Nov. 11, 1941. F. M. PECK 2,262,589

TEXTILE MANUFACTURE

Filed June 7, 1939 2 Sheets-Sheet 1

Fig. 1.

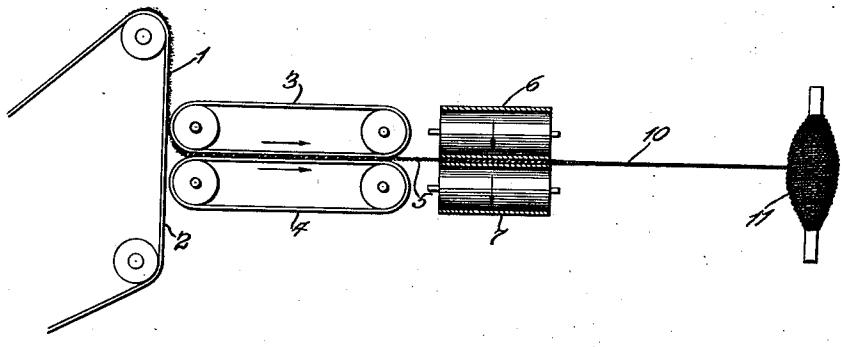
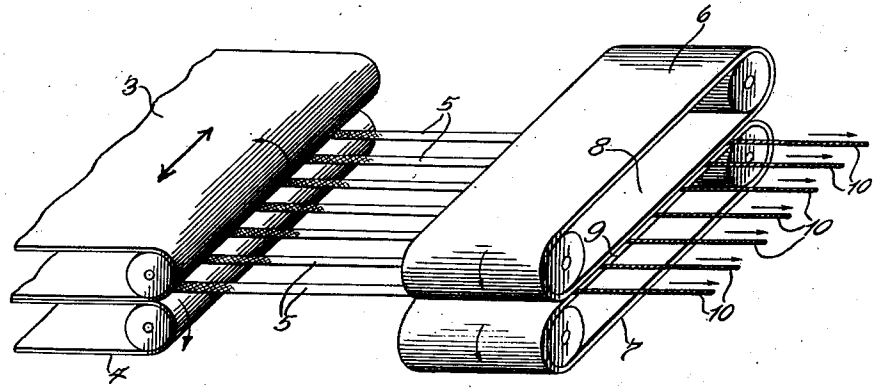


Fig. 2.



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Fig. 3.

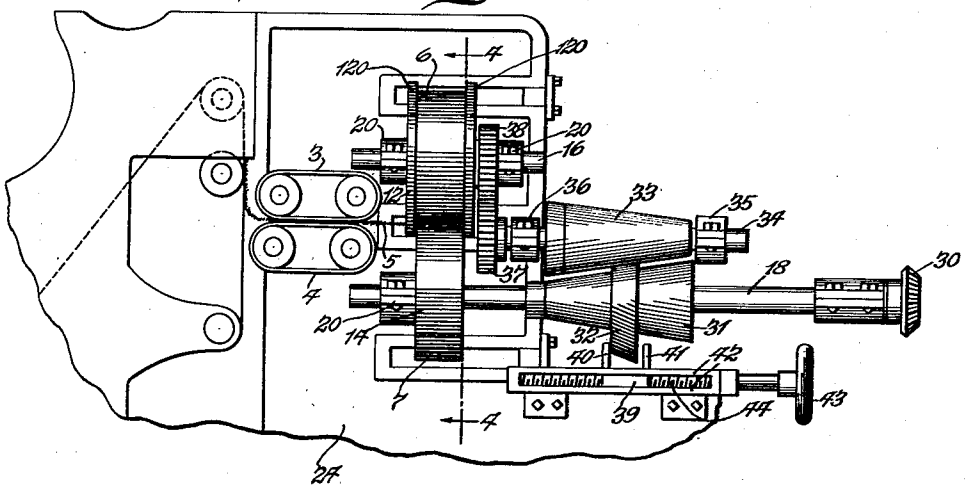
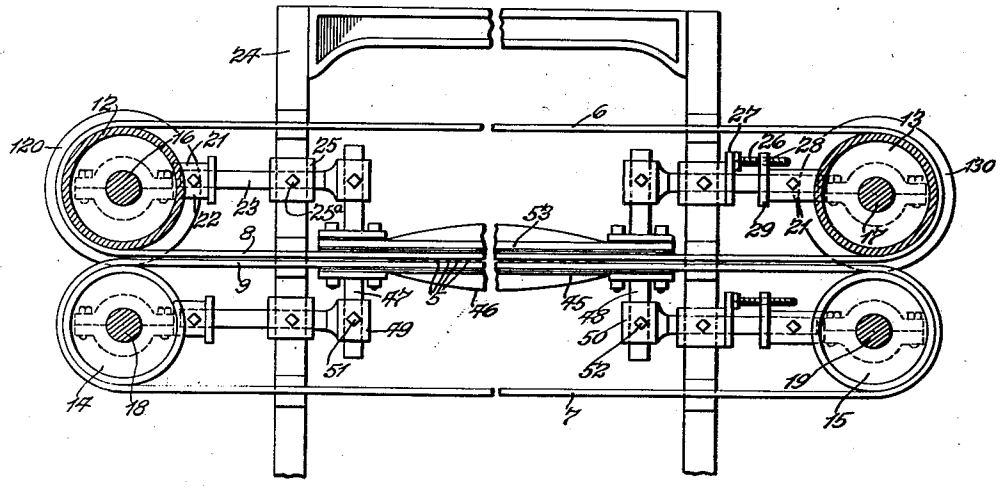


Fig. 4.



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Patented Nov. 11, 1941 2,262,589

UNITED STATES PATENT OFFICE

2,262,589

TEXTILE MANUFACTURE

Frank M. Peck, McGirk, Mo.

Application June 7, 1939, Serial No. 277,794

15 Claims. (Cl. 57—1)

This invention relates generally to textile machinery and particularly to a process and apparatus for rolling and condensing roving as it is delivered from a condensing machine. In the following description the invention will be disclosed with particular reference to the treatment of carded woolens, but it will be understood that the invention is likewise applicable to the treatment of other textile materials, such as cotton, rayon, etc.

Heretofore in the manufacture of textile materials, such as carded woolens, the woolen stock has been subjected to treatment on the usual carding machine which delivers the stock, after condensation, in the form of a condensed roving. Subsequently the condensed roving is treated upon a spinning apparatus which may be either a spinning frame, a mule, or any suitable well known apparatus for twisting and drawing the textile material so as to produce a yarn of substantial strength.

The present invention contemplates generally the application of an auxiliary rolling apparatus to a condenser. Such rolling apparatus may be operated to roll the textile material received from the condenser so as to condense and harden the strand.

The invention further contemplates a special rolling apparatus which, while peculiarly adapted for use as an adjunct to a condenser, may also be advantageously employed in a variety of twisting operations as, for example, in doubling or twisting two or more strands together to form cords, twines, yarns, etc.

The object of the present invention, generally stated, is to provide a process and apparatus for additionally condensing and hardening textile stock which has been preliminarily condensed by rolling the stock by the rolling elements adapted to apply an appropriate pressure thereto.

A further object of the present invention is to provide such an apparatus which may be arranged to further condense textile roving as it emerges from a preliminary condensing apparatus.

A more specific object of the invention is to provide an apparatus for rolling textile roving, constructed and arranged so as to be controllable to adjust or vary the speed of rolling and the pressure applied to the work during the rolling operation.

Other objects will become apparent to those skilled in the art when the following description is read in connection with the accompanying drawings which illustrate an embodiment of the invention as applied to one bank of condensers as employed in the usual woolen carding machine, and in which:

Figure 1 is a diagrammatic view, in side elevation, showing the elemental structure of a conventional condensing apparatus together with the rolling apparatus of the present invention.

Figure 2 is a perspective view, somewhat diagrammatic in form, illustrating the relation of the rolling apparatus of the present invention to a conventional condensing unit.

Figure 3 is a view, in side elevation, showing one embodiment of the rolling apparatus constructed in accordance with the present invention in operative association with one bank of a conventional condensing machine.

Figure 4 is an end view of the apparatus shown in Figure 3.

The present invention contemplates specifically the provision of a pair of endless belts arranged in such manner that the roving from the condensing apparatus may be fed between spans of the respective belts which operate adjacent and parallel with each other, but move in opposite directions. The roving is fed between the oppositely moving spans, just referred to, and is rolled therebetween so as to condense the roving to an extent which will be determined in accordance with the desired result. Suitable means may be provided for controlling the relative speeds of travel of the respective belts thereby controlling the extent of rolling of the roving between the belts. In order to control the direction in which the material emerges from between the rolling belts, suitable means may be provided for varying the specific speed of one of the belts above or below the specific speed of the other belt.

Any suitable means for reeling or winding the material after it has been treated by the rolling belts may be employed in conjunction with the present invention. It is desirable, however, that any such reeling or winding apparatus be so constructed and arranged that a slight draught may be applied to the stranded material. The degree of draught applied will be dependent upon the character of the material being treated as well as upon the character of the material it is sought to produce. In practically all cases, however, it is desirable to have the material, between the rolling belts and the winding apparatus, under at least some tension in order to facilitate the feeding of the material between the rolling belts and to prevent knotting or kinking.

In the embodiment shown in the drawings the

rolling apparatus is illustrated as applied to but one bank of rubbing aprons of the usual condensing machine, but it will be understood that a similar rolling apparatus may be associated with each bank of rubbing aprons.

Referring now to Figures 1 and 2 of the drawings a ribbon of textile stock 1 is fed by a tape 2, or any other suitable separating device, to a pair of rubbing aprons 3 and 4 in accordance with the usual practice in condensing machinery. The rubbing aprons 3 and 4 may be operated in the direction indicated by the arrows and also oscillated in accordance with conventional practice in order to condense the stock and deliver it in the form of roving 5. The roving 5 is fed directly from the rubbing aprons to a rolling apparatus which, in the form illustrated in the drawings, consists of a pair of endless belts 6 and 7 operating at right angles to the direction of operation of rubbing aprons 3 and 4. The belts 6 and 7 are arranged with respect to each other so that the lower span 8 of the belt 6 runs parallel with and adjacent to, yet in the opposite direction to, the upper span 9 of belt 7. Between the lower span 8 of belt 6 and the upper span 9 of belt 7, roving 5 is fed. When the roving is in position between the belts as just described, it is apparent that upon operation of the belts the roving will be rolled so as to become condensed, and the extent of rolling is dependent upon the relative speeds of the oppositely moving belts as well as upon the frictional characteristics thereof. The material emerges from between belts 6 and 7 in the form of additionally condensed stranded material 10. In the diagrammatic showing of Figure 3 but seven ends of textile material are shown as being under treatment by the rubbing aprons and by the rolling apparatus of the present invention, but it will be understood that any desired number of ends may be so treated, and the rolling belts are advantageously made of such length as to treat the full number of ends delivered from the condensing apparatus.

The rolling belts 6 and 7 may be formed of any material having frictional characteristics such as to cause the roving to roll therebetween. Leather of the type employed in rubbing aprons may be used with advantage.

As the rolled material 10 is delivered from between belts 6 and 7, it may be wound upon a suitable reeling device, such as bobbin 11. Any suitable arrangement for driving the winding devices, which may be in the form of reels, spools, bobbins, or the like, may be employed, but it is desirable to employ a winding device capable of applying some tension to the rolled material 10 in order to prevent kinking of that material as well as to facilitate the feeding of the material through the rolling device.

Referring now to Figures 3 and 4, an operative embodiment of the invention is shown as applied to a conventional condensing apparatus of a carding machine. In Figures 3 and 4 the reference characters applied to diagrammatic elements in Figures 1 and 2 denote corresponding parts in the operative structure shown in Figures 3 and 4 and consequently detail description of them will not be repeated.

The belt 6 is mounted upon a pair of pulleys 12 and 13 and the belt 7 is mounted upon a corresponding pair of pulleys 14 and 15. The respective pulleys are so arranged that the belts 6 and 7 will operate parallel to each other with a slight space therebetween in order to accommodate the roving ends 5 in the process of being rolled, and a suitable arrangement for driving the pulleys, hereinafter more fully described, is provided. The belt supporting pulleys are mounted upon suitable shafts, such as 16, 17, 18 and 19. Adjacent the pulleys the shafts such as 16 are mounted in suitable bearings, such as 20, and the bearings are in turn carried upon a support 21, one such being provided for each of the pulleys 12, 13, 14 and 15. In the embodiment shown, the support 21 consists of a yoke 22 having a shank part 23 connected to frame 24 in any suitable manner. For example, the shank part 23 may pass through an aperture in frame 24, in order to facilitate adjustment of the belts 6 and 7. A locking device consisting of a bushing 25 and a set screw 25*a* may be provided in connection with frame 24.

The pulleys supporting one of the belts, as for example the pulleys 12 and 13 which support the upper belt 6 may be provided with flanges 120 and 130, which may be of greater extent than the depth of the belt thereon, as shown. In this manner the flanges extend beyond the belt 6 and operate not only to maintain the belt 6 in alignment with pulleys 12 and 13, but, because of the overlapping of the flanges, also maintain belt 7 in alignment with pulleys 14 and 15.

In order to provide for fine adjustments in the tension of the belts, one of the supports for each belt may be provided with an adjusting device which may consist of a screw 26 having its head seated against an abutment 27 on bushing 25 and having its threaded part in engagement with an internally threaded opening 28 in an extension 29 on yoke 23.

The frame 24, it will be understood, is a part of the framework of the condensing apparatus, such as employed in the usual carding machine. In the drawings only that part of frame 24 which consists of the top section of the usual condensing machine is shown, but it will be understood that the frame may be of any desired width so as to accommodate a condensing apparatus having a capacity for the desired number of ends. Likewise the length of belts 6 and 7 will vary in accordance with the capacity of the machine, it being ordinarily arranged that belts 6 and 7 are of such length as to receive all of the ends delivered by a single bank of rubbing aprons.

The rolling apparatus may be driven by any suitable source of power, not shown, so as to rotate shaft 18. Shaft 18 may be provided with suitable gears such as 30 to receive the power from a driving member and on the opposite end thereof pulley 14 is directly mounted. Mounted on shaft 18 between pulley 14 and gear 30 is a frictional cone member 31 having a driving band 32 arranged for operation back and forth longitudinally of the cone member 31. Driving band 32 is provided with an internal diameter sufficient to accommodate the greatest diameter cone 31. Cooperating with cone 31 and driving band 32 is a complementary cone 33 mounted upon a shaft 34 and in frictional engagement with driving band 32. Shaft 34 may be mounted in suitable bearings 35 and 36 and is provided with a gear 37 meshing with a gear 38, the latter being mounted upon shaft 16. With the arrangement, just described, it is apparent that a driving force imparted to shaft 18 will be directly transmitted so as to cause rotation of pulley 14, and will be transmitted through cone 31, driving band 32, cone 33, and gears 37 and 38 to drive pulley 12.

In order to vary the speeds of rotation of pul-

leys 12 and 14, and consequently to vary the specific speeds of travel of belts 6 and 7, driving band 32 may be traversed longitudinally of cone 31. In order to accomplish this a shipper 39 is provided. The shipper may comprise a member having a pair of prongs 40 and 41 embracing the sides of driving band 32. The shipper 39 is arranged on trunnions to be traversed back and forth between guide rails 42 pursuant to manipulation of a hand wheel 43 which is connected to shipper 39 by a worm 44 in accordance with well known practice.

It will be apparent, therefore, that manipulation of hand wheel 43 will effect a control of the direction in which the rolled material emerges from between belts 6 and 7 so as to compensate for any factors which may tend to pull the material out of line. For example, the frictional characteristics of one belt may be different from those of the other with the result that upon rolling of the roving between the belts, it is translated sidewise. This may be compensated for by running the belts at different specific speeds so as to maintain the rolled material in the desired line of delivery. Characteristics of the material being treated may also effect the direction of delivery, but in any event these factors may be compensated for by adjustment of driving band 32 so as to run belts 6 and 7 at slightly different specific speeds.

The degree of rolling of the roving fed between belts 6 and 7 may be varied by varying the speed of driving shaft 18. Increase in the speed of the drive shaft 18 increases the speed of both belts and consequently imparts a greater number of turns to the roving as it is treated by the rolling apparatus. Mechanism for controlling the speed of shaft 18 may be of any suitable type well known in the mechanical arts and is not shown.

In order to uniformly roll the multiplicity of ends of roving 5 which will be concurrently treated by belts 6 and 7 means may be provided for insuring that a substantially uniform pressure will be applied to all of the ends as they pass between belts 6 and 7. In order to accomplish this, a platen 45 having a reenforcing and stiffening rib 46 may be so mounted as to form a flat supporting structure for span 9 of belt 7 in the region at which the ends 5 will be treated. In order to provide for adjustment of platen 45 in a direction normal to the belt thereon a pair of legs 47 and 48 may be provided thereon. The legs 47 and 48 may be arranged in adjustable relation within bosses 49 and 50 suitably connected to frame 24 of the machine. In the embodiment shown in the drawings bosses 49 and 50 are integral parts with shanks 23 of the pulley support yokes, but it is obvious that they may be separately mounted. Suitable set screws 51 and 52 may be provided in the bosses for locking legs 47 and 48 in the position selected for applying the desired pressure upon the ends of roving passing between the belts.

A similar platen 53 may be correspondingly mounted in inverted relation on the inside of the lower span 8 of the belt 6 so as to provide for applying a downward pressure upon the belts. The surface of platens 45 and 53 which contact with the insides of belts 7 and 6 respectively, should be formed so as to apply a minimum of friction to the contiguous belt parts and should be maintained in parallelism so as to insure that uniform pressure will be applied to the various roving ends passing between the belts.

Under some circumstances and in the treatment of some materials it may not be feasible to apply the necessary degree of draught to the stranded material through the medium of the winding apparatus. In such cases suitable means may be provided for traversing the rolling apparatus back and forth in the direction of travel of the ends thereby, in successive steps, to roll and tension the roving between the rubbing aprons and the rolling apparatus. When such a traversing mechanism is used, it is desirable to separate the belts of the rolling apparatus on the return stroke (movement toward rubbing aprons) and to provide some means for preventing retraction of the rolled material. For example, a pair of nipper rolls may be provided to grip the rolled material while the rolling apparatus is moving on the return stroke, but preferably so arranged as to permit the rolled material to readily pass when the rolling apparatus is being traversed away from the rubbing aprons. Alternatively the winding apparatus may be coordinated with the traversing mechanism to prevent retraction of the rolled material.

While the foregoing disclosure has treated the rolling apparatus of the present invention as an adjunct or attachment to the conventional condenser, it is to be distinctly understood that the rolling apparatus of the present invention may be employed in any relation of parts for rolling preliminarily condensed roving to the desired extent to further condense it. The invention is not limited to the use of the rolling apparatus disclosed in connection with rubbing aprons of the type referred to for the purpose of illustration, but may be advantageously used in connection with any suitable condensing apparatus, the only requirement being that the textile stock, before being fed to the rolling apparatus of the present invention, must have received some preliminary condensation.

Furthermore a rolling apparatus of the type herein disclosed may be used in a variety of other twisting and doubling operations. For example, two or more preliminarily condensed strands of roving, or two or more spun threads may be fed to the rolling apparatus in such adjacence or contiguity as to be rolled together into a cable form. In this manner the rolling apparatus of this invention may be utilized to produce cords, twines, yarns and any other textile material which is manufactured by rolling two or more spun, condensed, or partially condensed strands together.

While in the foregoing disclosure the rolling apparatus has been illustrated as applied to but one bank of rubbing aprons or condensers, it is to be understood that a separate rolling device may be employed for each bank of rubbing aprons or when the tensile strength of the condensed stock will stand it, a suitable arrangement of pulleys may be provided so as to adapt a single rolling apparatus of the character described to handle the ends delivered by a plurality of banks of condensers. Vice versa the rolling apparatus may be of such proportions as to handle only part of the ends delivered from a given bank of condensers.

From the foregoing description those skilled in the art will understand that the features of the present invention may be applied to a great variety of textile machinery and that many modifications in the specific design and arrangement of parts may be employed to take advantage of the principle of rolling preliminarily condensed textile stock in the manner hereinbefore adverted to. It is to be distinctly understood, therefore, that such modifications in the

details of construction, and the use and adaptation of such features and combinations of features as do not depart from the spirit of this invention are, although not specifically described herein, contemplated by and within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. A device for treating textile stock, comprising, means for feeding a ribbon of stock, means for preliminarily condensing the stock, and a pair of oppositely moving spans of endless belts continuously traveling in a direction substantially perpendicular to the direction of travel of the preliminarily condensed stock.

2. A device for treating textile stock, comprising, means for feeding a ribbon of stock, means for preliminarily condensing the stock, and a pair of oppositely moving spans of endless belts continuously traveling in a direction substantially perpendicular to the direction of travel of the preliminarily condensed stock, and means for controlling the relative speeds of said belts.

3. A textile machine, comprising, a condenser arranged to receive and condense a plurality of ends of textile material, a pair of endless belts arranged to receive the roving from the condenser between adjacent parallel spans of the respective belts, and means for operating said belts to move said adjacent spans in opposite directions substantially perpendicular to the direction of travel of the roving.

4. A textile machine comprising, a bank of rubbing aprons arranged to receive and treat a plurality of ends of textile material, and a pair of endless belts operatively arranged in front of and extending entirely across the delivery ends of said rubbing aprons, said belts having adjacent spans moving in opposite directions substantially perpendicular to the direction of delivery of the roving from the rubbing aprons, and said spans arranged to receive the roving therebetween.

5. The combination with a textile condensing machine having rubbing aprons arranged in banks; of a pair of endless belts operating at right angles to the rubbing aprons and having the space between adjacent spans of said belts arranged to receive roving from said rubbing aprons, said belts being operated so that the adjacent spans move in opposite directions parallel with each other.

6. The combination with a textile condensing machine having rubbing aprons arranged in banks; of a pair of endless belts operating at right angles to the rubbing aprons and having the space between adjacent spans of said belts arranged to receive roving from said rubbing aprons, said belts being operated so that the adjacent spans move in opposite directions parallel with each other, and a platen contiguous with the inside of a belt at the region where roving is treated thereby.

7. The combination with a textile condensing machine having rubbing aprons arranged in banks; of a pair of endless belts operating at right angles to the rubbing aprons and having the space between adjacent spans of said belts arranged to receive roving from said rubbing aprons, said belts being operated so that the adjacent spans move in opposite directions parallel with each other.

8. The combination with a textile condensing machine having rubbing aprons arranged in banks; of a pair of endless belts operating at right angles to the rubbing aprons and having the space between adjacent spans of said belts arranged to receive roving from said rubbing aprons, said belts being operated so that the adjacent spans move in opposite directions parallel with each other, a platen contiguous with the inside of a belt at the region where roving is treated thereby, and means for adjusting the platen normal to the belt.

9. In the art of making textile strands, the process comprising, preliminarily condensing the stock, and rolling the preliminarily condensed stock between parallel oppositely moving substantially planar surfaces.

10. In the art of making textile strands, the process comprising, preliminarily condensing the stock, and rolling the preliminarily condensed stock between parallel oppositely moving substantially planar surfaces, the relative speeds of said surfaces being controlled in accordance with tightness desired in the finished strands.

11. In the art of making textile strands, the process comprising, preliminarily condensing the stock, and rolling the preliminarily condensed stock between parallel oppositely moving substantially planar surfaces, the individual speeds of said surfaces being controlled to deliver the finished strands therefrom in the desired direction.

12. In the art of making textile strands, the process comprising, preliminarily condensing a plurality of ends of textile stock, and concurrently rolling all the ends between parallel oppositely moving substantially planar surfaces.

13. In the art of making textile strands, the process comprising, supplying stranded condensed textile material and passing the material endwise between and in contact with substantially planar surfaces moving in opposite directions at right angles to the endwise movement of the stranded material.

14. In the art of making textile strands, the process comprising, supplying a plurality of strands of condensed textile material, and passing the strands into contiguous relation endwise between and in contact with substantially planar surfaces moving in opposite directions at right angles to the endwise movement of the stranded material.

15. In the art of making textile strands, the process comprising, preliminarily condensing a plurality of ends of textile stock, concurrently rolling all the ends between parallel oppositely moving substantially planar surfaces, and imparting a draught to the condensed material.

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