

March 30, 1926.

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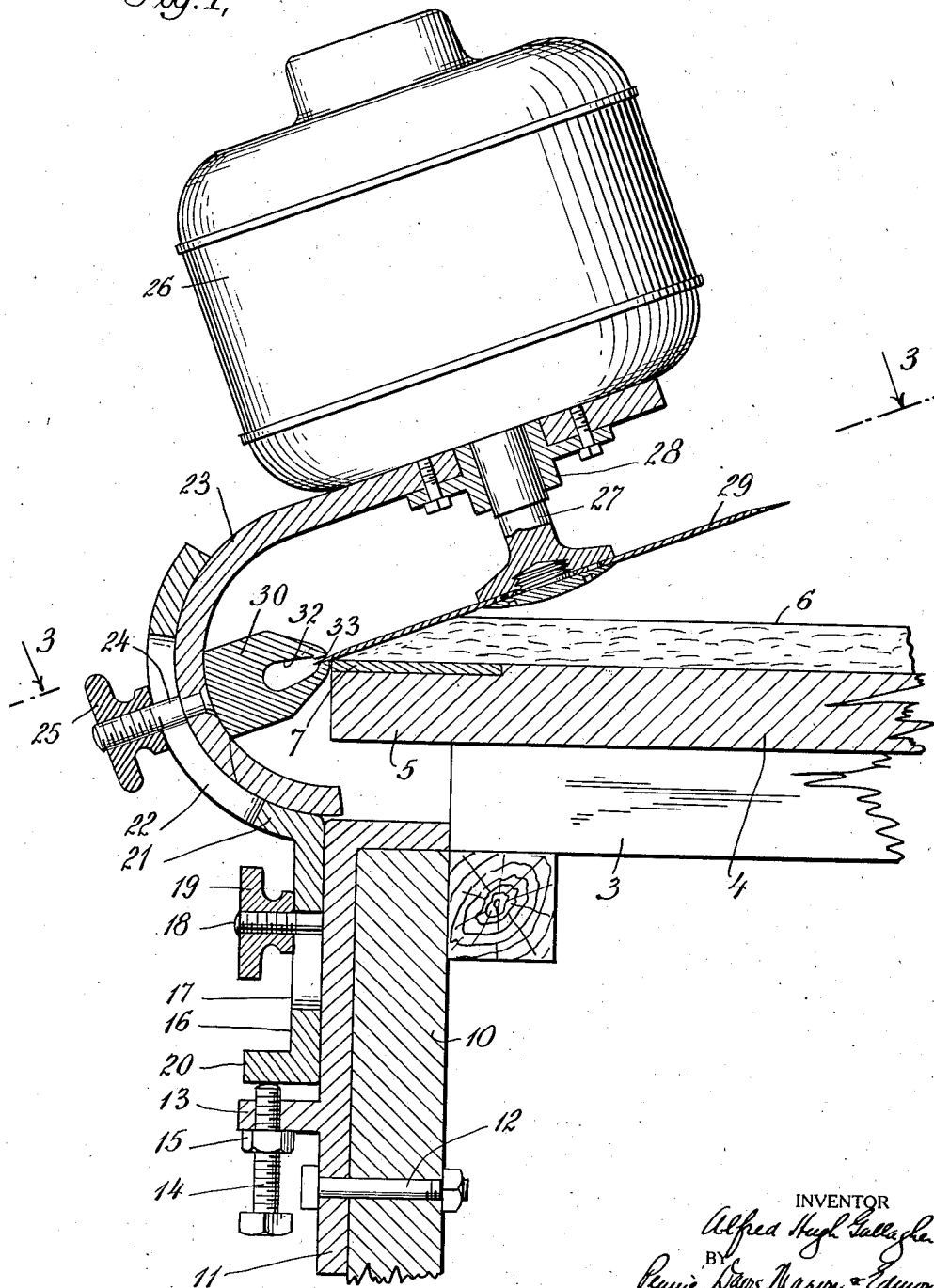
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METHOD AND APPARATUS FOR BEVELING FELT

Filed Jan. 3, 1924

3 Sheets-Sheet 1

Fig. 1,



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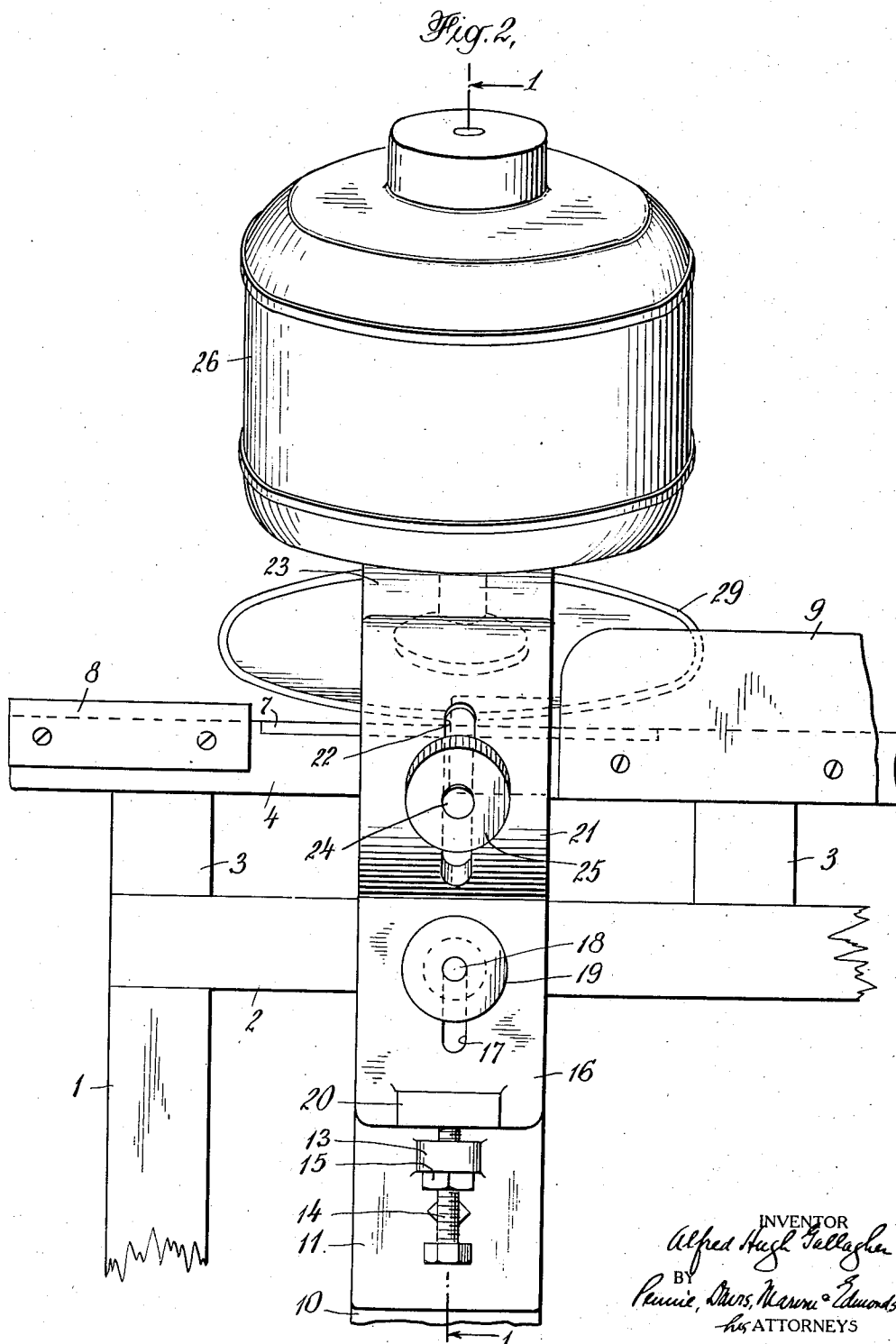
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Fig. 3,

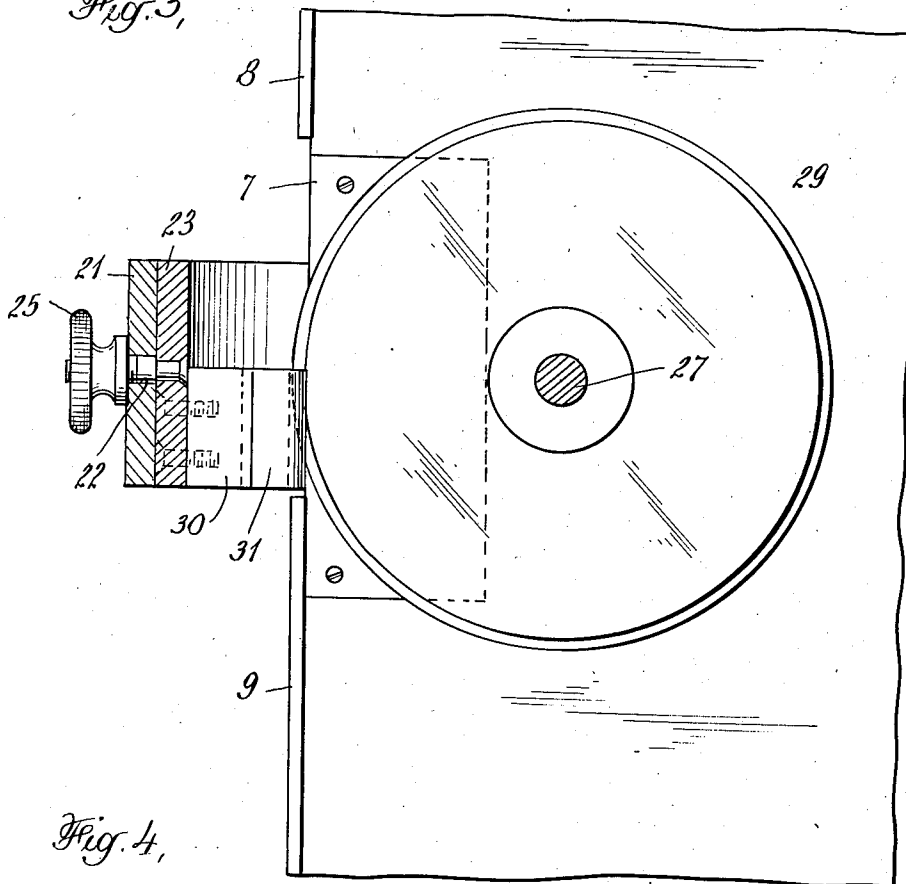


Fig. 4,

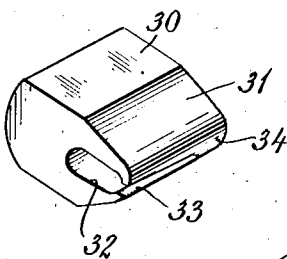
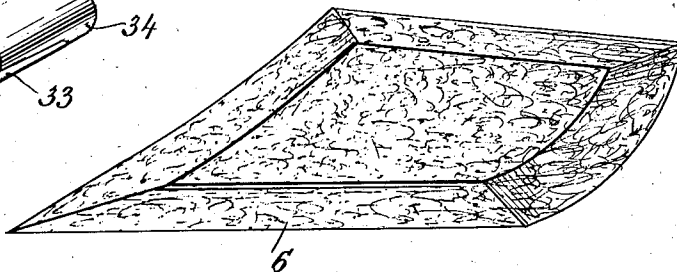


Fig. 5.



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METHOD AND APPARATUS FOR BEVELING FELT.

Application filed January 3, 1924. Serial No. 684,152.

To all whom it may concern:

Be it known that I, ALFRED HUGH GALLAGHER, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Methods and Apparatus for Beveling Felt; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved method and apparatus for beveling felt and is particularly advantageous for use in beveling pads made of cattle hair or other similar material so that the pads may be used as a unit in a chair seat or for the purposes of upholstery in other kinds of furniture or in automobiles, etc.

It will be understood that upholstered furniture is ordinarily constructed by stuffing or padding the various parts with some loose material such as animal hair or various vegetable fibres. In such construction, the stuffing material is shipped and handled in bulk and is placed in position by the workman. Obviously, such a method is wasteful both of material and time, and to obviate these difficulties there has been devised an improved pad for use in chair seats, cushions, etc., as set forth in my application for U. S. Letters Patent, Serial No. 491,421, this pad being made as a self-sustaining unit which may be distributed and handled as a separate article of manufacture. Such a pad, which is made of cattle hair or of a mixture of cattle hair and hog bristles loosely felted is cut into blanks of the desired outline and is then beveled along its edges so as to give the article in which it is employed the usual stuffed or padded appearance.

I have found that such pads may be best manufactured by mixing and felting the material in suitable machines, the finished felt being turned out in layers in which the hairs and bristles are loosely held together. A suitable blank having been cut, it becomes necessary to perform the beveling operation and for this purpose I have devised the method and apparatus later to be described. By reason of the condition of the loosely felted mass, it is impossible to use ordinary cutting devices without tearing the material

apart, or at least distorting it so that the beveled pad is useless for the purpose for which it is intended. The problem lies in providing some means by which the bevel may be cut at acute angles of varying degrees, while at the same time producing clean edges along the line of cutting. Ordinary shearing cutters or rotary knives are not alone satisfactory for the purpose for the reasons stated and the object of the present invention is to provide an improved method and apparatus by which a felted mass may be rapidly and easily given a bevel, while preventing distortion of the main mass of felt and at the same time producing a sharp clean edge.

In order to make clear the details of the invention, the accompanying drawings will be referred to. In these drawings, which form a part of the disclosure, there is shown a machine by which the method may be practiced. Of the several figures, Fig. 1 shows a vertical cross-sectional view of the device taken on the line 1—1 of Fig. 2, with certain of the parts shown in side elevation. Fig. 2 is a view of the machine in front elevation. Fig. 3 is a transverse cross-sectional view on the line 3—3 of Fig. 1. Fig. 4 is a view in perspective of a detail of the machine and Fig. 5 is a view in perspective showing a finished beveled pad.

Referring now to the drawings, the apparatus is shown to consist primarily of two units, of which one comprises a motor, a cutter driven by the motor and a throat block so disposed as to give the cutter a shearing action, these several parts being mounted on a supporting arm and being capable of angular adjustment as a whole with the arm. The second unit consists of a supporting arm cooperating with the first arm and permitting vertical adjustment so that the cutting mechanism may be suitably positioned to cut pads of varying thicknesses. The beveling apparatus as a whole will be mounted on any convenient support such as is shown in the drawings, to consist of upright legs 1, on which are mounted suitable cross-bars or frame members 2 and 3. Disposed on these cross-bars is a shelf 4, which provides a support for the pad which is to be cut. The shelf 4 as shown in Fig. 1 has an edge 5 which projects slightly beyond the face of the uprights 1. This shelf 4 will be made of any desired construction but is pref-

erably given a smooth upper surface on which may be placed the pad 6, during the cutting operation.

The overhanging edge of the shelf 4, as shown in Figs. 2 and 3, is provided with a pair of upstanding guides 8 and 9. These guides may be made of any suitable material and provide a support for the felt pad before and after it has been subjected to the cutting action. These guides may be rigidly secured in place or may be provided with adjustable mountings so that they may be raised or lowered to take care of pads of different thicknesses. It will be noted that the guide 9 projects to a greater height than the guide 8, this being necessary since the guide 9 supports the uncut pad, while the edge after beveling will lie against the inner face of the guide 8.

As shown in Fig. 1, the cutting mechanism is supported on an upright member 10, which is suitably secured to the frame. On the outer face of the member 10, there is disposed a face plate 11, secured in position by means of one or more bolts 12. Near its lower end, the plate 11 has a projecting lug 13, through which passes an adjusting screw 14, provided with a lock nut 15. On the outer face of the plate 11, is adjustably mounted a supporting member 16, this member having a longitudinal slot 17 formed therethrough. A bolt 18 secured in the face plate 11 passes through this slot and is provided with a milled nut 19, so that the supporting member 16 may be held in various positions of adjustment, relative to the plate 11. At its lower end, the member 16 terminates in an offset lug 20, against which bears the end of the adjusting screw 14.

At its upper end, the supporting member 16 terminates in an arcuate or quadrant arm formed with a longitudinally extending slot 22. A bracket 23, which terminates in an arcuate portion corresponding to the arc of the member 21, lies on the inner face of the quadrant and is provided with a bolt 24, which projects through the slot 22. On the end of the bolt is mounted a milled nut 25, so that the bracket 23 may be adjusted in various positions in the quadrant.

The bracket 23 supports the cutting unit and this consists of a small motor 26, the shaft 27 of which runs in a suitable bearing 28 in the bracket. Directly mounted on the outer end of the shaft by any suitable means, is a cutting disc 29. This disc is of the usual construction and has a peripheral bevel on its upper surface so as to form a cutting edge.

On the inner face of the arcuate portion of the bracket 23 and lying substantially in the plane of the cutting disc, is a throat member 30, shown in perspective in Fig. 4. This throat member is formed with a longitudinal ridge and has a channel 32 pass-

ing through it beneath the ridge. One portion of the ridge is slotted as shown at 33, the slot being relatively narrow and extending only partway along the ridge, so as to leave a solid portion 34 at one end. The throat member as shown in Fig. 3 is removably secured in the bracket 23 by means of screws and is located at one side of the bracket and at such a point that the slot will lie in the plane of the cutting member. The relative positions are such that the knife edge travels in the slot and the throat member thereby gives to the knife a shearing effect. The motor is preferably mounted on bracket 23 in such a way that it is capable of slight adjustment so that the position of the knife may be varied relative to the throat member to compensate for wear.

It will be seen that by the construction just described, the rotary cutting knife and the throat member are capable of angular adjustment as a unit on the arcuate support for the bracket. The throat block is also made of such dimensions that its outer face adjacent the slot in which the knife edge travels, will lie approximately at the center of angular adjustment of the cutting unit. Such an arrangement insures that whatever the angle at which the felt is to be cut, the throat block will always lie with its face against the edge of the felt where the cutting action occurs. With a layer of felt disposed on the shelf 4, as shown in Fig. 1, the bevel which is to be given the edge will obviously depend on the relative angular positions of the shelf and the cutting knife. The plane of the knife, and therefore the plane of the cut, is adjustable to various positions through an arc of approximately 90° and the angle of the bevel is relatively varied.

While the device is shown in position in Fig. 1 to bevel a comparatively thin layer of felt, it may be employed for layers of greater thicknesses, since the supporting member 16, which carries the bracket and cutting mechanism, may be moved relatively to the face plate 11. Such upward movements would permit the knife to act on thicker layers of felt than shown and it is also possible to cut such layers with a flat bevel or with a steep bevel, depending of course upon the position in which the knife is placed. At the same time the throat member by reason of its mounting, will always lie in the desired position.

It has been found that in attempting to produce a beveling cut of felt of the loosely matted variety, for which this machine is designed it is necessary to provide some means of support for the edge of the felt. Were the rotating knife here employed to be used without the provision of a throat member, even though the felt is supported on either side of the knife by the edge

guides 8 and 9 the rapid rotation of the knife would cause a tearing and pulling of the fibres, thus distorting and disintegrating the felt mass. By the provision of the throat piece, within which the edge of the knife always runs, there is provided not only a support for the edge of the felt at the point of cutting, but the action of the knife, one side of which lies closely adjacent to one face of the slot in the throat piece, is similar to a shearing action and this insures that the fibres will be cut rather than torn. It is necessary of course that the throat piece be given a construction and mounting so that some part of it will always lie in a position to support the edge of the felt at the point of cutting and it is necessary that the arrangement be such that the desired shearing action may take place regardless of the angular position of the knife and at the edge of the felt. The construction here shown attains the various desired objects and I have found that for the purposes which I have set forth the most satisfactory method of beveling the felt smoothly and cleanly at the edges is by providing a shearing action coupled with supporting the edge of the felt at the point of cutting.

As will be seen in Fig. 5, the finished pad of felt is ordinarily of an irregular form, depending of course on the contour of seat or cushion for which such pad is intended. As long, however, as the bevel of the cut is to remain the same, the cutting device illustrated may be used without adjustment regardless of the irregularities of the outline of the finished felt, since the pad will be fed to the knife with the edge to be cut in contact with the guides 8 and 9 and with the face of the throat piece. It is then only necessary to move the pad about so that all the edges will in turn be subjected to the cutting action whereupon there will be produced an even bevel along the entire edge of the pad, regardless of the irregular shape which the pad may have. Should it be desirable to give one edge of the blank a flat bevel and another edge a steep bevel, such a cutting operation only requires that the knife be set in the desired angular positions, no vertical adjustment being necessary so long as the thickness of material being operated upon remains the same. If varying thicknesses are to be beveled, the vertical adjustment may be performed without changing the angularity of the cut.

In the various angular positions of the knife relative to the plane of the support, the throat piece will always assume a position in which its face lies in contact with and serves as a support for the edge of the felt along the line of the cut. This action is secured by making the throat piece of such size that the lower edge of the knife slot lies approximately at the center of the arc on

which the quadrant bracket is formed the external contour of the throat piece being designed so as to permit the face to lie against the edge of the felt blank at all times. The throat piece so constructed performs the double function of supporting the felt at the point of cutting as well as giving the rotary knife a shearing effect.

While the apparatus here shown has been found to be most satisfactory for practising the novel method it is clear that this knife mechanism and its supporting bracket may be mounted on any suitable support and the felt may be moved against the knife by other arrangements than those shown. Where the felt pads to be beveled are of similar size and shape it may be desirable to provide a more or less permanent support for the cutting apparatus and as a table along which the felt is fed. Although there has been illustrated an electric driving means for rotating the knife if found desirable the knife may be driven from any convenient source of power. Though the quadrant bracket and the arcuate arm provide a satisfactory arrangement by which the various vertical and angular adjustments may be made, other forms of mountings, however, providing the same freedom of adjustment would be equally satisfactory. Other changes in construction within the scope of the following claims will be obvious to one skilled in the art.

I claim:

1. The method of beveling the edge of a piece of felt which comprises supporting the piece of felt on a plane surface, and progressively cutting the edge of the piece of felt with a shearing action while supporting the edge of the piece of felt on either side of the cutting mechanism and also at a point on the edge surface adjacent the point at which the edge is cut through for preventing distortion of the felt in a direction away from the main body of felt.

2. The method of beveling the edge of a piece of felt which comprises supporting the piece of felt on a plane surface, moving the piece of felt over the plane surface against an angularly disposed rotary cutting knife, and subjecting the edge of the piece of felt to a shearing action while supporting the edge of the piece of felt on either side of the cutting knife, and maintaining the edge surface of the felt in contact with a support adjacent the point at which the edge is cut through, to prevent distortion of the felt in a direction away from the main body thereof.

3. The method of beveling the edge of sheets of felt by means of a rotary knife, which includes moving the felt and the knife relatively and against one another with the planes through the knife and the felt intersecting at an angle corresponding to the

bevel to be produced, and maintaining the edge surface of the felt in contact with a support at the point at which the edge is cut through to cause the edge to move between the center and periphery of the knife and thereby preventing distortion of the edge in a direction away from the main body of felt.

4. The method of beveling a mass of felted material which includes subjecting the edge of the material to a shearing action, and maintaining the edge surface in contact with a support in advance of and at the point at which the edge is cut through to prevent distortion of the edge in a direction away from the main mass of felt.

5. A method of beveling a felt sheet by means of a rotary cutting knife, which comprises moving the felt and the knife relatively with the planes through the knife and the felt intersecting at an angle corresponding to the angle of the bevel to be produced, and during such movement supporting the felt on a plane surface extending to one side of the line of cut, and progressively supporting the felt along the line of cut immediately in advance of the point at which the knife edge passes through the felt.

6. A device of the class described comprising in combination a support, cutting means mounted on said support and capable of angular adjustment relative thereto, and means cooperating with the cutting means and adjustable therewith to give the latter a shearing action, said means further providing an abutment for the edge of the felt at the point where this edge is cut through to prevent its distortion.

7. A device of the class described, comprising in combination a support, cutting means mounted on said support and capable of angular and rectilinear adjustment thereon, and means movable with the cutting means and operable to give the latter a shearing action.

8. A device of the class described, comprising in combination a support, cutting means adjustably mounted thereon and means movable with the cutting means to adjusted position, and performing the double function of giving the cutting means a shearing effect and affording a support for the material being cut at the point of cutting.

9. A device of the class described, comprising in combination a support, a driven cutting member, a slotted member cooperating therewith to produce a shearing effect, and means to adjust the position of both members relative to the support.

10. A device of the class described, comprising in combination a support, a cutting member and a slotted member cooperating therewith to produce a shearing effect, means to hold the two members in varying angular positions on the support and means to hold

the two members in varying vertical positions on the support.

11. A device of the class described, comprising in combination a support, cutting means mounted adjustably thereon, means to support a sheet of felt beneath the cutting means and a throat member cooperating with the cutting means to give the latter a shearing effect and also providing an abutment for the edge of the felt to prevent its distortion in a direction away from the main sheet of felt at the point where the edge is cut through.

12. A device of the class described comprising in combination a support, an arcuate supporting member mounted on the support, a bracket adjustably mounted on the member, a driven cutter and a cooperating throat member having a slot into which the edge of the cutter projects, both the cutter and the throat member being mounted on said bracket.

13. A device of the class described comprising in combination a support, an arcuate arm mounted thereon, a bracket mounted on said arm, driven cutting means mounted on said bracket, and a throat member mounted on said bracket and cooperating with said cutting means to give the latter a shearing effect.

14. A device of the class described comprising in combination a support, an arcuate arm mounted adjustably on the support, a bracket mounted on the arm, driven cutting means mounted on the bracket, a throat member mounted on the bracket and cooperating with the cutting means to give the latter a shearing effect and means to vary the angular position of the cutting means and throat member in the support.

15. A device of the class described comprising in combination a support, a bracket mounted on the support and movable through an arc, means to hold the bracket in varying angular positions, a driven cutting member on the bracket and a throat piece on the bracket having a slot in which the edge of the cutting member runs, the throat piece having a face portion lying substantially at the center of the arc through which the bracket is adjustable.

16. A device of the class described and comprising in combination a support, a bracket mounted for angular adjustment thereon, a rotary cutting knife and driving means therefor mounted on the bracket and a throat piece having a slot in which the knife edge runs, and having a face portion lying substantially at the center of adjustment of the bracket, this face portion providing a support for the edge of the material being cut.

17. A device of the class described and comprising in combination a support, an arcuate arm mounted thereon, a bracket

having an arcuate portion mounted on the arm, a rotary knife and driving means therefor mounted on the bracket, a throat piece on the arcuate portion extending radially therefrom and having a face lying substantially at the center of the arc, means to vary the angular position of the bracket in the arm, and means to vary the position of the arm in the support.

18. A device of the class described comprising in combination, means to support a layer of felt, a support, a cutting device mounted thereon near one edge of the felt supporting means and capable of being given different angular positions relative to the latter and means cooperating with the cutting device and adjustable therewith to give the latter a shearing effect and performing the further function of supporting the edge of the felt at the point being cut.

19. A device of the class described, comprising in combination, a support, an arcuate arm adjustably mounted thereon, a bracket mounted on the arm and capable of angular adjustment thereon, a rotary knife and driving means therefor mounted on the bracket, a throat member on the bracket and having a slot in which the knife edge runs, and a face portion lying substantially at the center of adjustment of the bracket and means to vary the position of the arm on the support.

20. In a device of the class described, the combination with a support and driven cutting means mounted thereon and capable of vertical and angular adjustment, of a throat piece, having a slot in which the edge of the cutting means runs and being adjustable with the cutting means.

21. In a felt beveling machine, including

an angularly adjustable rotary knife, a throat piece cooperating with the knife to give the latter a shearing effect and movable with the knife as the latter is adjusted, said throat piece having a face portion lying at the center about which the angular adjustment of the knife takes place.

22. In a felt beveling machine, including a rotary knife angularly adjustable about a center, a throat piece having a slot in which the knife edge runs, and a face portion extending across the slot and lying approximately at the center of adjustment, this face portion providing a support for the material being cut at the point of cutting.

23. In a felt beveling machine including a bracket angularly adjustable about a center, and a rotary knife mounted on the bracket, a throat piece mounted on the bracket and having a slot into which the knife edge projects and a face portion extending across the slot and lying approximately at the center of adjustment of the bracket.

24. A device of the class described comprising in combination a support, a shelf thereon to support a layer of felt, an arcuate arm mounted on the support, a bracket having an arcuate portion cooperating with the arcuate arm and adjustable therealong, a rotary knife and driving means therefor mounted on the bracket, a throat piece mounted on the arcuate portion in the plane of the knife and having a face portion lying substantially at the center of the arc of the arcuate portion and means to vary the plane of the cut relative to the shelf.

In testimony whereof I affix my signature.

ALFRED HUGH GALLAGHER.