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TUFT-CUTTING MECHANISM FOR AXMINSTER CARPET LOOMS

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2 SHEETS—SHEET 1

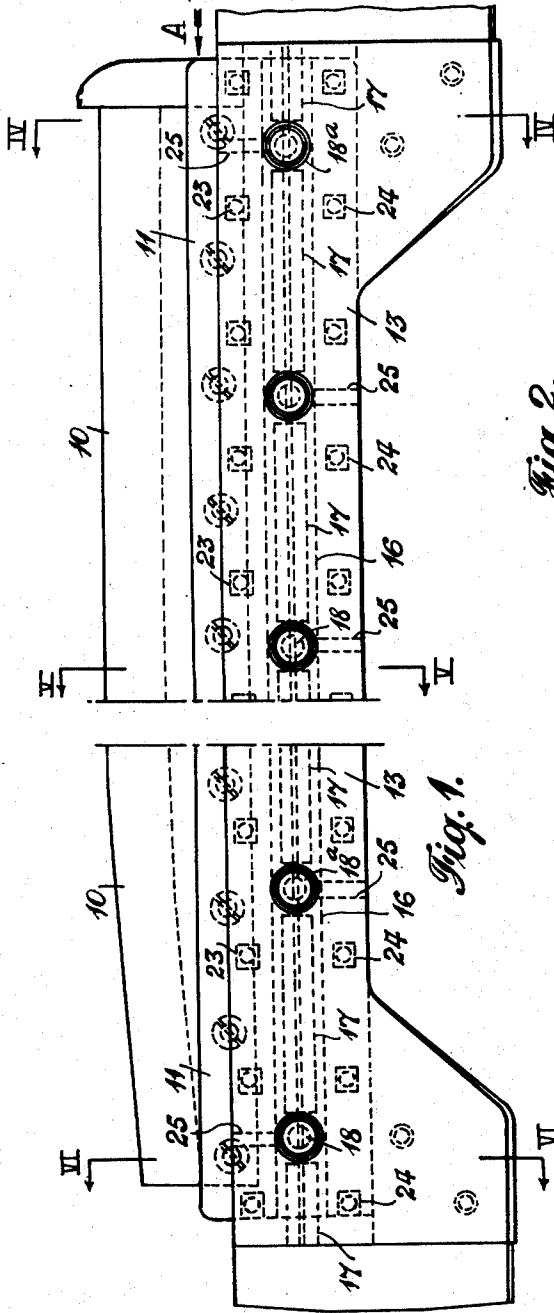
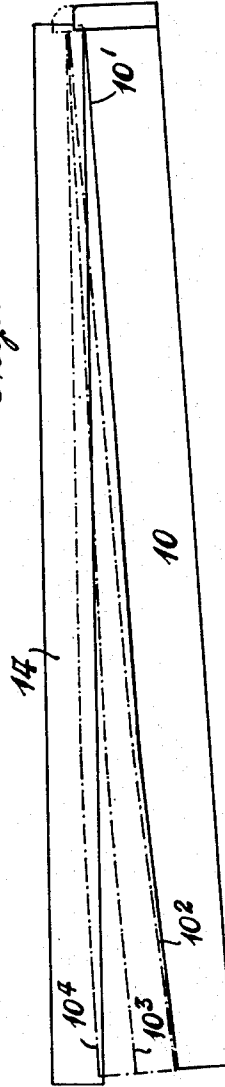


Fig. 1.

Fig. 2.



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## UNITED STATES PATENT OFFICE

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TUFT-CUTTING MECHANISM FOR  
AXMINSTER CARPET LOOMS

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1 Claim. (Cl. 139—7)

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This invention relates to improvements in pile tuft-cutting mechanism for Axminster carpet looms.

In the operation of an Axminster carpet loom as ordinarily constructed, the tuft-cutting operation is performed by front and back cutter knives which cut the pile tufts woven into the fabric from the tube frames which supply the tuft-forming yarn. The cutter knives are usually mounted on heavy cross-bars which extend across the width of the loom and the knives should have cutting engagement with one another throughout their entire length.

It is a desirable feature that the cutting edges of the knives shall be maintained in correct cutting relation along the whole length of the knives to ensure a clean cut of the pile tufts across the full width of the fabric being woven.

Due to the conditions of movement of the front knife in the cutting stroke in which said knife moves forwards and downwards in an inclined plane the cutting edge of the front knife does not engage the cutting edge of the back knife uniformly at all points along said edge with the result that some of the tufts are not properly cut. To correct this undesirable condition it is necessary to adjust the cutting edge of the front knife by raising, or lowering, certain parts of the knife to restore them to correct cutting relation with the back knife.

The present invention provides tuft-cutting mechanism for an Axminster carpet loom having co-operating front and back knives, in which the movable front knife may be accurately set in order to ensure a uniform pressure of its cutting edge against the back knife with which it co-operates and which is static during the actual cutting operation, and in which the front knife is provided with a multiplicity of independently adjustable pressure points spaced along its full length, whereby in the initial setting of the front knife a twist may be imparted to the blade of said front knife from end to end by pressure applied at certain points along the blade in order that its cutting edge may be adjusted to ensure correct cutting engagement with the back knife during the full cutting stroke, or whereby the cutting edge of said front knife may be subsequently adjusted at any particular point in which a defect has developed in use, said front knife comprising a cutter blade narrower at one end than at the other, and being secured in a knife stock, a cross bar carrying said knife stock and set at a slight angle to said cutter blade, slides, in which the said cross bar is mounted,

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means for reciprocating said cross bar in said slides, the contiguous faces of the knife stock and the cross bar being formed with opposed V-grooves, rollers in short lengths interposed in spaced relation between the cross bar and the knife stock and located in said V-grooves, adjustable holding screws each formed with a head and being mounted in spaced relation in said cross bar with freedom for slight pivotal movement relatively to said cross bar and each in screw-threaded engagement with the knife stock, there being a holding screw between each pair of rollers, washers each formed with a curved under-surface and respectively interposed between the head of the respective holding screw and the adjacent surface of the cross bar, whereby the pivotal movement of the holding screws permits a slight rocking movement of the knife stock on the aforesaid rollers, screws screwed into threaded holes in the cross bar and each engaging the respective holding screw to prevent accidental displacement of said holding screws after setting, and pairs of adjustable set-screws screwing into the lower face of the cross bar on opposite sides of the rollers with their heads abutting against the upper surface of the knife stock.

Description will now be given of pile tuft-cutting mechanism for Axminster carpet looms constructed according to the present invention, reference being made to the accompanying drawings in which Fig. 1 is a plan view of an adjustable front knife, as viewed from the front of the loom, the view being broken to shorten the figure; Fig. 2 is a plan of the front and back knives, drawn to a smaller scale; Fig. 3 is an end elevation, partly sectional, of the front knife and carrier bar, drawn to a larger scale and viewed in the direction of the arrow A, Fig. 1; Figs. 4, 5 and 6 are cross-sectional views taken through the lines IV, V and VI respectively of Fig. 1, drawn to a larger scale. The same reference characters are used to indicate corresponding parts in the several figures of the drawings.

Referring to the drawings, the front cutter knife 10 is secured to a knife stock 11 which is mounted for limited local rocking or twisting movement on a cross-bar 13 set at a slight angle, e. g., 6° to the blade 10, and mounted in slides, not shown, the cross-bar 13 being adapted for reciprocating movement in the working of the loom, whereby in the advance movement of the cross-bar 13, the front cutter knife 10 is advanced in a forward and downwardly inclined path to co-operate with the back cutter knife 14

to sever the tufts woven into the fabric from the tube frames which supply the tuft-forming yarn.

The contiguous faces of the front knife stock 11 and of the cross-bar 13 are each formed with a relatively shallow V-groove 15, 16 respectively, the opposed grooves serving to accommodate short rollers 17 interposed in spaced relation between the knife stock 11 and the cross-bar 13, the rollers 17 serving as fulcrums for the knife stock 11.

The knife stock 11 is held in position on the cross-bar 13 by holding screws 18, passing through clearance holes 19 spaced along the length of the cross-bar 13 and disposed perpendicularly to the axial centre line of the rollers, the screws 18 engaging internally threaded holes 20 in the knife stock 11, there being a holding screw 18 between the adjacent rollers 17 of each pair. Each holding screw 18 is formed with a head 18<sup>a</sup> which is accommodated in a recess 21 in the upper face of the cross-bar 13.

A washer 22 having a curved undersurface is interposed between the head 18<sup>a</sup> of the holding screw 18 and a correspondingly curved seating 21<sup>a</sup> formed in the floor of the recess 21.

There is sufficient clearance between the holding screws 18 and the holes 19 in the cross-bar 13 to permit of a slight rocking movement of the knife stock 11 on the rollers 17.

The cross-bar 11 is furnished with two rows of set-screws 23, 24 arranged on opposite sides of the rollers 17 and spaced between the aforesaid holding screws 18, the heads of the set-screws 23, 24, abutting against the upper surface of the knife stock 11.

In order to prevent accidental displacement of the holding screws 18 after setting, there are provided screws 25 screwed into threaded holes in the carrier bar and each engaging the respective holding screw 18.

When the front knife is first placed in position in the loom with the blade level, the cutting edge of the right-hand end of the blade in relation to the back knife is as shown in Fig. 4.

If the front knife blade be moved in a cutting stroke before being adjusted the cutting edge of the front knife blade would gradually lose contact with the cutting edge of the back knife; Fig. 5 showing the relative positions of the front and back knives at approximately midposition of the cutting stroke, and Fig. 6 showing the relative positions at the completion of the cutting stroke.

In Fig. 2 the starting position of the cutting knife 10 is shown at 10', the first and second middle positions by the dotted lines 10<sup>2</sup> and 10<sup>3</sup>, respectively, and the final cutting position by the dot-and-dash lines at 10<sup>4</sup>.

To overcome the difficulty experienced as described with reference to Figs. 5 and 6, when setting the knife blade 10 the front knife blade is twisted at points along its length in such manner that it is maintained in correct cutting relation with the back knife during the whole of the cutting stroke.

To adjust the front knife 10 into position to make correct cutting engagement with the back knife 14, the screws 25 of the holding screw, or screws, 18 adjacent to the part of the knife 10 to be adjusted are slackened to free the said holding screw, or screws, 18. If it is desired to raise the cutting edge of the knife to bring it into correct cutting relation with the back knife 14, the respective set screws 23 on the side of the

cross-bar 13 adjacent to the front knife 10 are screwed further into the cross-bar 13 and the registering set screw, or set screws, 24 on the opposite side is or are screwed outwardly of the carrier 13. By this means the head, or heads, of the set-screw, or set-screws, 24 remote from the knife 10 bearing against the surface of the knife stock 11 cause the knife stock 11 to have a slight local twisting or rocking movement on the respective roller, or rollers, 17 until the movement is arrested by the head, or heads, of the set-screw, or set-screws, 23 adjacent to the knife 10, when the cutting edge of the front knife 10 has been brought into correct cutting relation with the back knife 14.

The required movement of the holding screw 18 in the respective socket 21 in the cross-bar 13 is permitted by the rocking of the washers 22 on their respective seatings. The holding screw 18 or screws is or are then again secured in adjusted position.

Alternatively, if the cutting edge of the front knife 10 is to be lowered, the adjusting movements of the set-screws 23, 24 are reversed from that previously described.

It will be understood from the foregoing description that the front knife 10 may be readily adjusted into position to make correct cutting engagement with the back knife 14 at any part or parts of its length by manipulation of the screws 23 or 24 adjacent to the part to be adjusted without necessity for removal of the front knife 10 from the loom, whereby the cutting edge of the front knife 10 may be maintained in correct cutting position with the back knife 14 as shown in Fig. 4.

In making a cutting stroke the front knife 10 is moved forwardly and downwardly in an inclined plane in the direction of the arrow B, Fig. 3, until the right-hand end of the knife 10 cuts through the first tuft when the forward movement of this end of the blade ceases while the blade continues to move in a radial direction from the right-hand towards the left-hand, as seen in Fig. 2, in a guillotine action in order to cut the tufts successively across the full width of the carpet, in known manner, this action forming no claimable feature of the present invention.

While the setting operation is usually effected at the initial assembly of the loom it sometimes happens that the cutting edge of the front knife 10 may change its contour after continuous use to such an extent that it does not engage the cutting edge of the back knife 14 at all points across the width of the loom, with the result that some of the tufts are not properly severed.

To correct this undesirable condition it is necessary to adjust the cutting edge of the front knife 10 by raising or lowering the defective parts of the knife in the manner previously described in order to restore them to correct cutting relation with the back knife. Or the knife blade 10 may be removed, reground and replaced in the carrier 13 and re-set in correct position.

What is claimed is:

Tuft-cutting mechanism for an Axminster carpet loom having a movable front knife comprising a cutter blade narrower at one end than at the other co-operating with a back knife, in which the movable front knife may be accurately set in order to ensure a uniform pressure of its cutting edge against the back knife with which it co-operates, the back knife being static during the actual cutting operation, and in which

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the front knife is provided with a multiplicity of independently adjustable pressure points spaced along its full length, whereby in the initial setting of the front knife a twist may be imparted to the blade of said front knife from end to end by the application of pressure at certain points along its blade in order that its cutting edge may be adjusted to ensure correct cutting engagement with the back knife during the full cutting stroke, and whereby the cutting edge of said front knife may be subsequently adjusted at any particular point at which a defect may have developed in use, a knife stock in which the cutter blade of the front knife is secured, a cross bar carrying said knife stock and set at a slight angle to said cutter blade, slides in which said knife stock is mounted, means for reciprocating said cross bar in said slides, the contiguous faces of the knife stock and the cross bar being formed with opposed V-grooves, rollers in short lengths interposed in spaced relation between the cross bar and the knife stock, and located in said V-grooves, adjustable holding screws each formed with a head and being mounted in spaced relation in said cross bar with freedom for slight pivotal movement relatively to said cross bar and each in screw-threaded engage-

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ment with the knife stock, there being a holding screw between each pair of rollers, washers each formed with a curved undersurface and respectively interposed between the head of the respective holding screw and the adjacent surface of the cross bar, whereby the pivotal movement of the holding screws permits a slight rocking movement of the knife stock on the aforesaid rollers, screws screwed into threaded holes in the cross bar and each engaging the respective holding screw to prevent accidental displacement of said holding screws after setting, and pairs of adjustable set-screws screwed into the lower face of the cross bar on opposite sides of the rollers with their heads abutting against the upper surface of the knife stock.

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