Aug. 15, 1967 HIDEO CHO 3,335,474

APPARATUS FOR SPREADING FABRIC

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Fig 1

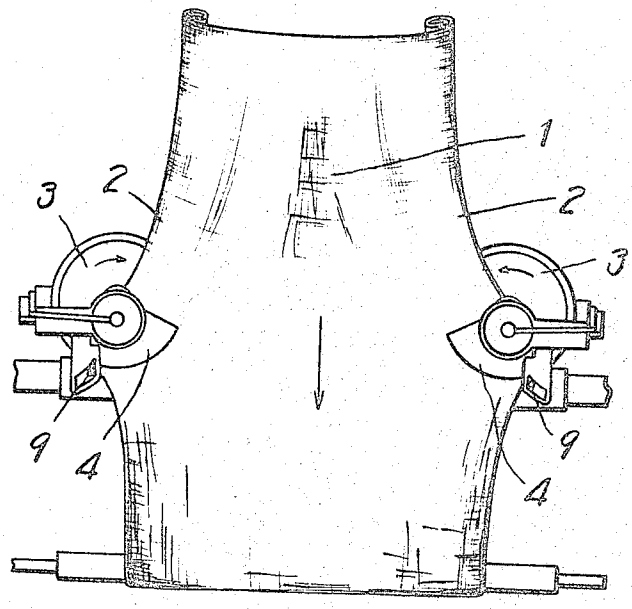


Fig 2

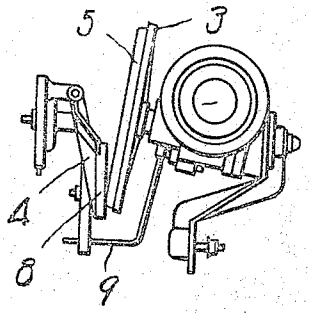
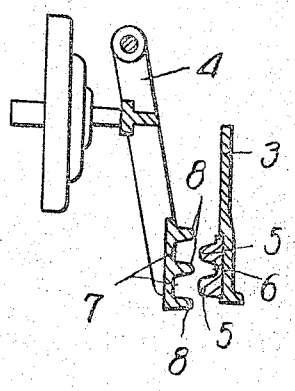


Fig 3



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Fig 4

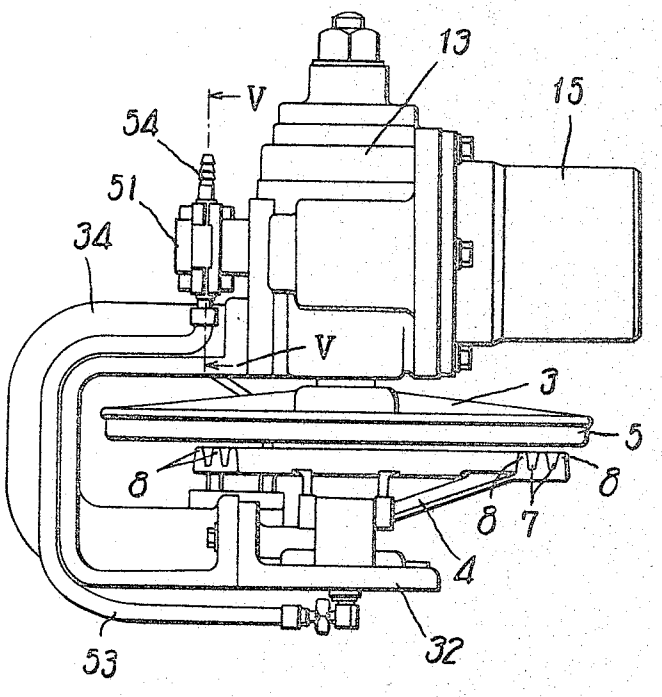


Fig 5

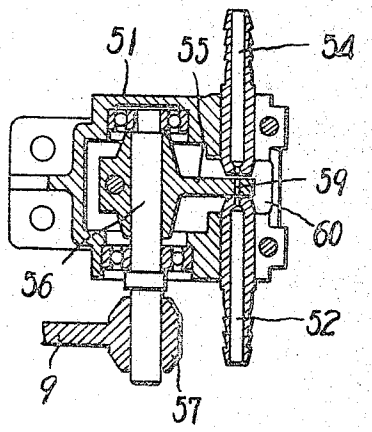


Fig 6

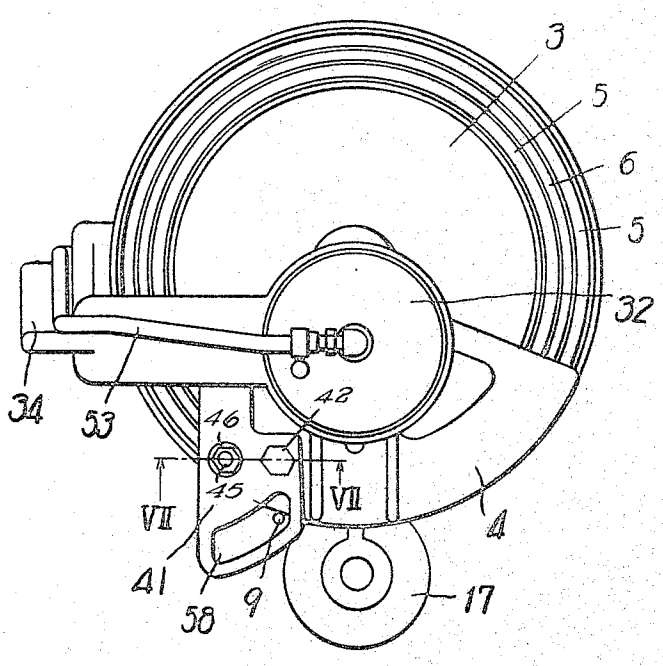
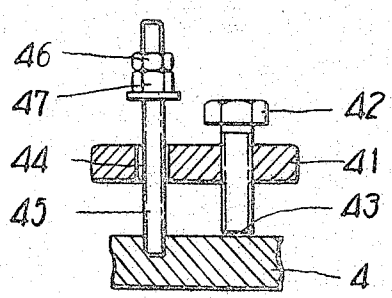


Fig 7

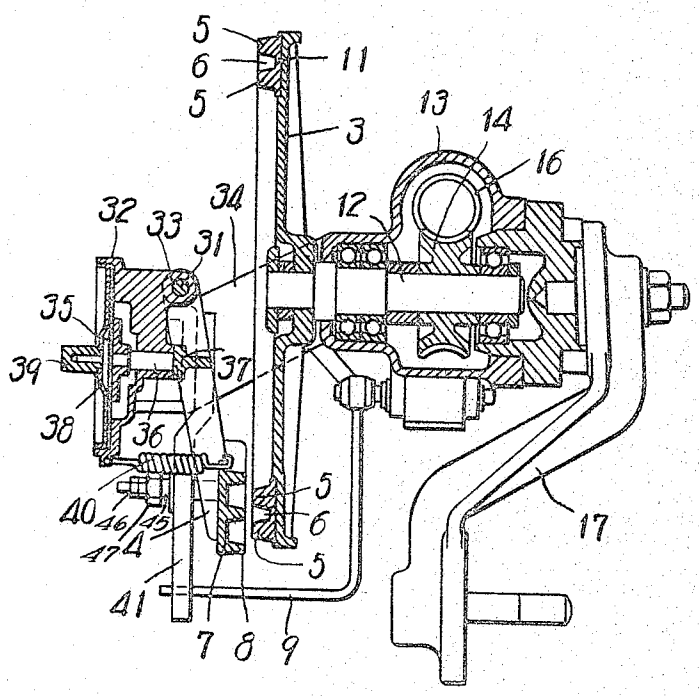


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APPARATUS FOR SPREADING FABRIC

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Fig 8



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3,335,474

APPARATUS FOR SPREADING FABRIC

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Filed Dec. 30, 1964, Ser. No. 422,204
1 Claim. (Cl. 26—54)

The present invention relates to an apparatus for the widthwise spreading of traveling fabric.

More particularly, when textile fabrics such as tricot, knitting and sheer woven fabric are advanced longitudinally for processing, the invention corrects selvage defects such as folds, particularly, the selvage turn-ups of such fabrics, by widthwise spreading of the traveling fabrics.

An important object of the present invention is to provide a spreading apparatus which is capable of reliably correcting the selvage folds and turn-ups of a traveling fabric.

Another object of the invention is to provide a spreading apparatus which is capable of controlling lateral deviations of the fabric.

An apparatus for spreading running fabrics constructed according to the present invention comprises spaced, rotary discs positioned on one surface of a traveling fabric at both lateral edges thereof, and push plates positioned on the other surface of the fabric so as to be opposed to said rotary discs. The rotary discs each have at least one annular projection and a groove formed on that side thereof facing the fabric. The annular projection and groove are disposed opposed to at least one arcuate groove and projection formed in and on the push plate on that side thereof facing the fabric. The rotary discs are rotated in the same direction as the direction of travel of the fabric with respect to the inner or contact surfaces of the rotary discs, and means including sensing members such as sensing lever provided adjacent the periphery of each rotary disc for causing, through a suitable mechanism, a push plate to be moved towards and away from corresponding disc.

Thus, according to the spreading apparatus of the invention, the turned-up portions at both lateral or side edges of a traveling fabric can be quickly unrolled widthwise by the rotation of the rotary discs and by the pressing of the push plates.

The friction exerted in such unrolling can be increased by the projections and grooves of the rotary discs and push plates, so that the spreading action is increased to ensure the correction of selvage folds and turn-ups.

Further, since such traveling fabric is stretched at both lateral edges thereof, wrinkles on the fabric surface are smoothed. Also, lateral control of the traveling fabric is obtained by changing the distance between the push plate and rotary disc in response to the variations in widthwise movement of the running fabric.

In order to afford a better understanding of the invention, a further description thereof will now be given with reference to the accompanying drawings wherein the same reference numerals denote like parts, in which:

FIG. 1 is a front view showing the layout of the apparatus;

FIG. 2 is a side view of part of the apparauts;

FIG. 3 is an enlarged sectional view of said part;

FIG. 4 is a side view of the left side of the device;

FIG. 5 is a sectional view taken along line V—V of FIG. 4;

FIG. 6 is an enlarged front view of the left-hand mechanism of FIGURE 1;

FIG. 7 is a sectional view taken along line VII—VII of FIG. 6; and

FIG. 8 is a longitudinal sectional view of the mechanism of FIGURE 6.

An apparatus according to the invention will be generally described with reference to FIGS. 1 through 3. The apparatus comprises rotary discs 3 each positioned adjacent a selvage 2 of a traveling fabric 1 on one surface thereof. On the other surface of the fabric are positioned push plates 4 in such a manner that two arcuate grooves 7 defined by projections 8 formed on each push plate 4 on the side thereof facing the fabric are opposed to two annular projections 5 provide on each rotary disc 3 on the side thereof facing the fabric. Each of the rotary discs 3 is rotated in a direction not interfering with the travel of each fabric, i.e., in the same direction as the direction of travel of the fabric. Further, the apparatus includes sensing members such as a sensing lever 9 provide adjacent the periphery of a rotary disc, the actuation of which will cause, through a suitable mechanism later described the push plate 4 to be moved towards and away from the corresponding rotary disc 3 as later described.

The push plates 4 and discs 3 are constantly engaged thereby stretching the fabric widthwise and turn-ups at the selvages are removed by unrolling. Any drift outwardly, as later explained, will cause the sensor 9 to disengage the disc and plate on the edge drilling outwardly to allow the edge to be pulled by the action of the other disc and plate on the opposite side sufficiently to bring the edge to a position or path of travel defined by the sensor 9 and to which the respective sensor is constantly biased and restored to its edge-engaging position.

With the apparatus thus constructed, it will be understood that when the undesired turn-ups at the selvages of the traveling fabric 1 are to be removed by unrolling or spreading them out in widthwise direction, the push plates 4, but against the rotary discs 3 to establish spreading action, which will be further increased by the entering of the projections 5 and 8 into the grooves 7 and 6, respectively, whereby the selvage defect such as turn-ups and folds can be effectively corrected. Further, since the fabric 1 is stretched widthwise at the opposed lateral edges thereof, the smoothing of wrinkels on the fabric takes place concurrently with correction on the selvage defects. The lateral control of the running fabric is attained by moving the push plates 4 towards and away from the rotary discs 3 in response to the variations in widthwise movement of the running fabric.

A further detailed description will now be given with reference to FIGS. 3 through 8.

The annular projections 5 and groove 6 of the rotary discs 3 are formed of a synthetic rubber member 11 having a shore hardness of 80 degrees. A gear 14 placed within gear box 13 and fixedly secured to a rotary shaft 12 of each rotary disc 3 meshes with a gear 16 of a torque motor 15. The gear box 13, which mounts the rotary disc 3 and torque motor 15, is attached to a bracket 17. The push plate 4 is a substantially triangle-shaped member formed with the above-mentioned arcuate projections 8 and arcuate grooves 7 therebetween on that surface of the member facing the synthetic rubber member 11. A shaft 31 provided at the base portion of the push plate 4 is journaled in a bearing 33 formed on a diaphragm body 32 attached to a U-shaped arm 34 which, in turn, is fixedly secured to the above-mentioned bracket 17. A slidable shaft 36 fixedly secured to a resilient diaphragm 35 within said diaphragm body 32 has its distal end positioned abutting against the central portion 37 of the push plate 4. On the surface of the resilient diaphragm 35 opposite the shaft 36 is positioned in tensioned condition a fixed plate 38 having a stub shaft 39 rigidly secured to the center thereof. A spring 40 is provided in tensioned condition between the push plate 4 and diaphragm body 32. The spring biases the push plate 4 in a direction away from the rotary disc 3, i.e., towards the diaphragm

body 32. When compressed air supplied through the stub shaft 39 flows into a space defined between the fixed plate 38 and resilient diaphragm 35, the pressure force of the air causes the resilient diaphragm to be flexed against the action of the spring 40, so that the shaft 36 of the resilient diaphragm is urged to turn or actuate the push plate 4, thus causing the projections 8 on the latter to move towards the projections 5 and grooves 6 of the corresponding rotary disc 3. An adjustment screw 42 bears at 43 on the plate 4 and is screwed in a fixed plate 41 attached as an arm on the diaphragm body 32. The adjusting screw has an end 43 which bears on the push plate 4 against the action of the spring 40. The distance between the push plate 4 and rotary disc 3 can be adjusted by suitably adjusting the length of the screw 42 between plate 41 and the push plate 4. That is to say, it is so arranged that by adjusting the screw the spacing of the push plate 4 from the rotary disc 3 is regulated against the biasing force of the spring 40 which tends to space the push plate from the rotary disc 3.

Further, the plate 41 is formed with a hole 44 through which projects a stud or bolt 45 screwed into the push plate 4 on the rear side thereof. The stud 45 has adjusting and lock nuts 46 and 47 threadedly engaged therewith at its free end portion. Thus, by suitably positioning the adjust nut 47, another limit adjustment of the approach distance of the push plate 4 to the rotary disc 3 is obtained. That is to say, the push plate 4 is prevented from completely approaching or excessively abutting the rotary disc 3 more than necessary when the push plate is actuated by compressed air since the adjustment nut acts as a limit stop as the push plate moves away from the plate 41 toward the disc 3 under control of the compressed air.

An air valve 51 attached to the gear box 13 includes upper and lower short connection nipples 54 and 52. The latter nipple 52 communicates with the above-mentioned stub shaft 39 by means of an air hose 53, while the upper short tube 54 communicates with a suitable air compressor (not shown). Positioned between these short nipples 52 and 54 is a lever 55 to the shaft 56 of which is secured the base portion 57 of the above-mentioned sensing lever 9. The distal end of the sensing lever 9 extends through an elongated opening 58 formed in the plate 41 which projects beyond the periphery of the push plate 4.

In normal operation, the air supplied from the compressor passes through a hole 59 in a control lever 55 in alignment with the passages of the short nipples 54 and 52, and through the air hose to the diaphragm region. The air pressure causes the diaphragm 35 to drive the shaft 36 in a direction actuating the plate 4 into engagement with the disc 3. However, when the variations in widthwise movement, due to lateral drift, of the traveling fabric 1 occur to cause the sensing lever 9 to be sufficiently moved outwardly this causes rotation of the sensor 9 and hence the lever 55, which rotation, in turn, causes the hole 59 of the control lever 55 to be displaced out of alignment with the air passages of the short tubes 54 and 52, whereby the air supplied from the compressor is blown against areas other than the hole 59 to be discharged to the outside through an opening 60 in the air valve 51.

The spring 40 then spaces the plate 4 apart from the corresponding disc 3. As the push plate 4 is spaced apart from its related disc 3 the cloth lateral pressure is decreased and the cloth or fabric tends to follow its designated path of travel and the sensor 9 is restored to its position aligning the air supply control lever with its normal control position so the fabric is again clamped. In an arrangement such as illustrated in the drawings, the return movement of the sensing lever 9 would be effected by a weighted restoration system, though, if desired, return spring means, not shown, may be employed to maintain the sensor 9 in contact with the edge of the cloth.

The spreading action can be increased by rendering the frictional resistance of the working surface (projection and groove portions) of the push plates 4 higher than that of the working surface of the rotary discs 3. Further, the spreading action can be smoothly effected by inclining the rotary discs 3 about 10 degrees with respect to the traveling fabric (i.e., providing a clearance on the entrance side), as shown in FIG. 2.

While a preferred form of the invention has been shown and described herein, it is to be understood that the same is not so limited but shall cover and include any and all modifications of the invention which fall within the scope thereof.

What I claim is:

An apparatus for widthwise spreading a traveling fabric, comprising rotary discs positioned in operation on one surface of the running fabric at both lateral edges thereof, push plates positioned on the other surface of the running fabric so as to be spaced and opposed to said rotary discs, said push plates each having at least one arcuate groove and projection formed on a side thereof facing the fabric, said rotary discs each having at least one annular projection and groove formed on a side thereof facing the fabric opposed to said one arcuate groove and projection formed in the corresponding adjacent push plate, means driving said rotary discs in the same direction as the direction of travel of the fabric with respect to the contact surfaces of the rotary discs with the fabric, sensing means comprising a sensing lever provided adjacent the periphery of each rotary disc sensing width variations of said fabric, and means responsive to said sensing lever for causing the push plate associated therewith to be moved towards and away from the corresponding rotary disc.

References Cited

UNITED STATES PATENTS

3,511	3/1844	Lane	139—294
1,739,993	12/1929	Tandel	26—67

FOREIGN PATENTS

55,442	2/1891	Germany.
1,758	1856	Great Britain.
479	1891	Great Britain.
24,027	1914	Great Britain.

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