United States Patent

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[54] CARPET-CUTTING APPARATUS AND METHOD

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[52] **U.S. Cl.** **83/18**, 83/20, 83/175, 83/455, 83/578, 83/614

[51] **Int. Cl.** **B26d 7/14**, B26d 7/02

[58] **Field of Search** 83/18, 20, 21, 175, 455, 578, 83/614

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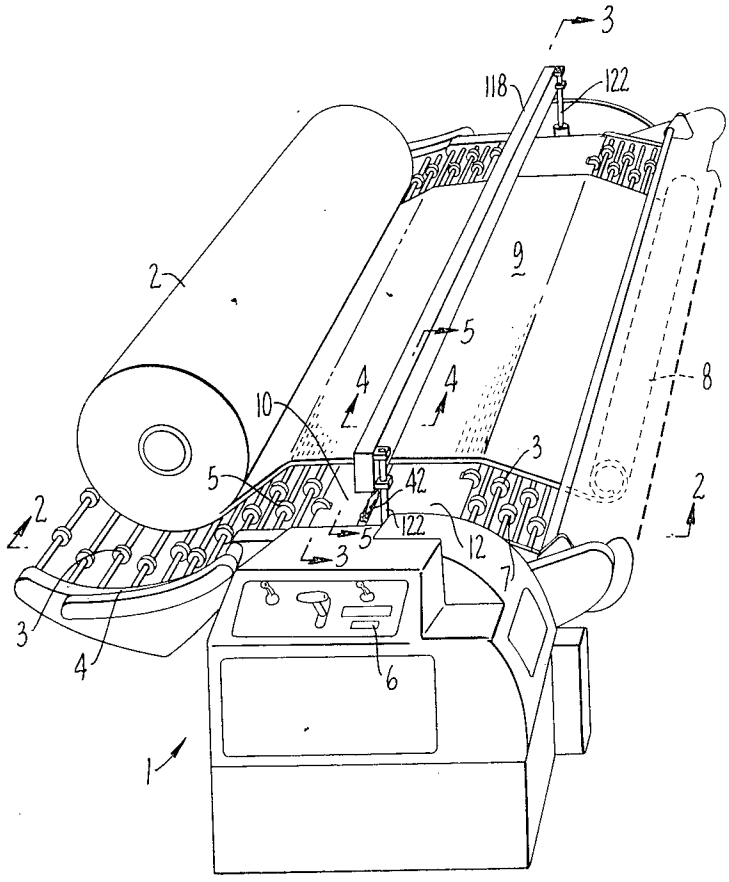
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[57] **ABSTRACT**

A sloping edged-cutting blade is mounted in a horizontally moving carriage so as to effect a transverse cut on carpet and related materials from below. A pair of overheat mounted parallel combs hold the material on both sides of the cutting channel. The leading edge of the blade carrier is raised so as to push up on the material before the blade reaches the material.

2 Claims, 7 Drawing Figures



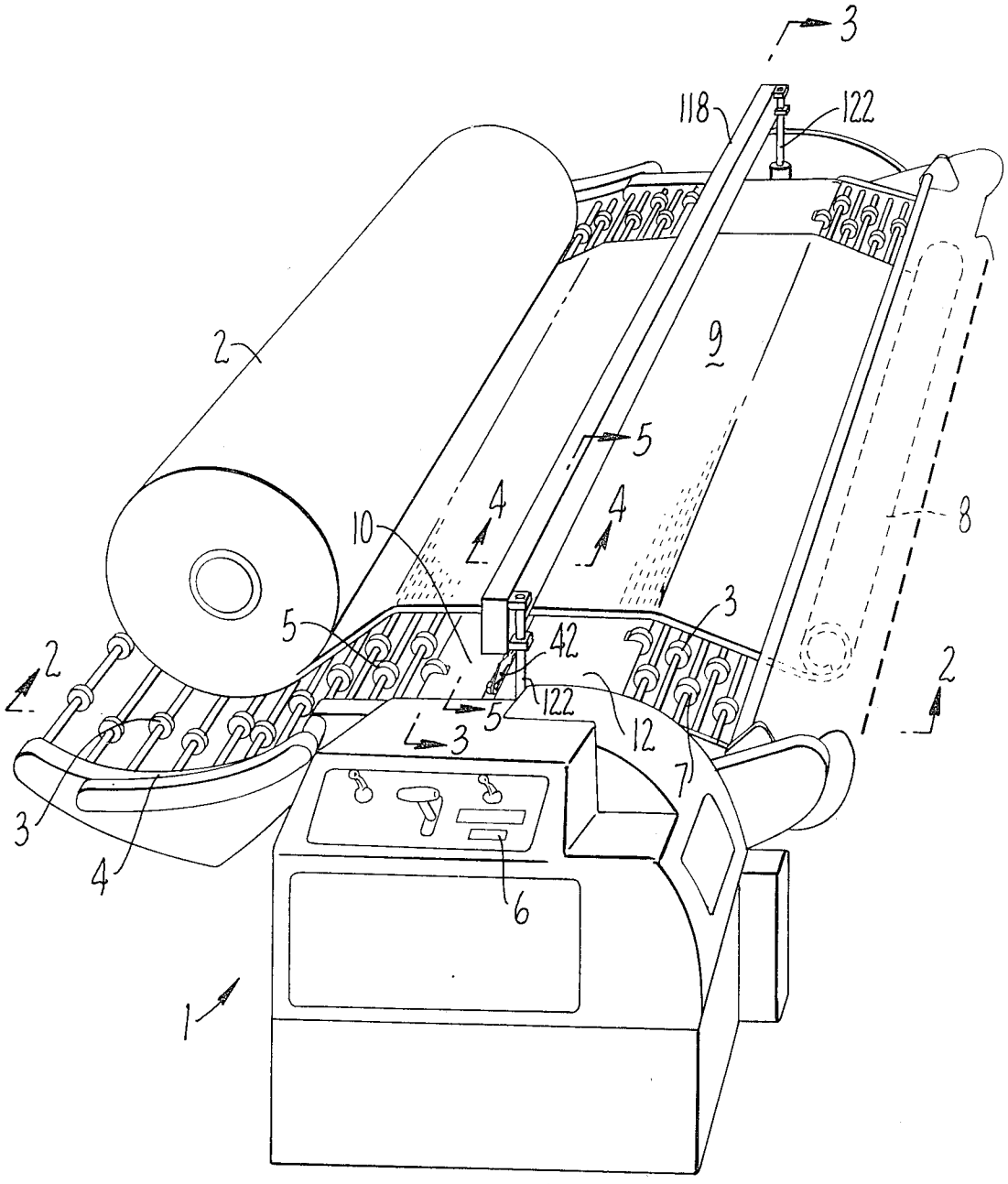


FIG. 1.

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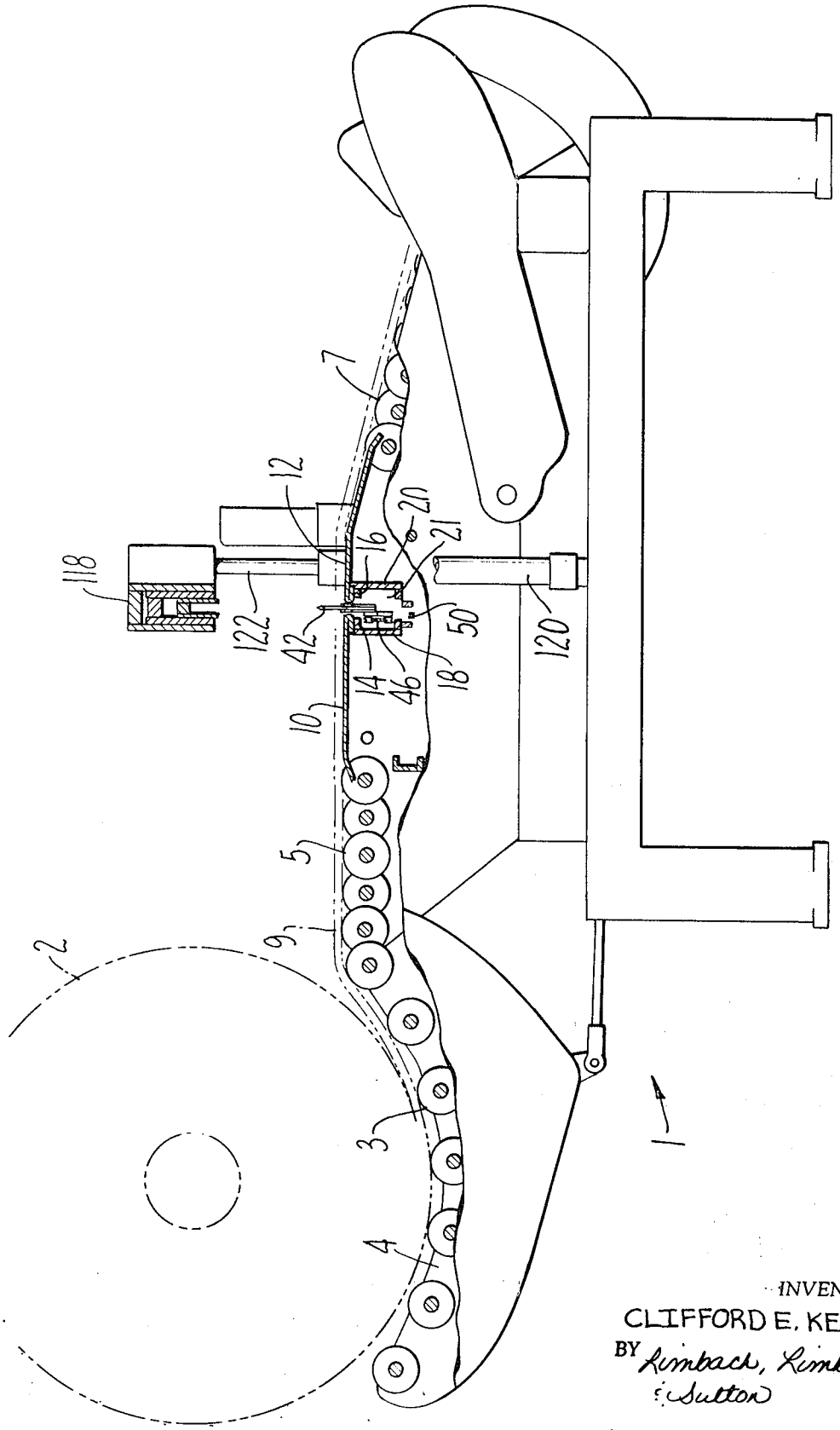


FIG. 2.

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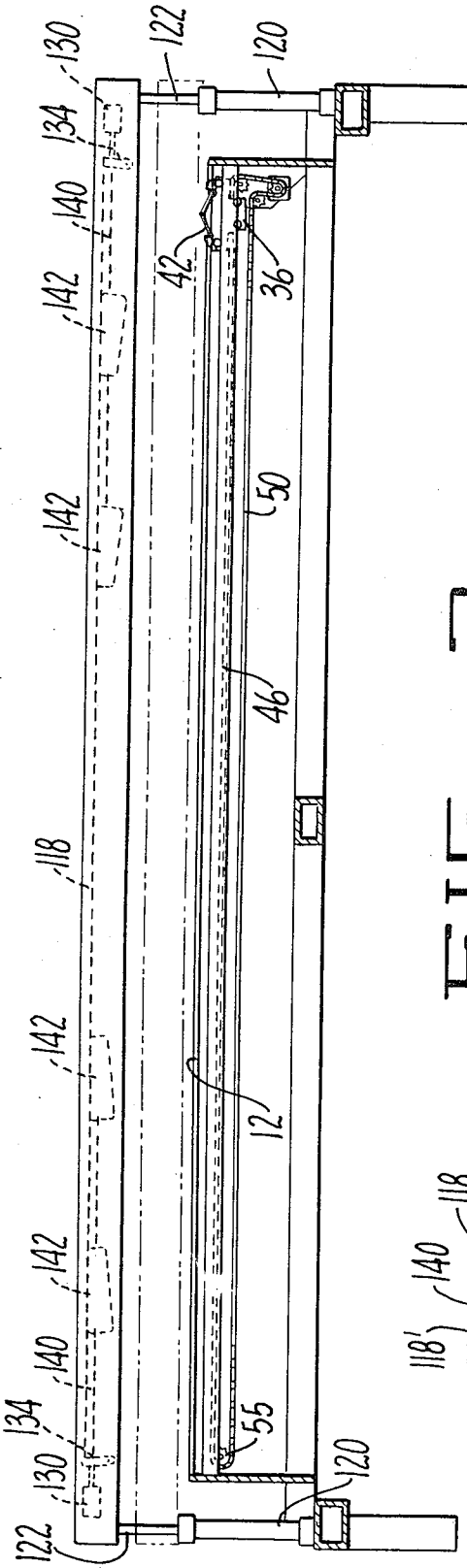


FIG. 3.

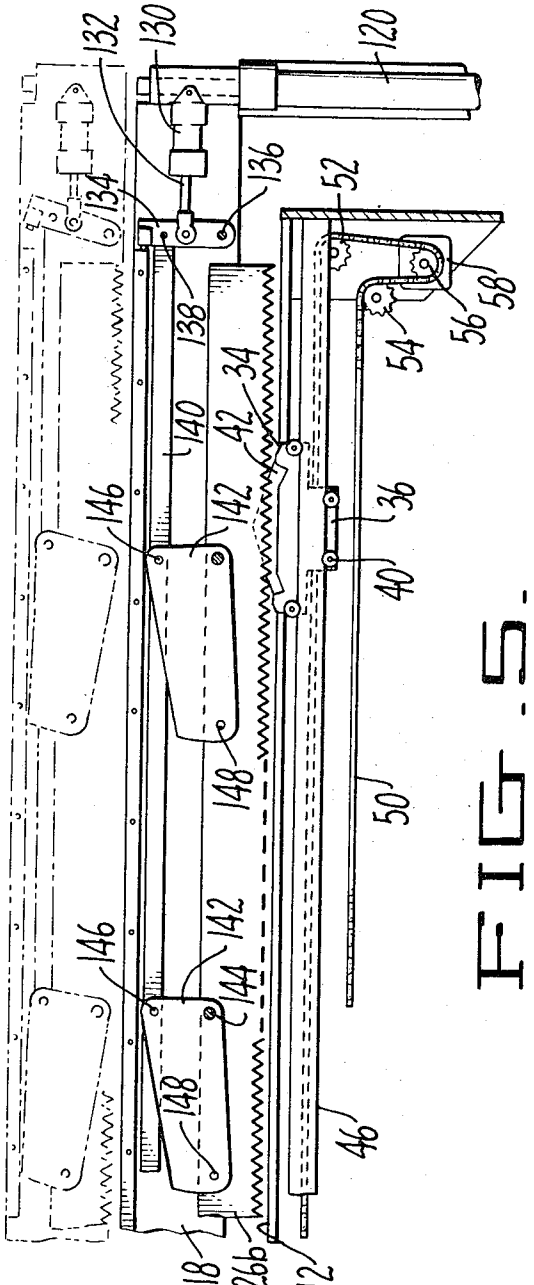


FIG. 5.

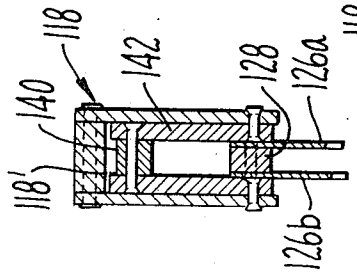


FIG. 4.

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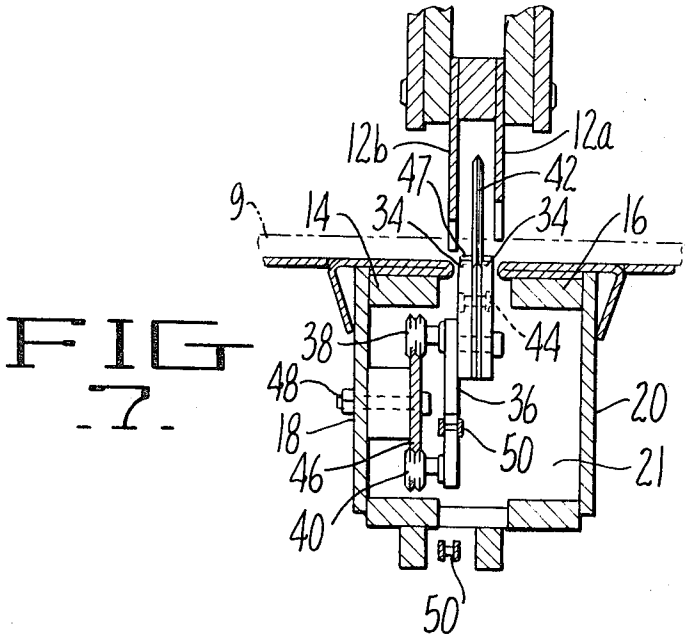


FIG. 7.

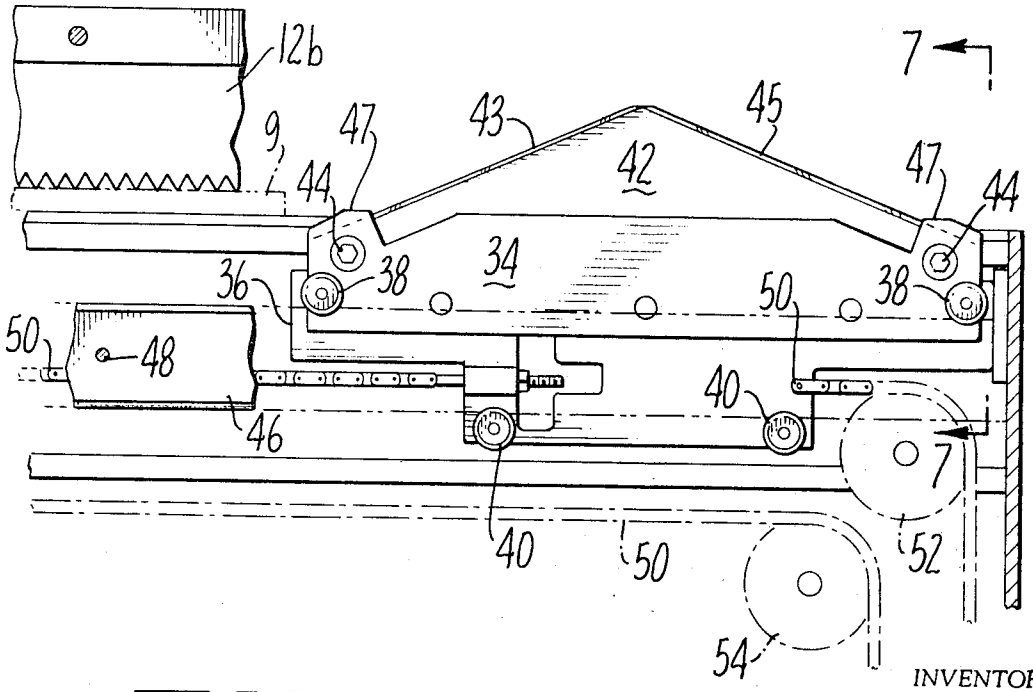


FIG. 6.

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CARPET-CUTTING APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

The invention relates generally to cutting apparatus and methods and more particularly of an apparatus and method for cutting carpet.

The major problem encountered in designing carpet-cutting apparatus is the provision of a cutter which will work efficiently for cutting all of the wide variety of carpets which are found in the typical carpet warehouse.

Prior art carpet cutting apparatus have generally employed a powered cutter having both a horizontal motion (to move across the carpet) and a vertical motion (to cut the carpet). For example, rotary cutting blades, of a type similar to a rotary knife, and vertical reciprocating saws have been used. A carpet cutting machine employing a cutter of the latter type is disclosed in copending U.S. Pat application, Ser. No. 730,836, filed May 21, 1968, and assigned to the assignee of the present invention. Such prior art devices are unsatisfactory for cutting certain materials and require not only a horizontal drive, but also a power drive to actuate the cutter blades. The blade power drive is costly and presents additional design complications because of the need to supply power to the drive as the drive is moved along a cutting path. Also, powered cutters of this type produce significant debris which can foul the equipment.

SUMMARY OF THE INVENTION

The cutting mechanism and method of this invention employs a slanted cutting knife mounted on a carriage for horizontal motion along a cutting path. The carriage is pulled to move along the path, but no vertical motion is imparted to the knife, and no power is supplied to the carriage along the path. Carpet to be cut by the cutter is clamped to the machine frame on opposite sides of the cutting path, and the knife is pulled along the path between the clamped areas and preferably on the "backing side" of the carpet. In other words, where the carpet is conveyed with the pile side of the carpet down, the knife is passed over the top of the carpet, and where the carpet is conveyed pile sideup, the knife is pulled across the carpet underneath the carpet. If only one knife is used, it is preferably mounted below the carpet since most carpets are rolled "backing side" out. Best results are obtained where the blade-holding carriage is arranged to stretch the carpet between the clamped areas before the knife engages the carpet.

With this arrangement of a slanted knife pulled across the backing side of carpet while the carpet is stretched between clamped areas, it has been found that a wide variety of carpet and other floor covering materials can be cut on the same equipment. Thus the apparatus illustrated in this application has been used successfully to cut loop pile carpet, cut pile carpet, jute-backed carpet, rubber backed carpet, rubber-backed felted carpet (indoor-outdoor type), jute padding, rubber padding, and linoleum.

The slanted knife preferably has a slope of less than 30° with the knife made sufficiently long that the upper end of the knife will cut through the longest pile carpet to be handled by the apparatus. Additionally, the knife is preferably double sloped from a high point in the center so that it can cut in both directions in a carpet cutting path.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an overall perspective view of the complete carpet-cutting machine carrying a partially unrolled carpet;

FIG. 2 is a side section of the carpet-cutting machine taken on the line 2—2 in FIG. 1;

FIG. 3 is a vertical front section of the cutting apparatus taken on the line 3—3 in FIG. 1;

FIG. 4 is an enlarged vertical section of the clamp beam taken along line 4—4 in FIG. 1;

FIG. 5 is a fragmentary side section of the clamp beam and deck taken on line 5—5 in FIG. 1;

FIG. 6 is an enlarged fragmentary view of the apparatus of FIG. 3, and;

FIG. 7 is a sectional view taken along the plane indicated at 7—7 in FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now in particular to FIG. 1, therein is illustrated a schematic view of a cutting machine 1 in operation, particularly adapted for the cutting of carpet, carpet padding and linoleum. Once a supply roll 2 of carpet is placed on the machine, all operations on cutting the material, exemplar carpet 9, rolling the cut section and rerolling the supply roll 2 are performed either automatically or are monitored from a central control panel 6 by a single operator. A set of roller shafts 3 form an arc-shaped cradle 4 in which the supply roll rests and a lead bed 5 for guiding the carpet to a pair of flat plate beds or decks 10 and 12 which serve as a cutting platform. The opening defined by decks 10 and 12 provides a channel for a cutting knife 42 to pass perpendicular to the carpet edge to effect cutting. A longitudinal clamp beam 118 raised and lowered by hydraulic cylinders 122 contains a pair of parallel combs 126*a* and 126*b* that clamp the carpet on both sides of the cutting channel. The details of the cutting operation are discussed along with the remaining figures. After the cutting platform, the carpet rides over a discharge bed 7 formed from roller shafts 3 and is guided by rollers in a roll form mechanism disclosed in the above-identified copending application to form an order roll 8.

The present invention is directed to the cutting apparatus; the details of the carpet handling including unrolling, centering and guiding over the cutting platform, forming an order roll, measuring and the like are the subject of the aforementioned copending U.S. Pat. application, Ser. No. 730,836 filed May 21, 1968, and assigned to the assignee of the present application.

Referring now to FIGS. 2 and 3 of the drawings, left and right flat plate beds or decks 10 and 12 provide support for the carpet (not shown). Longitudinal crossmembers 14 and 16 support decks 10 and 12, respectively, and left and right longitudinal support panels 18 and 20 fixed to members 14 and 16 define a central longitudinal portion 21 wherein the cutting blade carriage and support and driving means are housed. Cutting blade 42, having two straight top edge portions 43 and 45 each forming a 21° angle with the horizontal, is clamped between two plastic holders 34 by bolts 44. The holders are preferably made of a plastic sold under the trademark Delrin. Holder 34 includes raised portions 47 that rise above the level of the cutting platform and which in operation tend to stretch the carpet being cut and prevent tearing at the carpet edge where the cut is initiated. The cutting blade 42 and holder 34 are secured to a horizontal carriage 36 that moves along a longitudinal panel track 46 on a set of top and bottom rollers 38 and 40, respectively. There is no vertical motion imparted to the blade. The carriage is propelled by an endless roller chain 50 which passes over and around sprockets 52, 54 and 55 to a drive sprocket 56 on a motor 58. Because the blade 42 is double edged, cutting may be effected by passing through the material in either direction.

Hydraulically raised and lowered longitudinal clamp beam 118 is lowered by beam cylinders 120 and cylinder rods 122 when the carpet is located as desired and is stationary over the cutting channel. Parallel combs 126*a* and 126*b* are hydraulically lowered from clamp beam 118 by a second hydraulic system and firmly engage the carpet so as to hold it against decks 10 and 12, respectively.

Referring now to FIGS. 3, 4 and 5, the second hydraulic system includes comb cylinders 130 at each end of the clamp beam 118; the cylinders are attached to the outer sides of the clamp beam 118 and operate simultaneously. The cylinder rod 132 of the comb cylinder 130 is pinned to a vertical lever 134 that pivots about a pivot pin 136. Also attached to the lever by pin 138 is a comb bar 140. The comb bar 140 operates the

raising and lowering of the parallel combs **126***a* and *b* through two identical pairs of linkage plates **142** which are pivotally fixed to the clamp beam **118** on pivots **144**. The linkage plates **142** are pinned to both comb bar **140** and parallel combs **126***a* and *b* by pins **146** and **148**. When the comb bar **140** is longitudinally moved by vertical lever **134**, the combs, **126***a* and *b*, will rotate about the axis of the pivots **144** and be raised and withdrawn into the clamp beam **118** as indicated by the phantom lines in FIG. **5**. The linkage plates **142** are shaped such that rotation is limited when the top of the linkage plates strikes the top section **118'** of the clamp beam **118**, as illustrated by the phantom lines in FIG. **5**.

FIG. **3** shows an end section of the clamp beam **118**, combs **126***a* and *b*, and associated mechanism. A central spacer bar **128** is between the combs **126***a* and *b*.

In operation, carpet, carpet padding, or linoleum material is located on the cutting platform over the cutting channel between decks **10** and **12**. Clamp beam **118** is lowered to a close proximity of the material to be cut and the parallel combs **126***a* and *b* are lowered to hold the material tightly to the cutting platform on either side of the cutting channel. Cutting blade **42** is initially located at either side of the material to be cut **9**. Motor **58** is activated to move the chain **50** and carriage **36** longitudinally and horizontally across the material **9**. As the carriage moves, the raised portion **47** of the blade holder **34** pushes upward against the material that is simultaneously being held down by combs **126***a* and *b*. These opposing forces combined with the shallow angle of the cutting blade results in a clean cut. It has been found that this arrangement avoids tearing the material at the edges and provides a clean cut of both backing and pile on the carpet.

The cutting mechanism thus described has been found to provide a relatively low-cost means for cutting carpet and related materials while avoiding costly motor driven rotary and reciprocating cutting devices. In addition, the apparatus described produces no cutting debris as does rotary or reciprocating cutting apparatus.

What is claimed is:

1. In a machine for cutting carpet material, including a cutting platform for supporting said carpet material, said platform having a longitudinal cutting channel therein, the improved cutting apparatus comprising

A. a slanted cutting blade,

B. carriage means movably mounted in said cutting channel;

C. means for securing said blade to said carriage means, said blade protruding through said cutting platform, said securing means including a raised portion disposed at the leading edge of said blade and protruding beyond said platform for engaging and stretching carpet material before said blade reaches said material;

D. means for clamping carpeting to said cutting platform on opposite sides of said cutting channel, and

E. means for pulling said carriage means horizontally along said cutting channel whereby said carpet material is cut by said blade.

2. A method of cutting carpet material comprising:

A. placing said carpet material on a flat surface having a channel therein;

B. clamping said carpet material to the top of said surface on both sides of said channel;

C. pushing on the backing side of said carpet material to stretch said carpet material between the areas where it is clamped to said platform, and;

D. slicing said carpet material from the backing side thereof with a knife having a straight cutting edge inclined to said flat surface by an angle of less than 30°.

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