

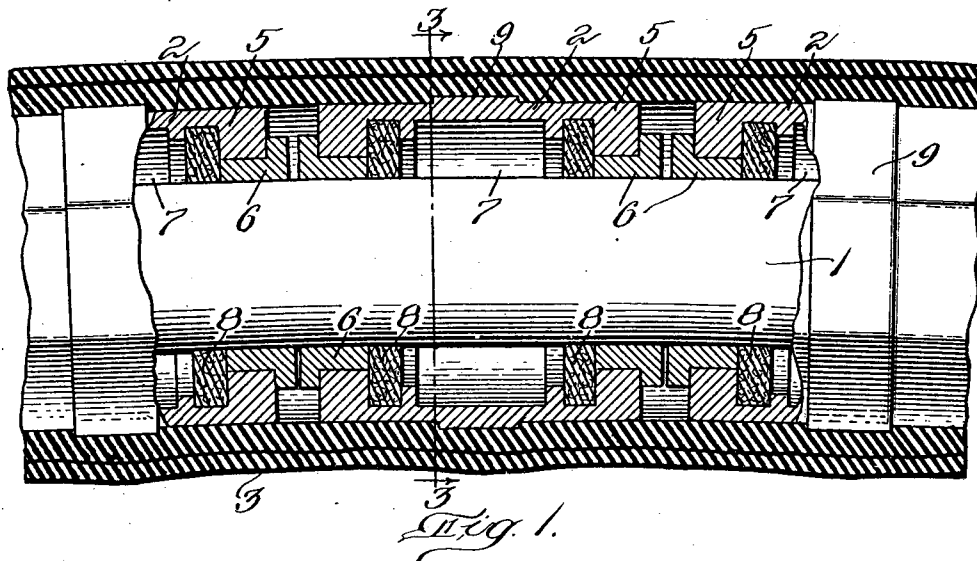
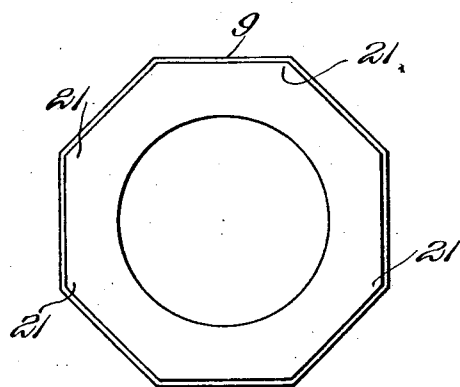
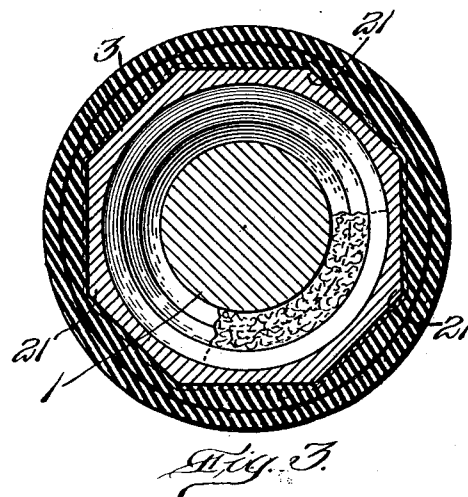
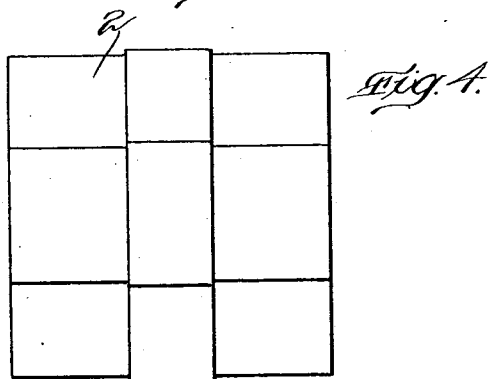
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CLOTH SPREADER OR EXPANDER

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CLOTH SPREADER OR EXPANDER.

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The invention relates to cloth expanders or spreaders such as are used in the processes of finishing, &c., for stretching cloth widthwise so as to eliminate wrinkles in the cloth when it passes into the machine in conjunction with which the expander or spreader is employed. Forms of such devices of the so-called bent-bar type are shown and described in United States Letters Patent to Mycock, No. 687,847, granted December 3, 1901, for apparatus for distending textile fabrics; and No. 1,233,059, granted July 10, 1917, for cloth spreader or expander.

The invention is an improvement in the curved spreader or expander rolls that are employed in machines of the above type; more particularly in those which are furnished with rubber coverings.

Rolls in general on the order of those employed in Mycock and similar expanders comprise a transversely-extending curved, non-rotating, supporting rod or bar, and a series of roll-sections, sometimes termed bobbins, that are mounted end to end upon such rod or bar with capacity to revolve upon the same. Mostly, in practice, such rolls heretofore have been unprovided with rubber coverings. In the case thereof, through the direct engagement of the cloth, in its passage, with the peripheries, usually serrated, of the roll-sections or bobbins, the latter are caused to turn around the supporting rod or bar. The stretching and smoothing of the cloth widthwise result from the fact that by reason of the curvature of the supporting rod or bar the revoluble roll-sections or bobbins stationed in different portions of the curve rotate in planes which respectively mostly are inclined transversely at different angles with relation to the direction of movement of the web of cloth, those at one side of the middle line of the path of the web having their planes of rotation diverging in one direction laterally, and those at the other side of such middle line diverging in the opposite direction laterally. Accordingly, the peripheries of the revolving roll-sections or bobbins operate in well-known manner to spread or expand the onwardly traveling cloth transversely of its width in both directions from its middle line.

It is the practice, in working on certain classes of goods, more especially light-weight goods, to provide each curved roll of a spreader or expander with a rubber covering over

the series of roll-sections or bobbins arranged as just described, so as by means of such covering to furnish a frictionally adhesive more or less yielding contact-surface instead of the serrated metallic surfaces of uncovered roll-sections or bobbins, whereby to avoid the disadvantages incident to direct engagement of such serrated metallic surface with the cloth operated upon, and secure results which cannot be secured through the employment of such uncovered roll-elements. In the case of these rubber-covered rolls, the engagement of a moving web of cloth with the rubber covering of a roll causes such covering and the associated roll-sections or bobbins to turn in unison upon the curved supporting rod or bar therefor, with results in smoothing and spreading the web widthwise similar to those attained in the use of uncovered rolls.

A drawback in connection with the rubber-covered curved spreader- or expander-rolls is the tendency, due to resistance of the cloth to being spread transversely of its width, to crowding of the rubber covering inwardly from the opposite ends of the rolls toward the middle line of the traveling web, with consequent wrinkling of the said covering in such manner as to result in damage to the covering, and other evils. Other incidents of the action in connection with the rubber coverings of the said rolls have contributed to cause comparatively rapid deterioration of the rubber coverings.

The main object of the present invention is to provide a rubber-covered curved spreader- or expander-roll in which the roll-sections or bobbins are so constructed as to provide for engagement between the same and the rubber covering such as to overcome the tendency referred to, by preventing movement of the covering relative to the roll-sections or bobbins axially of the latter and of the roll. Another object is to avoid the rapid deterioration aforesaid of the rubber covering in the working of the roll.

It has been proposed to counteract the tendency to axial displacement of a rubber covering, by means of recesses in the bodies of the roll-sections or bobbins, and plugs or studs projecting from the covering and occupying such recesses, said plugs or studs constituted by portions of the covering which are pressed into the recesses in the process of molding the covering upon the roll-sections or bobbins.

My observation has been that in practice such plugs or studs draw out of the recesses, so as to lose their intended function as means of preventing axial movement of the covering, and, through displacement relative to the recesses, produce local enlargements of the covering.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which,—

Fig. 1 is a view in longitudinal section of a portion of an improved roll containing the said embodiment.

Fig. 2 is an elevation of a roll-section or bobbin of the novel form that is employed in the improved roll.

Fig. 3 is a view in cross-section on line 3, 3, of Fig. 1.

Fig. 4 is an elevation of a roll-section or bobbin.

The said drawings show at 1 a portion of the length of the curved, non-rotating, supporting rod or bar aforesaid of a curved spreader- or expander-roll, and at 2, 2, 2, some of the roll-sections or bobbins which are mounted on the said rod or bar with capacity to rotate around the same. At 3 is shown a portion of the tubular roll-covering that is mounted upon the said roll-sections or bobbins.

The roll-sections or bobbins 2, 2, employed in my improved spreader-roll preferably have the exterior surface of each thereof formed with longitudinal salient portions 21, 21, 21, distributed around the periphery of the roll-section or bobbin, giving the roll-section or bobbin an exterior which is polygonal in cross-section. The interior of the rubber or other covering cylinder 3 is shaped or will shape itself to correspond to such polygonal cross-section, so that when the bobbins are in place within the previously formed covering 3, and the complete roll is installed in a spreading machine, the engagement of the moving cloth with the exterior of the covering 3 will cause all of the enclosed roll-sections or bobbins 2, 2, to turn or rotate in unison with the covering 3 around the bent supporting rod or bar 1.

The roll-sections or bobbins 2, 2, aside from their polygonal exterior are approximately cylindrical. In the case of the illustrated construction they are hollow or shell-like, with internal flanges or head-portions 5, 5, at their opposite ends. Within the central openings of the said head-portions are fixed bushings 6, 6, of suitable bearing material, for example metalline, fitting the supporting rod or bar 1, and adapted to turn freely thereon. A supply of lubricant may be stored within the cavity or chamber 7 of each roll-section or bobbin, suitable means being provided for keeping the lubricant in such cavity or chamber, as for example washers 8, 8, occupying grooves in the head-portions of the

roll-section or bobbin at the inner sides of the bushings. These washers may be composed of felt, soaked with oil or otherwise charged with lubricant, in which case a store of lubricant within the chamber or cavity may, or may not be supplied, as deemed advisable. These features of internal construction, lubrication, etc., are not material to the present invention.

The rubber covering fits snugly and firmly upon the exterior surfaces of the roll-sections or bobbins without being vulcanized or otherwise united thereto. This fit is secured through proportioning the internal diameter of the said covering so that normally it is a little less than the external diameter of a roll-section or bobbin. Consequently, as one of the latter is forced into the covering, it operates to expand the latter somewhat, the contraction of the covering around the exterior of the roll-section or bobbin causing the covering to close down upon the body of the roll-section or bobbin alongside the salients so as to hold the roll-section or bobbin tightly. The interlocking engagement between the longitudinal salient portions of the peripheries of the roll-sections or bobbins and the interior of the covering provides for enforced unison-rotation of the series of roll-sections or bobbins with the covering. In virtue of the fact that the covering is not vulcanized or otherwise united to the roll-sections or bobbins, the longitudinal disposition of the salients and intermediate surface-portions of the roll-sections or bobbins makes it practicable to insert the roll-sections or bobbins successively within an end of the tubular covering, and to push them along within the latter into the desired position relative to the length of a roll and to one another. This capacity for insertion, etc., renders it unnecessary to mould or otherwise form the covering upon the roll-sections or bobbins so as to become permanently attached thereto; also, the covering may be produced and supplied independently, and the roll-sections or bobbins may be applied and assembled therein at convenience, or whenever the application and assembling are convenient or necessary; also, removal and replacement of the roll-sections or bobbins are made possible. In carrying my present invention into effect, one special aim is to provide for attainment of the objects aforesaid of the present invention without interfering with the advantageous features just recited.

In accordance with the present invention I provide the individual roll-sections or bobbins of the series pertaining to a spreader- or expander-roll with salient axial-displacement-opposing means externally presented at their peripheries, of slight prominence permitting the roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter to be passed along with-

in the roll-covering to proper working position in the roll, but serving through occupancy of depressions in the interior surface of the roll covering to prevent relative axial displacement under normal working conditions.

The salient axial-displacement-opposing means may vary in form, location, arrangement, etc. In the case of the illustrated embodiment of the invention such means is constituted by raised and slightly prominent circumferential annular bands 9, 9, one thereof upon each of the respective roll-sections or bobbins. The extent of projection of these bands, or their equivalents, beyond the general peripheries of the respective roll-sections or bobbins is small, not enough to prevent the roll-sections or bobbins from being crowded into the central opening of the roll-covering, at one end of said opening, and then being forced along within the roll-covering to the positions they should occupy in the roll, lengthwise of the latter. The roll-covering may be formed interiorly with recesses or depressions for occupancy by the raised or prominent engaging means, but ordinarily any preliminary shaping of the interior surface of the roll-covering will be unnecessary. The material of the roll-covering will contract at opposite sides of the annular prominences at the interior of the roll-covering sufficiently to form the necessary depressions, and in virtue of the said material conforming to the prominences and fitting down alongside the latter, as well as of the substantial firmness of the rubber of which the roll-covering is composed chiefly, the engagement and resistance which are requisite for preventing axial displacement under normal working conditions will be secured. Nevertheless the material of the roll-covering will permit the roll-sections or bobbins to be displaced axially of the roll-covering through properly applied and directed driving force.

In the preferred form of embodiment of the invention the axial-displacement-opposing prominences are located at mid-length of the respective roll-sections or bobbins. Accordingly, the places of inter-engagement between the rubber covering and the roll-sections or bobbins, also are located at or approximately at mid-length of the roll-sections or bobbins. Hence a relatively considerable portion of the length of the covering intervenes between the axial-displacement-opposing prominence of one roll-section or bobbin and that of the next adjoining in either direction lengthwise of the roll.

The axial-displacement-opposing prominences are designed to prevent relative shift of the rubber coverings and roll-sections or bobbins with respect to each other in either direction longitudinally of the roll during the working of the roll under normal conditions. With this result in view, the oppo-

sitely-facing shoulders at the opposite sides of the annular prominence of a roll-section or bobbin are sufficiently abrupt to prevent slipping in either direction lengthwise of the roll, of the covering with reference to the roll-section or bobbin, or of the roll-section or bobbin with reference to the covering. Thereby a roll-section or bobbin is prevented from slipping axially toward an end of the roll, inside the rubber covering, in turning around from the concave side of the roll to the convex side; and equally is prevented from slipping or creeping toward the middle of the length of the roll in turning around from the convex side of the roll to the concave side thereof. One effect of this is illustrated in Fig. 1, in which the rubber covering is shown as tightened longitudinally at the convex side of the roll, and as relaxed longitudinally at the concave side thereof. In virtue of the slight gathering of the rubber covering lengthwise of the roll at the concave side of the roll, as in Fig. 1, and of the gradual extension of the gathered portion in turning around to the convex side of the roll, the action of the roll in stretching the web widthwise is improved. In operation, as the roll is rotated through the engagement of a moving web of cloth with its periphery, the successive portions of the covering, in passing around from the concave side to the convex side, will become tightened and extended lengthwise of the roll, and will be relaxed in passing around from the convex side to the concave side. By reason of the rubber covering not being vulcanized or otherwise united to the peripheries of the roll-sections or bobbins, the rubber covering will be permitted to stretch throughout the portion of the same extending from the annular band or prominence of one roll-section or bobbin to that of the next adjacent roll-section or bobbin at either side of the first. This distribution of the stretching throughout a considerable portion of the length of the covering obviates straining of the covering, and injury thereto, and contributes to secure long-lasting durability and serviceability. It also enables the roll to run more easily in operation.

What is claimed as the invention is:—

1. An improved cloth spreader- or expander-roll comprising a curved series of roll-sections or bobbins and a tubular roll-covering which is not vulcanized to said roll-sections or bobbins, with the individual members of the said series furnished at their peripheries with longitudinal salient portions to ensure unison-rotation of said members with the roll-covering, and with said roll-sections or bobbins improved by being furnished with salient axial-displacement-opposing means of slight prominence, constituted by annular bands or ridges extending around the respective roll-sections or bobbins, and having at opposite

sides thereof cover-detaining shoulders adapted to prevent undesired displacement of the covering axially in either direction but of slight prominence permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position therein, said roll-covering normally less in internal diameter than the external diameter of the roll-sections or bobbins and holding the latter in place by its contraction upon the same while permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position.

2. An improved cloth spreader- or expander-roll comprising a curved series of roll-sections or bobbins and a tubular roll-covering which is not vulcanized to said roll-sections or bobbins, with the individual members of the said series furnished at their peripheries with longitudinal salient portions to ensure unison-rotation of said members with the roll-covering, and with said roll-sections or bobbins improved by being furnished with salient axial-displacement-opposing means of slight prominence, constituted by annular bands or ridges extending around the respective roll-sections or bobbins at mid-length of the latter, and having at opposite sides thereof cover-detaining shoulders adapted to prevent undesired displacement of the covering axially in either direction but of slight prominence permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position therein, said roll-covering normally less in internal diameter than the external diameter of the roll-sections or bobbins and holding the latter in place by its contraction upon the same while permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position.

3. An improved cloth spreader- or expander-roll comprising a curved series of roll-sections or bobbins and a tubular roll-covering which is not vulcanized to said roll-sections or bobbins, with the individual members of the said series furnished at their peripheries

with longitudinal salient portions to ensure unison-rotation of said members with the roll-covering, and with said roll-sections or bobbins improved by being furnished with salient axial-displacement-opposing means of slight prominence, located at mid-length of the respective roll-sections or bobbins, and having at opposite sides thereof cover-detaining shoulders adapted to prevent undesired displacement of the covering axially in either direction but of slight prominence permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position therein, said roll-covering normally less in internal diameter than the external diameter of the roll-sections or bobbins and holding the latter in place by its contraction upon the same while permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position.

4. A cloth spreader- or expander-roll comprising a curved series of roll-sections or bobbins, and a tubular-covering which is not vulcanized to said roll-sections or bobbins, with said roll-sections or bobbins improved by being furnished with salient bands or ridges having at the opposite sides thereof cover-detaining shoulders adapted to prevent undesired displacement of the covering axially in either direction but of slight prominence permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along within the roll-covering to proper working position therein.

5. A cloth spreader- or expander-roll comprising a curved series of roll-sections or bobbins, and a tubular roll-covering which is not vulcanized to said roll-sections or bobbins, with said roll-sections or bobbins improved by being furnished at mid-length thereof with salient bands or ridges having at the opposite sides thereof cover-detaining shoulders adapted to prevent undesired displacement of the covering axially in either direction but of slight prominence permitting the respective roll-sections or bobbins, after having been inserted into the roll-covering at the ends of the latter, to be passed along with the roll-covering to proper working position therein.

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