Oct. 8, 1940. M. G. ANDERSON ET AL 2,217,607

APPARATUS FOR PROCESSING CORD TIRE FABRIC

Filed Aug. 26, 1936 2 Sheets-Sheet 1

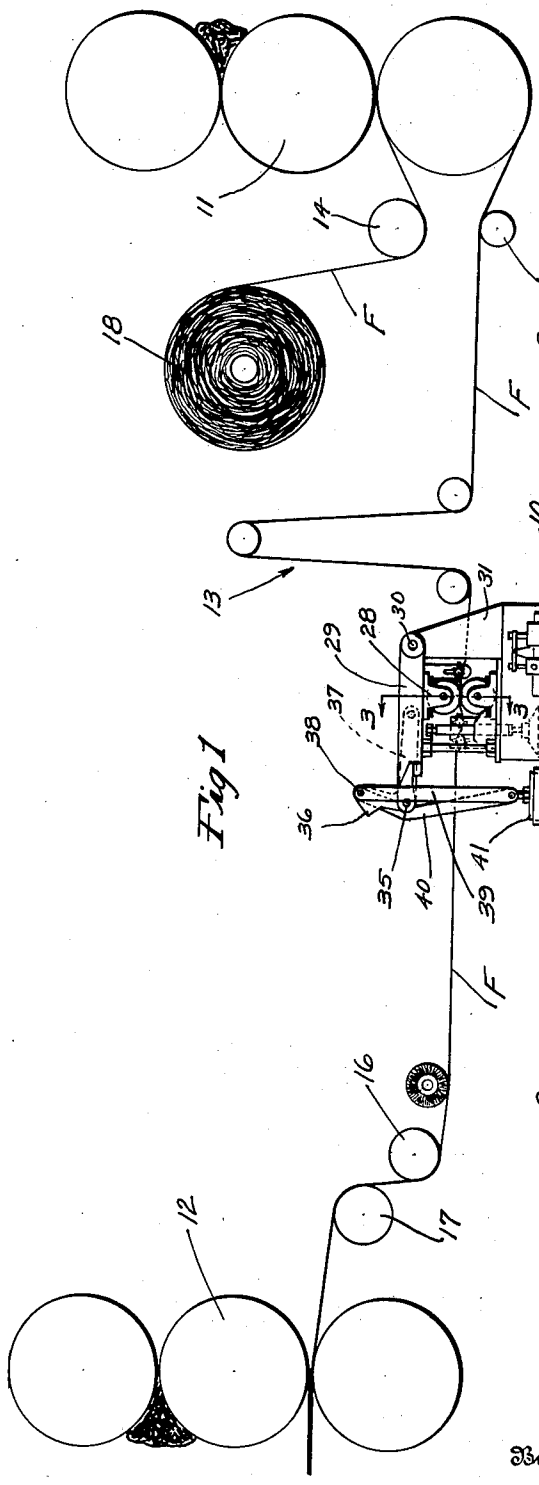


Fig. 1

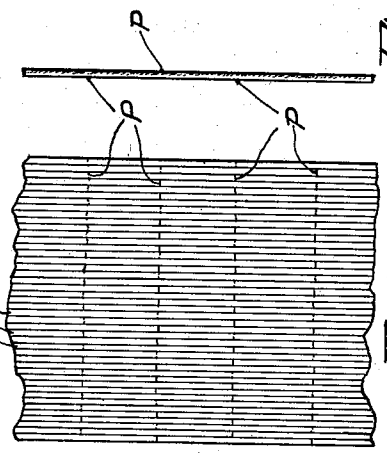


Fig. 8

Fig. 9

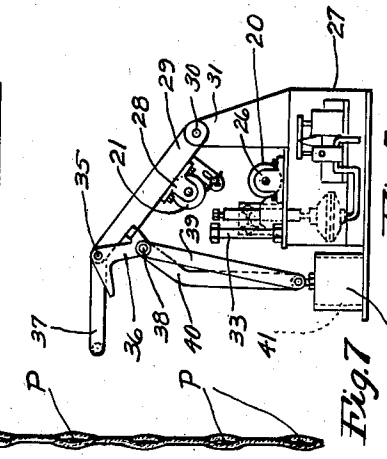


Fig. 5

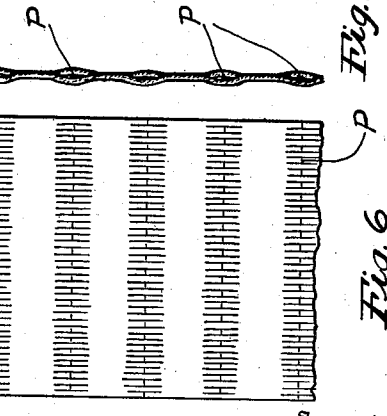


Fig. 7

Fig. 6

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APPARATUS FOR PROCESSING CORD TIRE FABRIC

Filed Aug. 26, 1936 2 Sheets-Sheet 2

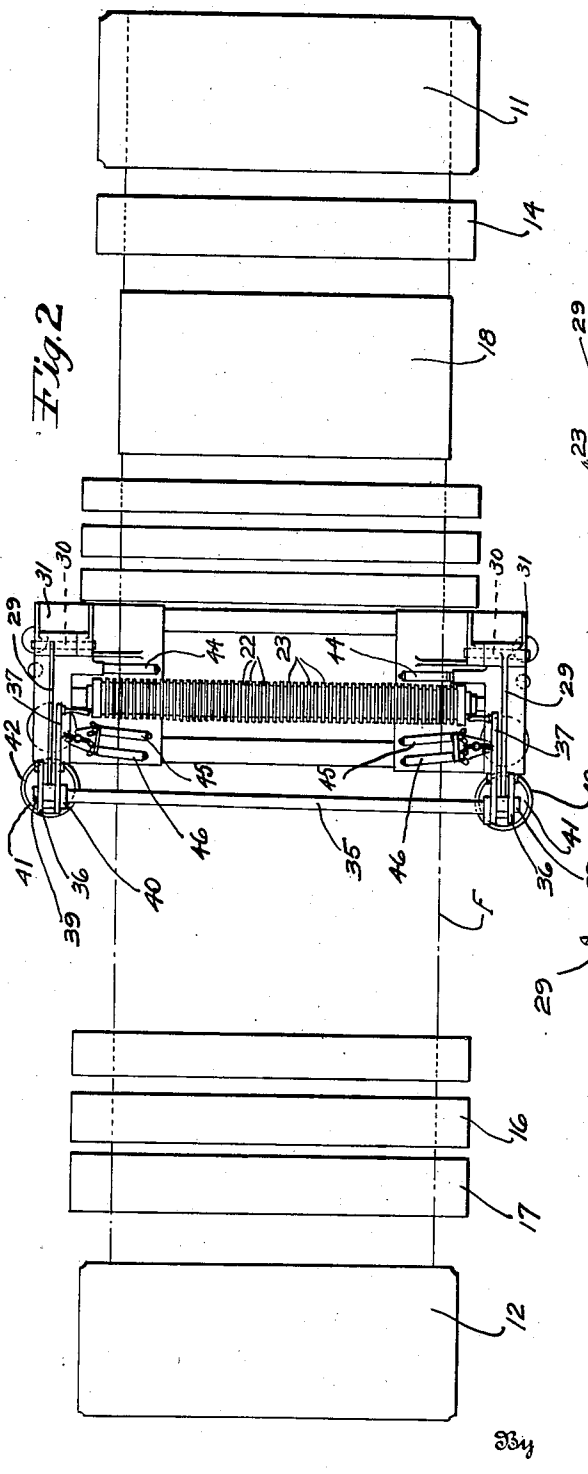


Fig. 2

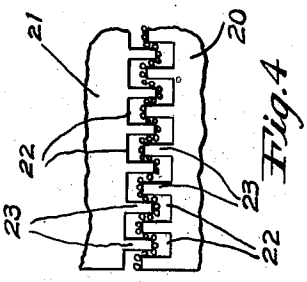


Fig. 4

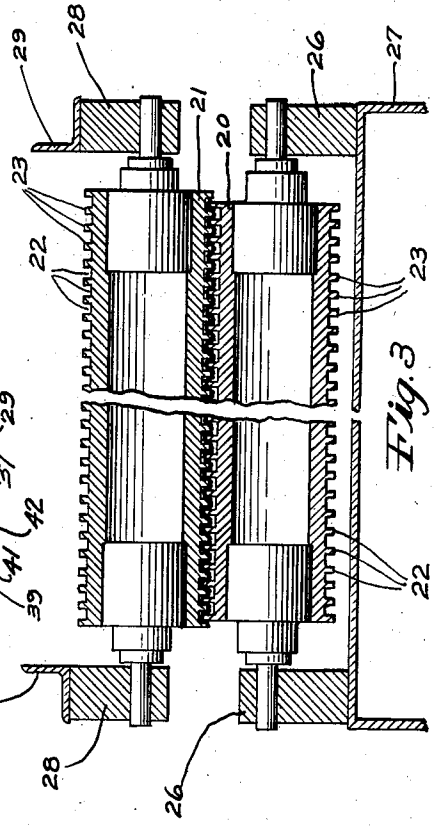


Fig. 3

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Patented Oct. 8, 1940

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UNITED STATES PATENT OFFICE

2,217,607

APPARATUS FOR PROCESSING CORD TIRE FABRIC

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Application August 26, 1936, Serial No. 98,104

5 Claims. (Cl. 154—1)

This invention relates to the art of handling and processing fabric, and it refers particularly to a novel method of treating pick-woven cord fabric, and to apparatus for practicing such method.

In constructing tires, belts and other reinforced rubber products, it has been customary to employ cord fabric which, for convenience in processing, had had the cords initially woven with relatively small yarns or pick threads of cotton. These pick threads serve no useful purpose in the finished article but, on the contrary, they have been found to be objectionable because they crimp the cords and chafe the same at their points of contact. The present invention overcomes these and other objectionable features of the prior art by providing a method and means for either substantially elongating or completely breaking into short pieces the pick threads whereby they will no longer be capable of chafing and injuring the cord fibers. An important feature of the invention is the arrangement of apparatus whereby the novel method steps may be performed coincidental with the fabric calendering operation, thereby insuring a good finish on the fabric and reducing the cost to a minimum.

More specifically, the invention contemplates passing the pick-woven fabric between a pair of cooperating rolls which are so formed as to exert a pronounced stretching force transversely of the fabric and longitudinally of the picks, such force being sufficient to break the pick threads into short pieces or at least to stretch the threads beyond their elastic limits. These rolls are mounted adjacent to a rubber calender and more preferably between two units of a calender train. The apparatus is capable of being rendered inactive, if desired, without interfering with the calendering operations, and the parts are so arranged as to facilitate the initial threading-through of the fabric.

Thus, one object of the invention is to provide a novel and inexpensive method of treating pick-woven cord fabric to break or excessively stretch the pick threads after they have served their usefulness.

Another object of the invention is to provide simple and efficient apparatus for practicing said novel method.

The foregoing and other objects, features and advantages of the invention will become more apparent as the following description proceeds in connection with the accompanying drawings wherein one form of the invention has been shown merely by way of illustration, and wherein:

Figure 1 is a diagrammatic side view of the apparatus for practicing the invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical transverse sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a fragmentary view like Fig. 3 but drawn on a larger scale;

Fig. 5 is a side view of the pick-breaking unit, showing the rolls in separated relation;

Figs. 6 and 7 are plan and edge views respectively of the cord fabric with the pick threads unbroken;

Figs. 8 and 9 are plan and edge views respectively of the fabric after the picks have been broken.

Referring first to Figs. 1 and 2, it will be seen that the novel pick-breaking unit 10 has been shown in association with a conventional calender train consisting of two three-roll calenders 11 and 12 and a festoon unit 13 with appropriate guide rolls 14, 15, 16 and 17 of any ordinary or preferred type. The arrangement of the parts is such that the calender 11 applies a coat of rubber to one surface of the fabric, and the calender 12 applies a coat of rubber to the opposite surface of the fabric, the interstices being at the same time filled whereby each cord becomes surrounded by rubber. The fabric F is drawn from a supply roll 18 while the pick threads P (see Figs. 6 and 7) are unbroken and intact, making possible the first coating of the fabric by the calender 11 without undue spreading of the cords C. As the fabric leaves the breaker unit 10, however, the pick threads P are broken (see Figs. 8 and 9) in relatively short pieces (approximately ¼" to ½") and the subsequent coating in the calender 12 has the additional effect of ironing or smoothing the fabric, leaving no rough projecting ends of the broken picks.

The picks P may be broken in several different ways, but preferably by excessive stretching in their lengths, that is, transversely of the fabric sheet. Thus, as shown in the drawings, the fabric F may be run continuously between a pair of coooperating rolls 20 and 21 which are characterized by peripheral grooves 22 defining between them flanges 23. The grooves are wider than the flanges and the arrangement is such that the flanges of one roll extend into the grooves of the other roll. Thus, the pick threads are stretched into a sinuous condition as they pass between the rolls, and pressure exerted upon them to the extent that they break. Of course, the pressure is uniformly distributed to render the breaking substantially uniform and to prevent un-

due lateral displacement of the cords C. Incidentally the parts are so proportioned that some of the cords can run between the successive flanges of the opposing rolls without danger of being sheared or bruised and this is an important consideration.

In the drawings, the rolls 20 and 21 are shown mounted one above the other, but obviously they might be otherwise arranged if desired. The lower roll 20 is journalled for free rotation in bearing blocks 26 mounted on a fixed base 27 of the breaker unit 10. The upper roll 21 is similarly journalled at 28 on adjustable arms 29 which are pivoted at 30 in uprights 31 rising from the base at th opposite ends thereof. When the arms 29 are in their lowermost positions as shown in Fig. 1, the rolls are in operative relation, and when the arms 29 are in their uppermost positions (Fig. 5) the rolls are ineffective. The operating positions of the roll 21 may be varied for different fabrics by adjustable stop bolts 33 which limit downward movement of the arms 29.

The arms 29 are connected together by a rod 35 whereby said arms and their associated parts may be moved in unison. In order to properly maintain the arms 29 and the roll 21 in selected positions any suitable means may be provided. For this purpose the pick-breaking unit 10 in the drawings has been shown as including weights for holding the arms 29 in their lowermost positions and links for rendering the said weights ineffective and for holding the arms 29 in their uppermost position. Thus, a pair of bell-crank levers 36 are pivotally mounted adjacent the outer ends of the connecting rod 35, said levers including handle portions 37. Pivoted at 38 to the levers 36 are links 39 and 40 which extend downwardly and have attached to their lower ends weights 41 which may preferably be confined within safety cylinders or wells 42 on the base of the machine. The arrangement is such that in the operative position, as shown in Fig. 1, the pivotal connection 38 is beyond the vertical plane of the rod 35, giving in effect a dead-center position of the levers 36 and lifting the weights 41 so that they will exert a downward force upon the arms 29 through the links 39 and 40. When the handle portions 37 are thereafter swung in a counter-clockwise direction, as viewed in Fig. 1, to the position shown in Fig. 5, the bell-crank levers 36 will be correspondingly moved in such a way as to lower the weights 41 to the bottoms of the cylinders 42, after which continued movement of the parts causes the links 39 and 40 to act through the levers 36 to swing the arms 29 upwardly about their pivots 30. Thus the weights 41 are effective in holding the roll 21 in its operative position with reference to the roll 20, yet said weights do not have to be lifted in order to move the parts into their inactive positions.

In order to prevent the edges of the fabric F from curling as the fabric is run through the pick-breaking unit, a plurality of guide rollers 44, 45 and 46 may be employed, the first of said rollers being carried by the arms 29 and the latter being mounted in suitable supports on the base 27.

From the foregoing description it will be evident that a relatively simple mechanism has been provided for practicing the novel method. The fabric F is run through the conventional calenders 11 and 12 in the usual way and if it is desired to break the pick threads the pick-breaking unit 10 may easily and adequately be placed in operation. After the pick threads have been broken the fabric is given an ironing action in the calender 12 which results in a very satisfactory smooth lay of the cords. The pick-breaking rolls 20 and 21 may be made of steel or any other suitable material and may of course be varied in structural details. In fact, the entire method and apparatus are susceptible of numerous modifications and the right is herein reserved to make such changes as fall within the scope of the appended claims without departing from the spirit of the invention.

We claim:

1. Apparatus of the class described comprising a pair of cooperating grooved rolls having relatively parallel axes, each of said rolls being characterized by grooves which are substantially wider than flanges defined between them, means for yieldingly maintaining the rolls in cooperating relation to act upon fabric passing between them, and means for separating the rolls to discontinue their cooperation.

2. Apparatus of the class described comprising a pair of cooperating grooved rolls having relatively parallel axes, each of said rolls being characterized by grooves which are substantially wider than flanges defined between them, means for yieldingly urging one of the rolls toward the other whereby they may cooperatively act upon fabric passing between them, and means for separating the rolls to discontinue their cooperation.

3. Apparatus of the class described comprising a lower roll and an upper roll, both of said rolls having circumferential grooves which are substantially wider than flanges defined between them, said grooves and flanges adapting the rolls for interfitting cooperation to exert upon a fabric passing between the rolls a substantial stretching force in a direction parallel with the axes of the rolls and substantially transverse to the direction of travel of the fabric.

4. Apparatus of the class described comprising a lower roll and an upper roll, both of said rolls having circumferential grooves which are substantially wider than flanges defined between them, said grooves and flanges adapting the rolls for interfitting cooperation to exert upon a fabric passing between the rolls a substantial stretching force in a direction parallel with the axes of the rolls and substantially transverse to the direction of travel of the fabric, means for yieldingly urging one of said rolls toward the other, and means for separating the rolls without resistance from said urging means.

5. Apparatus of the class described comprising a lower roll and an upper roll, both of said rolls having circumferential grooves which are substantially wider than flanges defined between them, said grooves and flanges adapting the rolls for interfitting cooperation to exert upon a fabric passing between the rolls a substantial stretching force in a direction parallel with the axes of the rolls and substantially transverse to the direction of travel of the fabric, weight means for maintaining the upper roll in operative position adjacent to the lower roll, and means for raising said upper roll to inoperative position without resistance from said weight means.

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