

(No Model.)

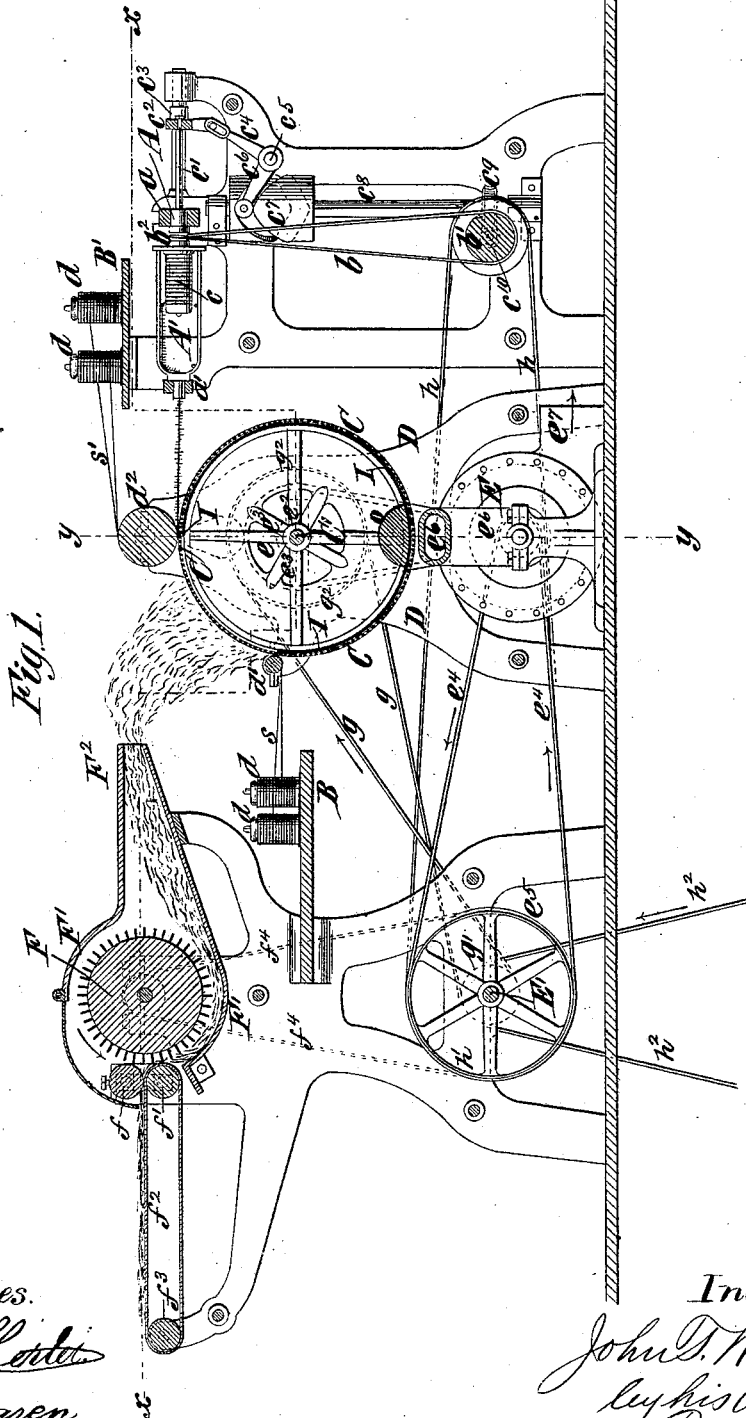
3 Sheets—Sheet 1.

J. T. WARING.

APPARATUS FOR MANUFACTURING NAPPED OR FILLED YARNS
OR THREADS.

No. 347,538.

Patented Aug. 17, 1886.



Witnesses.

Emil Hertel.

Stundgren

Inventor.

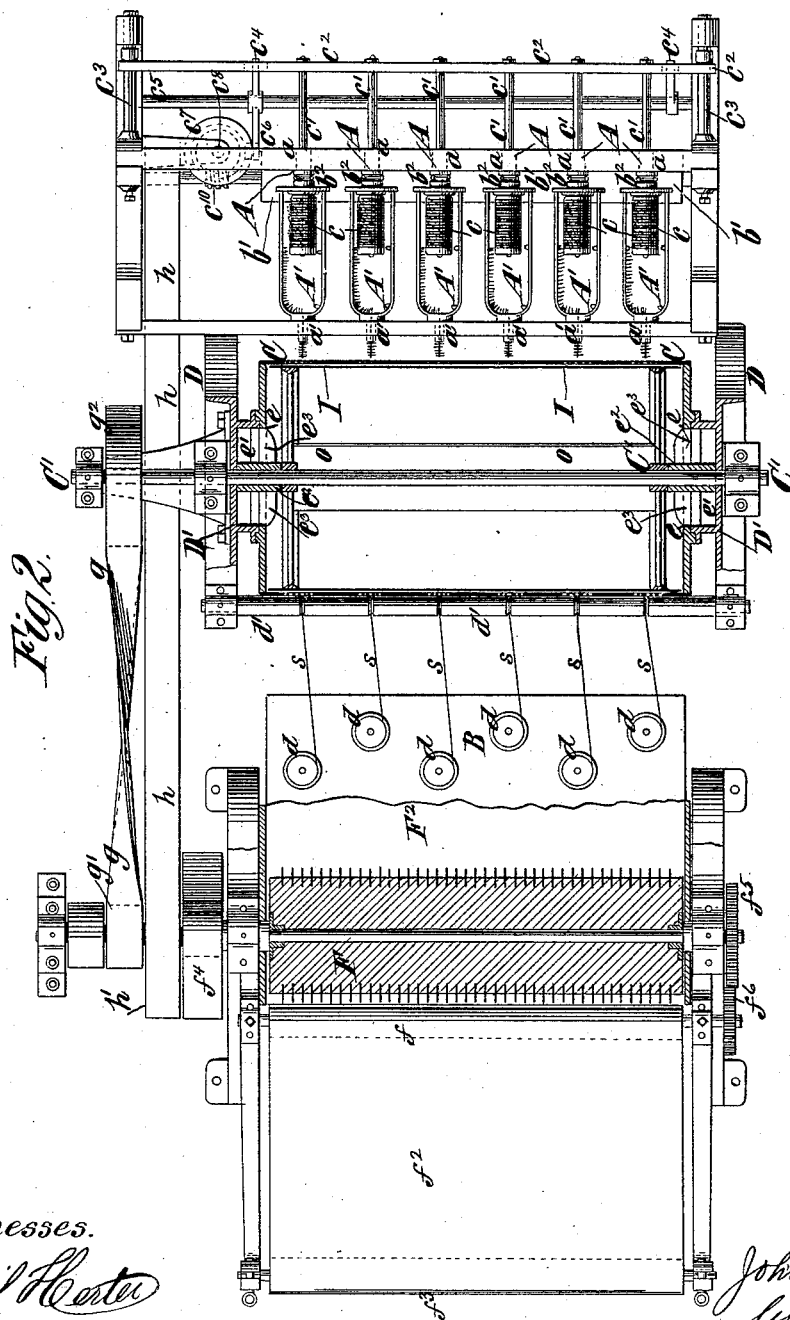
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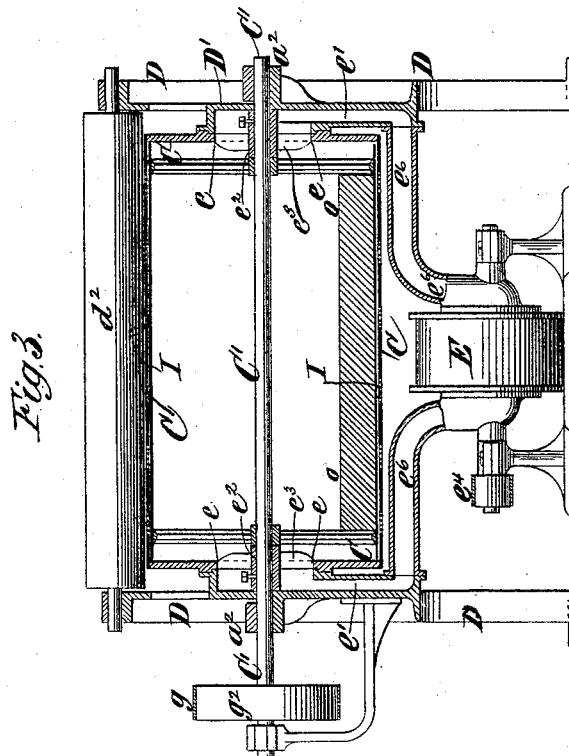
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UNITED STATES PATENT OFFICE.

JOHN T. WARING, OF YONKERS, NEW YORK.

APPARATUS FOR MANUFACTURING NAPPED OR FILLED YARNS OR THREADS.

SPECIFICATION forming part of Letters Patent No. 347,538, dated August 17, 1886.

Application filed November 9, 1885. Serial No. 182,170. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. WARING, of Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Apparatus for Manufacturing Napped or Filled Yarns or Threads, of which the following is a specification.

My invention relates to apparatus for producing yarns or threads, which are severally composed of two or more threads, yarns, rovings, or strands, doubled and twisted together, and nap or filling material secured between them by the operation of doubling and twisting them together. Such napped or filled yarns may be employed in producing woven or knitted fabrics, the surfaces of which will resemble natural fur skins, or they may be employed in the manufacture of woven or knitted fabrics for other purposes. In producing such napped or filled yarns the several separate strands or threads which compose each yarn are conducted from spools or carriers to a twisting-spindle, by the operation of which they are doubled and twisted together, and the nap or filling material is deposited upon one or more of the separate strands before they are so twisted together, and by the operation of twisting is caught and confined between the strands and caused to assume positions radial to the napped or filled yarns.

In carrying out my present invention I provide a movable support for certain of the strands in their passage from the carriers to the twisting-spindle, and I impart to this movable support a positive movement conforming to the travel of the strands, and I also employ a fiber-supplying apparatus for delivering nap or filling material in a loose and free condition upon the one or more strands, while they are upon the support, which nap or filling material is secured in place when said one or more strands are intertwisted with the other threads or strands which go to make up the completed yarn. I prefer to make the movable support in the form of a hollow body or cylinder having those portions with which the strands or threads come in contact made of perforated or reticulated material, and by means of an exhaust-fan or other suitable apparatus I exhaust the air from the interior of the hollow support or cylinder continuously.

When the fiber which is delivered by the fiber-supplying apparatus upon the threads while they are moving with the hollow support or cylinder comes in contact with the perforated or reticulated portions thereof, it is held thereon by the air rushing in through the perforated or reticulated portions, because of the partial vacuum within the support or cylinder, and by this means I hold the fiber in place across the strands which move in contact with the cylinder until such time as those strands are intertwisted with other strands and the fiber locked between the twisted strands, when no other support for the fiber is necessary. In order to cause the strands or threads which receive the nap or filling material upon them to move in contact with the cylinder throughout a considerable portion of its circumference, I provide a guide-roller, under which such strands pass, and I also provide a second guide-roller, whereby other strands which do not receive nap upon them, but which combine with the former to produce the completed yarns, are caused to travel in the same direction and adjacent to those strands which receive the nap or filling material upon them after the latter leave the cylinder.

The hollow cylinder may have large openings in its ends and be fitted to rotate in airtight contact with heads which are formed with or secured to the frame of the machine, and the air may be withdrawn from within the cylinder through passages formed in such fixed heads, and which are in connection with the exhaust-fan.

My invention consists in novel combinations of parts, which are hereinabove referred to and are hereinafter more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of an apparatus embodying my invention. Fig. 2 is a horizontal section and plan upon the plane of the dotted line x , Fig. 1; and Fig. 3 is a partly-sectional elevation of the hollow cylinder and adjacent parts upon the plane of the dotted line y , Fig. 1.

Similar letters of reference designate corresponding parts in the several figures.

A A' designate spindles and fliers, which are arranged in suitable bearings, a a' , and are

rotated by spindle-driving bands *b*, receiving motion from a driving-drum, *b'*, and driving onto the spindle-pulleys or whirls *b''*. I have shown a number of these spindles arranged side by side. Within the fliers are bobbins *c*, which are connected by traverse-rods *c'* with the traverse-bar *c''*. The traverse-bar *c''* is fitted to slide upon guides *c'''* at its opposite ends, and receives a to-and-fro motion by means of arms *c''''* upon the rock-shaft *c'''''*. The shaft *c'''''* also has an arm, *c''''''*, which engages with a cam, *c'''''''*, upon the upright shaft *c''''''''*, said shaft being driven by means of a worm-wheel, *c'''''''''*, from a worm, *c''''''''''*, on the shaft of the spindle-driving drum *b'*. In lieu of the mechanism above described, any other suitable mechanism, such as is in ordinary use, may be employed for imparting a proper traverse motion to the bobbins *c*. The spindles or fliers are each employed to double and twist together two or more strands which are taken from spools *d*. These spools are arranged upon fixed spindles on jack-boards B B'.

C designates a hollow cylinder, which is fixed upon a shaft, C', mounted in suitable bearings, *a''*, in side frames, D. Arranged adjacent to the cylinder C are guide-rollers *d'* *d''*, which are parallel with the axis of the cylinder. Certain of the strands or threads, *s*, from the spools *d* pass beneath the guide-roller *d'*, and thence partially around the circumference of the cylinder to the top thereof, and thence direct to the fliers A'. Other of the strands, *s'*, pass from spools or bobbins *d* partially around and beneath the guide-roller *d''*, and from the guide-roller *d''* they take the same course as the strands *s* to the fliers A'. The circumference of the cylinder C may be of sheet metal or other material, and at those points at which the strands *s* come in contact with the periphery of the cylinder its outer wall or circumference should be of perforated or reticulated metal, so that air may readily pass from the exterior to the interior of the cylinder. In making the cylinder its entire circumference may be of finely-perforated metal or of fine wire cloth or gauze, and all portions of its circumference, except narrow circumferential bands at those points where the strands *s* pass around the cylinder, may be covered with paper or other material, to close the openings in its circumference.

As here represented, the cylinder has openings *e*, of considerable size, in its ends, and is fitted to rotate in a more or less air-tight contact with fixed heads D', which are formed with or attached to the side frames, D, and are constructed with throats or passages *e'*. The cylinder, as represented, is provided with hubs *e''*, which are secured upon the shaft C', and are connected with the integral portions of the ends by means of spiders or bridges *e'''*.

E designates an exhaust-fan or an exhauster, which, as here represented, is driven by a belt, *e'*, from a pulley, *e''*, on the driving-shaft

E', and has its air-inlet openings connected by pipes or passages *e'''*, with the passages *e''''*, formed in the cylinder-heads D' and the adjacent frame portions. The exhauster E has at its periphery an air-outlet, *e''''''*, and by its constant operation air will be rapidly drawn in through the perforated or reticulated portions of the cylinder circumference and exhausted from the cylinder through the passages *e'* *e''*. This operation of the exhauster will produce a constant inflow of air through the perforated or reticulated portions of the cylinder-circumference, and will hold upon the surface of the cylinder the fiber delivered thereupon, as more fully hereinafter described.

In connection with the twisting-spindles and the hollow perforated vacuum-cylinder I employ a fiber-supplying apparatus, which may be of any suitable character. As here represented, this fiber-supplying apparatus consists of the picker-cylinder F, rotating within the casing F', from which extends a delivery nozzle or conduit, F''. It also comprises a pair of feed-rollers, *f* *f'*, arranged adjacent to the picker-cylinder F, and the feeding-apron *f''*, passing around the lower feed-roller, *f'*, and a second roller, *f'''*.

The picker-cylinder may be driven by a belt, *f''''*, passing around pulleys upon the shaft E' and the shaft of the picker-cylinder, and by means of gear-wheels *f''''''* *f'''''''*, which are shown in Fig. 2, the picker-cylinder imparts motion to the lower feed-roll, *f'*. The blast of air produced by the rapid rotation of the picker-cylinder F will be sufficient to cause the fiber to be discharged freely through the outlet F'' and delivered upon the strands *s* as they pass from the guide-roller *d'* to the guide-roller *d''*, and lie upon the circumference of the cylinder C, as shown in Fig. 1. The travel of the strands *s* *s'* is of course produced and controlled by the speed of rotation of the bobbins *c*, and the cylinder C should have a speed of rotation which will correspond to the speed of travel of the strands, so that during the time the strands *s* are in contact with the cylinder they will have no movement relative thereto. The hollow cylinder is, as here represented, driven by means of a belt, *g*, passing from the pulley *g'* to a pulley, *g''*, on the shaft C' of the cylinder.

The spindle-driving drum is, as here represented, driven by a belt, *h*, from a pulley, *h'*, on the driving-shaft E', and the shaft E', from which all parts of the machine are driven, as before described, may be operated by a driving-belt, *h''*. (Shown in Fig. 1.)

By the continuous exhaustion of air from the cylinder there is produced a constant inflow of air from the circumference of the cylinder through the perforated or reticulated portions thereof, on which the strands *s* lie, and an ample quantity of the fiber will by the inflow of air be held in position on these per-

forated portions of the cylinder and upon the strands which are in contact therewith to make the napped or filled yarns. As the strands *s* and the fiber which lies across the strands and is held in contact with the cylinder, as described, reach the guide-roll *d'*, the strands *s'* are brought into play and serve to bind the fiber which constitutes the nap or filling material between the strands *s s'*, and by the rapid rotation of the spindle and flier *A A'* the strands *s s'* are twisted together, the twist commencing at the guide-roller *d'*, and the nap or filling material is thereby secured between the strands or threads which compose the finished yarn.

I have here represented the finished yarn as produced by a single strand, *s*, in connection with a single strand, *s'*, the former passing partly around the cylinder *C*, and the latter being combined therewith at the guide-roller *d'*; but three or more threads or strands may be employed in making the finished yarn, one strand, *s*, being passed partly around the cylinder, and two strands, *s'*, being combined therewith, or two strands, *s*, may be passed partly around the cylinder, and one or two strands, *s'*, combined therewith to produce a finished yarn. In order to assist the adhesion of the nap or filling material to the strands or threads *s*, such strands or threads or the nap or filling material may be moistened with water or other liquid. Napped, filled, or tufted yarn, or even rope of considerable size, may be produced by my process. For the strands or threads which are to be twisted together I may use wool, cotton, flax, hemp, various kinds of grasses, wire, or narrow loosely-woven tape, and for the nap or filling material I may use any kind of fur, hair, grass, cotton, or wool waste, rags, excelsior, or wood shavings.

In order to prevent the free inflow of air through that portion of the cylinder *C* on which the strands *s* do not lie, it is desirable to employ a shield to guard the openings and cut off the inflow of air. I have here shown a shield, *I*, arranged within the cylinder *C* and supported loosely on the shaft *C'* thereof. This shield extends upon the interior of all that part of the cylinder on which the strands *s* do not lie, and in order to hold it against rotation with its opening opposite the part of the cylinder on which the strands do lie I weight it at its lower part, as shown at *o*.

In the operation of my apparatus the napping or filling fiber is deposited in a loose and free condition on the one or more threads or strands *s* which are on the cylinder *C*, and by this peculiarity my machine or apparatus is distinguished from one which comprises cords extending parallel with each other and both wound with silk or other material, which is first cut with a knife and then carried around a cylinder and between converging strands, which are twisted together to confine between them the silk or other material brought by the

said cords within the grasp of the strands as they are being twisted together.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a twisting-spindle for doubling and twisting together strands from two or more carriers, of a support for certain of the strands in passing from the carriers to the spindle, mechanism, substantially as described, for imparting a positive movement to said support to conform to the travel of the strands, and a fiber-supplying apparatus for delivering napping or filling material in a loose and free condition upon the one or more strands while upon the support, substantially as herein set forth.

2. The combination, with a twisting-spindle for doubling and twisting together strands from two or more carriers, of a hollow perforated or reticulated support for certain of the strands in passing from the carriers to the spindle, mechanism, substantially as described, for exhausting air from the support and for imparting thereto a positive movement corresponding to the travel of the strands, and a fiber-supplying apparatus for delivering napping or filling material upon the one or more strands while upon the support, substantially as set forth.

3. The combination, with a twisting-spindle for doubling and twisting together strands from two or more carriers, of a hollow cylinder forming a perforated or reticulated support for certain of the strands in passing from the carriers to the spindle, mechanism, substantially as described, for exhausting air from the cylinder and for imparting thereto a rotary motion corresponding to the travel of the strands, and a fiber-supplying apparatus for delivering napping or filling material upon the one or more strands while upon the support, substantially as set forth.

4. The combination, with a twisting-spindle for doubling and twisting together strands from two or more of the carriers, of a hollow cylinder forming a perforated or reticulated support for certain of the strands in passing from the carriers to the spindle, guide-rollers, whereby the one or more strands which are supported by the cylinder are caused to move in contact therewith throughout a considerable portion of its circumference, and whereby the other one or more strands are caused to take the same direction as the one or more strands upon the cylinder after the latter leave the cylinder, mechanism, substantially as described, for exhausting air from and rotating the cylinder, and a fiber-supplying apparatus for delivering napping or filling material on the one or more strands which pass in contact with the cylinder, substantially as, herein set forth.

5. The combination, with a twisting-spindle, *A*, of a hollow cylinder, *C*, forming a perforated or reticulated support for strands, guide-

rollers d' d'' , fixed heads in contact with which the cylinder turns, and an exhaustor for exhausting air from the cylinder through said heads, mechanism, substantially as described, 5 for rotating the cylinder, and a fiber-supplying apparatus for depositing napping or filling material upon the one or more strands as they move in contact with the cylinder, substantially as herein described.

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Witnesses:

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