Description

The present invention relates to a method of and an apparatus for producing hooks on surface-type fasteners known as hook-and-loop fasteners by cutting uncut loops on a base sheet on their one legs.

According to a known method and apparatus disclosed in CH-A 422 406 and reillustrated here in Figs. 7 and 8, a comb-like stationary cutter blade A of a given thickness and a pair of comb-like movable cutter blades B, B disposed on opposite sides of the stationary cutter blade A are inserted into loops C on a base sheet while the latter is fed along a path, and then the movable cutter blades B, B are horizontally reciprocated to cut the loops C on their one legs simultaneously at two different points, thereby producing hooks each of which has a relatively large loop-accepting passage or space substantially equal to the thickness of the stationary cutter blade A.

The known practice, however, has various drawbacks: The cutter blades A, B must be narrow and thin enough to pass through such small loops having a height of about 2 mm and hence they are hardly to manufacture at a low cost. The movable cutter blades B further need to be rigid enough to cut the loops of monofilament. Such rigid but thin movable cutter blades B are likely to be damaged and sometimes broken during cutting operation. The possibility of cutter breakage increases as the cutting speed or the reciprocating motion of the movable cutter blades B is increased. Additionally, the thin stationary cutter blade A is liable to vibrate in resonance with the reciprocation of the movable cutter blades B, thus making it difficult to cut all the loops at the same points of severance. Consequently, the resulted hooks have non-uniform shapes and configurations and provide only a low strength of engagement when coupled with loops of a mating fastener part. A further disadvantage is in that the loop-accepting spaces of the hooks, which depend on the thickness of the stationary cutter blade A, can be adjusted only by replacing stationary cutter blade A with another stationary cutter blade having a different thickness.

The present invention seeks to provide an improved method and apparatus for producing hooks on hook-and-loop fastener, which can overcome or substantially eliminate the foregoing drawbacks of the known practice.

The present invention further seeks to provide a method and apparatus for producing hooks on hook-and-loop fasteners by severing uncut loops twice on their one legs accurately at two different points by means of a loop cutter having a stationary blade and two movable blades, each of which is relatively thick and durable in construction, is free from resonant vibration and can be manufactured easily at a low cost.

The present invention further seeks to provide a method and apparatus for producing hooks on hook-and-loop fasteners, which can provide various loop-accepting passages or spaces with the hooks.

A method and an apparatus satisfying these requirements are characterized in claims 1 and 3, respectively.

Further developments of the invention are set forth in the depending claims.

The invention will now be described in more detail with reference to an exemplifying, non-limiting embodiment thereof illustrated in the accompanying drawings, in which

Figure I is a fragmentary cross-sectional view of an apparatus for producing hooks on hook-and-loop fasteners according to the present invention;

Figure 2 is an exploded perspective view of a loop cutter of the apparatus shown in Figure I;

Figure 3, appearing with Figure I, is an enlarged fragmentary end elevational view of a loop sheet having loops from which hooks are produced by the apparatus shown in Figure I;

Figure 4A is a cross-sectional view taken along line IV - IV of Figure I, showing the loop cutter in a first or standby position before effecting first loop-cutting operation;

Figure 4B is a view similar to Figure 4A, showing the loop cutter in a second position after the first loop-cutting operation;

Figure 5 is a cross-sectional view taken along V - V of Figure I;

Figure 6A is a cross-sectional view taken along line VI - VI of Figure I, showing the loop cutter in the first position before effecting a second loop-cutting operation;

Figure 6B is a view similar to Figure 6A, showing the loop-cutter in the second position after the second loop-cutting operation;

Figure 7 is a fragmentary plan view of a known apparatus; and

Figure 8 is a cross-sectional view illustrative of the operation of loop cutter of the known apparatus shown in Figure 7.

As shown in Figures I and 3, a loop sheet or tape I0 is composed of a foundation fabric II and a multiplicity of projecting uncut loops I2 of thermoplastic synthetic resin monofilament interwoven or interknitted in the foundation fabric II and arranged in rows and tiers at predetermined intervals or pitches. The loops I2 in transverse rows are longitudinally aligned in tiers. Each loop I2 has, as shown in Figure 3, a pair of legs I2a, I2b interconnected by an arcuate head I2c, the legs I2a, I2b being spaced from each other transversely of the foundation fabric II. The loop sheet I0 may be of the type, as shown in Figure 7, having a multiplicity of projecting loops arranged in transverse rows and longitudinal tiers, the loops in alternate transverse rows being transversely staggered by half the loop pitch in each transverse row, and the staggered loops in alternating transverse rows being longitudinally aligned in tiers.

An apparatus I3 for producing hooks according to the present invention comprises a sheet or tape guide I4 for slidably supporting the loop sheet I0 which is continuously or intermittently fed along a longitudinal path by a suitable sheet feed mechanism

(not shown). The loop sheet 10 as it is fed on and along an upper horizontal guide surface 15 of the sheet guide 14 turns around a downwardly sloping flat corner guide surface 16 and then is moved in a downward vertical direction, as shown in Figure 1.

The apparatus also includes a loop cutter 17 composed of a stationary blade 18 and a pair of upper and lower movable blades 19, 20 slidably disposed on opposite sides of the stationary blade 18.

As shown in Figure 2, the stationary blade 18 includes a substatially rectangular body 21 and a plurality of equally spaced, parallel cutting teeth 22 in the form of a comb projecting horizontally from an upper longitudinal edge of the body 21 in overhanging relation to the sheet guide surface 15 (Figure 1) for being inserted in the loops 12 and for cutting the loops 12, as described below. The comb teeth 22 have longitudinal axes transversely spaced by a distance equal to the half of the pitch or interval between each adjacent pair of loops 12 in one of transverse rows of the loops 12. The comb teeth 22 have a substantially square uniform cross-sectional shape throughout the length thereof and define therebetween a plurality of guide slots 23 opening toward the sheet guide 14 for receiving the legs 12a, 12b of the loops 12 as the loops 12 are advanced along the comb teeth 22. The stationary blade 18 further includes a plurality of guide grooves 24 extending contiguously from one or closed ends of the respective guide slots 23 downwardly across a beveled surface 25 of the cutter body 21. The bevelled surface 25 extends parallel to the corner guide surface 16 of the sheet guide 14 in confronting relation to the guide surface 16 so that the loops 12 after their first severance are advanced in and along the guide grooves 24. The guide groove 24 each have a width and a depth which are large enougth to alow passage of the cut loops 12 in such a manner as shown in Figure 5 in which the severed leg 12a and a hook 26 which have been produced from each cut loop 12 are guidedly received respectively in two adjacent guide grooves 24 with the severed leg 12a held in a posture suitable for a second severance made at a point near the foundation fabric 11. The stationary blade 18 has on its lower surface a plurality of cutting teeth 27 (Figure 1) in the form of comb defining therebetween lower ends or outlets of the respective guide grooves 24, and an elongate channel 28 disposed adjacent to the outlets of the guide grooves 24 in communication with the latter and extending across the cutter body 21 in a direction perpendicular to the axes of the cutting teeth 22 for discharging cut debris 29 (one being shown in Figure 1) produced during second loop-cutting operation.

The upper movable blade 19 is slidably mounted on an upper surface of the stationary blade 18 and includes a plurality of parallel, equally spaced tapered cutting teeth 30 in the form of a comb. The comb teeth 30 are half in number of the comb teeth 22 of the stationary blade 18 and, as shown in Figure 4A, they are disposed above every other comb teeth 22. The loops 12 are guided along the next adjacent comb teeth 22 extending between the comb teeth 22 above which the comb teeth 30 are disposed and hence the comb teeth 30 are normally disposed on the outer side of the loops 12. The comb teeth 30 are laterally movable into a position above the adjacent comb teeth 22 for effecting a first loop severance. The movable blade 19 is driven in a reciprocating movement in a direction perpendicular to the axes of the teeth 22, 30, through an amplitude or stroke substantially equal to the spacing between axes of two adjacent comb teeth 22 of the stationary blade 18 so that each loop 12 is cut only on its one leg 12a at a first point 31 (Figure 3) near the head 12c of the loop 12. Each of the comb teeth 30 has a width substantially equal to the width of each comb tooth 22 of the stationary blade 18. Since the comb teeth 30 are normally positioned outside of the loops 12 to be cut, it is not necessary to make the comb teeth 30 thin enough to be received in the loops 12 before the loop severance as in the case of the known comb teeth B (Figure 7). Unlike the known comb teeth B, the comb teeth 30 are made thick and hence can be manufactured easily at a low cost, and are durable in construction. Between the comb teeth 30, there are defined a plurality of slots 32 (Figure 2) opening toward the sheet guide 14.

The lower movable blade 20 which is disposed underneath the stationary blade 18 is structurally and functionally the same as the upper movable blade 19. More specifically, the lower movable blade 20 is slidably disposed on a lower surface of the blade body 21 and has tapered comb teeth 33 for further cutting, in co-action with the comb teeth 22, the loops 12 on their one legs 12a at a point 34 (Figure 3) near the foundation fabric 11. The tapered comb teeth 33 are equally spaced by a plurality of slots 35 Figure 2) defined therebetween so that the comb teeth 33 are disposed below every other comb teeth 22 of the stationary blade 18, as shown in Figure 6A. The comb teeth 33 are normally disposed on the outer side of the loops 12 and are laterally movable in a position immediately below the next adjacent comb teeth 22 extending between the severed leg 12a and the hook 26 of each loop 12 for further severing the severed leg 12a (Figure 6A to Figure 6B).

The upper and lower movable blades 19, 20 are assembled with the stationary blade 18 by means of three sets of bolts 36 and nuts 37 with three compression coil springs 38 disposed between and acting between the respective bolts 36 and the upper movable blade 19. The bolts 36 respectively extend successively through three holes 39 in the upper movable blade 19, through three oblong holes 40 in the stationary blade 18, and through three holes 41 in the lower movable blade 20. Each of the upper and lower movable blades 19, 20 includes an elongate guide ridge 42 extending perpendicularly to the axes of the comb teeth 30, 33 and slidably received in one of a pair of elongate guide recesses 43 defined in the upper and lower surfaces of the stationary blade 18. The movable blades 19, 20 thus assembled are reciprocably movable in unison in a direction perpendicular to the axes of the teeth 22 of the stationary blade 18. The reciprocating motion of the movable blades 19, 20 is limited by the length of the elongate holes 40.

The loop cutter 17 is horizontally and vertically

movable to adjust the positions of upper and lower pairs of the comb teeth 22, 30 and 22, 33 with respect to the sheet guide 14, thereby adjusting the distance d (Figure 3) between the first and second cutting points 31, 34. With this adjustment, it is possible to vary loop-accepting passages or spaces of the hooks 26 in depencence on the distance d.

Operation of the apparatus 10 of the foregoing construction is as follows: When the loop sheet 10 is fed on and along the upper guide surface 15 in a direction of the arrow 44 (Figure 1), alternate comb teeth 22 of the stationary blade 18 are inserted into the loops 12 in longitudinal tiers. A further advancing movement of the loop sheet 10 causes the loops 12 to enter into a first cutting region or a path of reciprocating movement of the comb teeth 30 of the upper movable blade 19 (Figure 4A). Then the movable blade 19 is driven to shift its comb teeth 30 rightward from the position of Figure 4A to the position of Figure 4B, thereby cutting each loop 12 on its one leg 12a at the first cutting point 31 (Figure 3) near the head 12c thereof. The other legs 12b which have not been severed and the heads 12c will serve as hooks 26 on the loop sheet 10 for engagement with piles (not shown) on a loop tape of a hook-and-loop fastener. The upper movable blade 19 is driven to move its comb teeth from the position of Figure 4B to the position of Figure 4A preparatory to the next loop cutting. The loop sheet 10, as it is further advanced, turns around the downwardly sloping corner guide surface 16, during which time the severed leg 12a and the hook 26 of each loop 12 are guidedly received in adjacent two of the guide grooves 24 in the stationary blade 18, as shown in Figure 5. When the severed loop 12 are arrived at the outlets of the respective guide grooves 24 where the stationary comb teeth 22 are formed, the lower movable blade 20 is driven to shift its comb teeth 33 rightward from the position of Figure 6A to the position of Figure 6B with the result that the severed leg 12a of each loop 12 is further cut at the second cutting point 34 (Figure 3) near the foundation fabric 11 while the leg 12a is still held stable in the guide groove 24. At this time, the cut debris 29 (Figure 1) are temporarily stored in the channel 28 and then they are discharged from the channel 28 outside the loop cutter 17. The lower movable blade 20 is driven to move its comb teeth 33 from the position of Figure 6B to the position of Figure 6A preparatory to the next loop cutting. The rate of advance of the loop sheet 10 is so synchronized with the reciprocation of the movable blades 19, 20 so that the movable blades 19, 20 made one reciprocation between the positons shown respectively in Figures 4A and 6A and the positions shown respectively in Figures 4B and 6B, each time a loop 12 reaches the cutting zone.

Claims

1. A method of producing hooks on hook-and-loop fasteners, comprising the steps of:

(a) introducing a plurality of parallel spaced first stationary cutting comb teeth (22) of a stationary blade (18) into loops (12) projecting from a foundation fabric (11) of a loop sheet (10) as the loop sheet (10) is fed along a path:

(b) cutting the loops (12) from the outside thereof on their one legs (12a) at a first point (31) near heads (12c) of the respective loops (12) by reciprocating a plurality of parallel spaced first movable cutting comb teeth (30) of a first movable blade (19) in a direction perpendicular to the axes of the comb teeth (22, 30) while the loops (12) are guided along the first stationary cutting comb teeth (22), thereby producing a hook (26) from each loop (12) thus severed;

(c) guiding the severed leg (12a) and the hook (26) of each severed loop (12) to move in and along an adjacent pair of parallel spaced guide grooves (24) defined in the stationary blade (18); and

(d) further cutting the severed leg (12a) from the outside of each severed loop (12) at a second point (34) near the foundation fabric (11) by reciprocating a plurality of parallel spaced second movable cutting comb teeth (33) of a second movable blade (20) in a direction perpendicular to the axes of the comb teeth of the stationary blade (18), characterized in that the stationary blade (18) is provided with a plurality of second stationary cutting comb teeth (27) for use when cutting the previously severed leg (12a) of each loop (12) at the second point (34) while the severed leg (12a) is held in on of the two adjacent guide grooves (24).

2. A method according to claim 1, said second stationary cutting comb teeth (27) being provided at outlets of the guide grooves (24).

3. An apparatus for producing hooks on hook-and-loop fasteners, comprising a sheet guide (14) for guiding a loop sheet (10) having a plurality of loops (12) arranged in transverse rows and longitudinal tiers and each having a pair of legs (12a, 12b) interconnected by a head (12c), and a loop cutter (17) disposed adjacent to said sheet guide (14) for cutting the loops (12) twice on their one legs (12a) at two different points (31, 34) as the loop sheet (10) is advanced along said first and second passages (15, 16), said loop cutter (17) including

(i) a stationary blade (18) having a plurality of parallel spaced stationary cutting comb teeth (22) for being inserted in the loops (12) in said tiers, a plurality of parallel spaced guide grooves (24) for receiving the loops (12);

(ii) a first reciprocably movable blade (19) slidably mounted on said stationary blade (18) and having a plurality of parallel spaced first movable cutting comb teeth (30) disposed above the stationary blade (18) for cutting the loops (12) from the outside thereof on their one legs (12a) at a first point (31) near the heads (12c) of the respective loops (12) while the loops (12) are guided along the remaining stationary cutting comb teeth (22); and

(iii) a second reciprocably movable blade (20) slidably mounted on said stationary blade (18) and having a plurality of parallel spaced second movable cutting comb teeth (33) disposed below the stationary blade (18) for further cutting the severed legs (12a) from the outside of the severed loops (12) at a second point (34) near the founda-

movable to adjust the positions of upper and lower pairs of the comb teeth 22, 30 and 22, 33 with respect to the sheet guide 14, thereby adjusting the distance d (Figure 3) between the first and second cutting points 31, 34. With this adjustment, it is possible to vary loop-accepting passages or spaces of the hooks 26 in depencence on the distance d.

Operation of the apparatus 10 of the foregoing construction is as follows: When the loop sheet 10 is fed on and along the upper guide surface 15 in a direction of the arrow 44 (Figure 1), alternate comb teeth 22 of the stationary blade 18 are inserted into the loops 12 in longitudinal tiers. A further advancing movement of the loop sheet 10 causes the loops 12 to enter into a first cutting region or a path of reciprocating movement of the comb teeth 30 of the upper movable blade 19 (Figure 4A). Then the movable blade 19 is driven to shift its comb teeth 30 rightward from the position of Figure 4A to the position of Figure 4B, thereby cutting each loop 12 on its one leg 12a at the first cutting point 31 (Figure 3) near the head 12c thereof. The other legs 12b which have not been severed and the heads 12c will serve as hooks 26 on the loop sheet 10 for engagement with piles (not shown) on a loop tape of a hook-and-loop fastener. The upper movable blade 19 is driven to move its comb teeth from the position of Figure 4B to the position of Figure 4A preparatory to the next loop cutting. The loop sheet 10, as it is further advanced, turns around the downwardly sloping corner guide surface 16, during which time the severed leg 12a and the hook 26 of each loop 12 are guidedly received in adjacent two of the guide grooves 24 in the stationary blade 18, as shown in Figure 5. When the severed loop 12 are arrived at the outlets of the respective guide grooves 24 where the stationary comb teeth 22 are formed, the lower movable blade 20 is driven to shift its comb teeth 33 rightward from the position of Figure 6A to the position of Figure 6B with the result that the severed leg 12a of each loop 12 is further cut at the second cutting point 34 (Figure 3) near the foundation fabric 11 while the leg 12a is still held stable in the guide groove 24. At this time, the cut debris 29 (Figure 1) are temporarily stored in the channel 28 and then they are discharged from the channel 28 outside the loop cutter 17. The lower movable blade 20 is driven to move its comb teeth 33 from the position of Figure 6B to the position of Figure 6A preparatory to the next loop cutting. The rate of advance of the loop sheet 10 is so synchronized with the reciprocation of the movable blades 19, 20 so that the movable blades 19, 20 made one reciprocation between the positons shown respectively in Figures 4A and 6A and the positions shown respectively in Figures 4B and 6B, each time a loop 12 reaches the cutting zone.

Claims

1. A method of producing hooks on hook-and-loop fasteners, comprising the steps of:

(a) introducing a plurality of parallel spaced first stationary cutting comb teeth (22) of a stationary blade (18) into loops (12) projecting from a foundation fabric (11) of a loop sheet (10) as the loop sheet (10) is fed along a path:

(b) cutting the loops (12) from the outside thereof on their one legs (12a) at a first point (31) near heads (12c) of the respective loops (12) by reciprocating a plurality of parallel spaced first movable cutting comb teeth (30) of a first movable blade (19) in a direction perpendicular to the axes of the comb teeth (22, 30) while the loops (12) are guided along the first stationary cutting comb teeth (22), thereby producing a hook (26) from each loop (12) thus severed;

(c) guiding the severed leg (12a) and the hook (26) of each severed loop (12) to move in and along an adjacent pair of parallel spaced guide grooves (24) defined in the stationary blade (18); and

(d) further cutting the severed leg (12a) from the outside of each severed loop (12) at a second point (34) near the foundation fabric (11) by reciprocating a plurality of parallel spaced second movable cutting comb teeth (33) of a second movable blade (20) in a direction perpendicular to the axes of the comb teeth of the stationary blade (18), characterized in that the stationary blade (18) is provided with a plurality of second stationary cutting comb teeth (27) for use when cutting the previously severed leg (12a) of each loop (12) at the second point (34) while the severed leg (12a) is held in on of the two adjacent guide grooves (24).

2. A method according to claim 1, said second stationary cutting comb teeth (27) being provided at outlets of the guide grooves (24).

3. An apparatus for producing hooks on hook-and-loop fasteners, comprising a sheet guide (14) for guiding a loop sheet (10) having a plurality of loops (12) arranged in transverse rows and longitudinal tiers and each having a pair of legs (12a, 12b) interconnected by a head (12c), and a loop cutter (17) disposed adjacent to said sheet guide (14) for cutting the loops (12) twice on their one legs (12a) at two different points (31, 34) as the loop sheet (10) is advanced along said first and second passages (15, 16), said loop cutter (17) including

(i) a stationary blade (18) having a plurality of parallel spaced stationary cutting comb teeth (22) for being inserted in the loops (12) in said tiers, a plurality of parallel spaced guide grooves (24) for receiving the loops (12);

(ii) a first reciprocably movable blade (19) slidably mounted on said stationary blade (18) and having a plurality of parallel spaced first movable cutting comb teeth (30) disposed above the stationary blade (18) for cutting the loops (12) from the outside thereof on their one legs (12a) at a first point (31) near the heads (12c) of the respective loops (12) while the loops (12) are guided along the remaining stationary cutting comb teeth (22); and

(iii) a second reciprocably movable blade (20) slidably mounted on said stationary blade (18) and having a plurality of parallel spaced second movable cutting comb teeth (33) disposed below the stationary blade (18) for further cutting the severed legs (12a) from the outside of the severed loops (12) at a second point (34) near the founda-

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tion fabric (11); characterized in that said sheet guide (14) defines thereon a horizontal first passage (15), and a downwardly inclined second passage (16) on which the loop sheet (10) is guided, that the stationary blade (18) has a plurality of first stationary cutting comb teeth (22) extending in overhanging relation to the horizontal first guide passage (15), that said guide grooves (24) extend downwardly from said first stationary cutting comb teeth (22) along said inclined second guide passage (16) and face toward said second passage (16) for receiving the loops (12) after their first severance, and in that the stationary blade (18) has a plurality of second stationary cutting comb teeth (27) defined at lower ends of said guide grooves (24).

4. An apparatus according to claim 3, said loop cutter (17) being vertically and horizontally movable with respect to said sheet guide (14) for adjusting said first and second cutting points (31, 34) on the loops (12).

5. An apparatus according to claim 3 or 4, said stationary blade (18) further having an elongate channel (28) disposed adjacent to said second stationary cutting comb teeth (27) and extending transversely across said guide grooves (24) for discharging cut debris (29) therefrom outside said loop cutter (17).

6. An apparatus according to one of the claims 3 to 5, said first stationary cutting comb teeth (22) having a uniform cross-sectional shape throughout the length thereof.

7. An apparatus according to one of the claims 3 to 6,said first stationary cutting comb teeth (22) defining therebetween a plurality of slots (23) opening toward said sheet guide (14), said guide grooves (24) extending contiguously from closed ends of the respective slots (23).

8. An apparatus according to one of the claims 3 to 7,said sheet guide (14) having a horizontal first guide surface (15) defining said first passage, and a downwardly sloping second guide surface (16) extending contiguously from said first guide surface (15) and defining said second passage.

9. An apparatus according to claim 8, said second guide surface (16) comprising a flat surface.

10. An apparatus according to one of the claims 3 to 9,said said first and second movable cutting comb teeth (30, 33) being tapered.

11. An apparatus according to one of the claims 3 to 10,said sheet guide (14) having a downwardly sloping guide surface (16) defining said second passage, said stationary balde (18) including a bevelled surface (25) extending parallel to said guide surface (16), said guide grooves (24) being defined in said bevelled surface (25).

Patentansprüche

1. Verfahren zur Herstellung von Haken an Flächenhaftverschlüssen, umfassend die Schritte:

a) Einführen einer Vielzahl von parallel beabstandeten ersten ortsfesten Schneidkammzähnen (22) einer ortsfesten Klinge (18) in die von einem Grundgewebe (11) einer Schlingenbahn (10) abstehenden Schlingen (12), während die Schlingenbahn (10) längs einer Bahn zugeführt wird;

b) Zerschneiden der Schlingen (12) von ihrer Außenseite her auf ihren einen Schenkeln (12a) an einer ersten Stelle (31) nahe den Köpfen (12c) der betreffenden Schlingen (12) durch Hin- und Herbewegen einer Vielzahl von parallel beabstandeten ersten beweglichen Schneidkammzähnen (30) einer ersten beweglichen Klinge (19) in einer Richtung rechtwinklig zu den Achsen der Kammzähne (22, 30), während die Schlingen (12) längs der ersten ortsfesten Schneidkammzähne (22) geführt werden, wodurch aus jeder auf diese Weise durchtrennten Schlinge (12) ein Haken (26) gebildet wird;

c) Führen des durchtrennten Schenkels (12a) und des Hakens (26) jeder durchtrennten Schlinge (12) zu einer Bewegung in und entlang einem benachbarten Paar parallel beabstandeter Führungsnuten (24), die in der ortsfesten Klinge (18) begrenzt sind; und

d) ferner Zerschneiden des durchtrennten Schenkels (12a) von der Außenseite jeder durchtrennten Schlinge (12) her an einer zweiten Stelle (34) nahe dem Grundgewebe (11) durch Hin- und Herbewegen einer Vielzahl von parallel beabstandeten zweiten beweglichen Schneidkammzähnen (33) einer zweiten bewegliche Klinge (20) in einer Richtung rechtwinklig zur Achse der Kammzähne der ortsfesten Klinge (18), dadurch gekennzeichnet, daß die ortsfeste Klinge (18) mit einer Vielzahl von zweiten ortsfesten Schneidkammzähnen (27) versehen ist, zur Verwendung beim Zerschneiden des zuvor durchtrennten Schenkels (12a) jeder Schlinge (12) an der zweiten Stelle (34), während der durchtrennte Schenkel (12a) in einer der beiden benachbarten Führungsnuten (24) gehalten ist.

2. Verfahren nach Anspruch 1, wobei die zweiten ortsfesten Schneidkammzähne (27) an den Auslässen der Führungsnuten (24) vorgesehen sind.

3. Vorrichtung zur Herstellung von Haken an Hakenhaftverschlüssen, umfassend eine Bahnführung (14) zum Führen einer Schlingenbahn (10), die eine Vielzahl von in Querreihen und in Längsreihen angeordneten Schlingen (12) aufweist, die jeweils zwei durch einen Kopf (12c) miteinander verbundene Schenkel (12a, 12b) haben, und eine Schlingenschneideinrichtung (17), die nahe der Bahnführung (14) angeordnet ist, um die Schlingen (12) an ihren einen Schenkeln (12a) an zwei verschiedenen Stellen (31, 34) zweimal zu zerschneiden, während die Schlingenbahn (10) längs der besagten ersten und zweiten Durchlässe (15, 16) vorwärts bewegt wird, wobei die Schlingenschneideinrichtung (17) umfaßt

i) eine ortsfeste Klinge (18) mit einer Vielzahl von parallel beabstandeten ortsfesten Schneidkammzähnen (22) zum Einführen in die Schlingen (12) der Längsreihen, einer Vielzahl von parallel beabstandeten Führungsnuten (24) zur Aufnahme der Schlingen (12);

ii) eine erste hin- und herbewegbare Klinge (19), die auf der ortsfesten Klinge (18) verschiebbar gelagert ist und eine Vielzahl von parallel beabstandeten ersten beweglichen Schneidkammzäh-

nen (30) aufweist, die über der ortsfesten Klinge (18) angeordnet sind, um die Schlingen (12) von ihrer Außenseite her an ihren einen Schenkeln (12a) an einer ersten Stelle (31) nahe den Köpfen (12c) der betreffenden Schlingen (12) zu durchschneiden, während die Schlingen (12) längs der übrigen Schneidkammzähne (22) geführt sind; und iii) eine zweite hin- und herbewegliche Klinge (20), die auf der ortsfesten Klinge (18) verschiebbar gelagert ist und eine Vielzahl von parallel beabstandeten zweiten beweglichen Schneidkammzähnen (33) aufweist, die unter der ortsfesten Klinge (18) angeordnet sind, um die durchtrennten Schenkel (12a) von der Außenseite der durchtrennten Schlingen (12) her an einer zweiten Stelle (34) nahe dem Grundgewebe (11) zu zerschneiden, dadurch gekennzeichnet, daß auf der Bahnführung (14) ein horizontaler erster Durchtritt (15) und ein nach unten geneigter zweiter Durchtritt (16) gebildet sind, auf dem die Schlingenbahn (10) geführt ist, daß die ortsfeste Klinge (18) eine Vielzahl von ersten ortfesten Schneidkammzähnen (22) hat, die sich in überdeckender Beziehung zu dem horizontalen ersten Durchtritt (15) erstrecken, daß sich die Führungsnuten (24) von den ersten ortsfesten Schneidkammzähnen (22) längs des geneigten zweiten Durchtritts (16) nach unten erstrecken und dem zweiten Durchtritt (16) zugekehrt sind, um die Schlingen (12) nach ihrer ersten Durchtrennung aufzunehmen, und daß die ortsfeste Klinge (18) eine Vielzahl von zweiten ortsfesten Schneidkammzähnen (27) hat, die an den unteren Enden der Führungsnuten (24) gebildet sind.

4. Vorrichtung nach Anspruch 3, wobei die Schlingenschneideinrichtung (17) in bezug auf die Bahnführung (14) vertikal und horizontal bewegbar ist, um die erste und die zweite Schnittstelle (31, 34) auf den Schlingen (12) einzustellen.

5. Vorrichtung nach Anspruch 3 oder 4, wobei die ortsfeste Klinge (18) ferner einen länglichen Kanal (28) hat, der nahe den zweiten ortsfesten Schneidkammzähnen (27) angeordnet ist und sich quer zu den Führungsnuten (24) erstreckt, um zerschnittene Abfälle (29) zur Außenseite der Schlingenschneideinrichtung (17) auszutragen.

6. Vorrichtung nach einem der Ansprüche 3 bis 5, wobei die ersten ortsfesten Schneidkammzähne (22) über ihre gesamte Länge einen gleichförmigen Querschnitt haben.

7. Vorrichtung nach einem der Ansprüche 3 bis 6, wobei die ortsfesten Schneidkammzähne (22) zwischen sich eine Vielzahl von Schlitzen (23) begrenzen, die zu der Bahnführung (14) hin münden, wobei die Führungsnuten (24) von den geschlossenen Enden der betreffenden Schlitze (23) ausgehen.

8. Vorrichtung nach einem der Ansprüche 3 bis 7, wobei die Führungsbahn (14) eine den ersten Durchtritt bildende horizontale Führungsfläche (15) und eine von dieser ersten Führungsfläche (15) ausgehende nach unten geneigte zweite Führungsfläche (16) hat, die den zweiten Durchtritt bildet.

9. Vorrichtung nach Anspruch 8, wobei die zweite Führungsfläche (16) eine ebene Fläche umfaßt.

10. Vorrichtung nach einem der Ansprüche 3 bis 9, wobei die ersten und zweiten beweglichen Schneidkammzähne (30, 32) verjüngt sind.

11. Vorrichtung nach einem der Ansprüche 3 bis 10, wobei die Führungsbahn (14) eine den zweiten Durchtritt bildende nach unten geneigte Führungsfläche (16) hat, wobei die ortsfeste Klinge (18) eine sich parallel zu der Führungsfläche (16) erstreckende Schrägfläche (25) aufweist, wobei die Führungsnuten (24) in dieser Schrägfläche (25) ausgebildet sind.

Revendications

1. Procédé de fabrication de crochets de fermetures du type à crochets et à boucles, comprenant les opérations suivantes:

a) introduction d'une pluralité de premières dents (22) de peigne de coupe fixes espacées parallèlement, appartenant à une lame fixe (18), dans des boucles (12) qui font saillie à partir d'un tissu de base (11) d'une surface (10) comportant des boucles, pendant le transport de la surface (10) comportant des boucles le long d'un parcours;

b) coupe des boucles (12) à partir de l'extérieur de celles-ci, sur l'une de leurs jambes (12a) en un premier point (31) situé à proximité des têtes (12c) des boucles respectives (12) en faisant aller et venir une pluralité de premières dents (30) de peigne de coupe mobiles espacées parallèlement d'une première lame mobile (19) dans une direction perpendiculaire aux axes des dents (22, 30) de peigne, pendant que les boucles (12) sont guidées le long des premières dents (22) de peigne de coupe fixes, en créant de ce fait un crochet (26) à partir de chaque boucle (12) ainsi sectionnée;

c) guidage de la jambe sectionée (12a) et du crochet (26) de chaque boucle sectionnée (12) afin de la déplacer à l'intérieur et le long d'une paire de rainures de guidage (24) voisines espacées parallèlement, définies dans la lame fixe (18); et

d) continuation de la coupe de la jambe sectionnée (12a) à partir de l'extérieur de chaque boucle sectionnée (12), en un second point (34) situé à proximité du tissu de base (11) en faisant aller et venir une pluralité de secondes dents (33) de peigne de coupe mobiles parallèlement espacées d'une deuxième lame mobile (20) dans une direction perpendiculaire aux axes des dents de peigne de lame fixe (18), caractérisé en ce que la lame fixe (18) est munie d'une pluralité de secondes dents (27) de peigne de coupe fixes, destinées à être utilisées lorsque l'on coupe la jambe précédemment sectionnée (12a) de chaque boucle (12) au second point (34) pendant que la jambe sectionnée (12a) est maintenue dans une des deux rainures (24) de guidage voisines.

2. Procédé selon la revendication 1, lesdites secondes dents (27) de peigne de coupe fixes étant agencés aux extrémités des rainures (24) de guidage.

3. Appareil de fabrication de crochets situés sur des fermetures du type à crochets et à boucles; comprenant un guide (40) pour surface destiné à guider une surface (10) de boucles comportant une pluralité de boucles (12) disposées en rangées

transversales et en rangées longitudinales et comportant chacune une paire de jambes (12a, 12b) reliées entre elles par une tête (12c), et un dispositif de coupe (17) de boucles disposé à proximité dudit guide (14) pour surface en vue de couper les boucles (12) deux fois sur une de leurs jambes (12a), en deux points différents (31, 34), pendant que l'on fait progresser la surface (10) comportant des boucles le long desdits premier et second passages (15, 16), ledit dispositif de coupe (17) comprenant:

I) une lame fixe (18) comportant une pluralité de lames (22) de peigne de coupe fixes espacées parallèlement destinées à être insérées dans les boucles (12) desdites rangées, et une pluralité de rainures de guidage (24) espacées parallèlement en vue de recevoir les boucles (12);

II) une première lame (19) susceptible d'être déplacée en va-et-vient, montée de manière coulissante sur ladite lame fixe (18) et comportant une pluralité de premières dents (30) de peigne de coupe mobiles espacées parallèlement disposées au-dessus de la lame fixe (18) en vue de couper les boucles (12) à partir de l'extérieur de celles-ci sur une de leurs jambes (12a) en un premier point (31) à proximité des têtes (12c) des boucles (12) respectives, pendant que les boucles (12) sont guidées le long des autres dents (22) de peigne de coupe fixes; et

III) une seconde lame (20) susceptible de se déplacer en va-et-vient, montée de manière coulissante sur ladite lame fixe (18) et comportant une pluralité de secondes dents (33) de peigne de coupe mobiles espacées parallèlement, disposées sous la lame fixe (18) en vue de continuer de couper les jambes qui ont été sectionnées (12a) à partir de l'extérieur des jambes qui ont été sectionnées (12) en un second point (34) situé à proximité du tissu de base (11); caractérisé en ce que ledit guide (14) pour surface comporte sur lui-même un premier passage horizontal (15) et un second passage (16) incliné vers le bas, sur lequel est guidée la surface (10) comportant des boucles, en ce que la lame fixe (18) comporte une pluralité de premières dents (22) de peigne de coupe fixes qui s'étendent au-dessus du premier passage de guidage horizontal (15), en ce que lesdites rainures de guidage (24) s'étendent vers le bas à partir desdites premières dents (22) de peigne de coupe fixes le long dudit second passage de guidage incliné (16) et qu'elles sont situées face audit second passage (16) en vue de recevoir les boucles (12) après le premier sectionnement de celles-ci et en ce que la lame de coupe fixe (18) comporte une pluralité de secondes dents de coupe fixes (27) définies aux extrémités inférieures desdites rainures de guidage (24).

4. Appareil selon la revendication 3, ledit dispositif de coupe (17) étant susceptible d'être déplacé verticalement et horizontalement par rapport audit guide (14) pour surface en vue de régler lesdits premier et second points de coupe (31, 34) sur les boucles (12).

5. Appareil selon la revendication 3 ou 4, ladite lame fixe (18) comportant en outre un passage de forme allongée (28) disposé à proximité desdites secondes dents (27) de peigne de coupe fixe, et s'étendant transversalement dans lesdites rainures de guidage (24) en vue d'évacuer les chutes (29) de coupe hors de celle-ci, à l'extérieur dudit dispositif de coupe de boucle (17).

6. Appareil selon l'une des revendications 3 à 5, lesdites premières dents (22) de peigne de coupe fixes, comportant une forme de section transversale uniforme sur toute leur longueur.

7. Appareil selon l'une quelconque des revendications 3 à 6, lesdites premières dents (22) de peigne de coupe fixes définissant entre elles une pluralité de fentes (23) qui s'ouvrent de direction dudit guide (14) pour surface, lesdites rainures de guidage (24) s'étendant de façon contigüe à partir des extrémités fermées des fentes respectives (23).

8. Appareil selon l'une des revendications 3 à 7, ledit guide (14) pour surface comportant une première surface de guidage horizontale (15) définissant ledit premier passage, et une seconde surface de guidage (16) inclinée vers le bas, s'étendant de façon contigüe à ladite première surface de guidage (15) et définissant ledit second passage.

9. Appareil selon la revendication 8, ladite seconde surface de guidage (16) comportant une surface plane.

10. Appareil selon l'une des revendications 3 à 9, lesdites premières et secondes dents (30, 33) mobiles de peigne de coupe étant effilées.

11. Appareil selon l'une des revendications 3 à 10, ledit guide (14) pour surface comportant une surface de guidage (16) inclinée vers le bas définissant ledit second passage, ladite lame fixe (18) comprenant une surface biseautée (25) s'étendant parallèlement à ladite surface (16) de guidage, lesdites rainures (24) de guidage étant définies dans ladite surface biseautée (25).