Jan. 7, 1941. S. COHN ET AL 2,228,001

TUBULAR FABRIC TREATING SYSTEM

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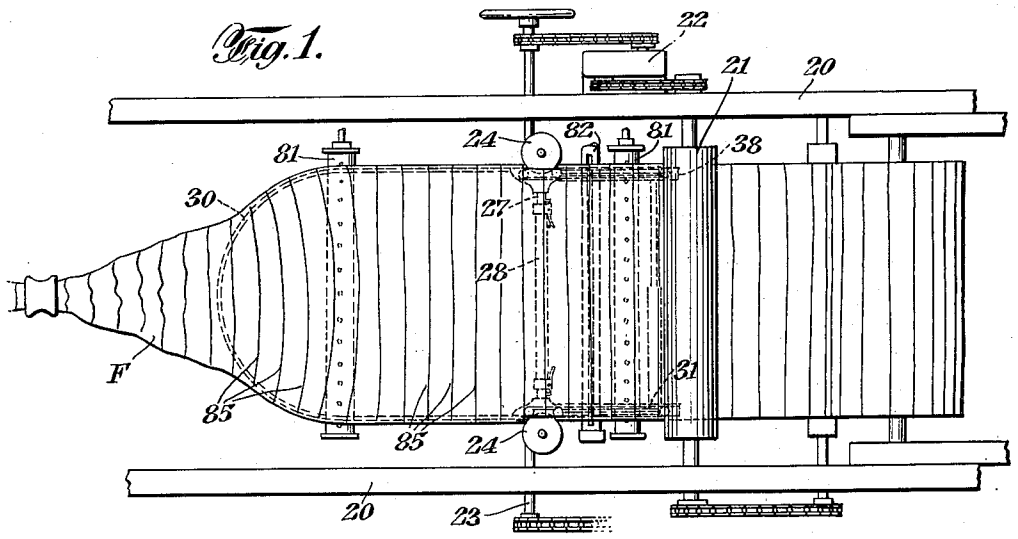
Fig. 1.



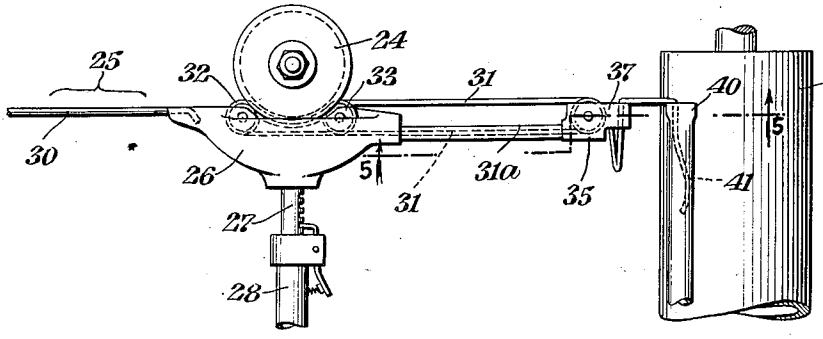


Fig. 2.

Fig. 3.

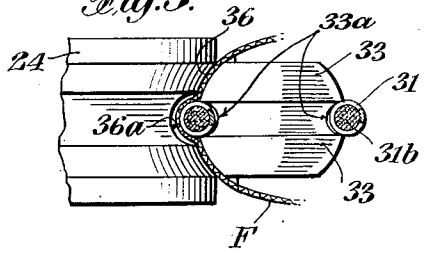
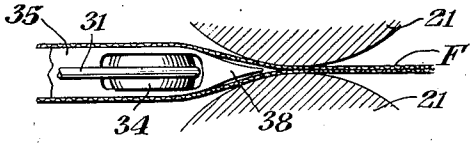


Fig. 4.



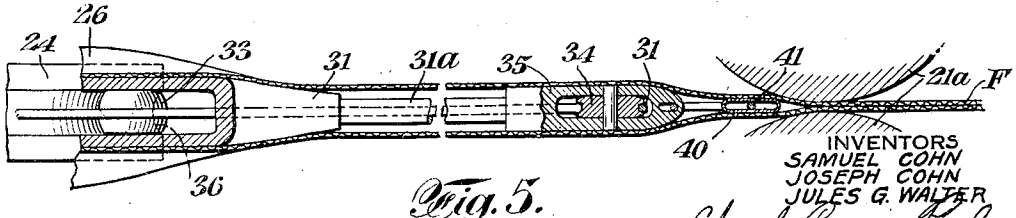


Fig. 5.

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TUBULAR FABRIC TREATING SYSTEM

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Fig. 6.

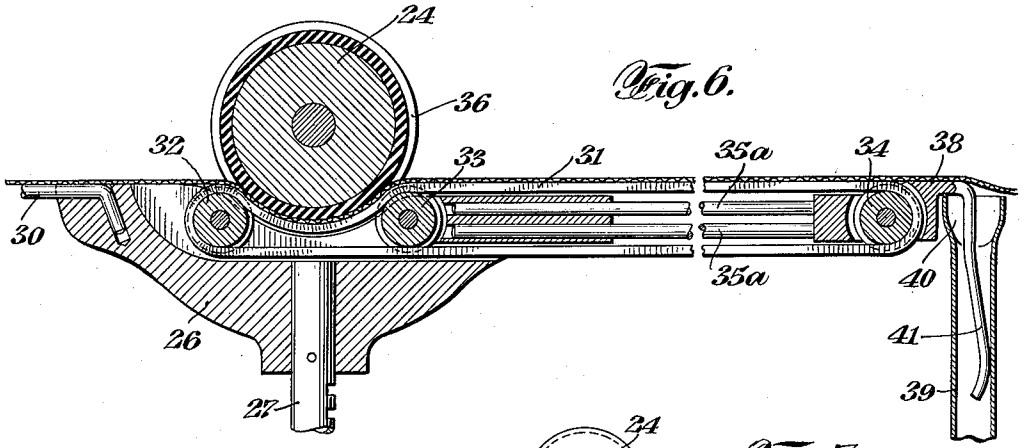

Fig. 7.

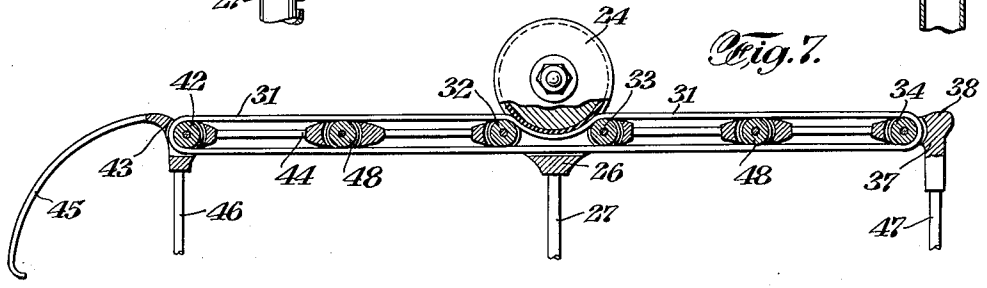

Fig. 8.

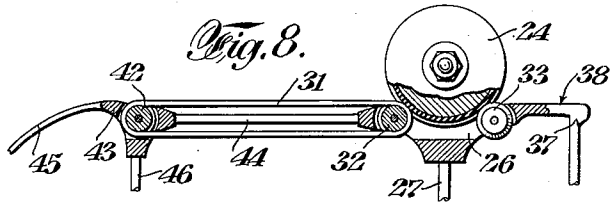

Fig. 9.

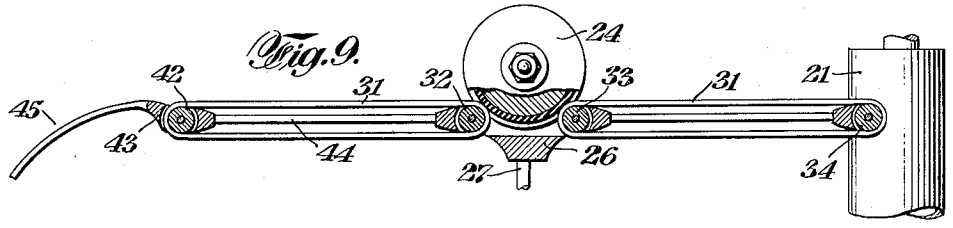

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Fig. 10.

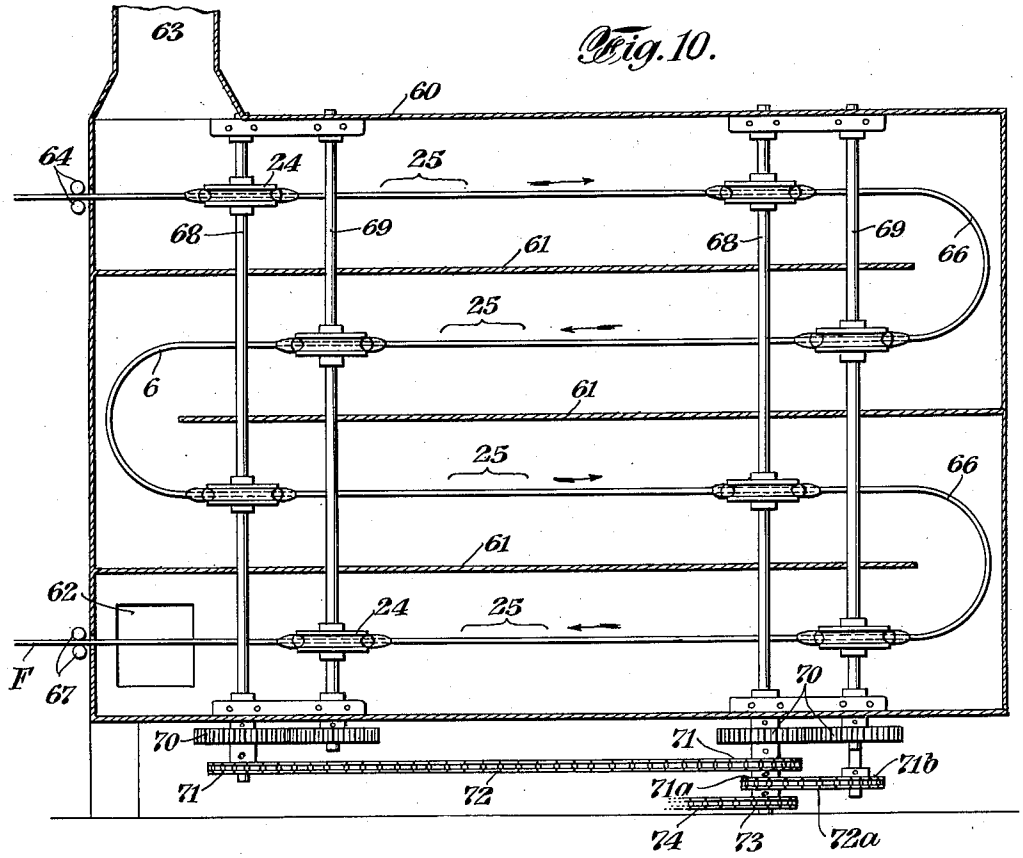
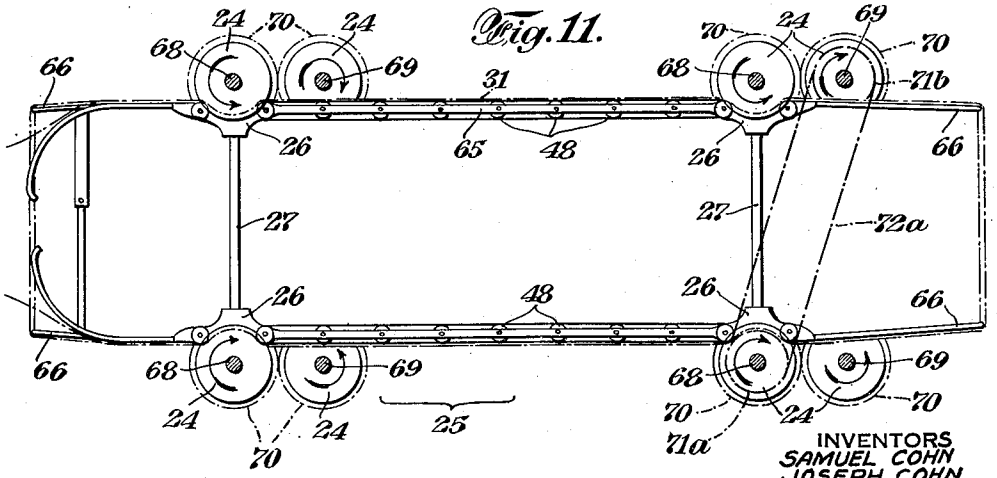


Fig. 11.



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Patented Jan. 7, 1941 2,228,001

UNITED STATES PATENT OFFICE

2,228,001

TUBULAR FABRIC TREATING SYSTEM

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Application April 5, 1938, Serial No. 200,064

18 Claims. (Cl. 26—56)

This invention relates to an apparatus and method for manipulating and treating traveling textile fabric tubes in which the fabric is subjected during travel to distension, preferably in flattened form.

Operations in which the traveling fabric is flattened and distended are frequently performed on tentering machines in which the fabric margins are held by clamps or pins; but this arrangement is unsuited to certain types of materials, especially knit goods, which can not be handled effectively on such apparatus. Knit goods in tubular form have been processed during travel while stretched transversely over internal spreaders; but the traction employed in pulling the fabric tube over the spreader has maintained a substantial longitudinal tension on the fabric. The material is therefore subjected to both transverse and longitudinal tension, whereas the longitudinal tension may be partly or wholly eliminated in treating fabric on tentering frames. This condition is of importance where the fabric undergoes changes of form or dimensions during treatment, such as the expansion of the fabric to a predetermined width, the shrinking thereof, or both. The direction of shrinkage or expansion has an important effect on the characteristics of the fabric and is largely determined by the relationship of longitudinal tension to transverse tension.

This factor is especially important in knit goods owing to the yieldable and readily distorted character of such goods particularly in the lighter weights. Fabric tubes of this type are sometimes expanded to widths greatly exceeding those at which they are originally knit, requiring the use of distending devices or spreaders that exert strong pressure on the fabric. The effect of such pressure is concentrated in the zones of contract between the fabric and the spreader; and since the fabric is pulled over the spreader by longitudinal tension, the localized resistance to travel in such zones of contact deflects the contiguous portions of the fabric rearwardly and results in more or less localized distortion.

While this distortion or rearward deflection can be substantially corrected by external propeller rolls engaging the fabric margins, such an arrangement corrects rather than eliminates the distortion. Moreover, since it involves a compensation for the effect of friction which may vary substantially with slight differences in various parts of the traveling tube, such an arrangement does not invariably produce perfect correction of the distortion and may require careful and constant attention to assure successful operation.

A purpose of the invention is to provide a novel arrangement and method for applying to tubular textile fabric the requisite transverse tension during travel without requiring the application of longitudinal tension. A further object is to provide in such an arrangement means for producing a prerequisite relationship between longitudinal and transverse tension, a mode of operation that is serviceable in certain processing steps, such as the finishing of tubular knit goods. In this operation it is usually necessary to finish the goods to a specified width and with a specified yield, which requires a definite length for a given weight of goods. The yield requirements will of course determine the ultimate length of a given piece of unfinished material when finished to a selected width, and such length can be accurately provided only by accurate adjustment of the relationship between transverse and longitudinal tension.

A purpose of this invention is to provide such adjustment whereby both the desired width of the goods and the desired yield may be produced accurately in a single run. A further object is to provide finished tubular knit goods that has a lower yield and consequently higher quality than any similar goods that could heretofore be produced by finishing processes of this general type, this object being attained by largely or completely eliminating longitudinal tension and thereby permitting the fabric to contract freely in a longitudinal direction, thus compensating as far as is necessary or desirable for the transverse distension of the fabric. An advantage of fabric of this type is that it will not change its proportions after washing in the manner or to the extent that has heretofore been considered inevitable in such fabrics.

Another object is to provide an arrangement that will bring the courses and other transverse elements of the fabric into transverse alignment with improved accuracy and efficiency.

A further purpose is to provide an arrangement for conveying tubular textile fabric maintained under transverse tension by internal marginal engagement while completely free to contract longitudinally, a specific feature involving freedom to contract longitudinally in the zones of marginal engagement as well as between such zones. An additional feature is the provision of means for propelling the fabric and a supporting belt therefor at different speeds from the same rotary drive member.

These purposes are in general accomplished by providing belt means in the zones of engagement between the fabric and the distending device,

thereby eliminating friction in such zones, and by providing an improved arrangement, support and drive for the belt means. This type of construction facilitates the application of heavy transverse distending pressure to the fabric without requiring longitudinal tension to feed the fabric and without producing the serious deflection and distortion in the zones of spreader engagement heretofore associated with substantial transverse distension.

An additional object of this invention is to provide a device of this type embodied in a floating spreader, together with means external to the traveling fabric tube for supporting the spreader and driving the belt means. In a preferred form this arrangement includes rotating driver or propeller rolls bearing against the fabric in register with the belt means and therefore serving to drive the belt means and to propel the cloth. Traveling tubular fabric has heretofore been propelled by rolls of this type engaging the margins of the flattened tube and advancing the fabric to an extent sufficient to compensate for the rearward deflection due to friction and longitudinal tension; but the present arrangement eliminates to the desired extent the necessity for such correction.

In the preferred form the invention may readily be employed to feed the material between a pair of pressure rolls such as squeeze rolls for wet goods or finishing rolls for dry goods; and by varying the ratio between the speed of the belt means and that of the rolls, various desirable effects on and adjustments of the fabric may be produced. This arrangements for instance permits an accurate and readily adjusted control of the yield. It likewise permits a completely accurate regulation and correction of marginal deflection of the flattened fabric tube, and when properly adjusted is much more certain and uniform in operation than previous spreaders in which the fabric is subjected to definite marginal retardation and correction thereof.

Apparatus of this type has special advantages in various operations in which fabric is subjected to distension or is preferably under substantial tension during processing. In general it may be employed in the different operations now carried out on tentering apparatus, and flat fabric can be processed by sewing the margins of the fabric to provide a tube that may be handled on machines of the type described herein. This arrangement permits the elimination of the engaging devices employed on tentering machines, with their known disadvantages for certain types of goods, permits the use of a much simpler mechanism and facilitates longitudinal control of the goods on the machine. Such processes comprise for instance mercerizing, treatment with liquids and drying.

As indicated, the invention involves certain methods of manipulating the fabric that are novel and which permit the production of textiles having new characteristics and qualities. The method features include the regulation of longitudinal relative to transverse tension and in particular the material or complete elimination of longitudinal tension, especially in operations involving fabric shrinkage.

Other objects and advantages, including the particular construction and arrangement of parts of the apparatus, will appear from the following description considered in connection with the accompanying drawings in which,

Fig. 1 is a partly diagrammatic plan view of a finishing machine embodying the invention;

Fig. 2 is an enlarged fragmentary plan view of one side of a modified spreader arrangement;

Fig. 3 is an enlarged fragmentary sectional view through a propeller roll and the adjacent fabric-engaging roller;

Fig. 4 is an enlarged fragmentary section through the arrangement for guiding fabric from the spreader to the rolls shown in Fig. 1;

Fig. 5 is a section on line 5—5 of Fig. 2, showing another arrangement for guiding the fabric between rolls;

Fig. 6 is a fragmentary horizontal median section through a slight modification of the spreader shown in Fig. 2;

Fig. 7 is a partly diagrammatic plan view of one side of a spreader embodying another modified arrangement, parts being broken away, illustrating a belt extending in both directions from the propeller roll;

Fig. 8 is a similar view of another modification having a belt at the feed side of the propeller roll;

Fig. 9 is a similar view of an additional modification with separate belts at opposite sides of the propeller roll;

Fig. 10 is a partly diagrammatic side elevation of a dryer arrangement employing belt spreaders; and

Fig. 11 is a diagrammatic plan view of the conveying mechanism illustrated in Fig. 10.

In a preferred form illustrated herein the invention is applied to a spreader arranged to distend a fabric tube laterally in flattened form by engaging the tube in opposite marginal zones, and is incorporated in a finishing machine of the type customarily employed for finishing tubular knit goods, in which the fabric is fed from the spreader between finishing rolls, or in a wet processing machine of similar construction including squeeze rolls. Apparatus of this general type is known and is illustrated in more detail in the application of Samuel Cohn, No. 17,934 filed April 24, 1935, now Patent No. 2,130,118 granted September 13, 1938.

In the form shown in Figs. 1–6 the apparatus is mounted on a frame 20 and includes a pair of pressure rollers such as finishing rolls 21 which may be heated and are driven through a speed changer 22 from shaft 23 which drives propeller rolls 24. The spreader 25 comprises propeller heads 26 provided with studs 27 adjustably connected by sleeve 28 to provide a unitary structure adjustable in width. Each head 26 is provided with means extending internally along the margins of the flattened fabric for maintaining the fabric in distended position. Such means includes a spreader bow 30 fixed to head 26 and having an inwardly curved end portion for receiving and initially distending the tubular fabric.

From bow 30 the fabric passes beneath propeller rolls 24 bearing against spaced rollers 32, 33 on each head 26. In this embodiment a belt 31 is provided at each side of the spreader, traveling in suitable grooves 33a in rollers 32, 33 and in pulley 34 mounted on frame block 35, connected by frame rods 35a to head 26. Belt 31 may fit snugly in the grooves of rollers 32, 33 and pulley 34 with the belt face flush with the faces of said rollers and pulley, as shown in Figs. 4 and 5. This arrangement provides a smooth surface on rollers 32, 33 for pressing the fabric against the abutting face of groove 36 in propeller roll 24, which may be surfaced with rubber or other yieldable

material, and for maintaining the smooth travel of the fabric over pulley 34 at the discharge end of belt 31. The portions of head 26 and frame block 35 extending along the fabric-engaging run of belt 31 are appropriately shaped and arranged to provide a smooth surface for the traveling fabric; and a frame rod 35a may be arranged immediately adjacent to said run of belt 31 to provide suitable backing and support for such run against the tension exerted by the fabric.

With certain fabrics any localized pressure tends to produce marks which are difficult to remove; and in order to avoid this result the propeller roll 24 may be provided with a central annular depression 36a in alignment with belt 31 arranged so that no direct pressure is exerted by roll 24 on the fabric overlying the belt 31 or the margins of the grooves 33a in rollers 32, 33 carrying the belt 31.

Under certain conditions it is advantageous to provide a speed differential between the belt and the fabric propelled by rolls 24, this arrangement being useful either for auxiliary correction of marginal distortion of the fabric or for facilitating longitudinal contraction of the fabric along the belt to accommodate fabric shrinkage and the like. A convenient arrangement for accomplishing this result by a single driving means is illustrated in Fig. 3.

In this arrangement the spring belt 31 rests upon and is driven by the edges of groove 33a, while the surface of groove 36 in propeller roll 24 has a driving engagement with the surface of roller 33 in a zone spaced along the curved surface of the roller from groove 33a. The effective diameter of roller 33 in the driving zone is therefore less than the diameter of the roller at the edges of groove 33a which drive belt 31; and as the fabric is propelled by engagement between propeller roll 24 and roller 33 in such driving zone, the speed of propulsion of the fabric will be less than the speed at which belt 31 is driven.

It will be apparent that by varying the relationship between the effective diameter of roller 33 in the driving zone and the effective diameter of such roller in the zone of propulsive engagement with the belt 31, the belt may be driven at the same speed as the fabric or at speeds above or below the speed of the fabric within a substantial range.

In apparatus of this type when used for finishing tubular fabric by a method including steaming, there is a tendency for steam to condense on portions of the apparatus which come in contacts with the fabric; and with certain types of fabric drops of water produced in this manner form spots which are objectionable and difficult to eliminate. In order to avoid the possibility of formation of condensate of this type on belts 31, especially when made of a tubular spiral spring, the return run of each belt 31 may pass through a metal tube 31a (Fig. 2) which is preferably in the path of the steam and therefore is normally heated by such steam to a temperature substantially above the vaporization point of the water. With this arrangement any water tending to accumulate on belt 31 will be vaporized before the belt comes into contact with the fabric. Tube 31a likewise constitutes the support for frame block 35.

Another method of accomplishing a similar object is illustrated in Fig. 3 in which the coil spring belt 31 is provided with a filling or core 31b of water-absorbent material, such as a cord or roving of cotton or other suitable material. Any water forming on the belt is absorbed by such filler and may thereafter be vaporized when the belt passes through a suitably heated zone such as that within the tube 31a.

A suitable arrangement is preferably employed for guiding the fabric from belt 31 into the nip of pressure rolls 21. This may include an extension 37 of frame block 35 provided with a guide face 38 in continuation of belt 31 extending into close juxtaposition to the nip rolls 21, as in the form shown in Figs. 1, 4 and 7. In this arrangement the opposite sides of the spreader adjacent the rolls 21 may be connected by an adjustable transverse rod 47 on frame blocks 35 and substantially spaced from the nip of the rolls. The spreader may however be provided with a dead bar, as illustrated in Figs. 2, 5 and 6. This arrangement may include a tubular dead bar 39 having flattened ends 40 forming longitudinal slots receiving spring arms 41 mounted on frame blocks 35 and bearing against the forward surface of the interior of bar 39, serving to press the bar yieldably into the nip of rolls 21. Spring arms 41 may be removably mounted in blocks 35, as shown in Figs. 2 and 5, or may be integral therewith, as in Fig. 6.

The belts 31 may be of various materials and contours, depending upon the design and conditions of use, and for instance may be made of leather, plain or impregnated fabric, chain, or spiral wire spring; and may be round or V-shaped. They may be arranged in various ways, depending upon the nature of the fabric and the type of treatment desired. The surface of the spiral wire spring belt may be treated to increase its frictional engagement with the fabric as by sandblasting or otherwise roughening the belt surface. In the form shown in Fig. 7, the belt 31 extends beyond the feed side of propeller roll 24, passing around pulley 42 carried by forward frame block 43, which is connected to head 26 by rod 44 and carries the feed bow 45 and adjustable cross rod 46 connected to the similar frame block 43 at the opposite side of the spreader.

The belt-carrying frames may be provided with any suitable means for supporting the belt against the transverse fabric tension. In Fig. 7 rollers 48 are employed for this purpose, and are appropriately spaced in accordance with the length of the belt and the transverse strain to which it is subjected.

Fig. 8 illustrates an arrangement in which the belt 31 is located only at one side of the propeller roll 24, being shown at the feed side thereof, and passes only around roller 32. Propeller head 26 is extended beyond roller 33 for a distance sufficient to provide the desired manipulation of the fabric, such as longitudinal contraction or stretching, between roll 24 and the succeeding mechanism such as finishing rolls 21.

Fig. 9 illustrates another arrangement in which separate belts are provided at the feed and delivery sides of the propeller roll 24 and are separately driven by said roll. In this arrangement it is also indicated that under proper circumstances the fabric may be fed directly from belt 31 to rolls 21, pulley 34 extending into the nip of the rolls.

The invention is also shown in its application to a dryer illustrated diagrammatically in Figs. 10 and 11. This embodiment shows a dryer of known type in which a casing 60 is provided with horizontal partitions 61 spaced at alternate ends from casing 60 to provide a tortuous passage for hot air traveling between ports 62 and 63. The

fabric F entering between guide rollers 64 passes over a suitable driven belt spreader 25 of any appropriate type, the form illustrated including two propeller heads 26 at each side of the spreader connected by a suitable frame 65 carrying belt 31 supported by a plurality of rollers 48 mounted on the frame. Similar spreaders 25 are provided in each horizontal run of the passage and are connected by bows 66 mounted on corresponding heads 26 of successive spreaders, bows 66 being preferably deflected toward each other to reduce friction on the fabric while passing over said bows. The fabric is discharged from the lowermost spreader through an opening in the casing 60 and between guide rollers 67 in known manner.

While the propeller rolls 24 of this embodiment may be supported and driven in any desired manner, such as that indicated in Fig. 1, a preferred arrangement is disclosed, in which the vertically registering rolls 24 of one set of alternate spreaders 25 are mounted on drive shafts 68, while the corresponding rolls 24 of the other set of spreaders are mounted on drive shafts 69. Each adjacent pair of shafts 68, 69 is connected by pinions 70, so that the runs of the fabric on successive spreaders 25 will be appropriately driven in opposite directions.

Shafts 68 and 69 are driven in any suitable manner, the form illustrated employing a sprocket 71 on each shaft 68, a sprocket chain 72 at each side of the spreader connecting the sprockets 71 at said side, a sprocket chain 72*a* connecting a sprocket 71*a* on a shaft 68 and sprocket 71*b* on a shaft 69 at the opposite side, and a sprocket 73 on the latter shaft 68 connected by sprocket chain 74 to a suitable source of power.

When operating the form shown in Fig. 1 in which the invention is applied to a machine for finishing tubular knit fabric, the latter is fed in the usual manner over the spreader bow 30, on which it is flattened and expanded to the desired width, and may be steamed by means of steam nozzle 81. The marginal zones of the tube then pass between propeller rolls 24 and rollers 32, and are held tightly against the faces of rolls 24 by belts 31 as far as rollers 33, the pressure of the propeller rolls 24 against the fabric serving to apply propulsion to rollers 32 and 33 as well as to belts 31.

Beyond rollers 33 the fabric, maintained in flat distended condition by the pressure of the marginal zones of the tube against belts 31, may be treated with heated or cooling air from nozzle 82, and may be subjected to a second steaming or other treatment.

As the belts in this arrangement are traveling at the same speed as the fabric in the marginal zones, there is not only a complete absence of any tendency toward distortion, but the position of such marginal portions relative to the center of the fabric may readily be adjusted by regulating the speed of rolls 24. The distance between the ends of belts 31 and the point of engagement of the fabric between finishing rolls 21 can be adjusted by appropriate design in accordance with the desired manipulation of the fabric, this space permitting the fabric to contract or expand longitudinally in accordance with the variations in speed between the belts 31 and the rolls 21.

It will be apparent that this spreader construction does not require the use of pressure rolls for longitudinal propulsion of the fabric, as the latter may be adequately propelled by the propeller rolls 24 and belts 31. The arrangement therefore provides two separate longitudinal feeding devices, the spreader and the pressure rolls, whose relative speed may be controlled in known manner by adjustment of the speed-changing drive connection 22, thereby permitting any desired ratio between longitudinal and transverse tension, and consequently any selected yield for a given fabric stretched to a predetermined width. It also permits the operator to feed the laterally stretched fabric to rolls 21 without any longitudinal tension, under which conditions the cloth is permitted free and complete shrinkage in a longitudinal direction.

This type of processing has been found highly advantageous with fabrics which heretofore have been treated exclusively on tentering machines, since such machines have been the only available apparatus permitting free longitudinal shrinkage while the fabric was held under substantial transverse tension. Since many types of knitted material cannot be held in the manner employed by tentering machines without serious marring or injury, it is in general impractical to treat traveling knitted material on such machines. The arrangement disclosed herein is entirely practical for such treatment of knitted material; and moreover, in processes such as mercerizing where the maintenance of relatively high tension is important, any desirable transverse and longitudinal tension may be adjustably applied by the present apparatus.

Where the frictional effect of the initial bow spreader 30 is objectionable, the belt means 31 may be extended as far as seems desirable along the marginal zones of the tubular fabric which are subject to distending pressure by engagement with the spreader. The embodiment of Fig. 7 shows a construction of this type in which belt 31 extends to the initial point of full distension, Fig. 9 showing a similar arrangement in which separate belts are employed at either side of the propeller roll 24 for like purpose. In Fig. 8 the belt at the delivery side is dispensed with, and the fabric may be fed either directly to the receiving apparatus such as rolls 21, or may be spaced sufficiently therefrom to provide a zone of longitudinal adjustment as already indicated. In Figures 8 and 9 the belt is driven by direct pressure of the driving roll against the roller carrying the belt. These embodiments are not limited to arrangements in which the belts 31 located at opposite sides of the spreader in advance of propeller rolls 24 are parallel, since a converging relationship may be employed, and feed bows 45 may be dispensed with.

In the forms illustrated in Figs. 1–9 the location of the rollers 32, 33 in the grooves 36 of propeller rolls 24 permits the latter to support the spreader 25 as well as to propel the fabric and belts.

While certain specific features have been illustrated in connection with one or another of the embodiments, such features including the arrangement for transferring the fabric from the belts to the nip rolls, the method of transversely connecting and adjusting the distance between the sides of the spreader, the method of mounting, supporting and driving the belts 31, and other specific arrangements, it will be understood that these features are interchangeable between the various embodiments in obvious manner.

The method of operation of the apparatus will in general be apparent from the preceding description. The embodiment shown in Fig. 1 may be operated to correct the deflection of the marginal portions of the courses, by suitable variation in the speed of rolls 24 as indicated by the change

in deflection of course lines 85. This adjustment requires a definite speed of said rolls, and the relationship of the fabric feed on belts 31 to the rate of take-up by rolls 21 may be adjusted by suitable manipulation of the speed changer 22 and the drive of shaft 23. The operation of the dryer arrangement shown in Figs. 10 and 11 will likewise be apparent. Knitted fabric normally shrinks very extensively during drying; and the belt conveying arrangement embodying the invention permits longitudinal shrinkage while maintaining the desired transverse tension and width of the flattened tube.

The method of manipulating the fabric that may be carried out on apparatus of the type disclosed has already been set forth. Certain features are particularly advantageous in processing knit material, owing to the facility with which the relative length and width of this type of fabric may be altered by variations in the shape of the various loops and by readjustment of the interengagement of such loops, as distinguished from the direct longitudinal stretching of the threads involved when similar adjustments take place in woven material.

The disclosed method of treating knit goods particularly facilitates such adjustment of loop shape and position, since the transverse and longitudinal tensions on the fabric are uniform and free from both marginal distortion and the correction thereof. This method likewise has proven to be highly efficient and accurate in producing and maintaining transverse alignment of the courses, cross stripes or other pattern or structural elements of the fabric. Furthermore, where tension on the threads of knit goods is desired in certain processes such as mercerizing, such tension may be applied uniformly and is readily adjusted, owing to the convenient control of longitudinal tension, to maintain the loop shape and alignment during treatment.

This method of manipulation likewise has definite advantages when employed during the wet processing of tubular fabrics. Fabrics when wet have a much stronger frictional engagement with the spreader bows and other portions of the apparatus over which the fabric passes. Moreover many fabrics such as various types of artificial silk have a much lower wet strength and are much more easily distorted during the wet processing. It has been found that pressure rolls such as squeeze rolls 21*a* tend to produce a certain set or permanence in the distorted fabric which frequently cannot be entirely eliminated even by highly efficient finishing methods. With the type of apparatus disclosed herein, distortion during wet processing is substantially elimiated by avoiding friction and providing uniform transmission of the fabric by internal marginal engagement, feeding the fabric uniformly and in accurate transverse alignment to squeeze rolls 21a. Somewhat the same problem and advantages are inherent in the manipulation of steamed fabric in the manner described; and this is of particular importance with knitted fabric made from artificial silk, since such steaming is essential to provide the necessary flexibility and extensibility, even though the frictional engagement of the fabric with contacting portions of the mechanism is greatly increased by steaming.

Since knitted material is made up of loops which in most instances may readily be distorted by the sliding of the threads in adjacent loops, spreading apparatus exerting substantial friction at the margins of flattened tubes, and producing substantial distortion of such margins, may change the size, form and interrelationship of the loops in the marginal zones to such an extent that, even though such distortion is corrected by pulling the margins into alignment with the central portion, the marginal loop form and size is not entirely restored, and such marginal loops are set in their distorted form upon passing through the pressure rolls.

This defect is substantially eliminated by avoiding the initial distortion through the use of the traveling belt supporting means for the fabric margins; and where such margins are subjected to a certain amount of friction, such as that applied by the initial distending spreader bows, such friction is kept within the elastic limits of the fabric so that no permanent distortion is produced, or the friction type spreader is dispensed with.

While certain types of apparatus embodying the invention have been disclosed, and in particular its application to floating spreaders arranged to flatten the tube has been set forth, together with numerous specific constructions and modes of operation, the invention in its broadest aspects is not restricted to such arrangements or methods, but is capable of numerous changes and variations from the methods and structures disclosed herein, within the scope of the claims.

We claim:

1. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader arranged to flatten the fabric tube, belt means extending internally along opposite margins of the tube, belt-supporting and driving means including a belt pulley, said pulley being provided with a drive face of lesser diameter than the diameter of the zone of engagement of the pulley with the belt, and rotary external drive means engaging said drive face of the pulley through the fabric.

2. Apparatus for treating traveling tubular textile material which comprises an internal floating spreader for distending the fabric tube, and means for supporting the spreader and propelling the fabric, said means including rollers carried by the spreader internally engaging the fabric, belt means extending around said rollers to be driven thereby and positioned for distending engagement with the fabric, and external rotary drive means bearing against said rollers through the fabric so as to propel the fabric and drive the rollers and recessed to provide clearance for said belt so as to avoid bearing against said belt.

3. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader, and means for propelling the fabric on the spreader comprising a plurality of drive arrangements each including a driven propeller roll externally engaging the fabric, cooperating rollers on the spreader bearing against the fabric at longitudinally spaced points engaged by the roll, and a belt passing around the rollers and extending therefrom in distending and conveying engagement with the fabric.

4. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader and means for propelling the fabric on the spreader, comprising rotary drive means externally engaging the fabric, cooperating elements on the spreader positioned to bear against the fabric at longitudinally spaced points of engagement between the fabric and the drive means, and traveling belt means connecting said elements and maintained in taut condition for holding the fab-

ric in engagement with the drive means between said points.

5. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader, means on the spreader for maintaining a distending engagement with the fabric comprising longitudinally aligned belts successively engaging the fabric, and an externally driven propeller roll maintained in engagement with the fabric in common driving relationship to said belts.

6. Apparatus as set forth in claim 5 in which there is drive means driving the first of the alined belts at a speed different from that of the speed of the following belts.

7. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader for the fabric tube, and belt means associated with the spreader and extending in supporting internal engagement with the tube, said belt means comprising a coil wire belt and an absorbent filler in the belt.

8. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader arranged to flatten the traveling tube, traveling belt means carried by the spreader and positioned for distending engagement with opposite margins of the flattened fabric, and means for driving the belt means, said belt means comprising a spiral metal spring belt having a roughened surface.

9. Apparatus for handling tubular fabric consisting of a spreader stretching the fabric laterally in flat form to a predetermined width in parallel transverse lines, said spreader concentrating frictional drag at the edges of the fabric and permitting the center portions thereof to run ahead of said edges, driving and driven rolls engaging and propelling the fabric at the edges and rotatable at a speed correcting said frictional drag and bringing the edges of said fabric into accurate transverse alinement, and belt means driven by said rolls, and receiving the correctly alined fabric therefrom and conveying the fabric and maintaining it in accurate transverse alinement.

10. Apparatus for handling tubular fabric consisting of a spreader stretching the fabric laterally in flat form to a predetermined width in parallel transverse lines, means for maintaining said fabric of substantially constant transverse width while conveying it in flat form and supplying a treating fluid to said fabric while so conveyed, driving and driven rolls engaging and propelling the fabric inside and outside at the edges to drive said fabric over said spreading means, belt means driven by said rolls and receiving the fabric therefrom and conveying the fabric with substantially constant transverse width, and means for supplying a treating fluid to said fabric while conveyed by said belt means.

11. Apparatus as set forth in claim 10 in which the belt means is followed by a pair of pressure rolls receiving the fabric in flat form and squeezing it to express liquid from the fabric by passage between the rolls.

12. Apparatus for handling tubular fabric comprising a fabric supply, driven belt means receiving the fabric from the supply and conveying the fabric by engagement at the edges while conveying it and maintaining it in flat form at a predetermined width, inner rolls supporting and driving said belt means, and outer rolls driving said inner rolls and having predetermined areas of their peripheries in intimate driving engagement with juxtaposed peripheral areas of said inner rolls through the fabric to develop direct driving pressure between said outer and inner rolls.

13. Apparatus as set forth in claim 12 in which there are drive means for varying the relative speeds of the belt means and the rolls.

14. Apparatus as set forth in claim 12 in which a pair of pressure rolls receives the flat fabric from the driven belt means and conveys the fabric in flattened condition.

15. Apparatus as set forth in claim 12 in which a pair of pressure rolls receives the flat fabric from the driven belt means and conveys the fabric in flattened condition, the delivery end of the belt means being spaced a substantial distance from the point of engagement of the fabric by said rolls.

16. Apparatus for handling tubular fabric comprising a fabric supply, driven belt means receiving the fabric from the supply and conveying the fabric by engagement at the edges while conveying it and maintaining it in flat form at a predetermined width, inner rolls supporting and driving said belt means, outer rolls driving said inner rolls and having predetermined areas of their peripheries in intimate driving engagement with juxtaposed peripheral areas of said inner rolls through the fabric to develop direct driving pressure between said outer and inner rolls, and having adjacent peripheral spaces providing clearances for said belt means to free said belt means of said driving pressure between the rolls.

17. Apparatus for handling tubular fabric comprising a feed bow over which the fabric is drawn, driven belt means receiving the fabric from the bow and engaging the fabric at the edges and maintaining it in flat form at a predetermined width, driving and driven rolls engaging the fabric between them at each of said edges, said rolls having predetermined areas of their peripheries in intimate driving engagement through the fabric to develop driving pressure between said rolls and adjacent groove spaces providing clearances for said belt means and freeing said belt means of said driving pressure between the rolls, said driven rolls having diameters in said driving areas different from the diameters of said adjacent groove spaces, maintaining a constant difference in speed between the speed of said fabric and the speed of said belt means.

18. Apparatus for treating traveling tubular textile fabric which comprises an internal spreader arranged to flatten the fabric tube, belt means extending internally along opposite margins of the tube, belt-supporting and driving means including a belt pulley, said pulley being provided with a drive face of different diameter than the diameter of the zone of engagement of the pulley with the belt, and rotary external drive means engaging said drive face of the pulley through the fabric.

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