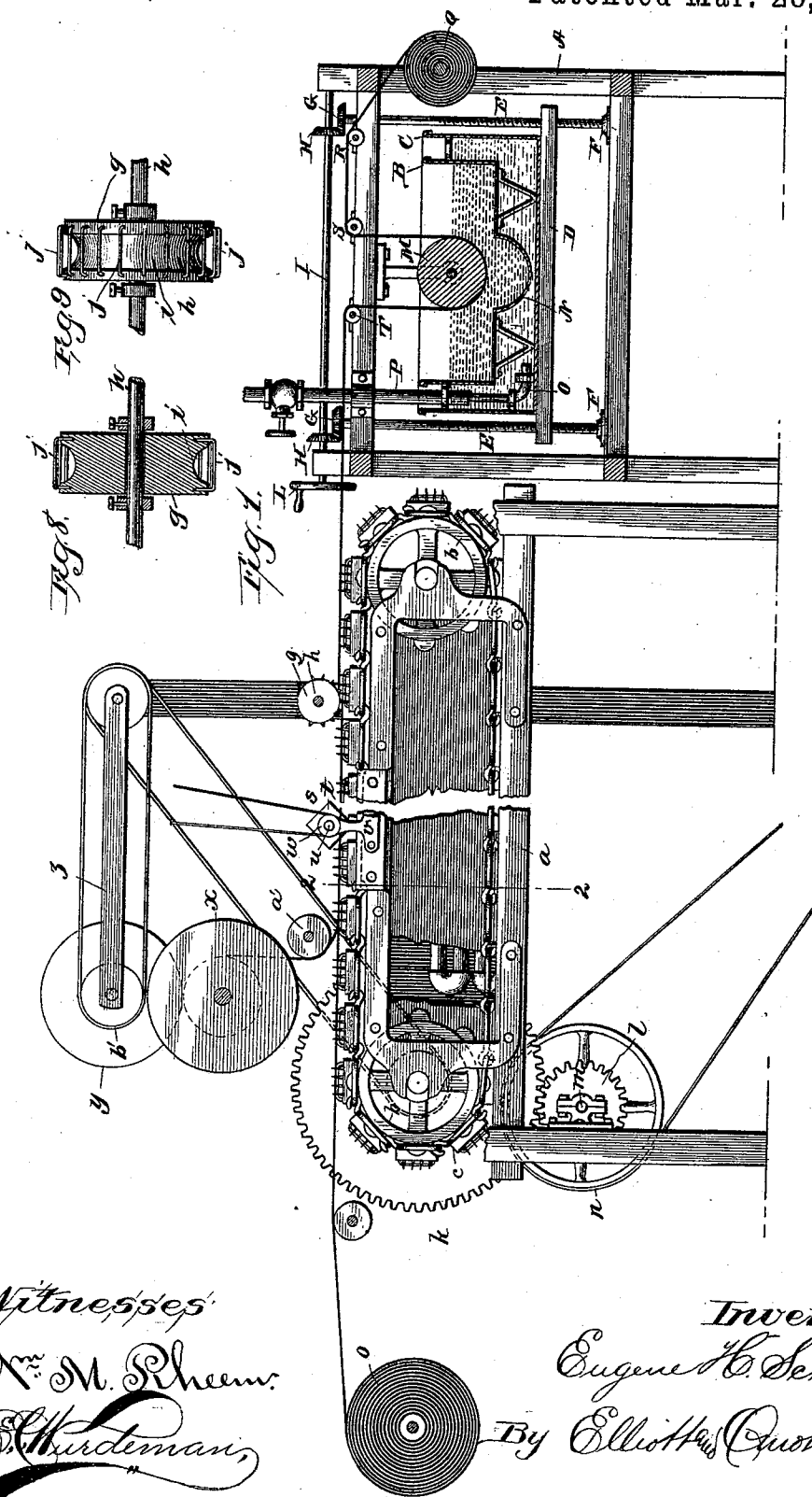


2 Sheets—Sheet 1.

CLOTH DRYING, TENTERING, AND TRIMMING MACHINE.

Patented Mar. 28, 1893.



Witnesses:
M. M. Rheem.
J. Hurdeman,

Inventor:
Eugene H. Schofield

By Elliott & Fisk.

Atty's

(No Model.)

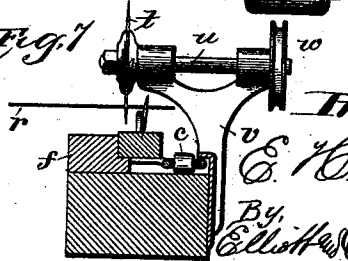
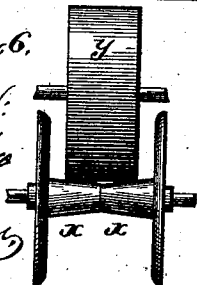
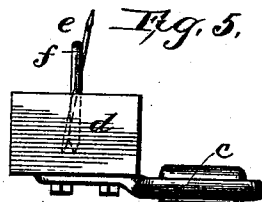
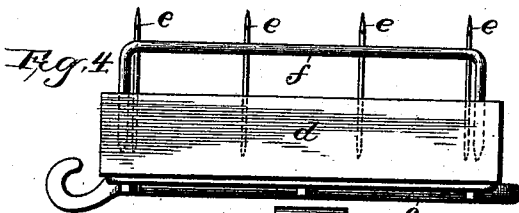
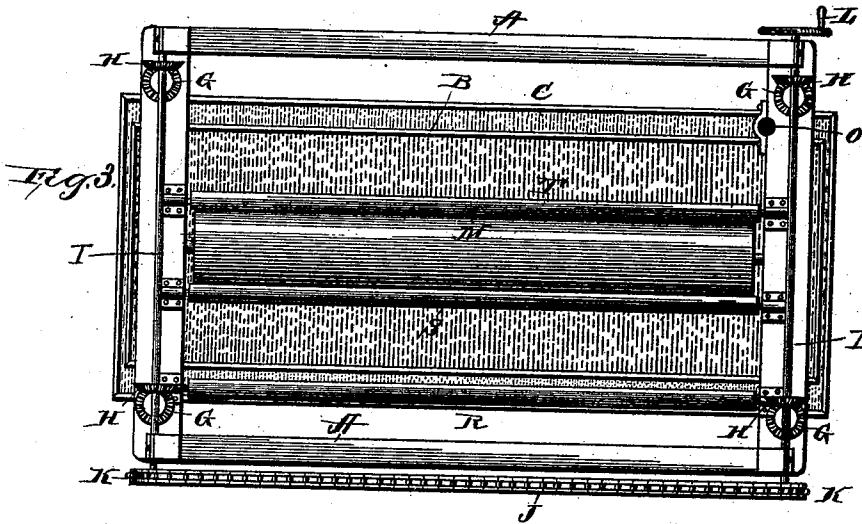
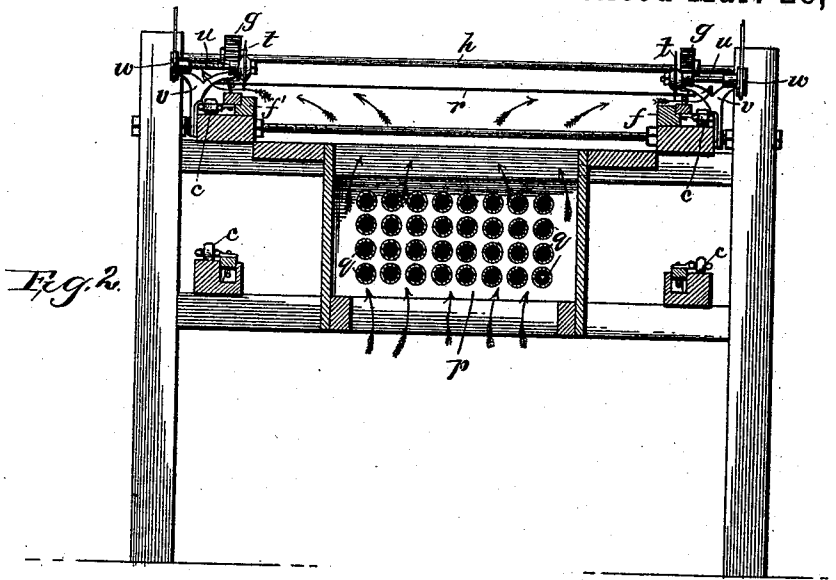
2 Sheets—Sheet 2.

E. H. SCHOFIELD.

CLOTH DRYING, TENTERING, AND TRIMMING MACHINE.

No. 494,492.

Patented Mar. 28, 1893.



Witnesses:
R. B. Quofunda
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Inventor.
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UNITED STATES PATENT OFFICE.

EUGENE H. SCHOFIELD, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
OREN DUNHAM, OF LUDINGTON, MICHIGAN.

CLOTH DRYING, TENTERING, AND TRIMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 494,492, dated March 28, 1893.

Application filed October 27, 1890. Serial No. 369,420. (No model.)

To all whom it may concern:

Be it known that I, EUGENE H. SCHOFIELD, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cloth Drying, Tentering, and Trimming Machines, of which the following is a specification.

This invention relates to improvements in machines for drying, tentering and trimming shade cloth and similar fabrics, as it leaves the sizing apparatus and has for its prime object to provide novel, efficient and economical means for stretching, drying and trimming the cloth during the continuous travel thereof through the machine.

A further object is to have the feeding, carrying and stretching devices of such character that the cloth will not only be maintained in proper position during the entire operation, but the entire surface thereof to the extreme side edges, will be subjected to the action of heat during its passage through the machine, whereby the cloth will be perfectly dried before being wound upon the storage reel.

A still further object is to trim the punctured edges of the cloth after it is thoroughly dried, but during its continuous travel through the machine, and to dispose of the cloth and trimmings upon separate storage reels, whereby the continuous operation of the machine is made practicable, the capacity of the machine is greatly increased, and the efficiency thereof is promoted to the maximum degree.

These objects are attained by the devices illustrated in the accompanying drawings, in which:

Figure 1, represents a sectional elevation of a cloth drying and stretching or tentering machine embodying my invention, showing it in connection with a sizing machine, parts being broken away to more clearly disclose the internal construction thereof; Fig. 2, a transverse vertical section on the line 2, 2, of Fig. 1; Fig. 3, a top plan view of the size vat and mechanism for operating the same; Figs. 4 and 5, enlarged detail side and end views respectively of one of the cloth holders; Fig. 6, a detail view of the strip winding reel; Fig. 7, an enlarged detail section through the cloth

carrying and stretching apparatus, showing the trimmer in front elevation, and Figs. 8 and 9, an enlarged detail section and elevation respectively of the pinioning wheel.

Similar letters of reference indicate the same parts in the several figures of the drawings.

The size applying apparatus may be of any suitable form, but I prefer to employ the one herein shown which, however, forms no part of the claims of this application. It consists of a supporting frame A, of any suitable character, upon which is mounted a size vat B, contained within a heating vessel C, which latter rests upon transverse bars or a suitable platform D, which is made vertically adjustable by means of four lifting screws E, working through the corners thereof, with their lower ends stepped in sockets F, and their upper ends provided with beveled gears G, with which mesh corresponding beveled gears H, upon a pair of cross shafts I, which rotate in unison through the intermediary of a link chain J, working over sprocket-wheels K, upon one end of each of said shafts, one of the shafts being provided with a hand wheel L, for applying power thereto. Thus it will be seen that whenever the hand-wheel is operated in either direction, a corresponding rotation will be imparted to the screw-shafts E, thus causing the platform D, carrying with it the heating vessel and sizing vat up or down, as the case may be.

From the frame A, is loosely suspended in suitable bearings, a vat roller M, which is designed to dip into the sizing vat, and to be submerged as nearly as possible to a point just below its center, to which end the bottom of the vat is curved, as shown at M, conforming to the periphery of the roller, so that as the vat is raised in the manner just described, as rapidly as the sizing is used therefrom, the roller may be maintained practically at all times submerged to the required depth, the curvature of the bottom of the vat permitting this action until substantially all of the sizing is used, although in practice it is preferred to replenish the vat at intervals to avoid the necessity for too great adjustment of the vat. It will of course be understood that the vat roller M, while loosely jour-

naled in its bearings and free to rotate is fixed with relation to the movable sizing vat.

To maintain the size in a liquid and heated condition the heating vessel C, is filled to a suitable depth with water which is maintained at the desired temperature by introducing steam therein through the pipe O, which has a sliding connection with the steam supply pipe P, so that the pipe O, may move up and down with the vessel without breaking connection with the main supply pipe, or necessitating the employment of a flexible connection there-between.

The cloth to be sized is wound upon a reel Q, suitably journaled upon the frame A, and passes over guide-rollers R, and S, down under the vat roller, at which point it is submerged in the size, thence up over another guide roller or rod T, which subserves the further purpose of a scraper to remove the surplus sizing from the cloth, after which the cloth passes out to the drying and stretching apparatus now to be described. This apparatus consists of a long horizontally disposed frame *a*, having loosely journaled thereon, a pair of sprocket-wheels *b*, at each end thereof, over which work spocket-chains *c*, traveling longitudinally of the frame, to each link of which chains is rigidly secured a cloth holder comprising a block *d*, in which is arranged a longitudinal series of teeth *e*, and a guard *f*, consisting preferably of a flattened arch of bent wire, the flattened top of which extends parallel with the surface of the block, a little below the points of the teeth, while the ends thereof are driven into the block near its ends. This guard serves to prevent the cloth being forced down upon the teeth beyond the point at which the guards intersect the teeth, thus leaving at all times an open space or passage between the under side of the cloth and the tops of the holder blocks and the guide rails *f'*, for the blocks, through which the hot air from the drying apparatus escapes as herein-
after more fully described.

At each side of the machine, and in a line with the teeth of the cloth holders, is arranged a pinioning wheel *g*, loosely journaled upon a cross-shaft *h*, and composed of a body portion provided with a peripheral groove *i*, spanned at regular intervals by a circumferential series of cross-bars *j*, between which and into the groove, the teeth of the cloth holder project, the cross-bars of the wheels serving to pinion the cloth on to the teeth of the holders as the cloth is drawn between the wheels and the holders, to which end one of the pair of sprocket wheels *b*, and preferably those at the delivery end of the machine are drivers for the link chains carrying the holders, being operated by any suitable gearing such as the cog wheel *k*, on one end of the shaft thereof, meshing with and driven by a smaller cog wheel or pinion *l*, mounted upon a cross-shaft *m*, which is in turn driven by a belt pulley *n*. Obviously, however, any other suitable driving mechanism may be employed

for driving the carrier, and in practice the storage reel *o*, for the sized and dried cloth should be run at just sufficient speed to take up the slack in the cloth as fast as delivered by the machine.

The frame *a*, may be of any suitable character so long as it forms a guide and support for the carrier, that is the sprocket chains and cloth holders secured thereto, and the other operative parts of my machine, and is additionally provided at the central portion thereof, as illustrated in Fig. 2, with a heating compartment *p*, containing steam pipes *q*, or other means of heating, which compartment is closed at the sides only, by the frame of the machine, and is open at both the bottom and top, the sized cloth *r*, spanning the top of the compartment so that the cold air will enter the compartment from the bottom, and when heated will rise against the extended cloth and be deflected to each side, escaping past the side edges of the cloth, between it and the carrier, as illustrated by the arrows in said figure. It is to this end that the guards for the teeth of the cloth holders are provided, for without such guards the cloth would be pressed down upon the teeth sufficient to make contact with the holders or the guide-rail therefor, and thus while the middle portion of the cloth would be dried in passing over the heated compartment, the side edges thereof would not be dried, because the heat could not reach them; but by the employment of these guards for the teeth, leaving the side escapes for the heated air, the full length of the compartment, the heated air has no other point of escape, and is therefore forced naturally into contact with every portion of the surface of the cloth, thus effectually drying the sizing before the cloth has passed beyond the compartment.

It is common in this class of machines to stretch the cloth during the drying operation, by spreading or diverging the guide-rails *f'*, of the carriers toward the delivery end of the machine, and this expedient is taken advantage of in this machine for the same purpose, the cloth holders being forced gradually and slightly apart by the diverging or spreading guide-rails therefor, after the cloth is pinioned thereon by the pinion wheels. After the cloth is thoroughly dried, the punctured edges are trimmed and separated therefrom by means of the trimmers *s*, comprising a small rotary knife or cutter *t*, mounted upon a short shaft *u*, journaled in a suitable bracket *v*, secured to the side of the frame *a*, and driven at a high rate of speed by means of a belt and pulley *w*, or in any other suitable manner. There are two of these trimmers, one at each side of the machine, the cutters of which enter the cloth just inside of the line of teeth on the cloth holders, and being opposed by the guards of the holders, which uphold the cloth against the action of the cutter, serves to trim off the punctured edges of the cloth during the continuous travel of the cloth through the

machine, and as rapidly as finished thereby. The finished cloth when trimmed, is stored upon the reel *o*, as before described, while the trimmings are wound upon a pair of spools *x*, one at each side of the machine, loosely journaled upon a suitable cross-shaft above or below the machine, and preferably composed of two sections as shown in Fig. 6, for convenience in removing the accumulated trimmings, to do which it is only necessary to slide the two sections of the spool endwise on the shaft away from each other. These spools are driven and operated by a friction pulley *y*, suspended above the spools in a suitable frame *j*, so that as the spools are filled by the trimmings, the pulley will be lifted vertically by the accumulated trimmings, still maintaining frictional contact therewith so as to constantly take up the slack from the trimmings, which are guided to the spools by a guide roller *a'*, the friction pulley being driven by a belt wheel *b'*, at a suitable rate of speed, the belt wheel and friction pulley being both loosely journaled in and carried by the frame *z*, which may be hinged or otherwise secured to permit of the vertical movement of the friction pulley.

A machine constructed in accordance with my invention embodies numerous advantages, chief among which is the great capacity thereof, the cloth being stretched, dried and trimmed in a most efficient manner, and during the continuous travel thereof from the sizing apparatus through the tentering, drying and trimming machine.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with the cloth carriers consisting of traveling belts, and a heated compartment located beneath the carriers and adapted to be spanned by the cloth; of means for holding the cloth aloof from said belts so as to form exits for the heated air between the edges of the cloth and the belts, substantially as set forth.

2. The combination of cloth carriers consisting of traveling belts, provided with longitudinal series of teeth and guards arranged between the belt and the points of the teeth, substantially as described.

3. The combination of cloth carriers consisting of belts, provided with longitudinal series of teeth, and guards arranged between said belts and the points of the teeth, and pinioning wheels arranged to register with each series of teeth, substantially as described.

4. The combination with the cloth carriers, consisting of belts provided with longitudinal series of teeth and guards arranged between said belts and the points of said teeth, of a pinioning wheel registering with each series

of teeth and comprising a wheel with a peripheral groove into which the teeth project, and transverse bars circumferentially arranged, spanning said groove, substantially as described.

5. The combination of the cloth carriers consisting of link chains, to the links of which are secured blocks, a series of teeth longitudinally arranged in each block, and a guard consisting of a flattened arch of wire secured at its ends respectively to said block and intersecting each tooth of the block between the point thereof and the surface of the block, substantially as and for the purpose described.

6. The combination with the cloth carriers comprising link chains provided with longitudinal series of teeth and guards intersecting the teeth between their points and the chains, of a heated compartment located between the carriers and underlying the cloth stitched between the carriers, said compartment being open at the top and bottom thereof, substantially as and for the purpose described.

7. The combination with the cloth carriers, provided with longitudinal series of teeth, and guards intersecting said teeth between their points and the surface of the carrier, of trimmers provided with rotary cutters entering the cloth adjacent to said guards, substantially as described.

8. The combination with the cloth carriers and the trimmers, of a storage reel for the finished cloth, a pair of storage spools for the trimmings, and a pair of vertically movable friction wheels bearing upon and operating said spools, substantially as described.

9. The combination with the cloth carriers, provided with longitudinal series of teeth, and guards intersecting said teeth between their points and the surface of the carrier, and trimmers provided with rotary cutters entering the cloth adjacent to said guards, of a storage reel for the finished cloth, a pair of storage spools for the trimmings, and a pair of vertically movable friction wheels bearing upon and rotating said spools, substantially as described.

10. The combination with the cloth carriers and the trimmers; of a storage spool for the trimmings and a movable friction wheel for operating said spool, substantially as set forth.

11. The combination of the cloth carriers having rows of teeth, the trimmers located between said rows of teeth, a storage spool for the trimmings, and a movable friction wheel for operating said spool, substantially as set forth.

EUGENE H. SCHOFIELD.

Witnesses:

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