No. 624,884. Patented May 9, 1899.

D. WELSH.

LUSTERING MACHINE.

(Application filed Oct. 16, 1895.)

(No Model.)

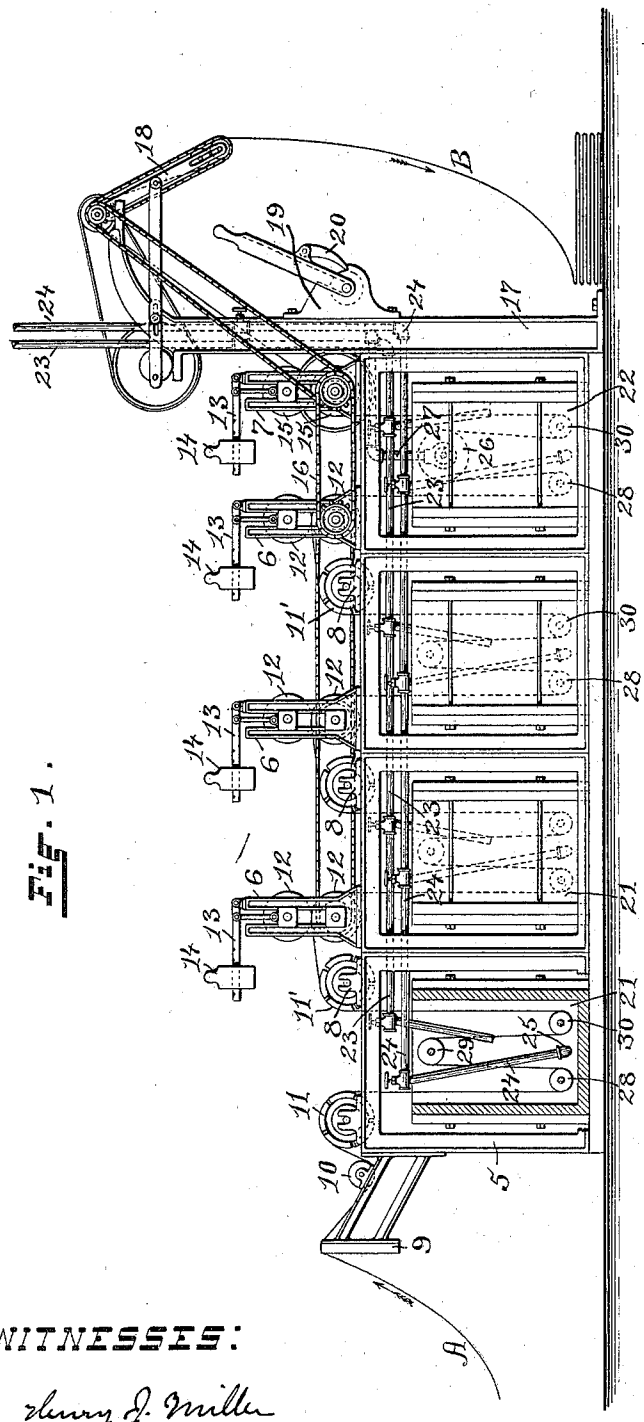


Fig. 1.

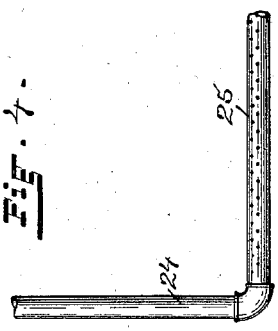


Fig. 4.

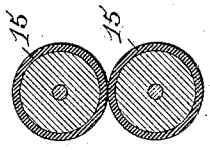


Fig. 3.

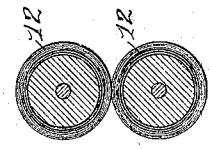


Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DAVID WELSH, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF TWO-THIRDS TO WALTER RUSHTON, OF SAME PLACE.

LUSTERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 624,884, dated May 9, 1899.

Application filed October 16, 1895. Serial No. 565,849. (No model.)

To all whom it may concern:

Be it known that I, DAVID WELSH, of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Lustering-Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

In order that the relation of the present invention to the art may be thoroughly comprehended, it may be premised that what is termed "finishing" in the art to which this invention appertains is understood to mean the treatment of the fabric which is designed by the application of heat, fluid, and pressure to prepare the fabric for the dyeing process. Fabric finishing has heretofore been accomplished in a variety of ways, the most common and perhaps most efficient method being to subject the fabric to high temperature on a steamer for the purpose of removing impurities, next to extract the moisture by throwing the fabric in an irregular mass into a cylindrical receptacle revolved at a high rate of speed, and, third, to press out the irregularities or wrinkles thus produced by passing the fabric through a hydraulic press, the three devices employed being termed, respectively, first, the "steamer;" second, the "hydro-extractor," and, third, the "hydraulic press." This mode of treatment, the employment of which is practically universal, is objectionable for the reason that the steaming is necessarily uneven because of the varying temperature and pressure at given distances from the steam-inlet, and when the goods are dyed the fabric, by reason of its uneven and irregular treatment, is given a wavy appearance. Another objection is that the wrinkles made by the hydro-extractor reappear if in the dyeing process or subsequently the goods have to be sponged. The principal reasons for these defects in the heretofore-approved treatment or finishing is that the weave of the fabric is not absolutely alike in all portions, and consequently when the fabric is not subjected to tension or is subjected to tension only in one direction the various steps have been more or less effective as the weave of the goods has been more or less open.

Having observed the fruitless efforts to devise a finishing process which will subject the goods to like treatment throughout their extent and which will lay the nap smoothly and evenly and will prevent the reappearance of wrinkles during the subsequent treatments, I have evolved the apparatus herein described and claimed.

The mode of operation of my apparatus consists in passing a strip of fabric under proper longitudinal tension through a series of tanks containing steam-heated water and over and between lateral stretch-rolls and pressure-rolls located intermediate of the vats and in such juxtaposition that the pressure-rolls will operate upon the fabric as it comes from the lateral stretch-rolls and before the fabric has had an opportunity to contract, in next passing the fabric, which has been successively treated to hot baths, lateral stretching, and pressure, to the action of steam expelled under pressure through perforations in a submerged steam-cylinder, around which the fabric is pressed smoothly, and, finally, in subjecting the fabric to the action of extractor-rolls immediately after it comes from the steam-cylinder described. The effect of this process is to subject the fabric to successive hot-water baths and pressure while the fabric is retained stretched or under tension both laterally and longitudinally, the result being a smooth and regular finish, the even lustrous laying of the nap, and the elimination of any wrinkling which might possibly be revived by subsequent sponging.

While many forms of apparatus might be devised for carrying out this process, a device which I have found effective is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my apparatus complete, one of the tanks 21 being shown in section and other of the elements being illustrated in dotted lines. Fig. 2 is a sectional view, on a somewhat-enlarged scale, of one pair of squeeze or pressure rolls. Fig. 3

is a similar view of the extractor-rolls, and Fig. 4 is a detail view of a portion of one of the steam-pipe branches.

Referring to the drawings, 5 indicates the frame of the apparatus, which may be of any desired construction.

6 6 6 indicate bearing-standards carried above the frame at proper distances apart and designed to retain the bearing-blocks of the squeeze or pressure rolls 12, which are mounted, as illustrated, in vertically-disposed pairs, the upper rolls being urged downwardly or against the lower rolls under the pressure produced by pressure-levers 13, fulcrumed upon the standards 6, connected to the bearing-blocks of the upper rolls by links or other suitable means, and provided upon their free ends with adjustable weights 14, by means of which the pressure exerted by the pressure-rolls is designed to be regulated.

Adjacent to the rear extremity of the machine are standards 7, similar to the standards 6, but designed to retain the bearing-blocks of what may be termed "extractor-rolls" 15, the upper of which is forced downward by a weighted lever similar in all respects to the levers described in connection with the pressure-rolls. Any suitable means may be provided for transmitting motion to the several rolls described; but I prefer to mount a band-pulley upon one end of the lower extractor-roll and to gear said roll through gear-and-sprocket mechanism with the several lower pressure-rolls, as illustrated.

8 8 indicate bearing-brackets mounted upon the frame immediately in front of each of the standards, in which are journaled the shafts of ordinary lateral stretch-rolls 11 11′, an additional stretch-roll being provided immediately adjacent to the front extremity of the frame, as shown.

9 indicates the scrimp-bar, supported in front of the machine, and 10 indicates a friction-roller carried by the scrimp-bar frame and designed to guide the fabric and to insure its proper passage under tension over the adjacent stretch-roll 11.

21, 21, 21, and 22 indicate the several tanks of a series, arranged within the frame and designed to be supplied with water through depending branches of a water-pipe 23, which extends the length of the frame above the tank and is supplied with water from any suitable source. Cocks or other suitable means may be provided for regulating the flow of water to each tank or means common to all of the tanks may be so employed.

24 indicates a pipe communicating with any source of steam-supply and extending the length of the frame, like the water-pipe 23, and provided with depending branches having right-angular foraminous ends 25, which are located within each of the tanks adjacent to their bottoms and preferably extending transversely at or about the center of the tank. It will be observed that the discharge branches or portions of the water-pipe are so located that the water is injected in the direction of the foraminous portion of the steam-pipe, the effect of which arrangement being to cause the cool water so injected to be immediately brought into contact with the source of heat, and thereby preventing circulation throughout the tank of a current of comparatively cool water, the detrimental effect of which will be readily understood by those skilled in the art to which this invention appertains.

29 indicates a transversely-extending guide-roller mounted at the vertical center of each of the tanks 21 and adjacent to their upper edges, and 28 and 30 indicate similar guide-rollers located adjacent to the bottoms and opposite sides of each of the tanks 21 and 22, the roller 29 being displaced in the tank 22 by a perforated steam-cylinder 26, to which steam is supplied through a steam-pipe 27, communicating with the pipe 24 or with a separate source of steam-supply, as desired.

A indicates a strip of fabric designed to be finished preparatory to its subjection to the dyeing operation. It is fed over the scrimp-bar, under the friction-roller 10, and over the first lateral stretch-roll of the series, where it is given an initial lateral distention. It then passes downwardly into the hot water contained in the first tank 21, thence around the rollers 28, 29, and 30, over the stretch-roll 11′, where while in the saturated condition it is again stretched laterally and is passed between the pressure-rolls 12, which are located in such relation to the stretch-roll that the fabric is squeezed and pressed before it has had time to contract after having passed over the stretch-roller 11′. In like manner the strip of fabric is then passed through the several tanks or vats, over the several stretch-rolls, and between the squeeze or pressure rollers, each time being stretched and pressed more effectively, and is finally passed over the steam-cylinder 26 and between the extractor-rolls 15, when it will have been deprived of free moisture and will then have been finished evenly and the nap laid with uniformity throughout its extent. As the fabric is fed from the machine it may be passed over a take-up roll, the shaft of which is mounted in a suitable frame 19, supported by standards 17 and provided with a pawl which engages a projection upon the standards and retains the frame in proper position to receive the fabric. When it is desired to remove the take-up roll, the pawl 20 is withdrawn and the frame 19 elevated from its support in a manner which will be obvious. Instead of this means for disposing of the finished fabric any suitable or ordinary folding mechanism 18 may be mounted at the upper ends of the standards 17 and may be operated by a sprocket and chain geared to a sprocket-wheel carried by the lower extractor-roll.

From the foregoing it will be observed that I have originated a novel method for finish-

ing fabrics and have invented an ingenious apparatus for carrying the method into effect; but while the present embodiment of my invention is believed to be preferable I do not desire to limit myself to the structural details defined, but reserve the right to change, modify, or vary them at will within the scope of the protection prayed.

What I claim is—

1. The combination with a suitable support, of a series of tanks, a series of lateral stretch-rolls located respectively intermediate of the tanks, a series of pressure-rolls located respectively in juxtaposition to the stretch-rolls, guide-rolls within the tanks designed to guide a strip of fabric therethrough, a perforated steam-cylinder within the last tank of the series, means for supplying steam thereto, and mechanism beyond the last tank of the series for extracting the moisture from the fabric, substantially as specified.

2. The combination with a suitable support, of a series of tanks and means for supplying fluid thereto, lateral stretch-rolls located intermediate of the tanks, pressure-rolls located in juxtaposition to and slightly beyond the lateral stretch-rolls, guide-rollers in each of the tanks, a submerged perforated steam-cylinder within the last tank of the series, means for operating the pressure-rollers to feed the fabric longitudinally, and fabric-retarding mechanism, as for instance a friction-roller located in advance of the series of tanks and designed by retarding the longitudinal movement of the fabric to subject the latter to longitudinal tension, substantially as specified.

In witness whereof I have hereunto set my hand.

DAVID WELSH.

Witnesses:
JOSEPH A. MILLER,
HENRY J. MILLER.