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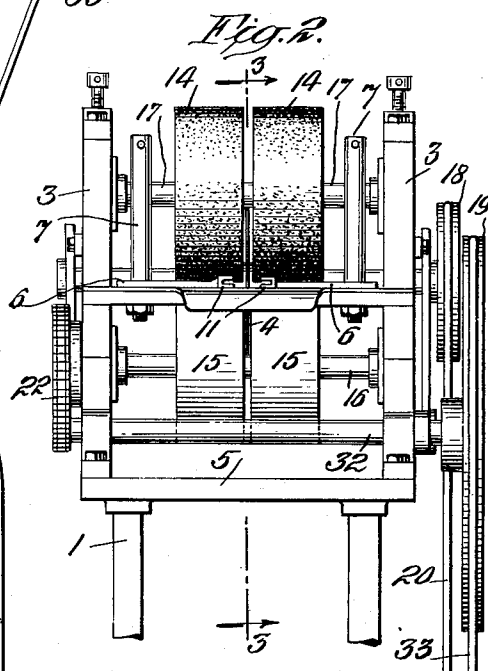
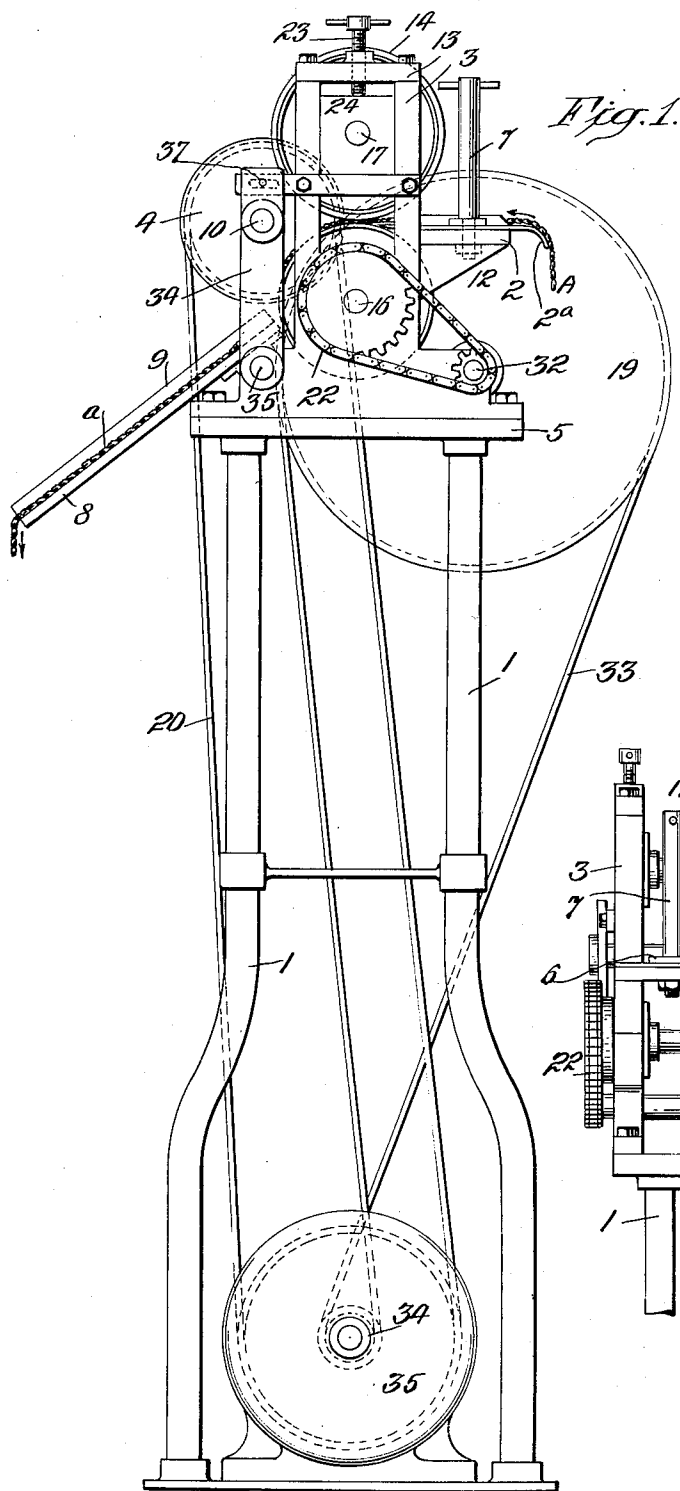
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CUTTER FOR TEXTILE FABRICS

Filed April 24, 1936

2 Sheets-Sheet 1



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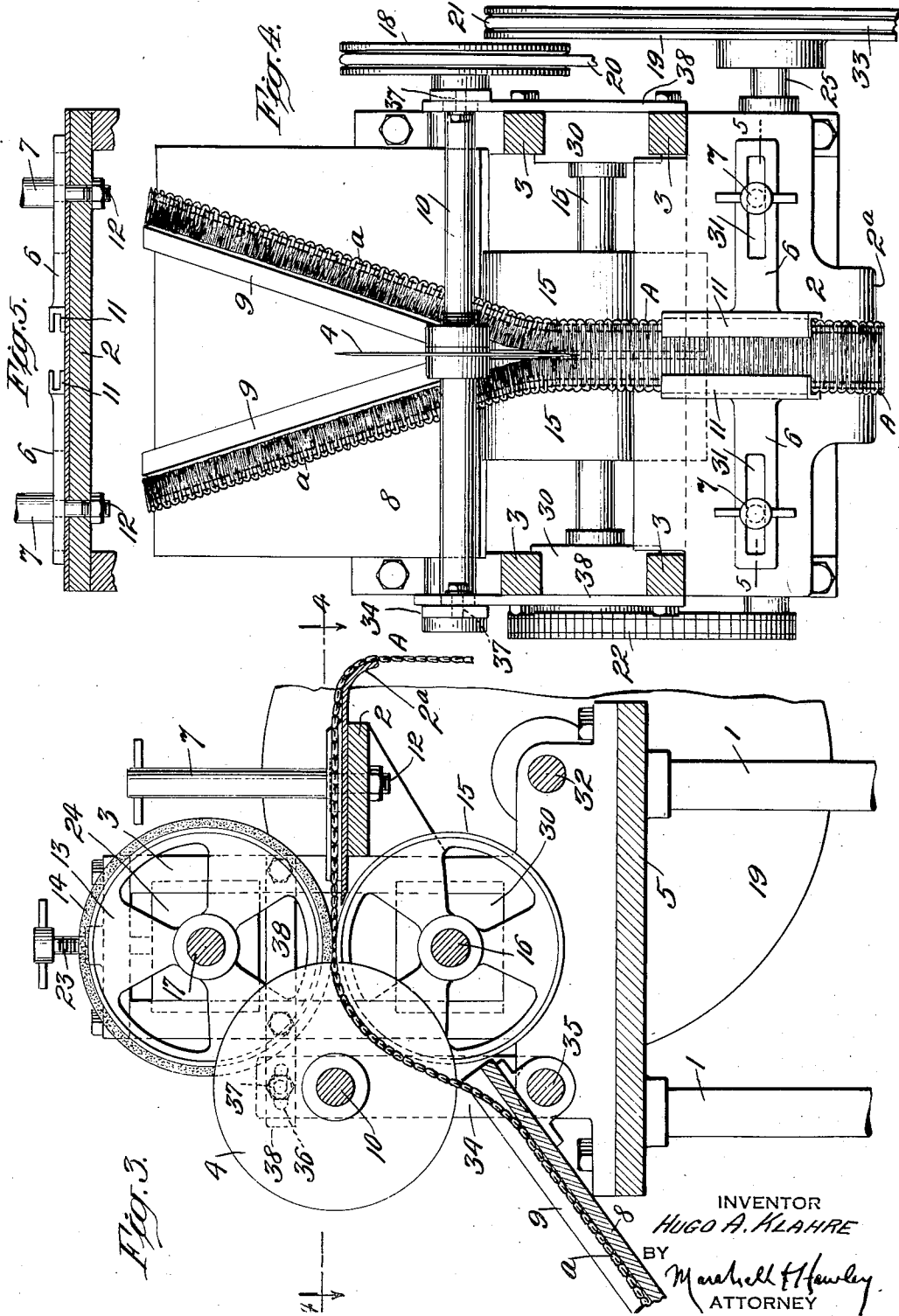
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UNITED STATES PATENT OFFICE

2,094,987

CUTTER FOR TEXTILE FABRICS

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7 Claims. (Cl. 164—61)

My present invention refers to certain new and useful improvements in cutting devices for severing strips of textile fabrics of various kinds into narrow longitudinal lengths, the invention being more particularly adapted for producing cut fringe, but being applicable to various branches of the textile industry where fringes or fabrics of a similar kind are employed for various purposes in the way of ornamentation or the finishing of hangings, upholstery, and the like; and wherein it is found most practicable and effective to weave tapings, webs or edgings of the fringe fabric in comparatively narrow widths or strips, but endless in length, and intended to furnish two rows of cut fringe, said narrow woven material being subdivided by cutting longitudinally into fringe strips to form proportionate sizes of the pieces of cut fringe as required for the particular conventional manufacturing uses for which they are employed.

In a very broad sense the invention is designed to provide means for cutting across a bunch or series of threads or fringe elements by a cross cutting operation that will not disturb or disarrange by the dispersion of any of the threads their relative placement, but will leave the raw ends of both sides of the cut harmoniously and evenly disposed in a fringe or tassel which is perfectly even on the edges, without any tendency to hump or bulge or ruck up. In a very special class of manufacture the object of the invention is to furnish a cutting means which will sever the fringe material accurately along a central or other line and in such a manner that the separate cross threads will all be cleanly cut, and will not become distorted or misplaced or disarranged from their normal position during or in consequence of cutting, but will be kept in situ during severance and afterwards, and with a complete and firm raw end or edge of all the threads which are being held closely compacted together at these cut ends, and thus in satisfactory condition for the subsequent uses to which the cut fringe is put. All this is done in a much more efficient and easy manner than heretofore, and, more especially, the production of the fringe is simplified, cheapened and carried on with numerous other incidental advantages by dispensing with the central warp threads or seams which are usually woven lengthwise through the fringe fabric in order to furnish stay means on the fringe threads at opposite sides of the central cutting line, as is the practice with known devices for severing the fringe, for holding said threads at the raw

edges of the fringe during the severing operation, which warp threads are not only expensive to insert but must be removed from the cut fringe by hand before it can be used, thus entailing large expense for labor and waste of time in achieving the proper results, besides the liability of raveling, diffusion and tangling of the cut threads. The use of these warp seams which are so necessary with known methods of preparing cut fringe, greatly complicates the employment of dyeing processes for the fringe, particularly where the warp threads must be removed after dyeing, all of which is avoided by the use of my device which absolutely does away with the warp threads, as they are entirely unnecessary.

The invention may be said to consist essentially in the rotating circular cutting knife or disk, a means for firmly holding the fringe fabric taut and straight while it is being introduced to the cutter to secure a clean cut and straight cross-cut of the threads, means for feeding the material to the knife, and for disposing of the strips or sections of the cut fringe or fabric automatically after they have been cut; and furthermore the invention comprises numerous details and peculiarities in the construction, combination and arrangement of the various parts, substantially as will be hereinafter more fully described and then pointed out in the ensuing claims.

In the accompanying drawings illustrating my invention—

Fig. 1 is a side elevation of my improved textile or fabric cutting machine for making cut fringe;

Fig. 2 is a front elevation of the same;

Fig. 3 is a vertical sectional elevation on the line 3—3 of Fig. 2;

Fig. 4 is a sectional horizontal plan view on the line 4—4 of Fig. 3;

Fig. 5 is a vertical cross-sectional detail view on the line 5—5 of Fig. 4;

Similar characters of reference designate corresponding parts throughout all the different figures of the drawing.

The main frame of the machine in which the several mechanical parts are conveniently placed for mutual and effective operation may be constructed in any desired manner, and in the simple example thereof portrayed in the drawings it consists of a supporting frame work construction having posts 1, 1 which carry an upper horizontal platform 5, whereon are mounted the lateral vertical members consisting at each side of the platform 5, of the parallel uprights 3, 3 having bolted on the upper ends thereof the cross heads 13. Between the uprights 3 are located the ver-

tically-slidable journal blocks 24, controlled by the hand screws 23, whose bearings are in the cross-heads 13, so that the bearing blocks 24 may be lifted or lowered to adjust the position of the horizontal shaft 17, whose ends are journaled in said boxes 24 and thus regulate the tension of rollers 14. This shaft 17 carries the pair of pressure and feed rollers 14, having preferably a rubber or elastic peripheral face adapted to bear upon the fringe or textile fabric and cause it to be delivered in a firm taut manner to the action of the knife. The vertical uprights 3, 3, in the side frames also serve to hold the lower journal bearings 30, which carry the lower rotary horizontal shaft 16, which is parallel to the upper shaft 17, and which has mounted thereon the lower rollers 15, 15, located directly opposite to the upper rollers 14, 14 and closely contiguous thereto so that the fabric may pass between the upper and lower rollers and be fed along while held under the pressure of these rollers. These upper and lower rollers are broad faced so as to apply considerable surface above and below to the fringe fabric and permit the latter to be presented taut and stretched flat and close to the action of the cutter.

Obviously each roller 14 is directly opposite to one of the lower rollers 15 so that the rollers 14 and 15 come into close association, and the horizontal rollers are close to each other also. The main frame of the machine carries a front horizontal table 2, as clearly shown in Figs. 1, 3 and 5, over which the fringe fabric enters into the machine. This table 2 has a front curved edge 2^a for convenience in permitting the fabric to run easily on to the table. Upon the table 2, moreover, are guide bars 6, 6 having at their opposing ends guide grooves 11, 11 through which the fabric passes. Said guide bars 6, 6 are adjustable towards and away from each other by means of the clamping rods 7, 7 having handles on the upper end thereof and having the lower portions screw-threaded to pass through slots 31, 31 in said bars 6, and also through openings in the table 2, the lower ends of these screw-threaded portions of the clamping rods 7 being provided with clamping nuts 12, 12. By loosening the nuts therefore, the guide bars 6 may be horizontally adjusted with relation to each other and permitted to allow the guides 11 to receive fabrics of greater or less width. When the nuts 12 are tightened they clamp the bars 6 rigidly to the table 2 in any predetermined position. The rods 7 rise above the level of the table 2, so that the upper ends may be out of the way and readily grasped by the operator of the machine.

The main cutting element consists of a circular steel knife or disk 4 of greater or less diameter, preferably held by collars or other devices on the central portion of the horizontal driving shaft 10 which is journaled in an adjustable frame, and said disk 4 has a cutting edge which is kept sharp and of such a character that it will sever the threads of the fabric neatly and evenly at all times.

The lower rollers 15 and the oppositely-located top rollers 14, which receive the textile material between them and feed the same to the action of the cutting knife, have a substantial width as clearly indicated in Fig. 2, so that they may exert a pressure upon the surface of the fringe web A which passes between them. This wide surface on the rollers enables substantially the entire width of the web or fabric to be acted upon and compressed and held firmly when it is presented

to the knife, as is clearly shown in Fig. 3. Furthermore, the knife 4, which as stated, is a circular steel disk, the form of which may be subjected to different modifications, and which is mounted as described in an adjustable frame, is situated closely adjacent to the feed rollers, and in fact as particularly shown in Fig. 2, this knife 4 revolves in a narrow space between the two rollers 14 and also between the two rollers 15, see Fig. 3, so that the cutting edge may be brought as close as possible to the fringe fabric material at that point where it is under pressure between the upper and lower rollers, which is a point near to a vertical line which would pass through the shaft 17 of the upper rollers and the shaft 16 of the lower rollers. This is so in order that when the fringe fabric is held gripped taut by these rollers, and therefore in a state of tension throughout its entire width, the knife may be brought to exert its cutting action upon the fabric and sever the same accurately along the desired line of cut. The fact that the knife is in a very narrow space between the upper rollers and a corresponding narrow space between the lower rollers causes it to act on the tightly tensioned fabric at the proper point to cut it to the best advantage, because there is only this very small central portion of the fringe that is not actually gripped and firmly held by the rollers but the rollers hold the whole fabric taut at this point. In fact, only enough space is left at this point for the action of the knife, and as the knife is very thin the space can be very small. In order to keep the edge of the knife as close as possible to this tightly held portion of the fabric the swinging and adjustable frame for holding the knife is utilized and employed in the manner set forth. So the knife as it wears through grinding is advanced and set closer to the cutting point from time to time.

The shaft 16 which carries the lower rollers 15 has on one end thereof outside of the main frame, a sprocket wheel around which passes a sprocket chain 22, that likewise passes around a sprocket pinion on a shaft 32, journaled in the main frame as seen in Fig. 1, which shaft 32 carries on the end thereof opposite to where the pinion is located, a large drive pulley 19 around which runs a belt 33 that passes to the lower part of the main frame and engages a grooved section at 34 of a main actuating pulley 35, whose shaft is supported in the lower portion of the machine, and which pulley receives its power through any convenient connection with motive power that runs the shaft thereof, such connection not being shown. Furthermore, the belting 20 which connects with the lower pulley device 35 passes around the pulley 18 on the shaft 10 of the main cutting disk 4, and serves to drive the same coincidentally with the actuation of the rollers which receive and deliver the fringe fabric to the cutter under tension, all as clearly shown in Figs. 1, 3 and 4.

In order therefore that the cutting edge of the disk 4 may always be kept as close as possible to the part of the fringe fabric which is held tightly between the rollers 14 and the oppositely revolving rollers 15, to produce the best results in enabling the cutting edge to be always applied to that portion of the fabric which is firmly and rigidly held and presented thereto, said knife shaft 10 in its mounting in the frame for speedy revolution is held in bearings in an adjustable frame composed of vertical members 34 arranged to rock on a supporting pivotal shaft 35 at their lower ends, and having near their upper ends bolts having lock nuts 37 thereon which may be

easily loosened and tightened, such lock bolts projecting through slots 36 in stationary extensions 38 forming a part of the upper upright frames including the posts 3, 3 to which these horizontal bars 38 are bolted. Thus as the edge of the disk 4 is worn away by the various processes of sharpening the same in order that it may constantly keep its required keen edge, said rotary knife is adjusted from time to time by loosening and tightening the nuts 37, and thus presenting the edge of the cutter more closely to the operative point where the fringe is held under tension.

The fringe with which my machine is customarily utilized is indicated at A, for an example, before it is cut, and when it is first introduced into the machine, and the two parts into which the fabric A is cut by the action of the knife 4 are shown at a on the delivery side of the machine. The severed portions a fall over the inclined rear table 8 and are spread away from each other by the V-shaped guide consisting of cleats 9 arranged on the table 8, and coming to a point close to the point where the knife 4 acts and cuts the web whose strips a thus diverge from said point, so that the two cut sections a, a may be discharged accurately and quickly out of the machine and into suitable receptacles if desired which receive the same.

It may be here remarked that this particular fabric with which this machine is intended to be used is a narrow woven fabric in a multitude of different sizes, but ordinarily intended to be utilized in the manufacture of braid, narrow trimming or fringed material of different kinds. In such manufacturing it is the customary practice to weave a narrow fabric as at A, but this is only one stage of the manufacture, and the fabric A is not the final form which it assumes for use, but this narrow fabric or weave A is designed to be cut into two narrow lengths or widths by cutting along a central line through a cut which must be very accurately and clearly made, because it must leave raw edges that must not be allowed to permit the threads to become dissociated from each other, for then the fringe would be worthless for use in subsequent operations. The fringe fabric A is woven in a narrow fabric loom and consists of finished edges in which there may be two or three or any number of threads, and between these finished edges is the transverse fringe composed of a series of parallel threads of greater or less weight, size, compactness, number of threads, and character so that the texture of the fringe product may be determined thereby. The problem therefore is to cut these threads along a central line with a clean and straight cross-cut.

It has been and is the uniform practice in the art in the process of weaving the fringe fabric A, to weave thereinto centrally a pair of parallel warp seams or threads which would be very closely contiguous to the median line, in order that in cutting the fabric A into two parts the cut might be made between these two seams, the latter serving to temporarily hold the edges in a firm and cohesive fashion while being cut. In the operation of my improved machine however the material in the form of the fabric A, which is supplied thereto for the purpose of being cut, omits the use of the two parallel central wraps, because the action of my improved mechanism does not require the use of these seams. This is a very important desideratum and constitutes a marked improvement by simplifying the operation by diminishing the required handling of the material,

because it is evident that when such seams are introduced into the weaving of the fabric, the halves of said fabric after they have been cut, must be divested of these seams which then become useless, but they must be removed before the fabric can be used in the subsequent manufacturing operations.

When the fabric A is carried into the machine firmly and surely by the action of the feed rollers 14 and 15 which grip the fabric tightly between their associated peripheries, as indicated in Fig. 3 at a point where the knife 4 which is rapidly revolving applies its cutting effect to the fabric A along a central line, the result is that the fabric is cut without the need of any such stiffening and holding warps, and it is cut cleanly without any ravelling or irregular projecting filaments or edges of the threads, so that a firm cohesive raw edge on each of the subdivided strips is provided, and these strips a after leaving the machine are in perfect condition for such uses as they are naturally put to in the manufacturing operations for which they are adapted. These valuable results are secured and attained by the relations of the mechanical parts to each other and to the fringe in the method of handling the latter and offering the fabric to the action of the cutting edge in a close form, and the expeditious manner in which these parts cooperate for cutting and subdividing a fabric of this character.

Of course fringes or thread groups of varying widths may be submitted to the cutting operation, and I do not wish to be restricted, though at the same time the machine is primarily designed for fabrics of a narrow width which are made in that manner for the purpose of being afterward split into two or more parts by the cleavage of a knife, so that while the fabric may always be designated as one of narrow width, the width may vary to some extent. This is provided for by the adjustable guide members 6, 6 through whose grooves the fabric A passes in the manner which I have described. The fact that the resulting strips a are carried away from the machine by the parting effect of the V-shaped directing guide, is a useful feature in the disposition of the fabric, for it enables the complete material to be transferred from the cutting machine to a place where it can be immediately carried off for its other uses, and results in a distinct gain in the method of operation and the simplifying action of the manufacture.

Many details in the exact construction and relative arrangement of the parts of this machine may be changed from time to time to suit the exigencies of different cases and different uses and kinds of material, and the combination herein portrayed is presented as one successful specimen of the invention, but without any idea that the same would be confined thereto in all of its embodiments, but liberty is reserved to change and reconstruct the details of the machine insofar as this may be possible or desirable within the limits of the following claims.

The operation of my improved fabric cutting device needs little further explanation to make it fully understandable, in addition to the previous description which I have given of the relative arrangement of the various parts and their detailed construction. When the fabric A arrives at the machine it slips thereinto over the curved ledge 2^a at the front of the work table 2, and passes between the grooved guides 11 on bars 6, and is thereby directed certainly and accurately

toward the knife 4. This movement of the fabric A is controlled absolutely by these guides 11 which are adjustable with respect to the width of the fabric, so that it will be delivered flat and taut with its whole width resting on the table, from which it immediately passes between the lower rolls 15 and the upper rolls 14, being thereby gripped and pressed while being fed forward to the knife 4 which performs its cutting severance along the medium longitudinal line of the fabric in the manner that I have already set forth. The cleft fringe fabric which is cut into the two fringe strips a, a, are led out of the machine over the inclined drop-table 8, being guided by the ledges 9 on said table 8. The fabric A, while it has at its outer edge a finished appearance, is composed in the main of transverse threads in a compact series of parallel members adaptable to be made into fringe for various purposes, and when the knife 4 acts upon the threads under the peculiar conditions stated where the fabric and its threads are so flatly and tautly held while being fed forward, the cutting action does not disturb the position of the ends of the threads, but they are left relatively firm and in substantially the same position after being cut as they were before being cut, notwithstanding the fact that the ends of these threads are then free and under other conditions might become disarranged or tangled, and the strips a confused with respect to the strings or threads of which they are composed, which would impair the usefulness in future operations of the fabric sections so constituted, all of which dangers and disadvantages are obviated by the method of cutting by the use of a rotary knife which places its sharp cutting action against and upon the cross threads of the fringe while in a taut state.

What I claim is:

1. In the device of the class described, the combination with a circular knife, of feed rollers arranged in pairs above and below and the members of which are closely contiguous to each other with a narrow intervening space into which the circular knife projects, and means for accurately directing the textile strip between the rollers so that it may be acted upon by the knife at a point where it is taut between the rollers, and means for delivering the cut material from the machine in narrow strips comprising essentially a V-shaped guide located in alignment with the edge of the circular knife.

2. In combination with a circular vertical rotary knife, means for feeding a fringe web in a taut state thereto, means for guiding the fringe web to the feeding means, and V-shaped guide means for separating the cut fringe pieces after being cut, the apex of the V-shaped guiding means being aligned with the edge of the knife.

3. In a machine of the class described, the combination of a circular rotary knife, a guiding means for introducing the textile fringe into the machine, pairs of rollers for receiving said material and imparting thereto a tension when it reaches the knife, said rollers being located on opposite sides of the knife so that the cutting point thereof will be closely contiguous to said rollers at a point where the fringe is held taut, means for adjusting the edge of the knife relatively to the point where the taut fringe is de-

livered thereto, and means comprising a guide having an inclined face and located below the rotary knife to divert the separate cut strips from the machine in different directions.

4. In a machine of the class described, the combination of a circular rotary knife, guiding means for introducing textile material into the machine, the same having adjustable grooved members, feed rolls arranged in pairs on opposite sides of the knife and receiving the textile material from the guiding means and feeding the same forward under tension so that it will reach the knife while in a taut state, together with a V-guide means for discharging the separate cut strips from the machine, said guide having its apex aligned with and close to the rotary knife in an inclined position below and beyond the latter.

5. In a machine of the class described, the combination of a circular rotary knife, a frame in which it is mounted, means for adjusting said frame so as to relate the cutting edge of the knife to the point where it acts upon the textile material so as to compensate for wear and enable the cutting to be performed at the point where the material is under the strongest tension, pairs of feed rollers for delivering textile material to the cutter, said rollers having an elastic action with reference to each other so that the material may be fed forward under tension and may reach the cutter while it is in a taut state, and said rollers being located on opposite sides of the knife so that the cutting point will be in a narrow space between and close to the rollers.

6. In a machine of the class described, the combination of a circular rotary knife, an adjustable frame in which it is mounted so that the cutting edges may be advanced as required, means for guiding the textile material into the machine, the same having grooved members for the material, and feed rollers located close to the knife and having broad faces to exert pressure throughout a substantial width on the textile material to keep the same flat and taut when it is undergoing the cutting action to prevent fraying and scattering of the threads, and a V-shaped guide for delivering the separate cut strips from the machine.

7. In a machine of the class described, the combination of a circular rotary knife, means for adjustably supporting the shaft of the knife with reference to its work so that it may be fed forward as the edge is ground away in sharpening, means for delivering fringe to the knife consisting of feed rolls on opposite sides of the knife, the same being arranged in pairs and having flat peripheral faces which exert a tension upon the fringe material to keep the same taut when introduced to the knife, the latter being located in a narrow space between the feed rolls all operating to sever the fringe material into longitudinal strips of cut fringe whose threads are compacted together on the raw edges, together with grooved guide devices adjustable with relation to each other so as to be wider or narrower and direct the fringe material to the rollers, means for securing said guides, in any desired position, and a V-guide for separating the cut strips as they leave the machine.

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