Oct. 14, 1969 J. SERRACANT SELVAS 3,471,908

FABRIC WASHING AND FULLING MACHINE

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FIG. 1

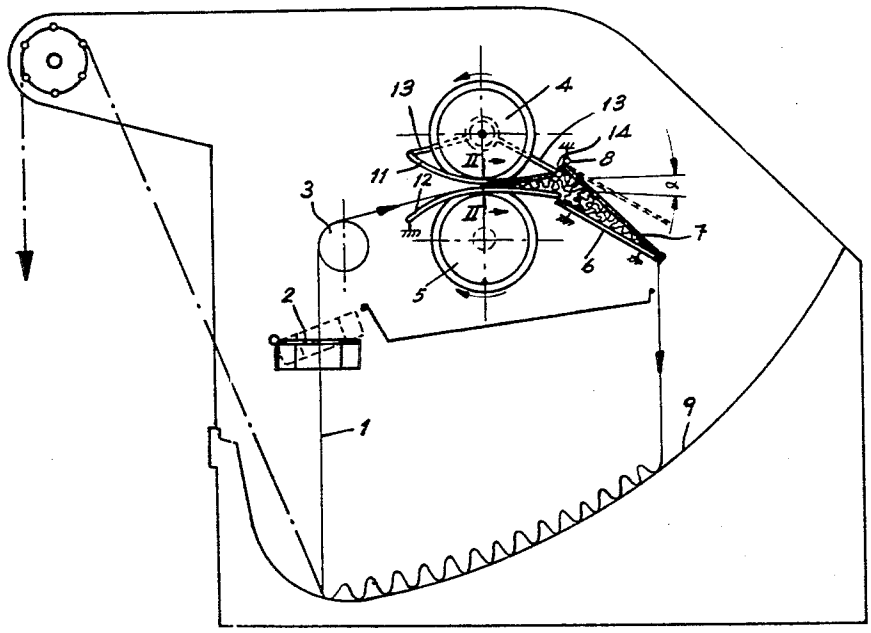

FIG. 2

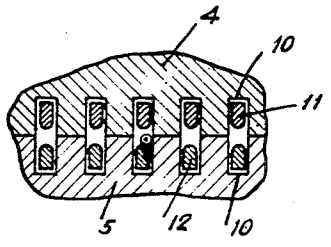

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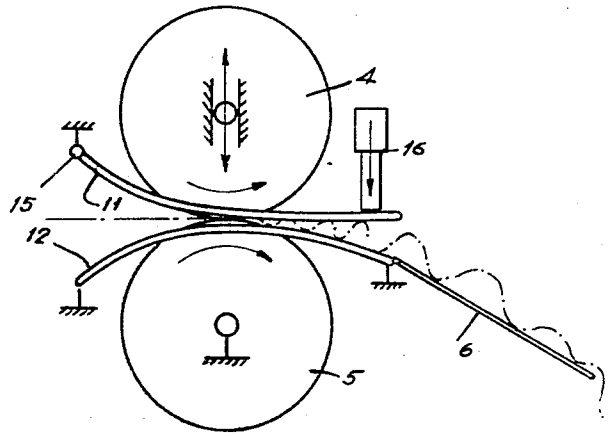
FIG. 3



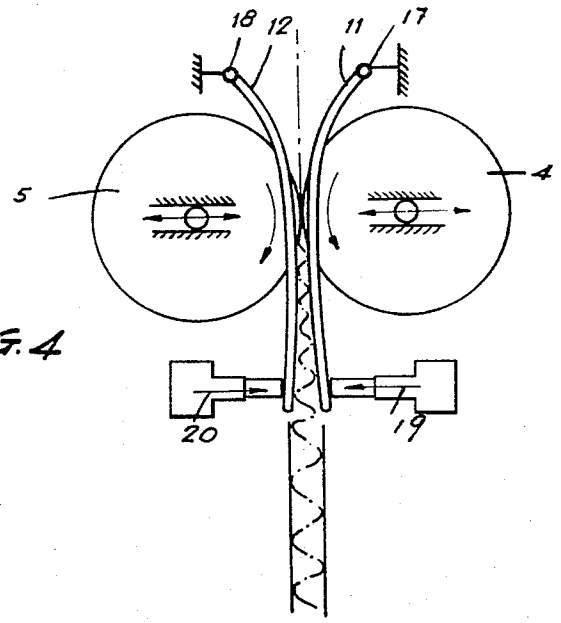


FIG. 4

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FABRIC WASHING AND FULLING MACHINE

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U.S. Cl. 26—21 4 Claims

ABSTRACT OF THE DISCLOSURE

A fabric washing and fulling machine of the type provided with one pair of feed rollers and a fabric retaining box, wherein said rollers are grooved forming peripheral canals which hold a number of elongated elements of convex form disposed tangentially to the rollers at their points of contact, said elements being slightly divergent to the forward movement direction of the fabric, thus giving rise to a small accumulated height of the fabric within the retaining box.

The present invention has as its aim a fabric washing and fulling machine, which is intended to minimize the deflections of the fabric on being made to undergo a densifying action in the longitudinal sense, and thereby to increase the effectiveness and speed of the fulling or milling action.

In existing forms of construction of fulling machines, and for a given size of the retaining box, a great proportion of the force applied by the rollers is lost owing to the bending deflections of the fabric within the box due to the fact that the volume of the box is excessive and allows the fabric to assume any random position. If, in an attempt to eliminate this shortcoming by reducing the volume of the retaining box of the fulling machine, the tongue pieces, strips or the like or brought closer to a sector of the rollers which is very close to the contact area between the two rollers, then serious problems arise in respect of mechanical adjustment between the rollers and tongue pieces, with the practical result that the fabric may be nipped between the two and may be pierced thereby, so that this method is not applicable.

If, on the other hand, one wishes to accomplish extensive fulling actions in a conventional fulling mill, the weight of the retaining box may be increased appreciably, engendering a powerful reaction of the fabric against the feed rollers, so that the latter whose surfaces are very hard and smooth tend to slip on the fabric, thus losing the effect of extension or contraction of the fabric in the retaining box and causing tearing of the fabric owing to considerable friction. This disadvantage could be eliminated by employing rollers covered with a material of lesser hardness, such as rubber for example, but the greater deformability of the latter has the result, when a powerful reaction of the fabric acts on the rollers, of causing the rollers to be deformed more than appropriate, thereby increasing the spacing between the tongue piece or the like of the retaining box and the rollers, whereby holes may be torn in the fabric.

The object of the present invention is to incorporate improvements in existing fulling or milling machines, which are intended to eliminate the shortcomings set forth hereinbefore in order to enable the fulling action to be performed more quickly and more intensively without risk of damage to the fabric.

A further object of the invention resides in reducing the height of the fabric retaining box to a minimum, starting from the same point of contact between the feed

rollers of the fulling machine, and to this end, the feed rollers employed are grooved and preferably endowed with a covering of rubber or other appropriate resilient material, and the grooves of these rollers have arranged in them convex elongated elements having a longer radius of curvature than that of the rollers, and extending tangentially at the point of contact of the rollers. By virtue of this arrangement, the tractive or compressive stress exerted by the rollers on the fabric may be exploited fully, since the deflections of the fabric are restricted to a minimum by the limited height of the retaining box, with the said elements forming an anti-deflection device by establishing a minimum angle of entry to the retaining box.

Resilient rollers may thus be employed, to prevent slipping on the fabric irrespective of its degree of humidity, the said elements housed in the grooves of the rollers being arranged to prevent nipping of the fabric.

The invention will now be described with reference to the accompanying drawings, which show an embodiment of the invention but in no restrictive sense.

FIGURE 1 is a schematic illustration of a fulling machine embodying the said improvements.

FIGURE 2 is an enlarged scale view of a detail in a section taken through the plane II—II of FIGURE 1.

FIGURES 3 and 4 schematically show details of some modifications.

In the fulling machine shown in FIGURE 1, the fabric **1** arranged to run continuously, rises in manner known per se, passing through the guide **2** of a sizing or dressing device, and over the roller **3**, then between the squeezing rollers **4** and **5**, entering the retaining box formed by the plate **6** which is fastened to the frame of the machine, and the cover **7** which is hingedly fastened to the frame at a point **8**, with the cloth descending from the box to the tub **9** containing the bath, in order to repeat the sequence.

According to the invention the rollers **4** and **5** have a number of circumferential grooves **10** arranged transversely of the rollers in which are situated many convex elongated elements **11** and **12**, these latter being in two sets, of which the set of elements **11** is arranged in the grooves of the upper roller **4**, whereas the set of elements **12** is arranged in the grooves of the lower roller **5**. The said elements **11** and **12** have a greater radius of curvature than that of the said rollers, and are positioned tangentially at the point of contact of the said rollers.

The presence of the said elements **11** and **12** of convex shape in the grooves of the said rollers renders it possible to maintain a very small angle for the entry of the fabric into the said retaining box, with the consequence that the height of the said box may be reduced to a minimum, thus equally limiting the deflections of the fabric to a minimum. The fact that the vertex of the said angle coincides with the point of tangency of the said rollers, renders it possible moreover to equip the said rollers with a resilient surface, for example a covering of rubber, to prevent the fabric from slipping, and eliminate any risk of the fabric being nipped.

In the form of construction illustrated by way of example in FIGURE 1, the convex elements **12** coordinated with the lower roller **5** are fastened immovably on the machine frame, like the plate **6** of the said retaining box, whereas the elements **11** of the upper roller **4** are suspended by means of tie rods or the like **13** from the same spindle as the said upper roller. This spindle is vertically displaceable in its mountings, and the elements **11** are articulated moreover by means of a small rod **14** connected to the same fixed hinging point **8** as the cover **7** of the said retaining box, in such manner that they may follow the upward and downward displacements of the

roller **4** caused by passage of the fabric between the said rollers while remaining parallel to each other.

This arrangement may be modified freely according to particular requirements. In the form of construction shown in FIGURE 3 for example, the elements **12** of the lower roller **5** are mounted immovably together with the plate **6** of the said retaining box, as in the previous case, whereas the elements **11** of the upper roller **4** are mounted independently of the said roller **4**. Said elements **11** have their leading extremity hinged at the infeed side of the said rollers at a point **15**, whereas their trailing extremity at the discharge side of the said rollers is acted upon by a downwardly directed force, illustrated by the arrow **16**. Said force may be applied by means of a weight, a spring or by any other appropriate means, in such manner that these upper elements **11** may oscillate to facilitate the passage of the fabric between the said rollers, but independently of the displacement caused thereby of the upper roller **4**.

As shown in FIGURE 4, the whole may also be arranged in such manner that the fabric performs an essentially vertical descending motion, the rollers **4** and **5** having their spindles situated in the same horizontal plane and being arranged to be displaceable in this plane under the action of thrust devices which tend to apply the said rollers against each other. In this case, the elements **11** and **12** corresponding to the said rollers, have their leading extremities hinged at points **17** and **18** at the infeed side of the said rollers, whereas their trailing extremities at the discharge side of the said rollers are acted upon by opposed forces **19** and **20** which tend to bring the said elements closer to each other.

The present invention is not necessarily limited to the forms of embodiment described in the preceding statement and illustrated in the accompanying drawings by way of example but in no restrictive sense, and modifications of detail and technical equivalent devices may be incorporated therein without departing from the inventive scope of the disclosure.

I claim:

1. A fabric washing and fulling machine comprising in combination:

(a) two cooperating fabric feeding rollers having circumferential grooves arranged transversely of said rollers,

(b) a fabric retaining box disposed at one side of said rollers and receiving the fabric fed by said rollers as it passes from a vat containing a treatment bath through which the fabric passes,

(c) means for producing a longitudinal compression in a portion of the fabric substantially free from puckers or ripples comprising two groups of elongated convex elements cooperating with said rollers, and whose curvatures are less than that of said feed rollers,

(d) said elements extending from points situated in front of their respective feed rollers to said fabric retaining box and tangential to said rollers through said grooves and

(e) said groups being slightly divergent at the outlet in the direction of the forward movement of the fabric.

2. A fabric washing and fulling machine according to claim **1** wherein one of said groups associated with one of said feed rollers are mounted fixably in relation to their corresponding feed roller and the other group associated with the other feed roller are mounted oscillatably independently of their corresponding feed roller, and means are provided for applying pressure to said other group to bring them closer to said fixably mounted group to vary the size of the opening formed by said two groups of elements for the passage of the fabric.

3. A fabric washing and fulling machine according to claim **1**, wherein the elements corresponding to each of said two groups are mounted for oscillation as a group independently of the other group.

4. A fabric washing and fulling machine according to claim **1**, wherein the elements corresponding to each of said two groups are mounted for oscillation independently as a group in relation to the other group, and both of said groups of elements are each provided with pressure means for bringing said two groups of elements nearer to each other.

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