

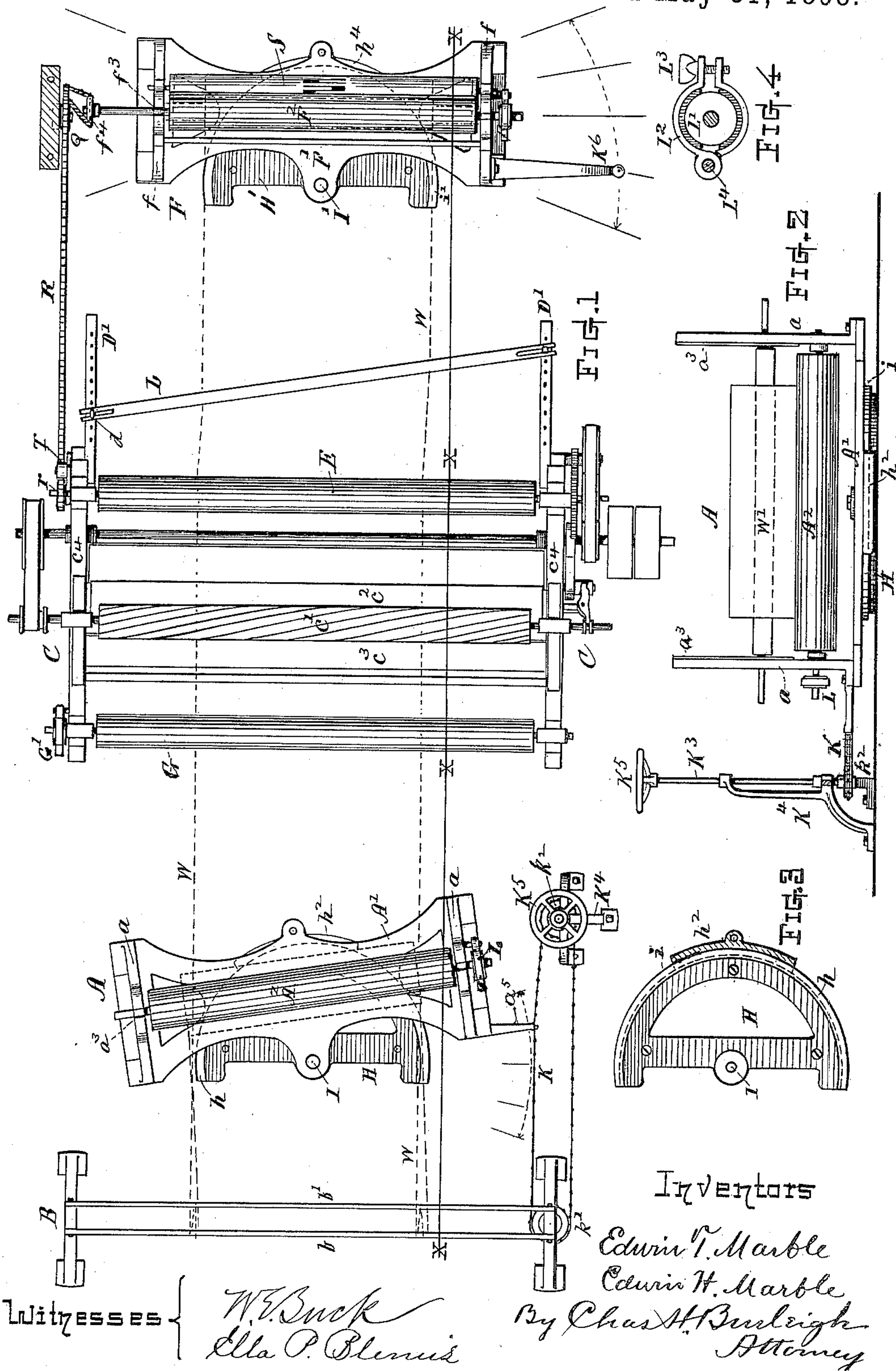
(No Model.)

2 Sheets—Sheet 1.

E. T. & E. H. MARBLE.  
LAPPET SHEARING MECHANISM.

No. 604,772.

Patented May 31, 1898.







# UNITED STATES PATENT OFFICE.

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## LAPPET-SHEARING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 604,772, dated May 31, 1898.

Application filed August 26, 1897. Serial No. 649,571. (No model.)

*To all whom it may concern:*

Be it known that we, EDWIN T. MARBLE and EDWIN H. MARBLE, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Lappet-Shearing Mechanism, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

Our present invention relates to a novel combination, with cloth-shearing appliances, of mechanism organized for automatically imparting to the lappet or similar cloth a draft or feed action that will bring the weft or filling threads into skewed or oblique positions, right or left, relatively to the warp-threads and which will feed or deliver the web of fabric while maintaining such skewed relation and in evenly-spread condition through the shearing or clipping machinery, thereby causing the connecting-loops or "bridge-threads" between the lappet figures, or such of them as lie in one direction of inclination, to be thrown up in a manner that will facilitate their successful removal from the surface of the fabric by a continuous passage of the same over the shear-rest.

The prime object of our invention is to provide facilities, in connection with ordinary cloth-shearing machinery, for conveniently handling lappet-cloth or similar fabrics in such manner that the shearing or clipping of the bridge-threads from the fabric can be readily and efficiently performed by passing the web of fabric through the direct shearing process by repeated longitudinal runs, the fabric being fed through the shear first with a greater or less degree of skew or transverse obliquity in its weft, which slackens and loops out the bridge-threads lying in one direction, so that they project from the body of the fabric and are presented to the shearing cutters, and then in a second run of the fabric skewing its weft in an opposite direction of obliquity, which slackens and loops out the remaining bridge-threads and exposes them to the action of the shear, as more fully hereinafter explained.

Another object is to provide means for mechanically imparting a suitable skew to the fabric and maintaining the same uniformly skewed during its passage through a shear; also, to afford means for regulation and adjustment of the mechanism to give greater or less amount of skew to the lappet-cloth.

Another object is to provide facilities for taking out the oblique set or eliminating the skew from the fabric and rolling up the web of fabric straight, or otherwise, when desired, simply rolling the fabric in skewed condition for a second passage through the machine.

We attain these objects by the mechanism illustrated in the drawings, wherein—

Figure 1 is a plan view. Fig. 2 is a transverse elevation of the feed-carrier. Fig. 3 is a plan view of the carrier-base segment. Fig. 4 is a side view of the tension device employed for various rolls. Fig. 5 is a longitudinal vertical section at line X X on Fig. 1, with the carriers adjusted at a right angle to the line of draft; and Fig. 6 is a detail of the drive-chain take-up for the receiving-carrier.

As illustrated, our machine comprises the following-described combined parts in general: the feed or delivering carrier A, a stand of horizontal tension-bars B, the shearing machinery C, a deflecting means D, and the receiving-carrier F, which general parts we will now severally describe more in detail.

The shearing mechanism C employed in carrying out our invention may be of the well-known class of cloth-shearing mechanism comprising the rotary blade-cylinder or "revolver"  $c^1$ , a stationary ledger-blade  $c^2$ , and an angular rest  $c^3$ , over which the fabric passes in its presentation to the shearing-blades at the point or line where the revolver coacts with the ledger-blade in usual manner. Mounted upon the shear-frame  $c^4$  there is a pair of power-driven draft-rolls E, that serve to advance the fabric through the machine, and a pair of pinch-rolls G, having an adjustable tension-brake G' on the shaft of one roll, that serve to give the required tension or drag, and a spreader-bar  $g$  for laying the fabric smooth in its passage over the shear-rest  $c^3$ , also guide rolls or bars J and J' for directing the course of the cloth. The tension-brake G' for the pinch-rolls G is preferably of simi-



lar structure and operation to that illustrated in Fig. 4 and hereinafter described.

The belting and gearing for operating the shear-revolver, the draft-rolls, and other portions of the shearing-machine may be of well-known construction and operation and need not be herein particularly described.

In accordance with our invention we provide in front of the shearing machinery a pivotally-arranged carrier A, adapted for carrying or supporting the web of lappet-cloth and delivering the same at any required degree of right or left oblique inclination relatively to the general direction of feed through the shear. Said carrier consists of a frame A', having upright housings  $a$ , in which is journaled a supporting drum or roll A<sup>2</sup>, with jaws  $a^3$  above its journals for the reception of the shaft of the cloth-winding roller or beam W', which can be lifted into and from the carrier-jaws  $a^3$  at will, the roll of cloth resting upon the top of the support-drum A<sup>2</sup> and unrolling thereon as the drum turns.

The carrier-frame is best seated upon a horizontal bed-segment H, fixed to the floor or fundamental support, and which segment is provided with a circular guide or track  $h$ , upon which the carrier has oscillative horizontal adjustment, said carrier-frame being pivoted to the bed-plate at I by a vertical stud. The carrier-pivot is disposed at the central line of the machine, but is in the present instance and preferably located considerably out of line with the transverse axis of the carrier-frame, so that the swing of the carrier on its pivot I gives more or less lateral bodily movement in connection with the oblique adjustment. The segmental edge of the bed-plate has an overhanging flange  $i$ , and the carrier-frame base has an under-lipped slide  $h^2$  engaging therewith; also, if desired, means for firmly clamping said lip and flange together for locking the carrier at positions of oblique adjustment. Such clamp devices may not in all cases be required and can in some instances be omitted, as the weight of the carrier-frame will generally retain its position.

The shaft of the carrier-drum A<sup>2</sup> is provided with an adjustable tension-brake L, preferably of the kind shown in Fig. 4, consisting of a disk L', fixed on the shaft and surrounded by a non-rotatable clasp-band L<sup>2</sup>, faced with leather and connected to a rigid stud L<sup>4</sup>, the brake being controlled in its degree of frictional pressure by a thumb-screw L<sup>3</sup> in well-known form and manner.

K indicates a sprocket-chain secured to an arm  $a^5$ , attached to the carrier-frame A' and passing around a guide-sprocket  $k'$  and around a sprocket  $k^2$ , fixed to the foot of an upright shaft K<sup>3</sup>, mounted in a standing frame K<sup>4</sup> and furnished with a hand-wheel K<sup>5</sup>, this combination affording convenient means for controlling or varying the swinging adjustment of the carrier mechanism, as may

be required for any particular condition of fabric to be operated upon.

As regards the swinging carriers we do not confine our invention to this particular hand-wheel and chain as a means for shifting the carrier-frame, since said carrier may be otherwise shifted by hand or by any suitable means, as a lever or handle K<sup>6</sup>, shown in connection with the receiving-carrier.

The stand B of the horizontal tension-bars is located at right angle to the general line of draft or parallel with the axis of the shear-revolver  $c'$ . The lower bar  $b$  is at a level substantially corresponding to that at which the cloth is delivered from the carrier-drum and its top bars  $b'$  at position facing the breast-rolls G of the shear.

At the back of the shear there is a high guide-roll P, mounted in bearings on suitable standards P', while near the bottom of the shear-frame we provide rearwardly-projecting brackets or arms D', upon which is secured, by bolts  $d$ , the deflecting spreader-bar D, which can be adjusted to various positions and in either right or left oblique relation.

In rear of the shearing apparatus we provide the pivotally-arranged receiving-carrier F, which is adapted for right or left inclined adjustment. Its general construction may be somewhat similar to the feed-carrier and comprising the segment bed-plate H' and swinging frame F', pivoted thereto at I' and having the under-lock flange  $i'$  and lipped bearing-piece  $h^4$ , also provided with end housings  $f$ , having the supporting-drum F<sup>2</sup> mounted therein and furnished with suitable means for its rotation by power for winding the cloth upon the winding roller or beam W<sup>2</sup>, carried upon said drum and retained by the jaws  $f^3$ . A stretcher-roll S is in the present instance shown combined with the winding support-drum F<sup>2</sup>, also a guide-bar  $s'$  at its front. Said guide-bar and stretcher-roll may, however, in some instances be omitted.

For imparting motion to the winding-drum F<sup>2</sup> we employ a band or drive-chain R, leading from a pulley or sprocket-wheel  $r$  on the draft-roll shaft E to a pulley or sprocket-wheel  $f^4$  on the drum-shaft, said band or chain passing upward and around suitable overhead guide-wheels Q, and thence down to the receiving-carrier in nearly vertical direction, so as to admit of the carrier F being swung to right or left inclination without material derangement in the run of the chain R. A take-up device T, (see Fig. 6,) consisting of an idler-pulley  $t$ , carried on a swinging lever  $t'$ , fulcrumed on the frame C<sup>4</sup> at  $t^3$  and having its opposite arm connected with a spring  $t^2$ , is combined with the chain R for accommodating any increase or diminution of tension thereon due to the radial shifting of the carrier-frame F'.

In some instances instead of passing the cloth through the stand of tension-bars it may be fed direct from the drum A<sup>2</sup> to the shearing-machine, to the front guide-roll J<sup>2</sup>,



and thence to the pinch-rolls G or spreader-bar *g*, but we deem it preferable to employ the tension-bars as specified; nor is it in all cases necessary that the rolls G be used as a pair of pinch-rolls, since a single roll, similar to the lower one, may in some instances be employed, the top roll being omitted and the cloth directed thereto in a manner to have additional lap or contact for obtaining the desired degree of friction.

In the weaving of lappet-patterns the individual figures are usually offset from each other, so that the bridge-threads—*i. e.*, the floating portion of threads that reach idly from one figure to another—extend diagonally to the right, or vice versa, from the first figure to the next and then diagonally to the left from that figure to the succeeding one, thus alternating in their direction over the surface of the cloth, so that by skewing the fabric one set of bridge-threads are slackened and the other set drawn taut, the particular set slackened depending on the direction in which the fabric is skewed. Hence by successively skewing the fabric first in one direction and then in the opposite direction all of the bridge-threads can be brought into subjective relation for shearing.

In the operation of our invention the position and course of the web of cloth as it passes through the machine are indicated by the dotted lines W. The lappet-cloth is primarily wound upon the roll or bar W', which is placed upon the feed-carrier A, the cloth passed under the carrier-drum A<sup>2</sup> and bar *b* and over the bars *b'*, thence to the pinch-rolls G, over the spreader-bar *g* and shearing-rest *c*<sup>3</sup>, and then under the guide-rolls J and J' to the draft-rolls E, by which it is advanced in continuous run. The carrier A is given such degree of angularity or horizontal obliquity that the lappet-cloth in passing from the roll or drum to the shear (principally before the bars *b'*) will be pulled or drawn so as to bring its weft into skewed position or more or less oblique to their normal condition by reason of one edge of the cloth feeding at an advance of the other edge, such oblique or skew being uniformly maintained throughout the web by the action of the delivery and feed mechanisms. This skewing of the cloth slackens the bridge-threads that lie in one direction across the spaces between the lappet figures, raising the loops thereof so that they will be clipped off in passing the shear-blades. The cloth, when delivered from the draft-rolls E, is carried over the high guide P, and thence down under the deflecting-bar D and backward to the receiving-carrier F, where it passes over the guide-bar S', around the stretcher-roll S and the drum F<sup>2</sup>, and is rolled up or wound onto the beam-roll W<sup>2</sup> for subsequent treatment or as finished product.

As a result of the adjustable bar D and the swinging adjustment of the receiving-carrier F we are enabled to handle and wind the cloth (which comes through the draft-rolls

E with the same degree of skew or obliquity imparted thereto by the skew-feed appliances) either with the skew maintained therein or with an oppositely-inclined skew, or, again, with the skew taken out or eliminated and the cloth rolled with its weft transversely straight, according to the particular positions of adjustment of the parts. By means of this angular adjustment the cloth in its passage from the high-guide roll to the receiving-carrier is deflected from the direct line of travel, and the distance being made longer along the line of one selvage than the distance along the other the previous advanced edge by its longer travel is offset or retarded, so that the transverse line of the weft-threads in the cloth is again straightened or brought into normal original condition.

The receiving-carrier F is shown in the drawings as at straight position, but may be swung on its pivot to either right or left adjustment, as indicated by radial lines on Fig. 1, so as to receive the cloth from the bar or guide under such direction and strain as will cause it to wind onto the beam-roll without "crawling" endwise thereof. When the cloth is wound thereon, the beam-roll can be lifted from the receiving-carrier and transferred to the feed-carrier A for a second run through the shear, and the inclination of the carrier can then be reversed for imparting an opposite skew to the weft of the fabric, thereby causing the bridge-threads lying in different direction from those previously sheared to slacken and loop out, so as to be taken off by the cutters.

The amount of oblique trend or skew required in the fabrics varies under different conditions, as style, weight of goods, and forms and sizes of patterns. This is accommodated by varied angular adjustment of the carriers. Furthermore, the right and left obliquity are not necessarily the same in degree, since the loss of the first set of bridge-threads renders the fabric weaker in its strain over the shear-rest. Consequently the oblique adjustment of the feed-carrier must be greater or to some extent modified to accommodate the peculiarities of the fabric under its changed condition or of its particular class of weave if the bridge-threads are originally of a varied character, as with some styles of figures.

It will be understood that we do not claim as of our invention the primal idea, broadly, of skewing a lappet-cloth to facilitate the shearing of the same, since such method has heretofore been attempted by a hand-pulling of the fabric in connection with means of different nature from that herein represented; but our invention relates to the organized mechanism as herein defined.

What we claim as of our invention, and desire to secure by Letters Patent, is—

1. The combination, with a cloth-shearing mechanism, and the guides and parallel rolls at front and rear thereof, that maintain the spread and control the feed of the fabric in a direct or laterally unwavering course of ad-



vancement while passing the shearing-cutters; of the feed-carrier frame having the rotatable delivery-drum and beam-roll mounted in bearings thereon and adapted for the support and delivery of the fabric; said feed-carrier frame arranged adjustable to right and left oblique positions for working said drum in skewed relation to the guides and rolls that control the shear-feed, and means substantially as described for transposing the obliquely-delivered web of fabric, skewed and spread, into straight alinement with its line of advancement at the shear.

2. The combination, with a cloth-shearing mechanism, its draft or feed rolls, and the pinch-rolls that hold the fabric taut preceding the shearing-cutters; of the obliquely-adjustable feed-carrier frame and the feed-carrier drum, disposed in front of said pinch-rolls, said carrier-frame pivoted to its supporting-base at a point central in the length and forward of the vertical plane passing through the feed-carrier axis; said carrier-frame adjustable about said pivot for swinging the feed-carrier drum to right or left angularity for delivering the fabric in a direction oblique to the line of the shear-feed; and a guide intermediate to said carrier and pinch-rolls, adapted for regulating the skew tension of the fabric, and presenting the skewed fabric in spread condition and directed straight in the line of the shear-feed.

3. In combination, as hereinbefore described, with a cloth-shearing machine, a feed-carrier comprising the segment bed-plate having the flanged edge, the swinging carrier-frame resting upon and pivoted to said bed-plate, and provided with end housings having bearings for the carrier-drum, the jaw-openings for the reception of the winding-beam shaft, the carrier-drum mounted in said bearings, the friction-brake on said drum-shaft, and means for effecting and securing the swing adjustment of said carrier-frame.

4. In a machine for skewing and shearing lappet-cloth, the combination with the shearing mechanism and stationary guide-stand, of the laterally-swinging feed-carrier frame having the frictionally-controlled supporting-drum and removable cloth-winding beam mounted thereon, the arm  $a^5$  fixed on said carrier-frame, the sprocket-chain K attached to arm  $a^5$  of said carrier-frame, the upright shaft-stand  $K^4$ , the shaft  $K^3$ , the hand-wheel  $K^5$  and sprocket-wheel  $K^2$  fixed on said shaft, said sprocket-wheel engaging said chain, and the guiding-wheel  $K'$ , as shown and described.

5. The combination, with the shearing mechanism comprising the shearing-revolver and ledger-blade, cloth-rest, draft-rolls and pinch-rolls; of the front tension-stand having a series of transverse bars that even and direct the fabric straight to said pinch-rolls; and the obliquely-adjustable feed-carrier frame having thereon the supporting-drum

and beam for delivering the cloth therefrom, and means for varying the angular position of said carrier in relation to the stand.

6. In mechanism for shearing and rewinding lappet-cloth, the combination as described, of the shearing mechanism, its draft-rolls, the high-guide roll, the receiving-carrier, a power-operated drum turning in bearings on said carrier, a beam for winding or rolling the cloth thereon, a guide bar or roll parallel and adjacent to said drum, and a transverse, obliquely-adjustable deflecting guide-bar arranged between said high-guide roll and the receiving-carrier, substantially as set forth.

7. The combination with the cloth-shearing mechanism, and means comprising pinch-rolls and draft-rolls for directly advancing the cloth therethrough; of an obliquely-adjustable feed-carrier and front guide adapted for automatically rendering the cloth in skewed condition; a rear guide, and an obliquely-adjustable receiving-carrier having the supporting-drum and winding-beam mounted thereon, and adapted for controlling the skew in the rewinding of the cloth, and means for rotating said drum, all substantially as set forth.

8. In a machine for shearing lappet-cloth, the combination of the cloth-shearing mechanism, its draft-rolls, and means for feeding said shear; of the receiving-carrier adapted for use in right or left oblique relation to said shear, and carrying thereon means for winding up the cloth; a deflecting-guide situated for action on the fabric between said draft-rolls and said receiving-carrier; said deflecting-guide and receiving-carrier being respectively adjustable to varied inclination in relation to the draft-roll axis and to each other, and means for operating the winding-up devices, substantially as and for the purpose set forth.

9. In a cloth-shearing machine of the character described, the rearwardly-projecting brackets or arms  $D'$  and the spreader-bar  $D$  adjustably secured upon said arms and adapted for right or left oblique adjustment, substantially as and for the purpose set forth.

10. The combination, with the shearing mechanism, its cloth-guides and draft-rolls; of the receiving-carrier comprising the laterally-swinging pivoted carrier-frame, the supporting-drum mounted in bearings thereon, the stretcher-roller adjacent to said drum, the drive-chain connecting from a sprocket on the draft-roll shaft, to a sprocket on the drum-shaft, and the overhead guides for said chain, for the purpose set forth.

Witness our hands this 23d day of August, 1897.

EDWIN T. MARBLE.  
EDWIN H. MARBLE.

Witnesses:

CHAS. H. BURLEIGH,  
CHARLES S. BACON.