these disadvantages are avoided by supplying the fibrous material to the twisting device that is to say the spinning device in a loosened state, so that the yarn is only formed at the point where it is twisted or rotated and so formed by the accumulation of the separate fibres that is the fibres reaching the spinning device in a loosened state. These are carried along by the rapidly rotating spinning device, and therefore caused to rotate rapidly and the yarn or roving is then formed by the fibres which have accumulated in the spinning device being twisted together during the continuous drawing down which takes place and so spun into thread.

A number of constructional forms of the subject matter of the present invention are more fully illustrated in the drawing.

Figure 1 shows diagrammatically in vertical axial section one constructional form and

Figure 2 shows another construction of a part of the centrifuge in axial section.

Figure 3 shows on a larger scale and in vertical section the shut off apparatus.

Figures 4 and 5 are an enlarged axial section and plan of a second construction of an apparatus for positively carrying the fibres through the spinning device.

In the machine according to the present invention there is attached to the delivery

cylinder *a* of a carding engine (not shown) and which condenses only very slightly on the drum coating, a suction device *b*. This latter attracts the fibres and blows through a pressure passage *c* into a nozzle-shaped spinning device which operates as a centrifuge and makes some ten thousand revolutions per minute according to the nature of the fibres. The loosely supplied fibres are deposited owing to the action of centrifugal force and their loose state as a fleece on the widest part of the centrifuge *d* and are carried along thereby that is to say are likewise caused to rotate rapidly. The fibres drawn out continuously and uniformly at the bottom of the centrifuge are twisted together into yarn at the lower end by their adhesion. For this purpose they are run between clamping rollers *e* and a continuous thread is produced, which is passed on directly to any desired type of winding or reeling device *f*.

According to this invention the fibrous material in the centrifuge is brought into positive connection therewith so as to ensure its being carried along thereby that is to say to ensure that it shall make the same high number of revolutions as the centrifuge *d* whereby the machine is rendered capable of a great output or capacity. For this purpose and according to the construction shown in Figure 1 a ball *g* is inserted loosely in the centrifuge *d* and bears owing to centrifugal force against the inner wall of the centrifuge *d* at the widest part thereof or is pressed against the inner wall thereof so that it is positively carried along thereby.

According to this invention a second factor of safety is therefore provided. This consists in the fact that the thread does not have the entire rotation imparted to it both in the centrifuge *d* and on its emergence therefrom but only a portion of the rotation at first. A roving is therefore produced and only so much rotation imparted thereto as is required for the fibres to hold together and to release the fleece from the wall of the centrifugal.

For this purpose the centrifugal is made in two parts, the lower one rotating more

slowly than the upper nozzle-shaped portion *d*. In this way there is imparted to the yarn between the upper part *d* and the lower part *h* only just as much rotation as makes the difference between the rotations of the two parts *d* and *h*.

When treating refractory material that is to say material which only takes the rotation with difficulty, the fact that the centrifuge is made in two parts may also at first produce over-twisting of the yarn by the lower portion *h* being rotated in the opposite direction to the upper part *d*. In consequence hereof the two rotary movements become added together and the yarn is at first overtwisted between the upper and lower portions of the centrifuge. This overtwisting is however equalized when the yarn emerges from the lower part *h* of the centrifuge and before it passes to the draw off or doffing rollers *e* the overtwist passing over into the normal twist.

In order to secure the effect aimed at the thread running through the lower portion *h* of the centrifuge must be offered such an amount of resistance therein that it does not rotate here of itself but lies still or rotates with the lower portion of the centrifuge. This may be effected by any desired means. In the constructional example according to Figure 1 the passage *k* for the thread is provided for this purpose with a lateral outlet opening *l* running obliquely to the axis of rotation, but other means such for example as springs *i* may be used in the portion *h*, see Figure 2. In the first case the thread wraps itself slightly round the point of the lower part *h* and is therefore prevented from rotating of itself.

In Figures 4 and 5 is shown an example of another construction of the apparatus, which ensures the fibres being carried through the centrifuge *d*. In this case two feed rollers *m* are provided, which are rotated positively and carry the bundle of fibre between them and along with them. The fibres are consequently positively disconnected from the wall and delivered to the opening of the nozzle. This enables the material to be slightly drawn if the speed of the doffing be made greater than the speed of rotation of the feed rollers *m* in the centrifuge *d*.

The feed rollers *m* are rotated continuously by a worm gearing during their rotation about the axis of rotation of the centrifuge. For this purpose the latter rotates in a stationary nut ring *n* and the rollers *m* have a corresponding screw thread *o* on their peripheries.

The operation of spinning is started by drawing a thread from below by the aid of a needle through the centrifuge *d* and *h* up to about its upper edge. When the centrifuge *d* and *h* rotates the fibres they hang

themselves on to the loose end of the thread and twist themselves together.

Finally means are also provided for mechanically stopping the supply of fibres to the centrifuge *d* and *h* at once should the thread break. For this purpose a cut off device of any kind, for example a rotary valve *p* is placed in or in front of the force pipe of the suction device *b* which, in the constructional example, is made in the form of a fan or blower, and according to its position controls either the force pipe *c* or alternately opens and closes a waste or exhaust pipe *e* which opens into a collecting receptacle (not shown). The valve *p* is controlled electrically, a contact *r* closing automatically when a thread breaks. The closing of the contact excites an electromagnet *s* the armature *t* of which in its turn reverses the valve. This valve *p* can however be also controlled in other ways.

Instead of the fan or blower *b* shown the drawing in of the fibres might also be otherwise effected as for example by a compressed air blower or the fibres may be drawn from a drawing frame or other apparatus for loosening the fibres. The centrifuge itself may also be so constructed that it has a suctional action and a separate suction device thus dispensed with.

Instead of using air the supply of the fibres to the centrifuge may be effected by another fluid such as steam, gases, etc. If an adhesive be also blown in with the fibres the yarn can be simultaneously sized. When blowing in any other desired substance for further treatment can also be added at the same time.

I claim:

1. A spinning machine comprising a suction device for removing the fibers to be spun from a carding or loosening machine; a centrifuge adapted to receive the fibers from the suction device and to centrifugally force them against the inner wall thereof and to rotate therewith, said centrifuge having an axially-arranged outlet through which the fibers are continuously and uniformly drawn out and having a lower part in the form of an elongated nozzle through which the fibers are drawn from the outlet; a ball loosely mounted in the centrifuge to aid in forcing the fibers against the inner wall thereof; and means for drawing the spun yarn from the centrifuge and for reeling the yarn.

2. A spinning machine comprising a suction device for removing the fibers to be spun from a carding or loosening machine; a centrifuge adapted to receive the fibers from the suction device and to centrifugally force them against the inner wall thereof and to rotate therewith, said centrifuge having an axially-arranged outlet through which the fibers are continuously and uni-

formly drawn out and having a lower part in the form of an elongated nozzle through which the fibers are drawn from the outlet; and means for drawing the spun yarn from the centrifuge and for reeling the yarn, said
5 lower part of the centrifuge rotating more slowly than the main part and having a clamp therein.

3. A spinning machine comprising a suction device for removing the fibers to be
10 spun from a carding or loosening machine; a centrifuge adapted to receive the fibers from the suction device and to centrifugally force them against the inner wall thereof and to rotate therewith, said centrifuge hav-
15 ing an axially-arranged outlet through which the fibers are continuously and uniformly drawn out and having a lower part in the form of an elongated nozzle through
20 which the fibers are drawn from the outlet; means for drawing the spun yarn from the centrifuge and for reeling the yarn; and a cut-off device provided in the suction device to close the pipe leading to the centrifuge
25 when the yarn breaks.

In testimony whereof I affix my signature.
WILLY GROSS.

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