

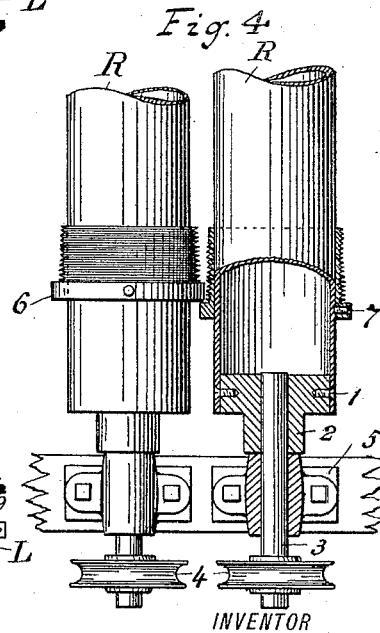
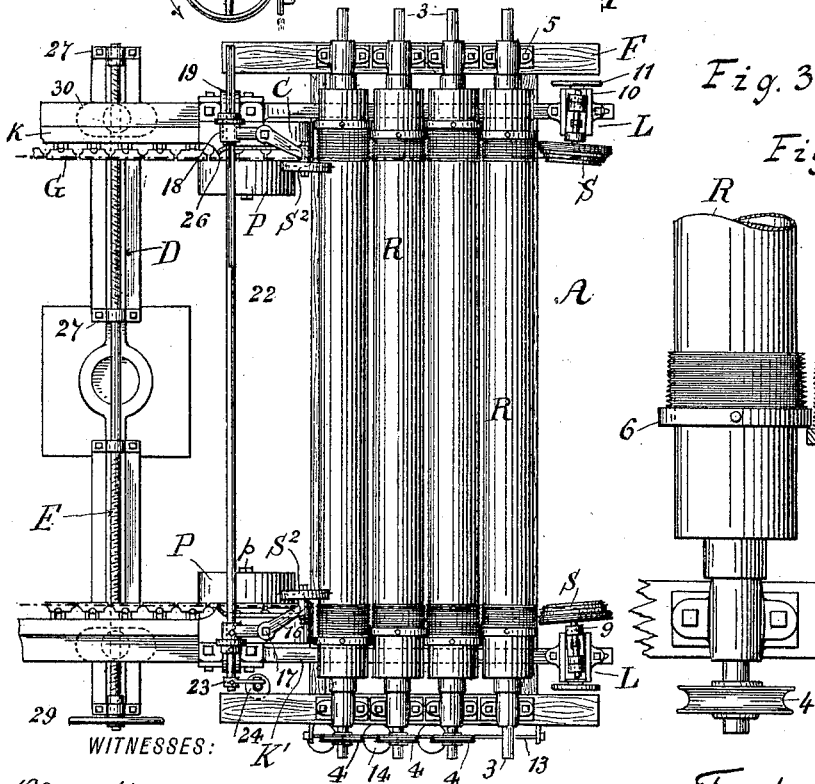
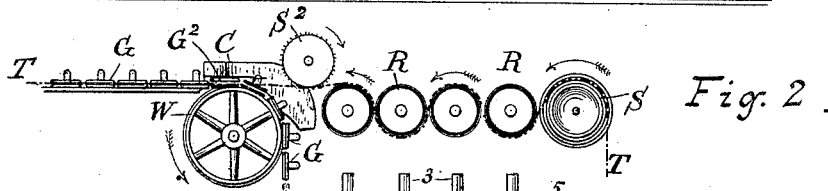
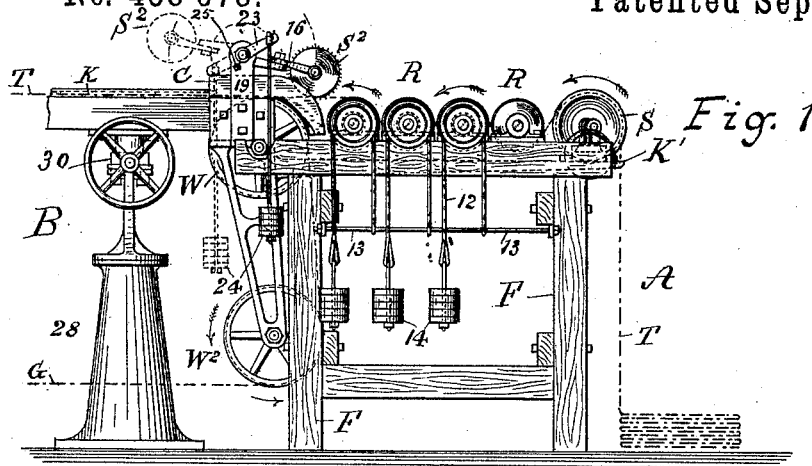
(No Model.)

2 Sheets—Sheet 1.

F. H. NARWOOD.  
TENTERING MACHINE.

No. 458 678.

Patented Sept. 1, 1891.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

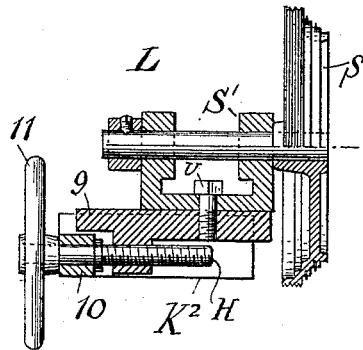


Fig. 6.

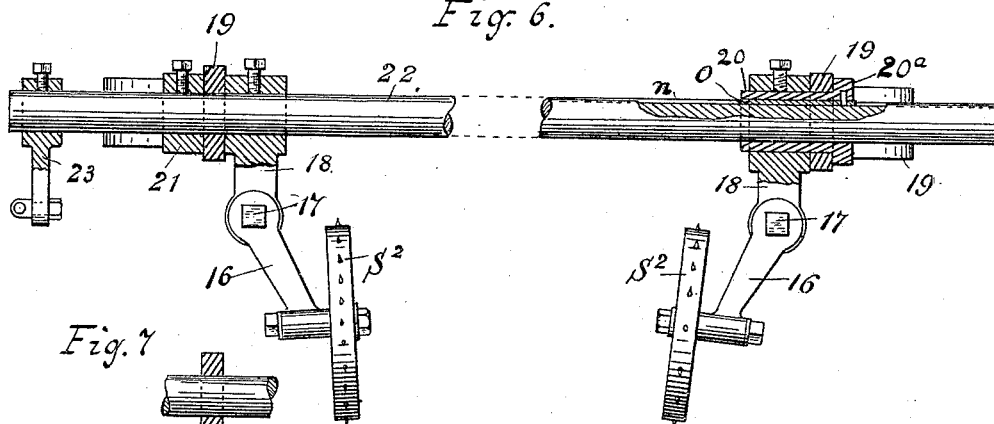
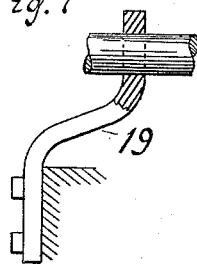


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## TENTERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 458,678, dated September 1, 1891.

Application filed May 16, 1891. Serial No. 393,046. (No model.)

*To all whom it may concern:*

Be it known that I, FREDRIC H. NARWOOD, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Tentering-Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention has relation, mainly, to tentering-machines of the class in which the selvages of the cloth to be treated are grasped and carried by clips or pins or similar devices borne by chains traveling in ways which are adjustable to and from each other, and which diverge slightly for the purpose of stretching the cloth transversely, and my improvements are particularly applicable to the feeding end of such machines. Heretofore the web of cloth has usually been fed by hand directly to the clips or hooks of the tentering-chains. The result has been that the transverse stretching has been left to be accomplished wholly by the tentering-chains and that no longitudinal stretching is given to the fabric throughout its width. The transverse stretching of the fabric causes a longitudinal shrinkage, often amounting to eight per cent., and the stretching of the fabric at the selvages alone, due to the placing of the selvages upon the hooks or clips of the chains, causes the warp-threads to assume at first a curvilinear position in the fabric, and finally to lie in wavy lines instead of straight lines at right angles to the length of the web, a defect which becomes very apparent in open fabrics. This difficulty is further enhanced by the fact that the fabric bags more or less as it is first engaged by the chains and for some distance thereafter. I have found that these difficulties may be overcome and better results be secured if the fabric, before it reaches the tentering-chains, is first stretched transversely, at least enough to take out the slack, and fed in that condition to stretching-rolls, by which it is stretched longitudinally to the required degree, and from the rolls is delivered directly to the tentering-chains as a smooth flat web under some degree of tension. The warp-threads will then lie in straight lines from the beginning to the end of the process. There

will be no loss in length and the general result will be greatly improved. My improvements are designed to accomplish these desirable results and generally to improve the operation of the machine and facilitate the handling of the fabric.

In the drawings, Figure 1 is a side elevation of a portion of a tentering-machine with my improvements applied. Fig. 2 is a diagrammatic view of a portion of the same, showing the path of the web. Fig. 3 is a plan view of the parts shown in Fig. 1, and Figs. 4, 5, 6, and 7 are detail views, partly in section.

The side frames K, the tentering-chains or selvage-carrying devices G, the cams C for acting upon the clips of the chain, the supporting-standard 28 for the slideways D, and the bearings 27, the adjusting-screw E, with its hand-wheel 29, and the traveling nuts 30, secured to the side frames, whereby the same may be adjusted toward or from each other, may be all as usual.

Upon a supporting frame-work F, adjacent to the ends of the side frames K, are journaled stretching-rolls R. These may be shells secured to heads 2, provided with journals 3, rotating in boxes 5 on said frame-work. The web T of the fabric to be tented is passed under and over these rolls alternately on its way to the tentering-chains, and is delivered by them to the chains as a perfectly flat web and under some degree of tension. In order to stretch the fabric longitudinally, each successive roll in the series is made to travel more slowly than the preceding roll. This may be effected by any of the usual retarding devices, as by gearing said rolls directly together with gears of successively increasing size; but as a convenient illustration of such devices I have shown each roll, except the first, as provided with a tension-pulley 4, about which is passed a strap or cord 12, attached to a convenient bar 13 and carrying a weight 14, the stretching of the web being regulated by adjusting the weights 14.

Whether gearing be employed between the rolls or whether a tension device be applied to each roll, I prefer not to employ means for driving the rolls positively, but to allow them to be rotated by the fabric as it is drawn for-

ward by the tentering devices. As the first roll rotates freely with a surface velocity equal or approximating to that of the fabric and as each successive roll is made to rotate more slowly, either by gearing or by increasing the weight on the tension-strap, a regularly-increasing tension is gradually put upon the fabric, and the stretch is thus distributed evenly over the entire length of fabric in the stretching device.

In order to take up the stretch of the selvages produced by the handling of the attendants in placing the web upon the feeding and stretching-wheels S and to insure the delivery of the web by the stretching-rolls to the tentering-chains or other selvage-carrying devices in a perfectly flat and smooth condition, I give to the stretching-rolls near their ends a slightly-increased diameter. Preferably these portions of increased diameter are formed by tapered sleeves 6, held in position by set-screws 7. They may thus be adjusted toward or from the middle of the roll, according to the width of the fabric treated. The sleeves may be scored circumferentially, as shown, to cause them to hold the selvages with more certainty.

The feeding and stretching wheels S, above referred to, are armed with pins or hooks, and are carried by extensions or arms K', secured to the side frames K, so that they are adjusted therewith according to the width of the web. The wheels are also adjustable upon said extensions, so that their exact position may be regulated as desired. As shown in Fig. 5, the stud of each wheel has bearings in a bracket S', clamped to the slide 9 by a bolt U, so as to permit of angular adjustment of the wheel. The slide 9 moves in transverse ways K<sup>2</sup>, secured upon the extension K', and is adjusted in position by a hand-wheel 11 and screw H, held to rotate in a fixed bearing 10 and engaging with a nut or threaded projection on the slide. The wheels, being first adjusted with the side frames according to the width of the web, are then given such angular disposition as to cause them, when engaged with the web, to stretch it sufficiently in its width to take up the slack entirely. From the last roll R the web is delivered to the tentering-chains, being guided into proper position by rotating guides P. Heretofore in the ordinary tentering-machines the web has been guided by fixed curved plates; but I have found that in treating certain classes of goods these plates soon become clogged with size and drag the selvages. I have overcome this difficulty entirely and relieved the fabric of all drag due to the fixed guides by employing rotating guides which are preferably mounted upon the same studs p with and secured to the wheels W, which carry the tentering-chains. Therefore the fabric-guides P rotate with the chain-wheels and, having the same surface speed as the fabric itself, cannot cause the fabric to drag.

When a web of fabric to be treated is made up of pieces sewed end to end, the web is narrower at the places where the pieces are united than elsewhere, and when such a narrow place reaches the selvage-carrying devices the web fails to be grasped by the clips not only in the line of such narrow place, but for some distance thereafter. So, likewise, if the attendant should fail to place the selvage properly upon the feed-wheel S the same result would take place. I have therefore placed in front of the point where the clips seize the selvages and somewhat within the lines of the selvages a pair of pin-wheels S<sup>2</sup>, one for each side, having the proper angular adjustment to guide the selvages into the reach of the clips. These pin-wheels are preferably so supported, substantially as described below, as to be movable into and out of operative position and at the same time to be moved laterally with the side frames in their adjustments for fabrics of different widths. Figs. 6 and 7 show the means which I have found convenient for this purpose. Each wheel S<sup>2</sup> is journaled upon the end of an arm 16, secured, with capacity for angular adjustment by a bolt 17 to an arm 18. Both of the arms 18 are so secured to a shaft 22 as to be rotated therewith, as hereinafter described. The said shaft is supported by brackets 19, secured to the side frames K. One arm 18 is secured directly to the shaft 22, as by a set-screw, against one face of the corresponding bracket 19, while a collar 21 is secured upon the shaft on the other side of said bracket. The wheel S<sup>2</sup> is thus carried with the corresponding side frame, while the shaft can be rotated freely in its bearing. The other end of the shaft is formed with a keyway n to receive freely a key or feather o, carried by a sleeve 20. The said sleeve is journaled to rotate in the corresponding bracket 19 and has a flange 20<sup>a</sup>, which bears against one face of said bracket, while the arm 18 is secured upon said sleeve, as by a set-screw, against the other face of said bracket. The shaft thus slides freely through the sleeve, but compels the sleeve to rotate with it. Thus both wheels S<sup>2</sup> may move with the side frames and at the same time be swung into or out of operative position by the rotation of the shaft 22. Any convenient means for rotating the shaft may be employed. I have shown an arm 23 secured to one end of the shaft and adapted to carry a weight 24, which serves to hold the wheels S<sup>2</sup> down upon the fabric. When the wheels are thrown back into the position shown in dotted lines in Fig. 1, the arm 23 rests against a stop 25 and the weight then acts to retain the parts in such position.

It is evident that the structural details of the mechanisms shown and described may be varied without departing from the spirit of my invention.

I claim—

1. The combination, with tentering-chains,

of a series of stretching-rolls and means to guide the fabric from said rolls to the tentering-chains, substantially as described.

2. The combination, with selvage-carrying devices, of stretching-rolls delivering the web to said devices in a flat and smooth condition and feeding-wheels for feeding the web to said rolls, substantially as described.

3. The combination, with selvage-carrying devices, of side frames carrying said devices and adjustable toward and from each other, rolls for delivering the fabric to said devices under tension, arms secured to said side frames, and feeding-wheels carried by said arms in front of said rolls, substantially as described.

4. The combination, with the selvage-carrying devices and the side frames, of rotatable wheel-like guides for the selvages supported to move with said side frames, substantially as described.

5. The combination, with tentering-chains and chain-wheels carrying the same, of wheel-like fabric-guides supported to rotate with said chain-wheels, substantially as described.

6. The combination, with selvage-carrying devices and rolls delivering the fabric to said devices, of pin-wheels within the lines of the selvages and between said devices and said rolls, substantially as described.

7. The combination, with selvage-carrying devices and rolls delivering the fabric thereto, of pin-wheels within the line of the selvages

and between said devices and said rolls and swinging arms supporting said wheels, substantially as described.

8. The combination, with selvage-carrying devices and side frames adjustable toward and from each other, of pin-wheels and supporting devices intermediate said side frames and said wheels, whereby the latter may move with the former in their adjustments, substantially as described.

9. The combination, with selvage-carrying devices and side frames, of brackets carried by said side frames, a shaft having bearings in said brackets, and arms bearing pin-wheels carried by said shaft to be rotated therewith, substantially as described.

10. The combination, with selvage-carrying devices and side frames adjustable toward and from each other, of brackets carried by said side frames, a shaft having bearings in said brackets, arms bearing pin-wheels carried by said shaft to rotate therewith, one of said arms having a sliding connection with said shaft, and devices holding said arms to said brackets to move therewith, substantially as described.

In witness whereof I have hereunto set my hand.

FREDRIC H. NARWOOD.

Witnesses:

W. B. GREELEY,  
E. A. GREELEY.