July 2, 1935. J. PAYET 2,006,814

APPARATUS FOR TREATING TEXTILE FABRICS

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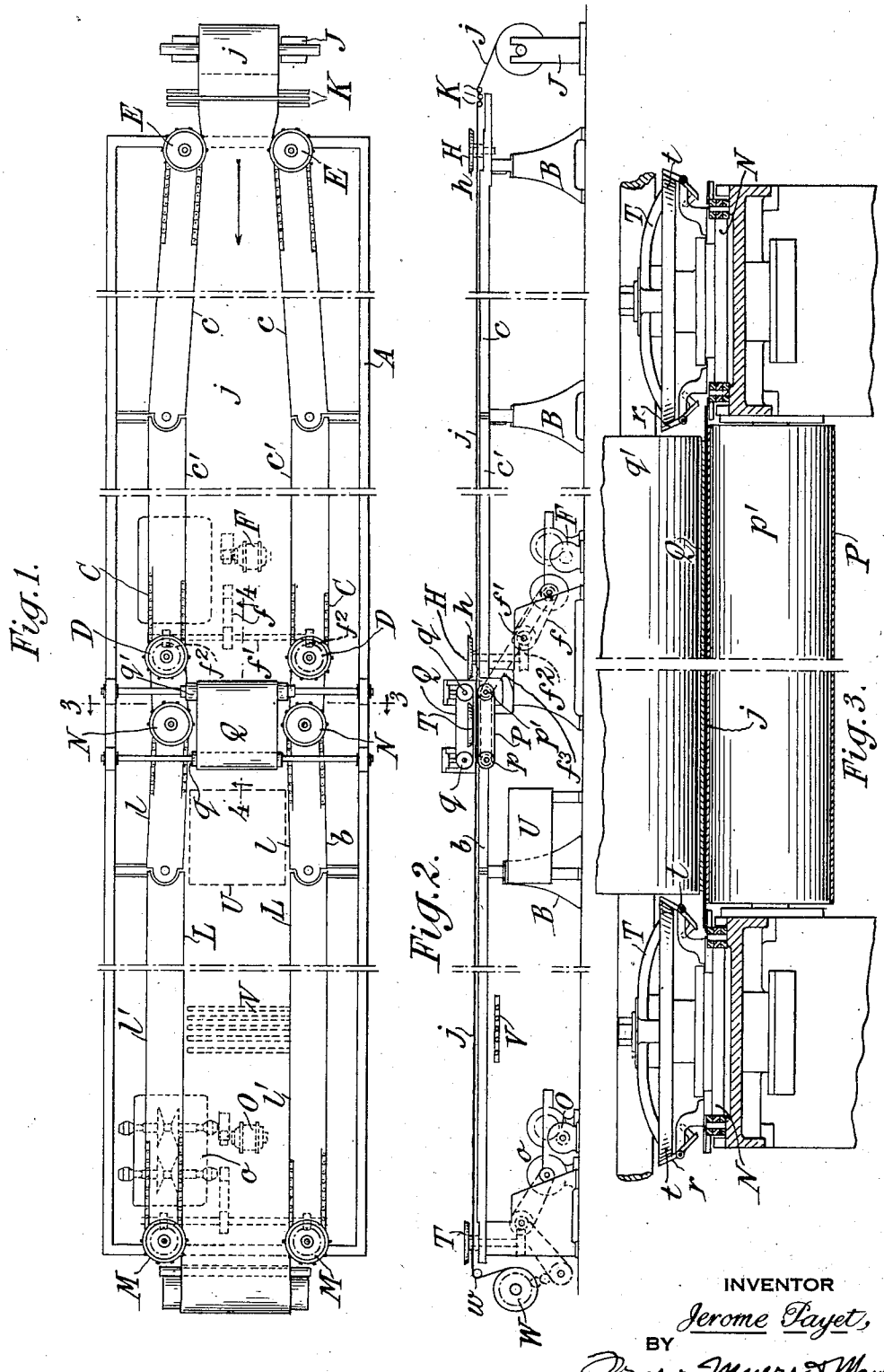


Fig. 1.

Fig. 2.

Fig. 3.

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Fig. 4.

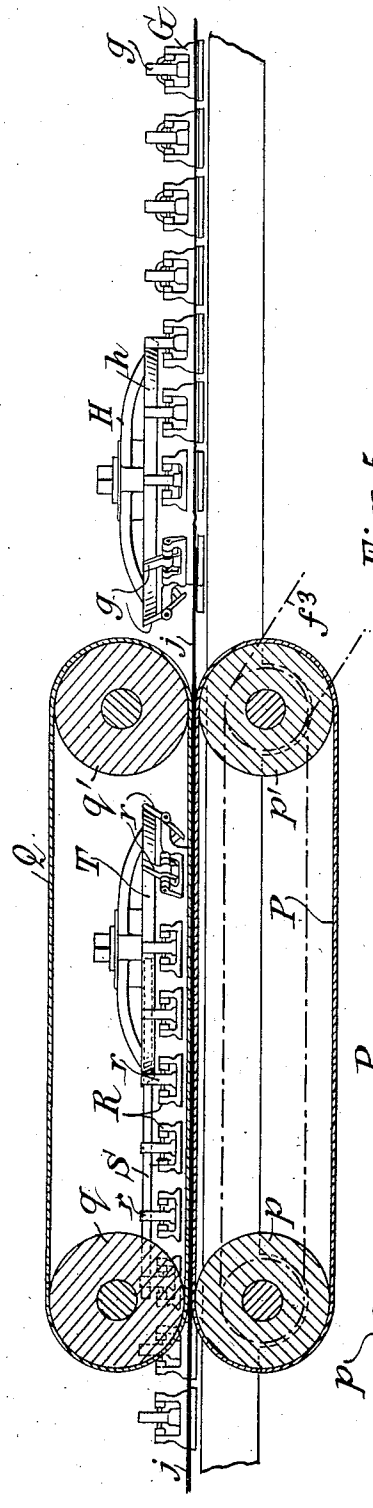
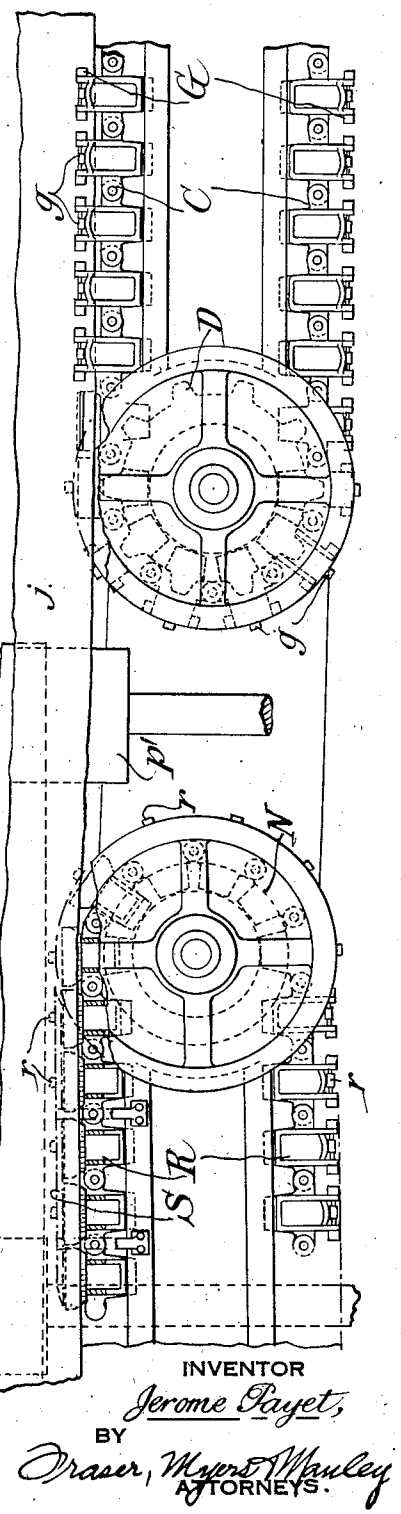


Fig. 5.



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APPARATUS FOR TREATING TEXTILE FABRICS

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Application July 20, 1933, Serial No. 681,250

12 Claims. (Cl. 26—57)

The present invention relates to an apparatus for and the method of treating textile fabrics, and aims to provide certain improvements therein. More particularly it relates to improvements in a tentering frame whereby, in addition to the usual functions of the tentering frame, it is rendered adaptable for mechanically contracting or shrinking textile fabrics.

The conventional manner of contracting or shrinking textile fabrics requiring such contraction or shrinkage for their appearance and quality, for example, crepe de chine, Canton crepe, georgette and the like, which, in many instances, require as much as fifteen per cent. contraction to provide the required crepe effect, or other fabrics of wool, worsted, cotton, artificial fibers, or combinations of such materials, which must be preshrunk and sized before being fabricated into garments so as to prevent shrinking thereof in laundering, is to give to said fabrics their desired contraction or shinkage on a tentering frame in a manner well known in the art. In order to obtain contractions or shrinkage as high as fifteen per cent., as required in certain crepe fabrics, the operators at the tentering frame are obliged to push or wrinkle or ruffle the fabric by hand into the tenter clips or onto the tenter pins or hooks of the tentering frame, a procedure which is not only tedious and costly, but one which often results in the production of an irregular crepe effect.

To reduce the high cost of operation and to remedy the uncertainty of, and irregularity of the contraction or shrinkage in fabrics, the primary object of my invention is to provide an apparatus of the class described, adapted to mechanically contract or shrink textile fabrics. A further object is to provide such device wherein the degree of contraction or shrinkage can be mechanically controlled, and wherein the resulting fabric will have a regularity which heretofore has not been possible of attainment on the tentering frame. A still further object is to accomplish the foregoing in a wholly automatic manner.

The foregoing and other objects, which will be apparent from the detailed description of my invention which follows, I accomplish by modifying the conventional tentering machine so that the tentering frame, instead of having one pair of continuous edge carriers for holding the web, will have a plurality of independently operative pairs of such edge carriers or sections, each adapted for independent adjustment and speed control. Hence by having successive sections operate at a speed differential which can be controlled, the textile fabric can be contracted or stretched to any predetermined degree, depending upon which of the sections is operated at the greater speed. And by operating the plurality of sections at the same speed, the same effects are obtained as with a regular tentering frame. The invention will be better understood from the detailed description which follows, when considered in conjunction with the accompanying drawings showing one embodiment of my invention, and wherein

Figure 1 is a top plan view of the device embodying my invention.

Fig. 2 is a side elevation of the device shown in Fig. 1.

Fig. 3 is an enlarged section taken substantially along the plane of the line 3—3 of Fig. 1.

Fig. 4 is a section taken substantially along the plane of the line 4—4 of Fig. 1.

Fig. 5 is a fractional top plan view of that portion of the invention shown in Fig. 4.

Referring to the drawings, let A indicate the top framework of a tentering frame which is supported upon suitable standards B. Mounted upon the framework A is a pair of endless chains C, C, which are trained around sprocket wheels D, D, and pulleys E, E, respectively, said chains being adapted to be driven at any desired speed by a motor or equivalent driving means F and intermediate transmission means f, f' and f^2. The chains C are composed of a plurality of links G each having a pivotally mounted, gravity-actuated clamp g, which latter is adapted to be opened upon engaging a cam surface h of wheels H mounted respectively on the shafts of the sprocket wheels D and pulleys E. The relative positions of the sprocket wheels D and pulleys E are such that the chains C will have divergent portions c, c, so as to facilitate the initial engagement of the web by the clamps g and the lateral stretching of the web to its desired width, which is controlled by the spacing apart of the portions c', c', of the chains C. In advance of the feeding end of the frame there is a support J for a roll of web material j to be treated, and between said support and the frame there is a plurality of transversely disposed parallel rolls K through which the web passes before being fed to the clamps of the chains C. The construction thus far described is substantially that of a conventional tentering frame and per se does not constitute a part of my invention.

Mounted on the frame A from a point slightly beyond the sprocket wheels D and extending to the discharge end of the frame is a second pair of endless chains L, L, which are trained over

sprocket wheels M, M, and pulleys N, N, in a manner quite analogous to that hereinbefore described with respect to the chains C, said chains L being driven by a motor or equivalent means O through transmission means *o* in any known manner. The chains L also have divergent portions *l*, *l*, and substantially parallel portions *l'*, *l'*, to give to the web being treated the requisite lateral tension and definite size or width.

Between the sprocket wheels D and the pulleys N, or in other words, between the point of release of the web *j* by the chains or carriers C and the reception of said web by the chains or carriers L, I provide a transfer means for feeding said web from one carrier to the other. This transfer means may be of any desired form or construction which will accomplish such transference of the web, and as herein shown, comprises an endless driven belt P trained over pulleys *p*, *p'*, and a second endless belt Q trained over pulleys *q* and *q'*, the said belts P and Q being normally adapted to contact with one another so as to positively feed the web in an unruffled condition to the clamps *r* of the links R of the chains L. As shown, the pulley *p'* is driven indirectly by the motor F through a belt *f*[3].

It is intended that the chains L will move at a somewhat slower speed than the chains C when the device is to be used for contracting or shrinking fabrics, hence it is not desirable to cause a clamping of the edges of the web by the clamps *r* of the chains L until the web has reached the effective carrying end of the belt P or at the point of tangency of the top portion of the belt P with the pulley *p*. Accordingly, means are provided for normally holding the pivot clamps *r* open until said point of tangency is reached, and to accomplish this I provide cam bars S extending tangentially to the pulleys N and in horizontal alignment with the cam surface *t* on the wheels T mounted upon common shafts with the pulleys N.

To definitely set or fix the web being carried by the chains L, I provide beneath the traveling web *j*, suitable moistening apparatus U and drying means V.

The primary purpose of the device is to contract or shrink textile fabrics, and to accomplish this it is intended to build up a longitudinally slack condition in the web between the points of release of the web from the first carrier or chains C and the gripping of the web by the succeeding carrier or chains L, in which slack condition the web will be gripped by the clamps *r* and be caused to set as it passes over the moistening and drying means. To provide this longitudinally slack condition aforesaid, I propose to drive the carrier chains L at a somewhat slower speed than the chains C, so that a speed differential will be maintained between the two carrier elements. The degree of contraction or shrinkage in the fabric can thus be accurately controlled by varying said speed differential, making it greater where the contraction is to be considerable, for example, in the formation of crepe fabrics, and having said differential relatively small where only normal shrinkage in the fabric is to be provided for. It will be understood, of course, that if desired, the speed of the second carrier may be greater than that of the first, in which event the material may be stretched and set in said stretched condition. It will also be appreciated that if desired, the both sections of the carriers may be operated at the same speed, or that the first section alone may be used, in which event the function of the device will be identical with that of the conventional tentering frame.

In the operation of my device for contracting or shrinking textile fabric, the spacing apart of the chains C, C, and L, L, will first be made in accordance with the width of the web being treated and the desired width to be given to the finished product. The degree of contraction or shrinking will then be controlled by the speed differential at which the carriers C and L are driven. The web *j* will be first fed by hand to the clamps *g* at the feeding end of the machine, and in passing from the sections *c*, *c*, to *c'*, *c'*, the web will be laterally tensioned to the desired amount. Upon leaving the clamps *g* at the sprocket wheels D, the end of the web will initially be fed by hand or otherwise to the transfer means or belts P and Q, by which the web will be in turn fed to the clamps *r* of the chains L, L, but before being gripped thereby said web will have its lateral edges disposed and moving in the open clamps *r* until said clamps pass clear of the cam bar S. In view of the differential speed between the carriers L and C, it will be apparent that there will build up rearwardly of the point of clamping of the web by the clamps *r* and forwardly of the point of release of the web by the clamps *g*, a longitudinally slack condition in the web which will evenly distribute itself throughout said portion and consequently the web in said slacked condition will be engaged by the clamps *r* and permanently set in said longitudinally slacked condition by the moistening and drying means over which the web in said condition is carried. At the discharge end of the frame the web may be batched up on a roll W after passing over a guide roll *w* or it may be submitted to or prepared for any subsequent desired operation.

From the foregoing detailed description it will be apparent that I have provided exceedingly simple means whereby textile fabrics can be economically and efficiently contracted or shrunk, and although I have shown but a single embodiment of my invention, it is to be understood that changes in the construction thereof may be made within the range of engineering skill, without departing from the spirit of my invention.

What I claim is:

1. A machine for treating textile webs, comprising a plurality of successive pairs of movable edge carriers, each pair of edge carriers being adapted for holding the opposite edges of a web under lateral tension, the edge carriers of successive pairs having adjacent spaced apart holding terminals, means for transferring the web from the holding terminals of one pair of edge carriers to another, and means for moving the pairs of edge carriers at different speeds during such transfer.

2. A machine for treating textile webs, comprising a frame having a plurality of successive pairs of movable endless edge carriers for holding the web under lateral tension, the edge carriers of successive pairs having adjacent spaced apart holding terminals, means for moving one pair of endless carriers at a greater speed than the pair of endless carriers next succeeding it so as to permit the building up of a longitudinally slack condition in the web between the two carriers, and means for transferring the web in said slack condition from the faster to the slower moving carriers.

3. A tentering frame comprising at least two pairs of edge carriers for holding the web under lateral tension arranged in longitudinal spaced

relation, means for driving the carriers of the two pairs so as to establish a speed differential therebetween, the edge carriers of successive pairs having spaced apart holding terminals, and a transfer means between the adjacent holding terminals of the spaced pairs of edge carriers movable at approximately the speed of the faster of the two carriers for transferring the web from one carrier to the other.

4. A tentering frame comprising at least two pairs of edge carriers arranged in longitudinal spaced relation, each carrier having tenter clips adapted for holding the edge of a web and means for automatically controlling the action of said clips to hold and release the web, means for driving the first carrier at a somewhat faster speed than the succeeding carrier, means for transferring the web from one carrier to the next, and means for holding open the tenter clips of the second carrier until a point well in advance of the first carrier is reached so as to permit the building up of a longitudinally slack condition in the web between the two carriers.

5. A tentering frame comprising at least two pairs of edge carriers arranged in longitudinal spaced relation, each carrier having tenter clips adapted for holding the edge of a web and means for automatically controlling the action of said clips to hold and release the web, means for driving the first carrier at a somewhat faster speed than the succeeding carrier, means for transferring the web from one carrier to the tenter clips of the next, and means for holding open the tenter clips of the second carrier until a point well in advance of the first carrier is reached so as to permit the building up of a longitudinally slack condition in the web, in which condition the web is adapted to be engaged by the tenter clips as they are caused to close.

6. A tentering frame comprising at least two pairs of edge carriers arranged in longitudinal spaced relation, each carrier having tenter clips adapted for holding the edge of a web and means for automatically controlling the action of said clips to hold and release the web, means for driving the first carrier at a somewhat faster speed than the succeeding carrier, means for transferring the web from one carrier to the tenter clips of the next, means for holding open the tenter clips of the second carrier until a point well in advance of the first carrier is reached so as to permit the building up of a longitudinally slack condition in the web, in which condition the web is adapted to be engaged by the tenter clips as they are caused to close, and moistening and drying means for setting the web while moving in engagement with the second carrier.

7. A device of the class described, comprising a frame having two pairs of endless chains movable in substantially parallel relation, there being a portion of the chain of each pair in substantially aligned spaced relation to a portion of the chain of the other pair, each chain being provided with tenter clips, means for automatically controlling the opening and closing of said clips to engage and release the edges of the web, means for moving the pairs of chains at different speeds, and means for transferring the edges of the web from the clips of one pair of chains to the clips of the other while moving at different speeds.

8. The method of treating textile webs which comprises feeding a web held under lateral tension moving at one speed to a web edge holding and lateral tensioning means moving at a different speed.

9. The method of treating textile webs which comprises feeding a web held under lateral tension moving at one speed to a web edge holding and lateral tensioning means moving at a slower speed.

10. The method of treating textile webs which comprises feeding a web held under lateral tension moving at one speed to a web edge holding and lateral tensioning means moving at a different speed, and maintaining the edges of said webs substantially the same distance apart while moving the web holding means at the different speeds.

11. The method of contracting or shrinking textile fabrics which comprises building up a longitudinally slack condition in the fabric between two pairs of movable web edge holding lateral tensioning means having a speed differential therebetween, and wherein the speed of the first pair is the greater, and causing a setting of the fabric while in the slower moving tensioning means.

12. The method of creping textile fabrics which comprises building up a longitudinally slack condition in the fabric between two pairs of movable web edge-holding, lateral-tensioning means having a speed differential therebetween and wherein the speed of the first pair is the greater, feeding said fabric in said longitudinally slack condition to the second pair of movable web edge-holding, lateral-tensioning means and causing a setting of the fabric in said second tensioning means.

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