May 19, 1931. H. A. MacKNIGHT 1,806,208

TENTERING MACHINE

Filed July 23, 1930 4 Sheets-Sheet 1

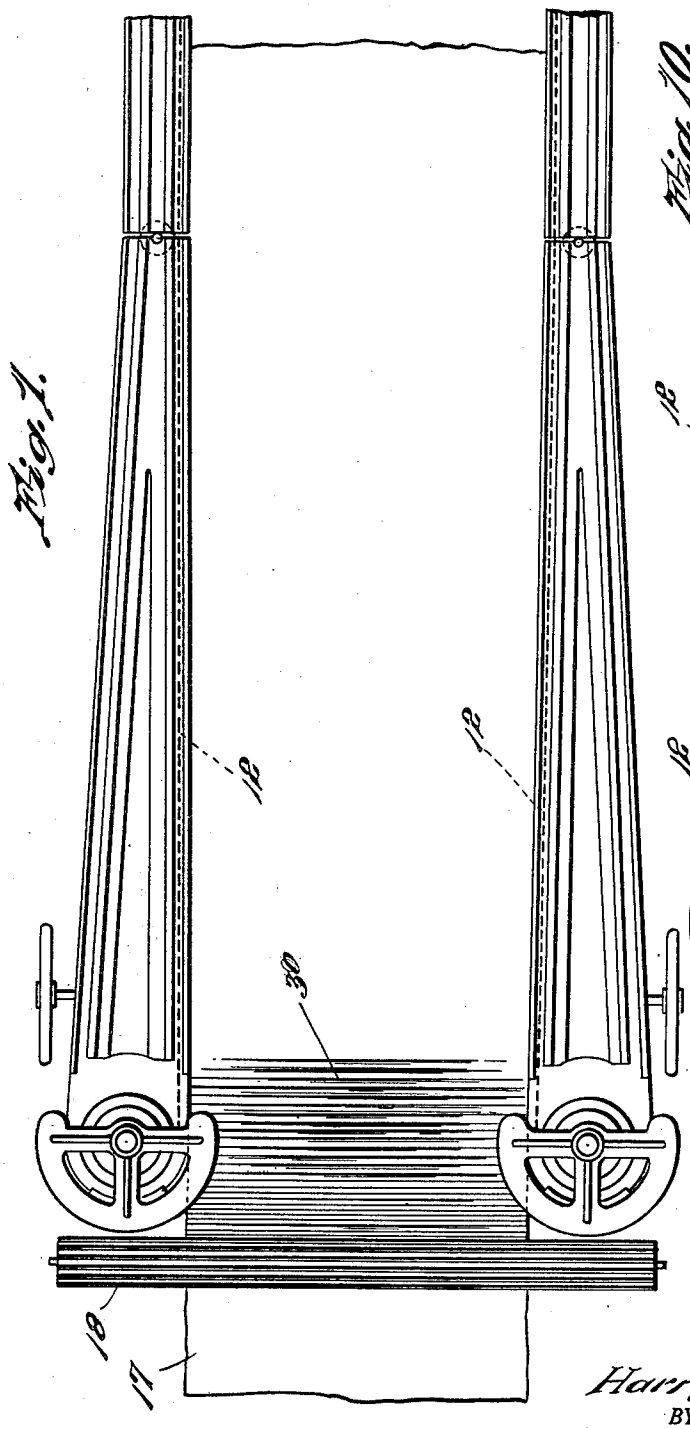


Fig. 1.

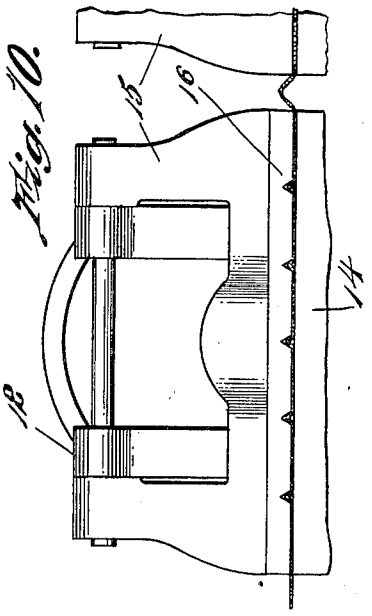


Fig. 10.

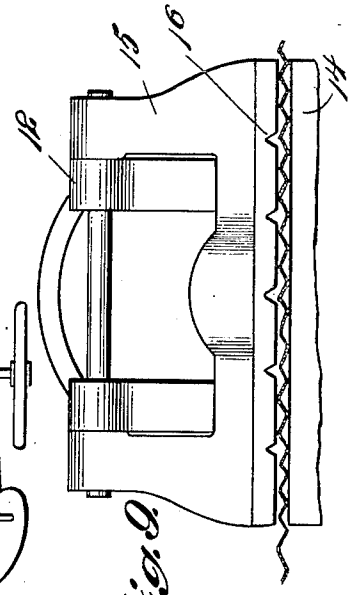


Fig. 9.

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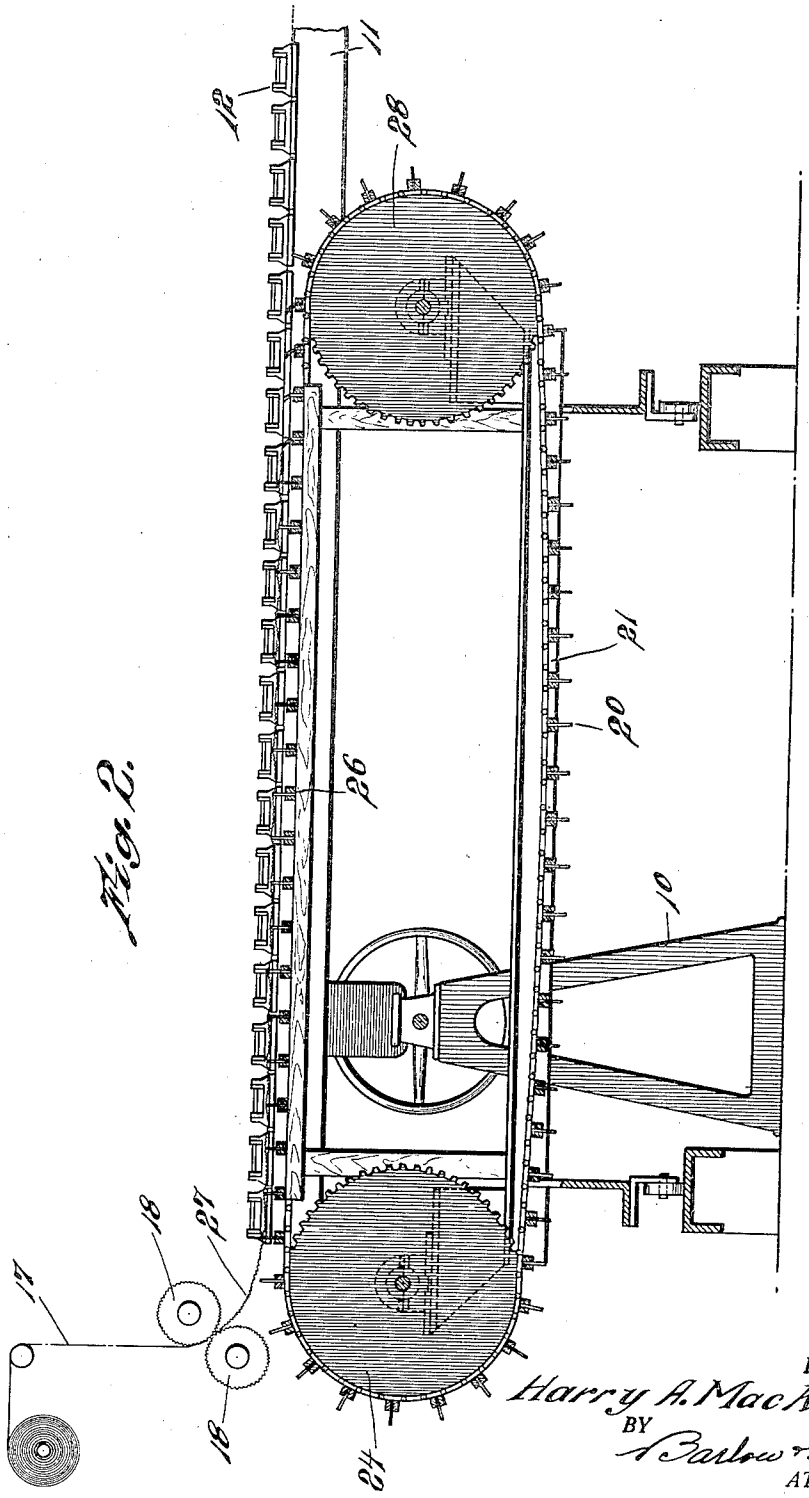


Fig. 2.

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TENTERING MACHINE

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Fig. 3.

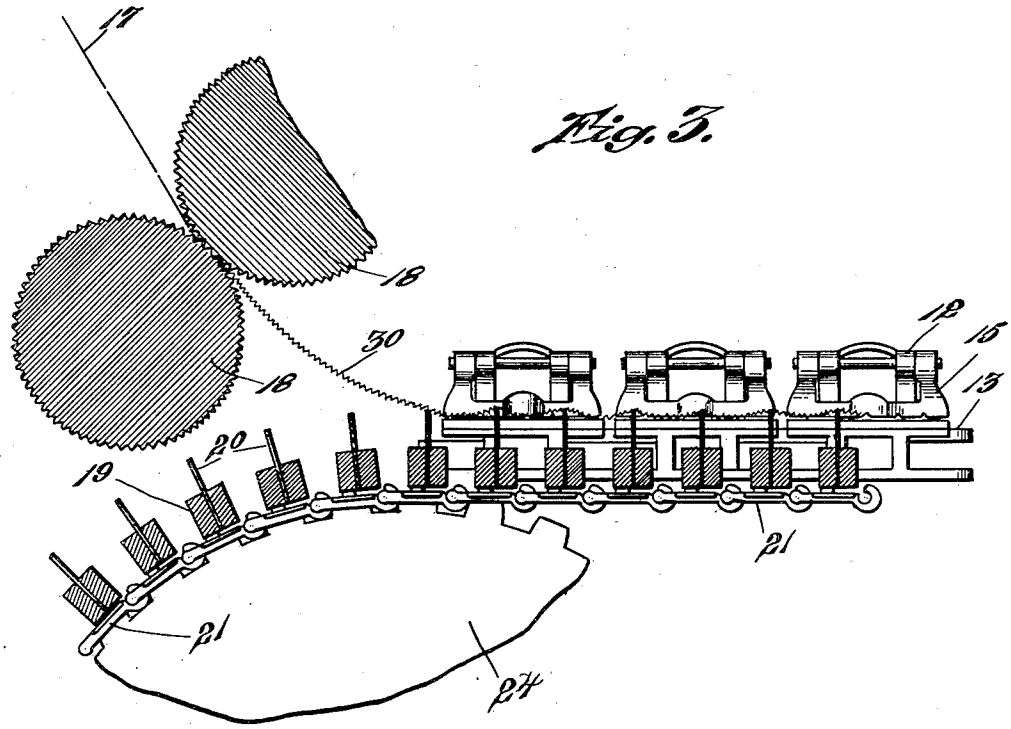
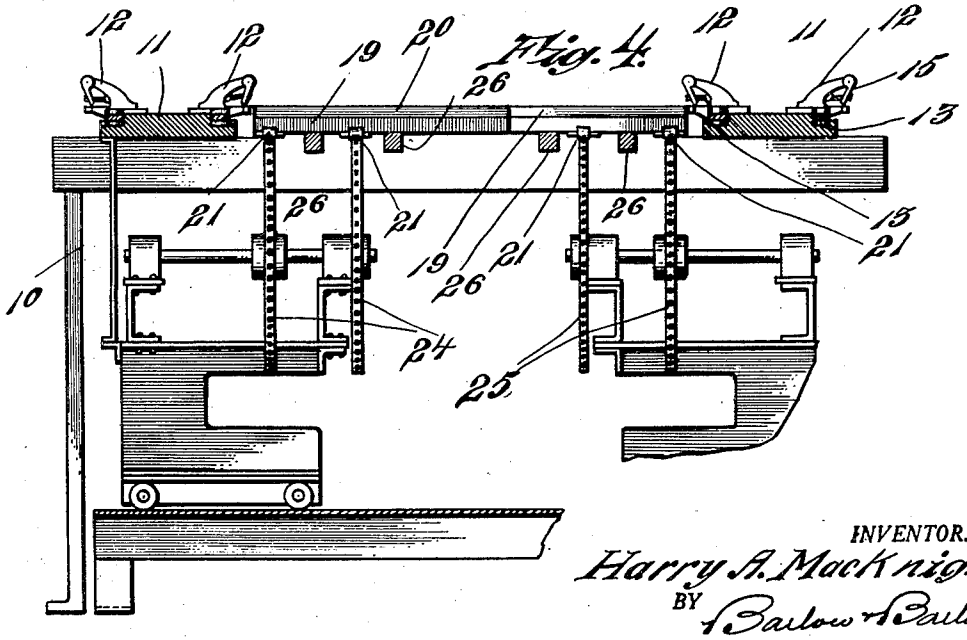


Fig. 4.



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Fig. 5.

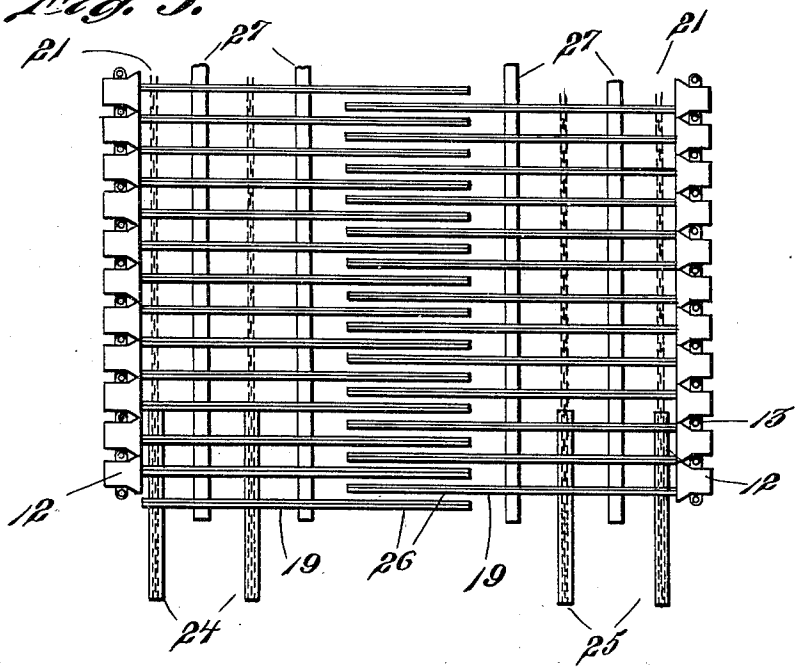
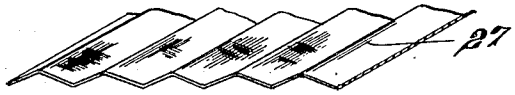


Fig. 11.



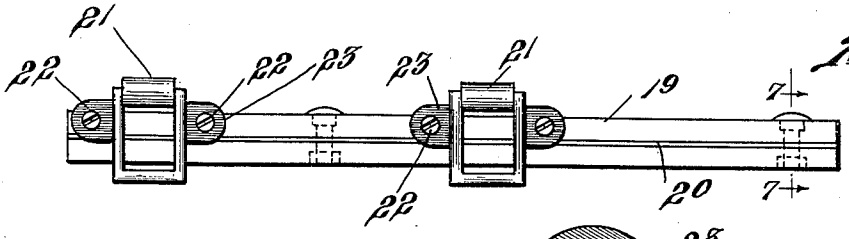
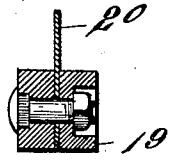


Fig. 6.

Fig. 7.



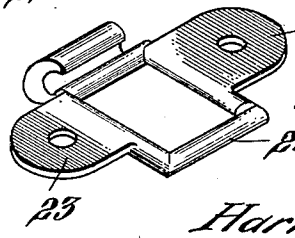


Fig. 8.

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Patented May 19, 1931

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UNITED STATES PATENT OFFICE

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TENTERING MACHINE

Application filed June 23, 1930. Serial No. 463,022.

This invention relates to an improved construction of tentering machine or the like; and has for its object to provide simple and effective means whereby a traveling textile web may be treated to shorten it in the direction of one of its dimensions prior to being engaged by the web edge-engaging devices of the machine.

A further object of the invention is to provide means for crimping the web to shorten it in the direction of its length during the operation of feeding it to the machine to be subsequently engaged by the traveling web edge-engaging devices to stretch the web in the direction of its width while being subjected to a shrinking treatment to take up the slack provided by the crimp.

The invention further consists in the provision of a pair of crimping rolls thru which the web is passed to crimp or ruck the web and so provide slack in the direction of its length when engaged by the clamping means.

The invention further consists in the provision of a carrier on which the crimped web may rest to be presented to the web clamps, or other edge-engaging means.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a plan view showing a portion of a tentering machine with the end sections of the chain rails pivoted to be separated laterally whereby the web may be stretched in the direction of its width while being shrunk lengthways.

Fig. 2 is a side elevation showing a portion of the web clamps which engage the edges of the crimped web and showing the carrier chain with its cross bars for engaging the crimped web and presenting its edges to the traveling edge clamps.

Fig. 3 is an enlarged view showing a short section of the edge clamp chain and a short section of the chain carrying cross bars which support and advance the crimped web as fed in thru the crimping rolls.

Fig. 4 is an end view of the machine, showing the two sets of chains and sprockets for each set of web-carrying arms.

Fig. 5 is a top view showing a short section of the machine with the two sets of carrier chains attached to each set of inter-engaging carrier arms.

Fig. 6 is a top view showing one of the carrier arms attached to the links of its pair of spaced chains.

Fig. 7 shows a cross section on line 7—7 of Fig. 6, illustrating the two side bars which form the carrier arm between which bars the flexible supporting blade is mounted.

Fig. 8 is a perspective view showing the special form of sprocket chain link having ears to which the carrier arms are secured.

Fig. 9 shows a clamp with its jaw open and the crimped fabric therein.

Fig. 10 shows the clamp with its jaw closed upon the fabric showing a portion of the crimp as flattened out by the grip of the jaw and the surplus as having been crowded into the notches spaced along the length of the clamp blade.

Fig. 11 is a perspective view of a short length of crimped fabric before being engaged by the clamps.

It is found desirable in some instances, in the treatment of traveling webs of certain kinds of textile fabrics, of advantage to shrink the fabric in one direction, usually in the direction of its length while being stretched in the other direction; and in order to operate in this way upon such fabrics, I preferably pass the web thru a so-called tentering machine having web edge-engaging devices such as pins or clamps, and in order to permit the web to shrink in the direction of its length while held by these engaging devices, it is of course necessary to feed the web thereto in such a manner as to permit such shrinkage.

My improved way of accomplishing this result is to crimp the web prior to its being engaged by the web-engaging devices, the crimps in the web providing the necessary

slack to permit the web to shrink the desired amount in the desired direction when subjected to a suitable shrinking treatment. My preferred method is to cause crimps or wavy effects to be pressed into the web as fed, which crimps are caused to remain in the web to some extent until engaged by the clamps, when the form or arrangement of these crimps may be changed in some instances to conform to the shape of the clamp or engaging device employed.

By my improved method, I preferably employ clamps for engaging the edges of the web, and in one of the jaws, preferably the swinging jaw of the clamp, I preferably provide a plurality of notches so that when the clamp grips the crimped edge of the web, a portion of the web will be straightened out by the force of the bite and the surplus will be forced into these notches along the clamp jaw and this surplus is then taken up by the shrinking of the fabric. A transverse stretching or tentering action is also preferably being applied upon the fabric during the shrinking operation while the web is passing thru the machine; and the following is a detailed description of the present embodiment of my invention and showing one arrangment of mechanism by which these advantageous results may be obtained:

With reference to the drawings, 10 designates the frame of a tentering machine and 11 the chain rails thereof, the end sections of these rails being adapted to be swung toward and from each other in the usual way so as to control the sideways stretch of the fabric at the entering end of the machine.

I have herein shown the web edge-engaging devices as being clamps 12 mounted on or forming a part of the tentering chain 13, the clamp comprising a lower fixed jaw 14 and an upper swinging jaw 15, the biting edge of the swinging jaw being notched as at 16, at intervals along its length for the purpose of receiving the surplus stock of the crimped edge of the web when the edge of the web is gripped between these jaws.

The web 17 may be fed to these jaws by any suitable means but I have herein shown a pair of corrugated or fluted rolls 18 between which the web is gripped and fed, and a temporary crimping or plaiting effect is formed therein which is stretched out to some extent while being advanced to the clamps, one of the rolls being preferably formed of relatively soft rubber, while the other is preferably of a harder nature.

In order to support and carry this crimped web forward and present it into position to be gripped by these clamps, I have provided two sets of carrier bars 19, each bar of each set being provided with a flexible web engaging blade 20 and these bars of each set are secured to two spaced chains 21 by means of screws 22 thru the ears 23. One set of these chains which carries one set of the arms is driven by the two sprocket wheels 24 while the other set of chains is driven by the other pair of sprockets 25. These carrier bars are arranged in sets, as best illustrated in Fig. 5, so that the end portions 26 of the opposite sets will intermesh or overlap each other while sliding along their support bars 27, and the flexible edge portions 20 of these bars as they are swung upward by the sprocket 21 will come up underneath the crimped portion 30 of the web to support and carry the same forward and present its opposite edges to be gripped by the clamps 12 in the oppositely spaced chains, after which these carrier chains 21, as best illustrated in Fig. 2, pass around the sprocket wheel 28 to be returned to the sprocket wheels 24 to be again presented beneath the web to repeat their carrying action.

The peripheral speed of the fluted feed rolls 18 may be varied by any suitable well known means (not shown) to crimp the web and feed the crimped portion to the chain clamps 12 at exactly the desired speed relative to the traveling speed of the tender chain, that is, the speed of feed of the crimped web should be such as to furnish sufficient slack to permit of the desired amount of lengthwise shrinkage of the web. Then again the depth of the flutes in these nip rolls 18 may also be varied. This plait or crimp which is set in the web across its face is only temporary and while being advanced from the rolls 18 to the clamp, the corrugations or crimps will naturally pull apart to some extent so that these crimps will not be so deep in the surface of the cloth at the time the web is engaged by the clamps, but will be of a depth to provide sufficient slack in the web to permit of the proper or required amount of shrinkage of the web, after having been engaged by the edge clamps.

My improved means and method of crimping the web prior to its engagement by the edge-engaging devices in the tentering machine, is very simple and practical and by this means I obtain the exact amount of slack in the fabric, which is required to permit proper shrinkage of the goods during their travel thru the machine.

I claim:

1. In a machine for treating textile webs, traveling edge clamps, a web supply, means intermediate said supply and said clamps for treating said web to shorten it by folding it in the direction of its length prior to engagement with said edge clamps, and means for presenting the edges of said shortened web to said clamps.

2. In a tentering machine, a series of spaced web edge-engaging devices, means for treating a web as fed to the machine to shorten it by folding it longitudinally, and

means for feeding the shortened web to said edge-engaging devices.

3. In a tentering machine, a series of spaced web edge-engaging devices, means for mechanically acting upon a web as fed to shorten it by folding it longitudinally, and means for feeding the shortened web to said edge-engaging devices.

4. In a tentering machine, a series of spaced web edge-engaging devices, means for crimping a web as fed to shorten it longitudinally by folding it, and means for feeding the crimped web to said edge-engaging devices.

5. In a tentering machine, a series of traveling spaced web edge-engaging devices, means for treating a web to shorten it longitudinally, and means traveling in the direction of travel of said edge-engaging devices for feeding the shortened web to said edge-engaging devices.

6. In a tentering machine, a series of traveling spaced web edge-engaging devices, means for rucking a web to shorten it longitudinally, and a carrier movable in the direction of travel of the web engaging devices for feeding the treated web to said edge-engaging devices.

7. In a tentering machine, a series of spaced web edge-engaging devices, web feeding means, means in said feeding means for treating a web to shorten it longitudinally, and flexible carriers for feeding the treated web to said edge-engaging devices.

8. In a tentering machine, a series of spaced web edge-engaging devices, web feeding means, means in said feeding means for treating a web to shorten it longitudinally, and flexible web-engaging arms transversely disposed between said edge-engaging devices for presenting the treated web thereto.

9. In a tentering machine, a series of spaced web edge-engaging devices, means for treating a web as fed to shorten it longitudinally, and sets of intermeshing flexible web carrier arms transversely disposed between said edge-engaging devices for presenting the treated web to said devices.

10. In a tentering machine, a series of spaced web edge-engaging devices, means for treating a web as fed to the machine to shorten it longitudinally, sets of intermeshing flexible carrier arms transversely disposed between said edge engaging devices, and a plurality of actuating chains for each set of arms.

11. In a tentering machine, a series of spaced web edge-engaging devices, a web supply, corrugated rolls for crimping a web as fed from the supply, and means for feeding the crimped web to said edge-engaging devices.

12. In a tentering machine, a series of spaced web edge-engaging devices, web supply intermeshing corrugated rolls for crimping a web therebetween, one of said rolls being resilient, and means for feeding the crimped web to said edge-engaging devices.

13. In a tentering machine, a series of spaced web edge-engaging devices, a web supply, intermeshing corrugated rolls for crimping the web therebetween as fed from said supply, one of said rolls being of soft rubber, and a traveling carrier for feeding the crimped web to said edge-engaging devices.

14. In a tentering machine, a series of spaced web edge-engaging devices, a web supply, means for rucking the web to shorten it longitudinally as fed from said supply, and means for carrying the rucked web to said edge-engaging devices, each edge engaging device having a plurality of spaced web-receiving recesses into which the rucked web is forced.

15. In a tentering machine, a series of web edge engaging clamps, crimping rolls thru which the web is passed as fed, and web carrier arms having flexible web-engaging edges and carried by an endless chain positioned between the clamp-carrying endless chains.

16. The method of treating a traveling textile web, which consists in initially crimping the web to reduce it by shortening it in one dimension, and then subjecting the shortened web to a shrinking treatment to take up the slack formed by the crimp while stretching the web in its other dimension.

17. The method of treating a traveling textile web, which consists in initially rucking the web to reduce it by shortening it in one dimension, and then subjecting the rucked web to a shrinking treatment to take up the slack formed by the rucking treatment and simultaneously acting upon the web to stretch it in its other dimension.

18. The method of treating a traveling textile web, which consists in initially crimping the web to shorten it in the direction of its length and than subjecting the crimped web to a shrinking treatment to take up the slack formed by the crimp while stretching the web widthwise while being shrunk lengthwise.

19. The method of tentering a traveling textile fabric, which consists in initially treating the web to shorten it longitudinally by folding it, and then engaging opposite edges of the shortened web by engaging devices, and separating the opposite engaging devices to stretch the web in the direction of its width.

20. In the art of preparing textile fabrics, the steps of crimping a web of textile fabric and feeding the web while in crimped condition to tentering mechanism.

21. In the art of preparing textile fabrics,

the steps of crimping a web of textile fabric, feeding the web while in crimped condition to tentering mechanism, and stretching the web laterally while shrinking it longitudinally.

22. The method of tentering a web of textile fabric, comprising the steps of passing the fabric thru crimping rolls to ruck the web, and feeding the rucked web to traveling edge-engaging devices at substantially the same rate as the rate of travel of said edge-engaging devices.

23. The method of tentering a web of textile fabric, comprising the steps of crimping the web to shorten it longitudinally, and conveying the crimped web on a moving fabric conveyor to be engaged by traveling edge-engaging devices, the speed of conveying the web being substantially the speed of travel of the edge-engaging devices.

In testimony whereof I affix my signature.

HARRY A. MacKNIGHT.