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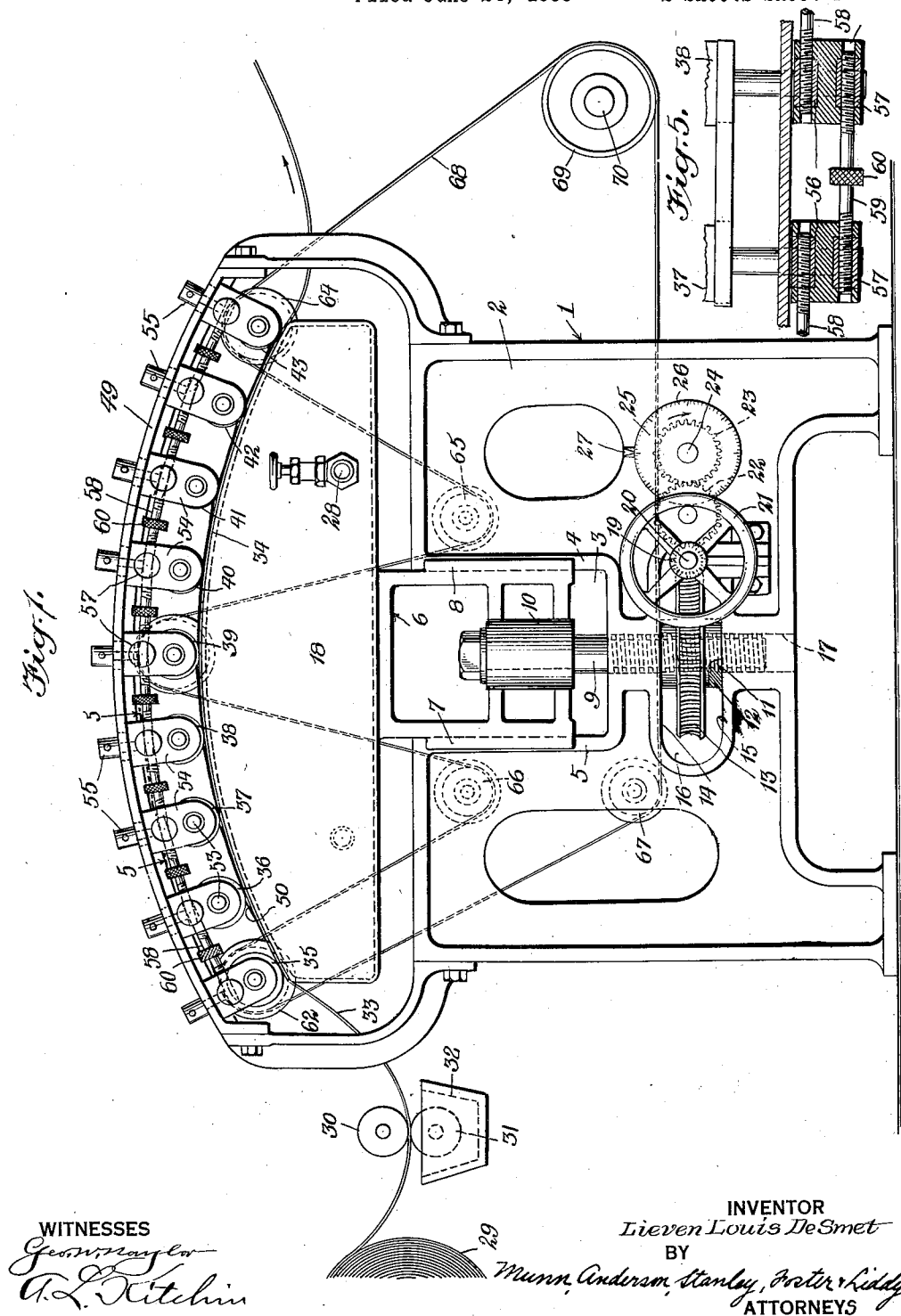
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CLOTH PRESHRINKING MACHINE

Filed June 24, 1933

2 Sheets-Sheet 1



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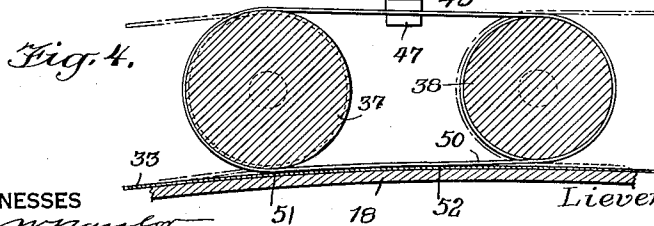
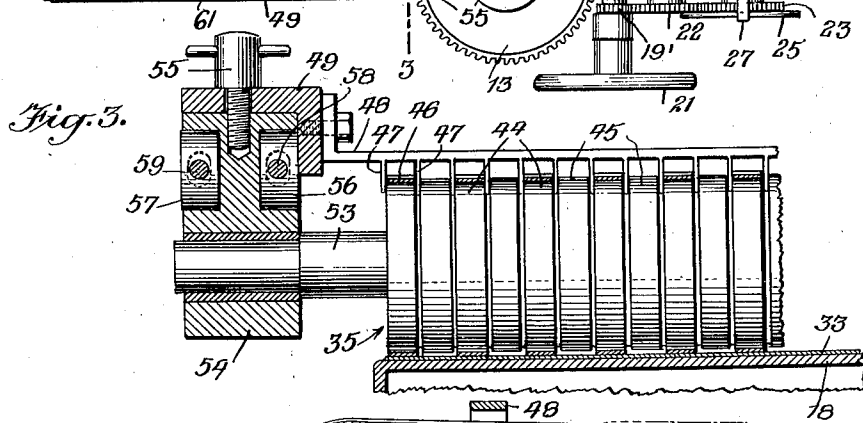
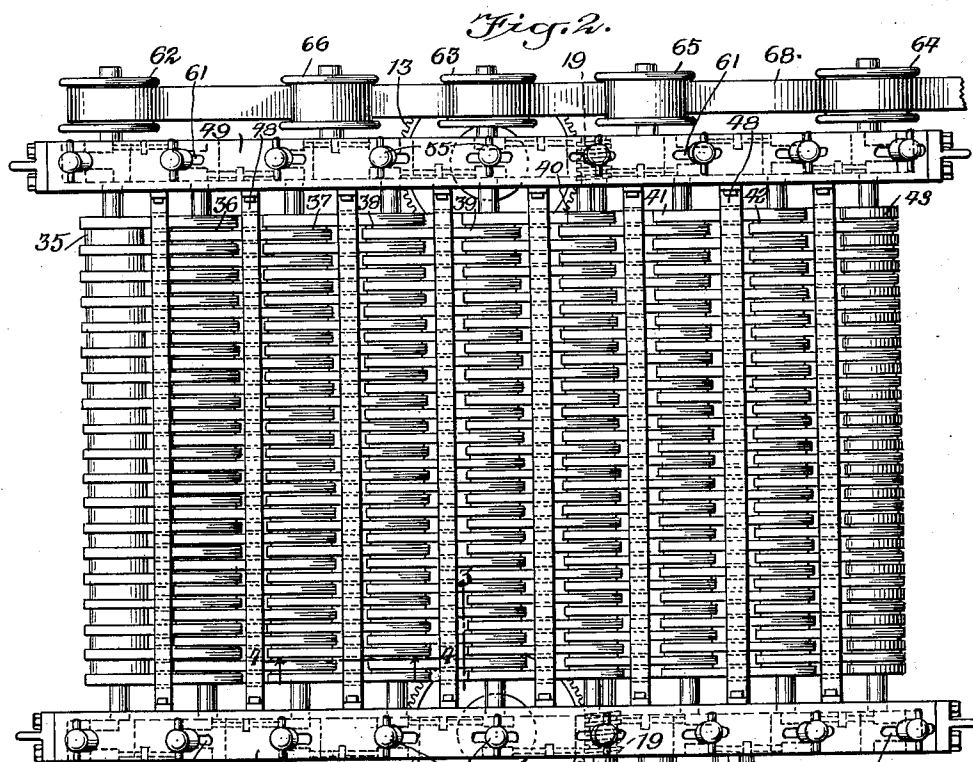
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UNITED STATES PATENT OFFICE

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CLOTH PRESHRINKING MACHINE

Lieven Louis De Smet, Paterson, N. J.

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12 Claims. (Cl. 26—38)

This invention relates to a cloth preshrinking machine, and has for an object to provide an improved construction which is comparatively inexpensive and yet which in operation functions at a comparatively high speed.

Another object of the present invention is to provide a preshrinking machine wherein the parts may be readily adjusted to preshrink cloth to any desired extent and to function at a comparatively high speed.

A further object of the invention is to provide a preshrinking machine for preshrinking cloth wherein a system of gathering or pulling belts are used not only to feed the cloth through the machine but to act thereon to move the filling or pick threads closer together as the cloth passes through the machine.

In the accompanying drawings—

Figure 1 is a side view of a cloth preshrinking machine disclosing an embodiment of the invention;

Figure 2 is a top plan view of the machine shown in Figure 1;

Figure 3 is an enlarged fragmentary sectional view through Figure 2 on the line 3—3;

Figure 4 is an enlarged fragmentary sectional view through Figure 2 on the line 4—4;

Figure 5 is an enlarged fragmentary sectional view through Figure 1 on the line 5—5.

Referring to the accompanying drawings by numerals 1 indicates a frame which may be provided with suitable uprights to take care of the various bearings and other devices that need to be properly supported. Preferably there is an end member 2 at each end of the device, the respective end members and suitable connecting bars forming the frame. The detailed structure of this frame forms no part of the present invention except certain parts which will be hereinafter specifically described.

As shown in Figure 1, the respective end members 2 are identical so that a description of one will apply to both. As illustrated in Figure 1 each end member 2 is provided with what may be termed a guiding socket 3 having vertical guide-ways 4 and 5 accommodating the sliding frame 6 which has suitable flanges 7 and 8 straddling the guide ways 4 and 5, whereby this sliding frame may reciprocate a shaft 9. Shaft 9 is rigidly secured to an enlargement 10 of the sliding frame 6, this shaft being provided with threads 11 which accommodate the nut 12, said nut being preferably rigidly secured to and, if desired, formed integrally with the worm wheel 13. The respective ends of nut 12 are fitted

between the surfaces 14 and 15 forming opposite sides of the opening 16 in the end 2. It will be understood that the end 2 is provided with a suitable bore 17 for loosely accommodating shaft 9, whereby whenever wheel 13 is rotated shaft 9 will be moved upwardly or downwardly, and as it is rigidly secured to the sliding frame 6 a similar movement will take place with respect to this frame and to the heating drum 18, which is rigidly secured to the sliding frame 6. A worm pinion 19 is continually meshing with the worm gear 13 and is also rigidly secured to shaft 20, which shaft has a hand wheel 21 rigidly secured thereto. Shaft 20 extends entirely across the machine so that the hand wheel 21 may operate the gear wheel 13 at each side of the machine simultaneously, it being understood that both sides of the machine are formed identically. As indicated by the dotted lines in Figure 1, the gear wheel 22 is continually in mesh with pinion 19 rigidly secured to shaft 20 and also with gear wheel 23, which latter gear wheel is rigidly secured to shaft 24 carrying the indicating disc 25 having graduations 26 thereon. A stationary pointer 27 is provided near the disc 25 so as to indicate the amount of movement of the sliding frame 6 and associated parts whenever hand wheel 21 is rotated. It will be understood that the gear wheel 13 and worm pinion 19 are arranged at both sides of the machine, as shown in Fig. 2, while the hand wheel 21 is only on one side and also the vernier adjustment or indicating means 25 and associated parts.

By this construction and arrangement the hand wheel 21 may operate at any time and be moved considerably or only for a short distance, and the disc 25 will indicate the movement thereof and consequently the upward or downward movement of the heating drum 18. Drum 18 is made from a desired metal amply strong to withstand appreciable pressure of steam and also an appreciable pressure of the drum against the cloth being treated and the parts associated therewith. Steam from any suitable source is passed through valve 28 into the drum 18 so as to maintain the same at a certain heat. This heat is sufficient to completely dry the cloth before it passes out of the machine. As shown in Figure 1, the roll 29 indicates a roll of fabric to be preshrunk. This fabric is caused to move between the rollers 30 and 31, roller 31 being partly submerged in the tank 32 of water. Roller 30 presses somewhat against the fabric and presses the fabric against the roller 31,

whereby moisture from the roller will be pressed into the fabric so that the fabric will be wet all the way through. The fabric 33 then passes to the drum 18, and over this drum to the discharge end thereof. As it passes over the curved upper edge 34 of the drum it is treated to produce the preshrinking action and is also dried, so that when the cloth finally moves out the discharge end of the machine it will be preshrunk and also substantially dry.

After a piece of cloth leaves the loom it is treated in various ways, for instance, bleached and dyed, and in this treatment it is stretched more or less. In the washing and treatment of the cloth the filling threads or "picks" are moved further apart than intended. It is not unusual for a piece of cloth to be woven with forty picks or filling threads per inch and after it has been bleached and dyed to have only thirty-two filling threads or picks per inch. In order to move the filling threads or picks back to their original position so that there will be forty filling threads per inch when the cloth has been stretched to its original width, it is treated by the machine shown in the accompanying drawings. This machine will pull the filling threads back to their original position and when the machine is properly set cloth fed into the same having thirty-two threads or picks per inch will emerge from the machine having forty filling threads or picks per inch. This is only an example, as the machine may be adjusted to get other and different results. For instance, thirty-eight filling threads or picks per inch where before there were only thirty-two per inch. The filling threads or picks are moved or crowded forwardly in a smooth, even manner so that they are spaced the proper distance apart when leaving the machine.

The action of the machine is such that quite a number of yards per minute may be passed through the machine and preshrunk as just described. As an example, it is possible to run ninety yards per minute through the machine, though this speed is not essential to the proper action of the machine.

In order to secure the results just described a number of rollers and belts are associated with the drum 18 for acting on the cloth as it passes through the machine. In the machine shown in the accompanying drawings there are nine rollers which are identical as far as construction is concerned but of different sizes. It will be noted that more or even less than nine rollers could be used without departing from the spirit of the invention. As illustrated in Figure 3, each of the rollers has the appearance of roller 35, and in addition, as shown in Figure 1, there are provided rollers 36, 37, 38, 39, 40, 41, 42 and 43. As just mentioned, each of the rollers 35 to 43, inclusive, are shown in Figure 3, namely, with a large annular section 44 and a small annular section 45. There are a large number of annular sections 44 and also a large number of sections 45 in each of rollers 35 to 43. The various sections 45 are of less diameter than sections 44, the difference being approximately one-sixteenth of an inch, though it could be greater or even less without departing from the spirit of the invention. The width of sections 44 and 45 also may vary but a convenient size has been found to be one inch. On sections 44 of roller 35 are placed endless belts 46, and associated with these belts and the various sections 44 are a number of guiding fingers 47

carried by a guiding bar 48 bolted or otherwise secured to the respective supporting bars 49. The various belts 46 passing over the large sections 44 of roller 35 also pass over the small sections 45 of roller 36. Likewise similar belts are fitted over the large sections 44 of roller 36 and fit over the small sections 45 of roller 37. This idea is carried out for the full length of the machine from the left to the right as shown in Figure 1. It will be understood that the rollers 35 to 43 are successively smaller and smaller, the difference being about $\frac{1}{16}$ " for each roller from roller 35 to roller 43 inclusive. Expressed in another way, the small section 45 of roller 35 is usually of the same diameter as the large section 44 of roller 36, and in turn the small section 45 of roller 36 is the same diameter as the large section 44 of roller 37. By carrying out this idea from front to rear of the machine approximately half or a little more of each of the belts 46 fit tightly against the cloth 33, and the other half or two-fifths inclines upwardly from the cloth as indicated at 50 (Figs. 1 and 4). It will thus be seen that the cloth 33 is acted on or pulled by the respective belts from approximately point 51 to point 52, as illustrated in Figure 4. Between each of the rollers the same thing is true, and by reason of this action the various filling threads are crowded forwardly or to the right as shown in Figures 1 and 4. A sufficient crowding of the threads is provided so that they will be restored to their first position, namely, to forty filling threads or picks per inch, where the cloth was woven with that number of filling threads or picks. After leaving the machine shown in Figure 1 the cloth may go to a tentering machine and be otherwise treated in the usual manner.

The rollers are preferably identical throughout as shown in Figure 4, and are provided at each end with a shaft 53. Each of these shafts is journaled in a journal block 54 which is clamped to a bar 49 by suitable clamping members 55, there being one clamping member for each bar. Each of the bearing blocks 54 is provided with a pair of discs 56 and 57, each of said discs being provided with an internally threaded bore extending through the center of the disc, as illustrated particularly in Figure 5.

As shown particularly in Figures 1 and 5 there are provided a number of adjusting screws 58 carried by the various discs 56 and other adjusting screws 59 carried by the discs 57. It will be understood that an adjusting screw is arranged between each of the belts from roller 35 to 43 inclusive. The various adjusting screws 58 and 59 are provided with thumb members 60 whereby they may be manually adjusted. These screws are provided with right and left hand threads, as illustrated in Figure 5, so that they may be adjusted for maintaining the various belts taut. In order to permit the various blocks 54 to move as they are adjusted for tightening the belts, the bar 49 is provided with slots 61 (Figure 2), except for the first clamping screw 55. When it is desired to tighten the various belts all of the screws 55 except the first one at the left, shown in Figure 1, are loosened and then the various adjusting screws 58 and 59 are tightened. As this takes place the various screws 55, except the first, will slide in their various slots 61.

After the belts have been tightened the clamping members 55 are screwed down and the device is then in condition for use. It will be understood that the various slots 61 are of ample

length to secure the desired adjustment as this adjustment is rather small at all times.

In order that the various rollers may function the rollers 35, 39 and 43 are provided with extending shafts to which pulleys 62, 63 and 64 are secured. Coacting with these pulleys there are provided what may be termed guiding or idler pulleys 65, 66 and 67. A belt 68 passes over all these pulleys and over the driving pulley 69 which is operated by a power shaft 70 driven by an electric motor or any other suitable source of power. By rotating the rollers 35, 39 and 43 in a positive manner there will be three points of power transmitted to the device, and power will be transmitted from these three points through the various belts 46 to the other rollers and, consequently, all of belts will function at the same time and be driven so as not only to feed the cloth 33 through the machine, but to crowd the filling threads together. As the various belts 46 are functioning, the drum 18 is pressing the cloth 33 against the belts with the desired pressure which is considerable with certain fabrics and much less with other fabrics.

The machine is adapted to be made of a width to accommodate the widest cloth to be preshrunk, but it will be evident that if a narrow strip of cloth is to be preshrunk it may be readily passed through the machine and the unused parts will merely function in an idle manner while the cloth will be treated efficiently and in the way planned. It is even possible where two narrow strips of cloth are to be preshrunk to treat them side by side, provided they are sufficiently narrow to not crowd each other.

While the device has been described as using steam heat, it will be understood that gas heat, electric heat or any combination of these heating means or other heating means may be used without departing from the spirit of the invention. In many cases the use of gas burners for heating is very desirable.

I claim:

1. A preshrinking machine of the character described, including a drum having an operating surface, means for directing cloth over said operating surface, a plurality of comparatively narrow belts for feeding said cloth over said surface, said belts being appreciably shorter than the length of said surface, a plurality of rollers for supporting said belts, each of said rollers having belt receiving sections, half of the sections on each roller being of one diameter and half of the sections of less diameter, one end of each belt being on a section of larger diameter of one roller and on one of the sections of lesser diameter of the next adjacent roller, and means for driving certain of said rollers, the remaining rollers being driven by said belts.

2. A preshrinking machine including a heating drum having an arc-shaped surface over which a piece of cloth is adapted to be passed when being treated, means for preshrinking said cloth as the same passes over said surface, said means including a plurality of rollers, a reciprocating member carrying said drum, threaded means connected with said reciprocating means for causing the reciprocating means to function, and a hand operated member for actuating said threaded means for varying the position of said drum, said actuating means being provided with an indicator for indicating the amount of movement thereof.

3. A preshrinking machine including a heated drum having a functioning surface, means for

moistening a piece of cloth adapted to move over said drum, a plurality of rollers arranged in parallelism adjacent said drum, a plurality of belts connecting the various rollers and moved thereby so as to act on the cloth so that it will be pressed against said drum and at the same time the filling threads will be crowded closer together whereby the cloth is preshrunk and substantially dried as it passes through the machine, each of said belts being of a length to fit over one roller and extend therefrom to and over the next adjacent roller, the belts being staggered so that half the belts on the respective rollers between the first and the last roller will extend to the roller in front and the other half to the roller in the rear, said rollers being successively of different sizes from the first to the last and formed so that a portion of each belt at one end will always remain out of contact with the cloth being treated, and means for varying the distance apart of said rollers whereby the tension on said belts may be maintained.

4. A preshrinking machine of the character described including a member having a supporting surface over which a piece of cloth is adapted to be passed, a plurality of rollers arranged adjacent said surface, each of said rollers being provided with two sets of sections, one section being of greater diameter than the other, a belt arranged on each section, the belts on the section having the greater diameter of one roller fitting also on the sections of lesser diameter on the next adjacent roller, a guiding structure for the belts including a supporting bar having a plurality of fingers straddling said belts for preventing the belts from moving off their respective sections, and means for driving certain of said rollers.

5. A preshrinking machine of the character described, including a frame, a plurality of supporting bars carried by the upper part of the frame, a drum having an arc-shaped surface, means for directing steam into the drum for heating the same, means for moving the drum upwardly and downwardly, means for moistening a cloth passing over the arc-shaped surface of the drum, a plurality of rollers arranged adjacent the arc-shaped surface of the drum, each of said rollers having sections of greater diameter and sections of smaller diameter, belts arranged on said rollers, each belt passing over the greater diameter of one roller and fitting on to the section of lesser diameter of the next adjacent roller, means for holding the belts on the respective sections, means for supporting the rollers on said supporting bars, adjusting means for adjusting the position of said supporting means so as to maintain said belts under tension, and power means for driving certain of said rollers.

6. A preshrinking machine comprising a frame, a drum adapted to be heated, a group of rollers positioned to substantially contact with one surface of said drum, said rollers being successively smaller from the first roller to the last roller, and a plurality of belts connected to the various rollers and acting on cloth passing between the drum and the belts for moving the cloth over said drum while in contact therewith and for preshrinking the cloth as the same moves.

7. A preshrinking machine including a member having a cloth engaging surface, a plurality of endless belts of less length and less width than said surface and positioned to engage cloth moving over said surface and crowd the filling

threads of the cloth in a direction longitudinal of the cloth, said belts being staggered to substantially cover said surface and of such lengths that a plurality are necessary to cover said surface from one end to the other.

8. A preshrinking machine of the character described, including means presenting a surface over which cloth is adapted to be passed, a plurality of comparatively narrow belts for feeding said cloth over said surface, said belts being appreciably shorter than the length of said surface, a plurality of rollers for supporting and moving said belts, the rollers being successively smaller from the first roller to the last, each of said rollers having belt receiving sections, half of the sections on each roller being of one diameter and half of the sections being of less diameter, one end of each belt being on the section of larger diameter of one roller and on one of the sections of less diameter of the next adjacent roller, and means for driving certain of said rollers, the remaining rollers being driven by said belts.

9. A preshrinking machine of the character described, including means having a surface over which cloth is adapted to pass, a plurality of rollers arranged adjacent said surface, said rollers being successively smaller from the first roller to the last roller, a plurality of belts carried by said rollers adapted to engage said cloth for moving the same and producing a preshrinking operation at the same time, the succeeding smaller and smaller rollers having a higher and higher peripheral speed from the first roller to the last roller, means for driving certain of said rollers, the remaining rollers being driven by said belts.

10. A preshrinking machine comprising a frame, a member having a cloth engaging surface, a group of rollers positioned a short distance above said surface, a plurality of endless belts of less length and less width than said surface and positioned to engage cloth moving over said surface and crowding the filling threads

of the cloth in a direction longitudinally of the cloth, said belts being mounted on said rollers, said rollers being adapted to successively rotate faster and faster from the first roller of the group to the last roller so that said belts will move successively faster and faster from the first belt to the last belt, and means for causing said rollers to function.

11. A machine of the character described, including means having a surface over which cloth to be treated is adapted to pass, a plurality of rollers arranged adjacent said surface, a plurality of belts of less length than said surface carried by said rollers and adapted to engage said cloth for part of the length of the respective belts, and means for causing said belts to move faster and faster from one end of said surface to the other, said cloth being adapted to be fed into the machine at either end and if fed in at one end of said surface will be acted on by said belts for producing a preshrinking of the cloth when the belts are traveling in a given direction, and if fed in at the opposite end with the direction of movement of the belts reversed will be stretched.

12. A machine of the character described, including a surface over which cloth to be treated is adapted to pass, a plurality of comparatively narrow belts for feeding the cloth over said surface, said belts being appreciably shorter than the length of the surface so that a plurality of belts is necessary to cover the surface from one end to the other, a plurality of rollers for supporting said belts, each roller having belt-receiving sections of different sizes, the belt positioned on a large size section of one roller being positioned on the small size section of the next adjacent roller, and at the next adjacent roller being supported above the cloth being treated, and means for driving said rollers which in turn drives said belts for acting on the cloth passing between said surface and said belts.

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