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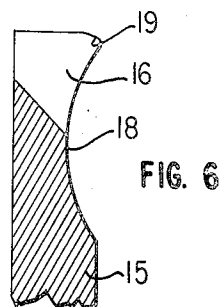
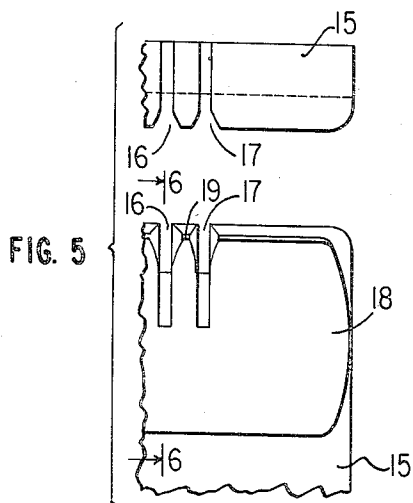
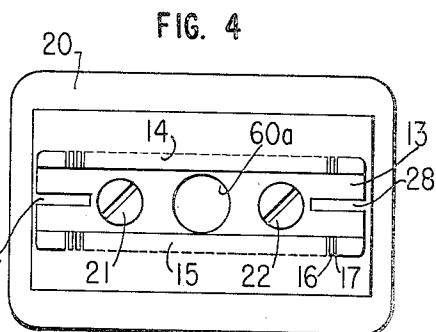
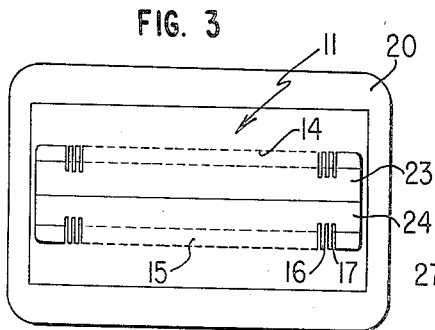
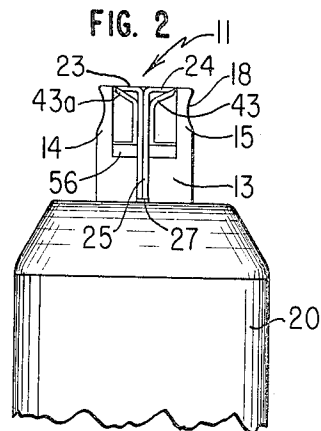
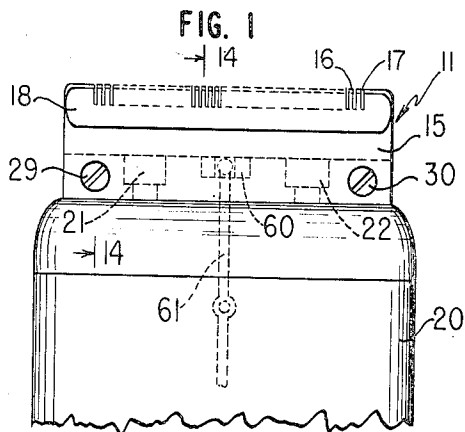
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2,544,897

SHAVING DEVICE

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2 Sheets-Sheet 1



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SHAVING DEVICE

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9 Claims. (Cl. 30—43)

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This invention relates to automatic shaving or haircutting devices and is particularly concerned with an improved cutter head or cutter mechanism for such devices.

The new cutter head comprises a cross-sectionally, generally U-shaped, open-ended comb or guard frame provided along its free parallel edges with transverse slots. In this guard or comb is mounted a cross-sectionally, generally T-shaped member whose crossbar forms two parallel wings which are transversely slotted and bridge the space across the free edges of the comb or guard frame. Each of these wings constitutes a stationary cutter. The transverse slots in the stationary cutter form cutting teeth and coact with the slots of the comb or guard frame for guiding hairs toward and into the cutting mechanism. Movably mounted on each side of the leg of the T-shaped member, underneath each wing forming a stationary cutter, is a movable cutter provided with transverse slots forming cutting teeth for coaction with the cutting teeth of the corresponding stationary cutter. Means are provided for oscillating the movable cutters with respect to the stationary cutters so as to cut hairs guided into the mechanism through the transverse slots in the edges of the comb or guard frame.

The prominent advantages of the new structure are structural as well as functional. The stationary as well as the movable cutters can be made of steel punchings, and are shaped so as to simplify the grinding operation which can be accomplished on standard surface grinders. The efficiency of the haircutting or shaving operation is improved by clipping the hair stubbles close to the skin at the instant when they enter the mechanism.

Details of the invention will appear from the description which is rendered below with reference to the accompanying diagrammatic drawings.

Figs. 1, 2 and 3 represent elevational side, end and top views, respectively, of an embodiment of a cutter mechanism made in accordance with the invention and mounted on a suitable handle;

Fig. 4 is a top view of the device, showing the handle carrying the guard frame or comb with the cutting mechanism removed therefrom;

Fig. 5 illustrates, on an enlarged scale, the comb or guard frame in fractional enlarged top and side views;

Fig. 6 indicates, on an enlarged scale, a section through the comb or guard frame along line 6—6 in Fig. 5;

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Fig. 7 shows a side and end view of the members forming the stationary cutters;

Fig. 8 represents a side and end view of the movable cutter which is to be mounted on either side of the structure, Fig. 7;

Fig. 9 shows three views of a spring for holding the movable cutters resiliently in engagement with the stationary cutters;

Fig. 10 illustrates three views of a member forming a carriage for oscillating the movable cutters of Fig. 8 with respect to the stationary cutters of Fig. 7;

Figs. 11 and 12 show the parts shown in Figs. 7-10 assembled before insertion into the comb or guard frame shown in Fig. 4;

Fig. 13 is a sectional view, on a greatly enlarged scale, taken approximately along line 13—13 of Fig. 11, showing the manner of slidably mounting the movable cutters on the T-shaped member forming the blades or wings which constitute the stationary cutters;

Fig. 14, at the left of the dot-dash vertical center line, shows an elevational end view of the mechanism greatly enlarged and, at the right of the dot-dash vertical center line, it shows the mechanism in section taken approximately along the line 14—14 in Fig. 1; and

Figs. 15 and 16 are diagrams illustrating the cutting action of a known cutting device and contrasting it with the action of a cutting device made in accordance with the present invention.

The drawings are not to scale, and are intended for illustrative and explanatory purposes only. Like parts are designated by like reference numerals throughout the drawings.

The new cutter head is generally indicated in Figs. 1, 2 and 3 by numeral 11. It comprises the cross-sectionally, generally U-shaped comb or guard frame having the base 13 and the legs 14 and 15. The free edges of the legs 14 and 15 extend in parallel and are transversely slotted as shown in Figs. 1, 3 and 4, to guide hair into the cutting mechanism. A fraction of the leg 15 of the comb is shown in Fig. 5, and two of its slots appear in these figures at 16 and 17. It will be seen that the slots are cut at an angle as shown in Fig. 6, and that each tooth or bar separated by two adjacent slots is undercut as indicated at 18, forming a hollowed shoe-like projection 19 at the tip of each bar. A comb-like structure is thus formed which facilitates the guiding of hairs through the slots such as 16 and 17 into the cutting mechanism.

The U-shaped comb frame is mounted on the housing forming the handle 20 by means of

screws 21 and 22 indicated in Figs. 1 and 4. Mounted in this comb is the stationary T-shaped member having two wings or blades 23 and 24 and depending legs 25 and 26 (see also Fig. 7) which engage slots 27 and 28 in the base 13 of the comb at either end thereof. The slots 27 and 28 in the base 13 are particularly apparent from Fig. 4. The stationary cutter with its two wings or blades 23 and 24 is firmly mounted in the base 13 of the comb by means of screws 29 and 30 shown in Fig. 1, which project through holes 31 and 32 (see Figs. 7 and 11) in the mounting legs 25 and 26, respectively, of the stationary cutters. The screw 29 is also shown in Fig. 14. It will be seen that the screw projects at one end of the base 13 of the comb frame into a threaded hole 33. The attachment is made by means of a split spacer sleeve 34. The stationary cutter with its blades or cutter wings 23 and 24 is thus firmly held in the base of the comb, with the blades 23 and 24 bridging the gap between the transversely slotted free ends of the comb legs 14 and 15.

The stationary cutter may be made of two steel punchings particularly indicated in Fig. 14 at 35 and 36, and these parts may be angularly shaped at one end to form the cutter blades or wings 23 and 24, and may be welded together so as to form the unitary mounting indicated in Figs. 2, 7 and 12 by numeral 25.

The blades 23 and 24 of the stationary cutter are transversely slotted as shown in the various figures, to provide cutting teeth for coaction with similar cutting teeth of the movable cutters which will be presently described. The slots forming these cutting teeth are coextensive with the slots in the free ends of the legs 14 and 15 of the guard or comb, so as to guide hairs into the cutter mechanism when the cutter head is operated in contact with the skin.

The structure of the stationary cutter and the manner in which it is disposed within the comb frame will be sufficiently clear from the foregoing description. This description may be supplemented with reference to Fig. 7 which shows that the stationary cutter is also provided with an elongated hole or aperture 40. This aperture serves the purpose of mounting on the stationary cutter the movable cutters having two wings or cutting blades for coaction with the stationary wings or cutting blades 23 and 24.

The structure of the movable cutter is particularly apparent from Fig. 8. The cutter comprises a generally U-shaped structure having a lower leg or base 41 which is formed substantially perpendicular to the intermediate section 42, and a leg 43 which is formed at an obtuse angle to the intermediate section or wall 42. In the wall section 42 is provided a hole 44. A depression forming a groove is provided in the wall 42 of the movable cutter, which extends from the hole 44 longitudinally to either side. The two sections of the groove extending from the hole 44 are indicated by numerals 46 and 47.

The movable cutter may likewise be punched from flat sheet steel just like the parts forming the stationary cutter. There are two such movable cutters provided in the mechanism shown in the drawings, one on either side of the stationary cutter, as indicated in Fig. 7 in dotted lines marked 42 and 42a.

The cutting edges of the wings or blades 23 and 24 of the stationary cutter and the coacting cutting edges of the blades 43 and 43a of the movable cutters are ground for cutting coaction, as is particularly apparent from Fig. 14. The

grinding operation can be accomplished on standard surface grinders, no special equipment being necessary.

The edges of the angular parts 43 and 43a of the movable cutters are provided with transversely inwardly extending slots forming cutting teeth for coaction with the cutting teeth in the stationary cutter blades 23 and 24. The number of teeth on the movable cutters may be equal to the number of teeth on the coacting stationary cutters, or less.

Fig. 9 shows a leaf spring 50 having a slot at either end, as indicated at 51 and 52. This leaf spring is provided for the purpose of resiliently holding the teeth or cutting edges of the wings 43 and 43a of the movable cutters in engagement with the teeth or cutting edges of the wings 23 and 24 of the stationary cutters.

The mechanism for reciprocating the movable cutters with respect to the stationary cutters includes the carriage shown in Fig. 10, which comprises the body portion 55 made of stamped or punched sheet material with the ends formed angularly to provide the projections or ledges 56 and 57. The body 55 is slotted at each end, as indicated at 58 and 59. A tubular bushing 60 depends from the body portion 55 for receiving the free end of an actuator arm 61 indicated in Figs. 1 and 11. This actuator arm may be actuated in any suitable manner by a suitable motor mechanism disposed within the casing forming the handle 20 (Figs. 1-4) for the purpose of reciprocating the carriage shown in Fig. 10, which in turn reciprocates the movable cutters with their toothed wings 43 and 43a relative to the toothed stationary cutter blades or wings 23 and 24.

Figs. 11 and 12 show the various parts of the cutting mechanism assembled outside of the guard or comb frame. Numerals 25 and 26 indicate the mounting legs of the stationary cutters which are provided with the holes 31 and 32. These legs or extensions 25 and 26 will be disposed within the slots or cut-outs 27 and 28 in the base 13 of the comb or guard frame, as shown in Fig. 4, when the mechanism is placed into the comb of the cutter head, and the structure is firmly secured in position by means of the screws 29 and 30 indicated in Fig. 1. The legs 25 and 26 thus extend in the assembled device upwardly from the base 13 of the comb and the stationary toothed cutter blades 23 and 24 bridge the gap between the free parallel edges formed by the legs 14 and 15 of the comb. The movable toothed cutter blades 43 and 43a, as shown in Figs. 11 and 12, are disposed underneath the stationary cutter blades 23 and 24, in resilient engagement therewith, the walls 42 and 42a of the members forming the movable cutter blades being slidably secured on the central portion of the stationary cutter which interconnects the mounting legs 25 and 26. Underneath the angular base extensions 41 and 41a is disposed the leaf spring 50, its slots 51 and 52 (see Fig. 9) accommodating the mounting legs 25 and 26 of the stationary cutters. Underneath the spring 50 is disposed the carriage 55, its slots 58 and 59 (see Fig. 10) being in alignment with the slots 51, 52 of the spring 50 accommodating the mounting legs 25 and 26 of the stationary cutter, and its angular ends 56 and 57 engaging the opposite ends of the bases 41 and 41a of the movable cutters.

The manner in which the movable cutters are slidably mounted on the central mounting por-

tion of the stationary cutters is particularly apparent from Figs. 13 and 14. In these figures, numerals 35 and 36 indicate the walls of the two stampings forming the central mounting portion of the stationary cutters. These walls are welded together to form the unitary structure 25 indicated, for example, in Figs. 2, 7, 11 and 12. The central mounting portion is provided with the hole or aperture 40 referred to in connection with the description of Fig. 7. The intermediate section 42 of the movable cutter attached to the wall 36 is provided with the hole 44 and with a depression or groove extending from the hole 44 on either side thereof, as indicated at 46 and 47. The intermediate sections 42a of the other movable cutter is provided with a similar hole 44a and with a depression or groove extending from the hole 44a on either side thereof, as indicated in Fig. 13 at 46a and 47a. The stampings forming the movable cutters are placed on the structure shown in Fig. 7, as indicated in Figs. 11, 12 and 14, in such a manner that the holes 44 and 44a in the two stampings 42 and 42a are in alignment with the hole 40 in the stampings 35 and 36 forming the central mounting portion of the stationary cutters. The assembly is secured, as shown in Figs. 13 and 14, by means of a loop-like member 65 which projects through the coextensive aligned holes 44-43-44a. A small leaf or rod-like spring 66 is then pushed through one end of the loop member 65 into position in the groove having the sections 46 and 47, as seen in Fig. 11. A similar small leaf or rod-like spring 67 is pushed through the other end of the loop member 65 in a similar manner, and its ends are placed in the grooved sections 46a and 47a (Fig. 13) in the wall 42a of the oppositely disposed movable cutter. We then have the parts assembled as shown in Figs. 11 and 12. The toothed wings 43 and 43a of the movable cutters are in sliding engagement with and on the under side of the toothed wings 23 and 24, respectively, which form the stationary cutters. The movable cutters are slidable on the wall or central mounting portion of the stationary cutters within the limits of the hole or aperture 40.

The stationary and movable cutters, assembled as just described, and as shown in Figs. 11 and 12, are inserted into the guard or comb frame shown in Fig. 4, which is attached to the housing forming the handle 20, the legs 25 and 26 (Fig. 11) projecting into the cut-outs 27 and 28, and the entire mechanism is secured by means of the screws 29 and 30, as shown in Fig. 1. The free end of the actuating lever 61 (Figs. 1 and 11) projects into the bushing 60 of the carriage 55. Oscillation of the actuating lever therefore causes reciprocation of the carriage 55, and thereby reciprocation of the movable cutters 43-43a relative to the stationary cutters 23-24. The cutter teeth of the movable cutters 43 and 43a are held in resilient engagement with and underneath the cutter teeth on the edges of the wings 23 and 24 of the stationary cutter. This resilient engagement is secured by means of a leaf spring 50.

Referring now to Fig. 15, this figure shows schematically a section through the cutter head of a known cutter mechanism comprising a stationary casing having the walls 70 and 71, the upper end being connected by the bridge section 72. This bridge section is transversely slotted as indicated at 72 to form the teeth of the stationary cutter. Within this casing is provided

a movable cutter having the walls 73 and 74 and a slotted, i. e., toothed, bridge section 75 and coaction with the cutting teeth formed by the slots in the stationary cutter section 72. The surface of the stationary cutter 72 is hollow-ground, as indicated in the drawing.

At the right of this diagrammatic representation, Fig. 15, of the cutter mechanism is shown a portion of skin 76 and a hair stubble 77. The cutting action of this cutting device will be understood when it is imagined that the mechanism is moved to the right from its position shown in Fig. 15, so as to cut hair stubbles such as 77. The hollow-ground surface of the stationary cutter 72 forms shoes or projections 78 which are elevated with respect to the central section. These shoes contact the skin. As the hair stubbles 77 move into the comb slots separating the shoes 78, they are cut and sliced in sections, the hollow-ground face of the cutter section 72 producing in this manner a progressive or step-by-step slicing and cutting of the hair stubbles. The operation lacks in certainty and therefore requires skill and experience in placing the mechanism and in manipulating it over the skin.

In the present invention the hair stubbles are sliced off or cut close to the skin at the instant they enter the cutter. Numeral 24 in Fig. 16 is one of the toothed stationary cutters corresponding to the similarly numbered cutter in the previously discussed figures; numeral 43 is the toothed movable cutter blade coacting with the stationary cutter 24; and numeral 16 designates a guide slot in the wall 15 of the comb or guard frame. 76a is part of the skin and 77a is a hair stubble projecting from the skin corresponding to the hair stubble 77 and the skin part 76 in Fig. 15. As the cutter mechanism is moved over the skin to the right, as shown in Fig. 16, the hair 77a is cut close to the skin, as indicated at 80, at the instant the hair enters through the guard slot 16 into the mechanism and into the path of the coacting cutting blades 43 and 44. Numeral 81 designates the hair stubble which is cut off. The action is positive and more efficient, requiring less effort and little skill or experience beyond stroking the cutter head over the skin portion which it is desired to shave.

Attention is called, in conclusion, to the manner in which the various parts of the mechanism are assembled and positioned for coaction. Hair stubbles which enter into the spaces below the movable cutters are expelled from the open opposite ends above the bases of the movable cutters which rest against the leaf spring 50. This leaf spring covers the bushing 60 in the carriage 55, thereby preventing deposit of hair through the bushing into the motor housing.

Changes may be made within the scope and spirit of the appended claims which define what is believed to be new and desired to have protected by Letters Patent of the United States.

I claim:

1. In a shaving device, a cutter mechanism comprising an elongated cross-sectionally substantially L-shaped member made of relatively thin sheet stock and having cutting teeth formed in the edge of one of its legs, means for mounting the other leg of said L-shaped member in fixed position to expose its toothed leg for shaving engagement with the skin to be shaved, the toothed leg of said member constituting the stationary cutter of the device, an angular elongated companion member made of relatively thin sheet stock forming a mounting portion for engage-

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ment with the mounted leg of said L-shaped member substantially throughout its length and also forming a toothed cutter portion extending at an angle to such mounting portion at one side thereof, said toothed cutter portion of said companion member constituting the movable cutter of the device, means exerting pressure effective transversely of said mounting portion of said companion member for resiliently retaining such mounting portion in engagement with the mounted leg of said L-shaped member and slidable relative thereto to position its toothed cutter portion for coaction with the stationary cutter, and means exerting pressure effective in a direction which extends perpendicular to the plane of said mounting portion of said companion member for retaining the teeth of the movable cutter teeth thereof in resilient engagement with the teeth of the stationary cutter.

2. In a shaving device, a cutter mechanism comprising a pair of elongated angular substantially L-shaped members each forming a mounting leg and a cutter leg, means for joining said mounting legs to form a generally T-shaped member with the joined mounting legs thereof forming a mounting element from one end of which project the cutter legs transversely outwardly thereof and perpendicular thereto, teeth formed in the free edges of said cutter legs, said toothed cutter legs constituting stationary cutters, a pair of elongated angular companion members, each companion member forming a mounting portion for engagement with one side of the mounting element of said T-shaped member and also forming a toothed cutter portion extending angularly outwardly at an angle to its mounting portion, said toothed cutter portions of said companion members constituting movable cutters for coaction with said stationary cutters, means for exerting pressure on the mounting portions of said companion members transversely thereof for resiliently retaining such mounting portions in engagement with said mounting element of said T-shaped member and slidable relative thereto to position said movable cutters for coaction relative to said stationary cutters, and means for exerting pressure on the mounting portions of said companion members in a direction perpendicular to the planes of the mounting portions thereof for retaining the teeth of the movable cutters resiliently in engagement with the teeth of the stationary cutters.

3. A shaving device comprising an integral cross-sectionally generally U-shaped member forming an elongated base and two transversely spaced legs generally perpendicularly extending therefrom, the free ends of said legs forming elongated parallel edges which are transversely slotted to form comblike guard elements, an elongated cross-sectionally generally T-shaped member forming a mounting leg which extends inwardly substantially centrally between the two legs of said U-shaped member and parallel therewith and also forming a pair of edgewise transversely toothed stationary cutter elements disposed across the gap between the parallel edges formed by the two transversely spaced legs of said U-shaped members at the free ends thereof, means for firmly securing the mounting leg of said T-shaped member in the base of said U-shaped member, an elongated movable cutter disposed alongside each side of a portion of the mounting leg of said T-shaped member and

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having an edgewise transversely toothed cutter element positioned underneath the corresponding stationary cutter element for cutting coaction therewith, and means for securing said movable cutters on the mounting leg of said T-shaped member in sliding engagement therewith, said last-named means comprising a resilient member for each movable cutter, and means for holding said resilient members in engagement with their associated movable cutters to retain such cutters resiliently in engagement with a portion of the mounting leg of said T-shaped member.

4. The structure defined in claim 3, together with means disposed underneath said movable cutters forming a reciprocable carriage, said carriage forming a ledge at each end thereof for overlapping endwise engagement with the corresponding ends of said movable cutters, and spring means disposed between said carriage and said movable cutters for holding the cutter elements thereof resiliently against their coacting stationary cutter elements.

5. In an automatic shaving device, a first member forming a mounting portion and a toothed edge constituting a stationary cutter, a coacting member forming a mounting portion and a toothed edge constituting a movable cutter for cutting coaction with said stationary cutter, the respective mounting portions of said stationary cutter and of said movable cutter each forming an aperture and elongated depressions extending from each aperture to either side thereof, securing means for resiliently holding the mounting portion of said movable cutter in engagement with the mounting portion of said stationary cutter, said securing means comprising an endless looplike fastener extending transversely through the apertures in said mounting portions, spring means disposed in said grooves and extending through said looplike fastener for holding such fastener at one end thereof, and means extending through said fastener for holding it at the other end thereof.

6. In a shaving device, a first member forming a mounting portion and a toothed edge constituting a stationary cutter, a coacting member forming a mounting portion and a toothed edge constituting a movable cutter for cutting coaction with said stationary cutter, securing means for slidably holding the mounting portion of said movable cutter on the mounting portion of said stationary cutter with said toothed edges in coacting resilient sliding engagement, said securing means comprising an endless looplike fastener extending transversely through the mounting portions of said cutters, and retaining means for holding in position the opposite ends of said looplike fastener.

7. The structure defined in claim 6, together with spring means forming part of said securing means for resiliently engaging said movable cutter at a point disposed perpendicular to the plane of said retaining means, and a reciprocable carriage for holding said spring means.

8. A cutter head for attachment to one end of the handle portion of a shaving device from which projects the free end of a rodlike actuator which may be oscillated by a suitable motor contained in said handle portion, said cutter head comprising an elongated unitary cross-sectionally generally U-shaped member forming a base and two legs extending therefrom to form a comblike guard frame having transversely slotted transversely spaced parallel edges, means

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for mounting the base of said guard frame on the end of said handle portion, a carriage in said guard frame adjacent the base thereof, a bushing like member extending from said carriage into an aperture formed in the base of said guard frame for receiving the free end of said rodlike actuator to cause reciprocation of said carriage by said actuator responsive to oscillation thereof by said motor, a stationary member mounted in and extending from the base of said guard frame, said stationary member carrying a pair of transversely outwardly extending wings forming oppositely disposed toothed stationary cutters positioned across the gap between the slotted edges of the legs of said guard frame, a movable cutter for each stationary cutter, and means formed on said carriage for reciprocating said movable cutters responsive to reciprocation thereof by said actuator.

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9. The structure defined in claim 8, together with means for slidably mounting said movable cutters, one on each side of said stationary member to form a unitary sub-assembly therewith.

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