

Description

This invention relates to a method and apparatus for applying a protective strip to one end of a slide fastener for use on infant garments, for example, so as to cover an end portion of a pair of interengaged coupling element rows of the slide fastener.

In the manufacture of garments, a continuous slide fastener chain having a pair of interengaged rows of coupling elements mounted respectively on a pair of continuous fastener stringers is first attached by sewing to a garment fabric and then cut off into individual slide fastener lengths, successively.

The individual garment fabric with a slide fastener of individual length attached thereto is finally tailored into an infant garment. This conventional practice is efficient but is disadvantageous when used with a slide fastener chain having rows of continuous coiled or zigzag monofilamentary coupling elements because, upon severance of the fastener chain, a cut end portion of the monofilamentary coupling element is likely to be deformed and project outwardly from the general plane of the fastener stringer. The garment fabric having such projecting coupling element end is harmful particularly when the garment fabric is tailored into an infant wear.

With this drawback in view, the free end of the interengaged coupling element rows is covered by a protective strip applied by sewing to the end of the slide fastener. The application of the projective strip has heretofore been performed manually by first placing a protective strip of a predetermined length on and around one end of a slide fastener, and while keeping this placement of the strip, then sewing the protective strip to the end of the slide fastener. Such manual application of the protective strip is tedious and time-consuming and hence the productivity of garments with the slide fasteners attached thereto is extremely low.

US-A-2 438 615 discloses a method of applying a protective strip to an end of a slide fastener, comprising the steps of:-

- (a) extending a continuous protective tape and applying the protective tape to the end of the slide fastener;
- (b) folding a portion of the protective tape around the end of the slide fastener;
- (c) fastening the folded protective tape portion to the end of the slide fastener; and
- (d) severing said protective tape portion from the remainder of the protective tape.

However, the tape is extended transversely of several side-by-side lengths of slide fasteners all together, and US-A-2 438 615 does not disclose any apparatus for carrying out the operation automatically or even semi-automatically.

With the foregoing drawbacks in view, the present invention seeks to provide a method of semi-automat-

ically applying a protective strip to one end of a slide fastener at an increased efficiency.

The present invention further seeks to provide an apparatus for reducing the above method into practice.

According to a first aspect of the present invention there is provided a method of applying a protective strip to an end of a slide fastener as claimed in claim 1.

According to a second aspect of the present invention there is provided an apparatus for applying a protective strip to an end of a slide fastener as claimed in claim 6.

Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

Figure 1 is a fragmentary side elevational view, partly in cross section, of an apparatus according to the present invention;

Figure 2 is a front elevational view partly in cross section, of the apparatus;

Figure 3 is an enlarged perspective view of a main portion of the apparatus;

Figure 4 is a cross-sectional view taken along line IV - IV of Figure 2;

Figure 5 is a perspective view showing a cam device incorporated in an intermittent tape feed unit of the apparatus;

Figures 6(A) through 6(C) are side elevational views illustrative of a sequence of operation of the cam device;

Figure 7 is an enlarged plan view showing a pivotable side plate supporting thereon a cutter and a cutter actuation mechanism;

Figure 8 is a plan view showing the operation of the cutter;

Figures 9 and 10 are fragmentary perspective views of the apparatus, showing the manner in which a protective strip is applied to the leading end of a slide fastener; and

Figure 11 is a fragmentary perspective view of one end of a slide fastener having a protective strip applied thereto according to the present invention.

Figure 11 shows a portion of a slide fastener 1 including a protective strip 3 applied to an end of the slide fastener 1 according to the present invention. The protective strip 3 is attached by sewing stitches 6 to one end of a pair of opposed fastener stringers 4,5 so as to cover an end of a pair of interengaged rows of coupling elements 2. The application of the protective strip 3 to the slide fastener 1 is achieved on an apparatus shown in Figures 1 through 10.

As shown in Figures 1 and 2, the apparatus

includes a sewing machine SM having a sewing station or position X on its base 7, and an intermittent tape feed unit 10 disposed above a front end 8 of the base 7 for intermittently feeding a continuous protective tape 9 downwardly toward a tape supply station or position on the base 7 which is located upstream of the sewing position X as viewed along a direction of feed of a slide fastener indicated by the arrow 0 shown in Figure 1.

The tape feed unit 10 is composed of a vertical tape guide plate 12 secured to a frame 11 of the sewing machine SM, and a fluid-pressure cylinder actuator 15 having a tape feed member 14 connected to the front end of a piston rod 13 of the cylinder actuator 15. The cylinder actuator 15 is pivotally connected by a horizontal pin 16 to the sewing machine frame 11 and is normally urged by a resilient ring 17 to turn about the pin 16 in the counterclockwise direction in Figure 1, so that the tape feed member 14 is held in resilient contact with a vertical tape guide groove 18 in the tape guide plate 12. The resilient ring 17 extends around the cylinder actuator 15 and is connected with the tape guide plate 12. The resilient ring 17 is preferably formed of a ring of a coil spring.

The tape feed member 14 is reciprocally movable along the tape guide groove 18 in response to operation of the cylinder actuator 15. As shown in Figures 2, 5 and 6(A) - 6(C), a cam device 19 is disposed on the tape guide plate 12 at one side of the path of reciprocating movement of the tape guide member 14.

As shown in Figures 2 and 5, the cam device 19 includes a pair of vertically aligned support lugs or brackets 20, 21 projecting horizontally outwardly from the tape guide plate 12, a rocking lever 23 pivotally connected by a horizontal pin 24 to the upper bracket 20, a plate cam 22 secured to one side face of the rocking lever 23, and a tension coil spring 27 extending between upper and lower retainer pins 25, 26 connected to the pin 24 and the lower bracket 21, respectively, for urging the rocking lever 23 into abutment with the tape guide plate 12.

The plate cam 22 is in the shape of a parallelogram in plan with its major axis extending vertically, the plate cam 22 having a length or vertical extent L equal to a stroke of the reciprocating movement of the tape feed member 14.

As shown in Figure 3, the tape feed member 14 includes an actuating pin 28 projecting laterally outwardly toward the cam device 19 and engageable with a cam surface of the plate cam 22. The cam surface of the plate cam 22, as shown in Figures 5 and 6(A) - 6(C), is composed of two opposite vertical sides E, G normally extending parallel to a front face 29 of the tape guide plate 12 and two opposite sides D, F extending obliquely upwardly outwardly with respect to the front face 29 of the tape guide plate 12.

With this construction, when the cylinder actuator

15 is operated to extend its piston rod 13, the tape feed member 14 is lowered to feed the protective tape 9 downwardly along the tape guide groove 18 in the tape guide plate 12. The downward movement of the tape feed member 14 causes the actuating pin 28 to engage the upper oblique side D of the plate cam 22, as shown in Figure 6(A). As the tape feed member 14 is further advanced, the actuating pin 28 slides downwardly along the upper oblique side D of the plate cam 22 to turn the rocking lever 23 in the direction of arrow H against the force of the tension coil spring 27 and then moves into sliding engagement with the inner vertical side E of the plate cam 22, as shown in Figure 6(B).

As described above, the length (vertical extent) L of the plate cam 22 is the same as the stroke of the reciprocating movement of the tape feed member 14. Therefore, if the actuating pin 28 and the plate cam 22 are set in such a positional relation that a lower peripheral portion of the actuating pin 28 is held in contact with a top apex of the plate cam 22 when the tape feed member 14 is disposed in its uppermost position, and an upper peripheral portion of the actuating pin 28 is held in contact with a bottom apex of the plate cam 22 when the tape feed member 14 is located in its lowermost position, then upon completion of downward movement of the tape feed member 14 for feeding a length of the protective tape 9, the actuating pin 28 will be disengaged from the bottom apex of the plate cam 22 as the rocking lever 23 is turned in the direction of arrow I under the force of the tension coil spring 27, as shown in Figure 6(C). Immediately thereafter, the actuating pin 28 is brought into contact with the lower oblique side F of the plate cam 22 under the force of the resilient ring 17 (Figure 1) tending to urge the cylinder actuator 15 in a direction to move the tape feed member 14 toward the front face 29 of the tape guide plate 12. Due to this engagement of the actuating pin 28 with the lower oblique side F, however, the tape feed member 14 is held out of contact with the protective tape 9 received in the guide groove 18 in the tape guide plate 12.

Then the tape feed member 14 is moved upwardly whereupon the actuating pin 28 slides upwardly along the lower oblique side F and then moves into sliding contact with the outer vertical side G of the plate cam 22 as indicated by dotted lines in Figure 6(C). During that time, the tape feed member 14 is kept out of contact with the protective tape 9. When the tape feed member 14 arrives at its uppermost position, the actuating pin 28 is disengaged from the top apex of the plate cam 22 under the resiliency of the resilient ring 17 (Figure 1) tending to urge the cylinder actuator 15 to turn in a direction to move the tape feed member 14 toward the front face 29 of the tape guide plate 12. The tape feed member 14 is thus brought into contact with the protective tape 9 again under the resiliency of the resilient ring 17.

As shown in Figures 1 through 3, a tape guide block 31 is disposed immediately below a lower end 30 of the tape guide plate 12. The tape guide block 31 is secured to the distal end of a side plate 33 pivotably connected by a vertical pin 32 to the frame 11. The tape guide block 31 has a vertical tape guide channel 34 defined in a front face of the tape guide block 31 directed to an upstream side of the slide fastener feeding direction of arrow O, the tape guide channel 34 extending contiguous to the tape guide groove 18 in the tape guide plate 12. The tape guide channel 34 has a varying depth progressively reducing from an upper end to a lower end thereof such that at its upper end, the tape guide channel 34 has the same depth as the tape guide groove 18 and, at its lower end, the tape guide channel 34 blends into the front face of the tape guide block 31, as indicated by the dotted lines in Figure 3. The tape guide channel 34 is covered by upper and lower covers 35, 36 (Figures 1 and 2) secured to the front face of the tape guide block 31.

The tape guide block 31 includes a cutting edge 38 formed along the front edge of a bottom surface 37 of the tape guide block 31. The cutting edge 38 cooperates with a horizontal cutter 39 to sever the protective tape 9, as described later on. The cutter 39 is horizontally movable in a direction perpendicular to the tape guide channel 34 in the tape guide block 31.

As shown in Figures 1, 3, 7 and 8, the cutter 39 is firmly connected to the front end of a horizontal shaft 40 extending across the tape guide block 31. The horizontal shaft 40 is connected by a universal joint 44 to a piston rod 43 of a fluid-pressure cylinder actuator 42 horizontally supported by a bracket 41 secured to the side plate 33. The universal joint 44 permits the shaft 40 to rotate about its own axis.

The cutter 39 serves to perform a scissors-like action relative to the stationary cutting edge 38 of the tape guide block 31 for cutting the protective tape 9. To this end, the cutter 39 is tapered widthwise toward the distal end thereof such that the cutter 39 and the cutting edge 38 normally define therebetween a substantially triangular space, as shown in Figures 7 and 8, and the proximal end 45 of the cutter 39 is always disposed in sliding contact with the bottom surface 37 of the tape guide block 31. With this construction, when the shaft 40 is retracted in the direction of arrow J, the cutter 39 is brought into sliding engagement with the bottom surface 37 of the tape guide block 31 progressively from the proximal end to the distal end thereof, thereby severing the protective tape 9 by and between the movable cutter 39 and the stationary cutting edge 38. This sliding engagement causes the shaft 40 to be turned in the direction of arrow K against the force of a tension coil spring 47 which extends between the side plate 33 and a retainer pin 46 on the shaft 40 for urging the shaft 40 to turn about its own axis in a direction opposite to the direction of arrow K, as shown in Figure 9.

Upon completion of cutting, the shaft 40 is advanced in a direction opposite to the direction of arrow J and is returned to the standby position shown in Figure 3 by the force of the tension coil spring 47.

An air nozzle 48 is disposed in a path of movement of the slide fastener at a position downstream of the sewing position X and directed upstream of the slide fastener feeding direction indicated by the arrow O for issuing a stream of pressurized air along the upper surface of the base against one surface of the protective tape 9. The air nozzle 48 is horizontally supported by a bracket 49 secured to the side plate 33.

As shown in Figures 1 - 3, the underside of the cutter 39 and the upper surface of the base 7 jointly define therebetween a fastener receiving-space 50. The height or vertical extent of the space 50 is determined such that a leading end of the protective tape 9 is properly folded into a U-shape extending from the back to the face of a slide fastener 1 around the leading end thereof when the slide fastener 1 is advanced through the fastener-receiving space 50.

As described above, the tape guide block 31, the cutter 39, the cylinder actuator 42 connected to the shaft 40, and the air nozzle 48 are mounted on the side plate 33 pivotably supported by the vertical pin 32 to the frame 11. The side plate 33 is normally held in a predetermined position relative to the frame 11 in which position, the tape guide block 31, the cutter 39 and the air nozzle 48 are disposed in alignment with the path of movement of the slide fastener 1. To hold the side plate 33 in this position, there is provided a positioning unit.

The positioning unit, as shown in Figures 2 - 5, includes an L-shaped locking lever 51 pivotably connected by a vertical pin 52 to the front end of the side plate 33 adjacent to the tape guide block 31. The locking lever 51 has a locking hook 53 projecting from one end thereof toward the tape guide plate 12. The tape guide plate 12 has a locking groove 54 lockingly engageable with the hook 53 on the locking lever 51. The positioning unit further includes a compression coil spring 56 acting between the locking lever 51 and the side plate 33 for urging the locking lever 51 to turn about the pin 52 in one direction to bring the locking hook 53 into interlocking engagement with the locking groove 54 in the tape guide plate 12. The pivotal movement of the locking lever 51 in this direction is limited by an adjustment screw 57 engageable with the other end 55 of the locking lever 51. The adjustment screw 57 is positionally adjustably mounted on a bracket 58 secured to the side plate 33. The hook 53 is released from locking engagement with the locking groove 54 when the locking lever 51 is turned in the opposite direction against the force of the compression coil spring 56, thereby allowing the side plate 33 to be turned about the pin 32 in the direction of arrow M to bring the components 31, 39, 42 and 48

into a position laterally remote from the path of movement of the slide fastener 1. With this arrangement, the maintenance of the sewing machine SM can be performed easily without interference with the components supported on the side plate 33.

As shown in Figures 1 and 2, the protective tape 9 is wound around a reel 59 rotatably mounted on a horizontal shaft 60 supported by the frame 11. A compression coil spring 62 is disposed around the shaft 60 and acts between the reel 59 and a retainer ring 61 secured to the shaft 60.

The spring 62 serves to exert a braking force to the reel 59 for preventing the reel 59 from overrunning by inertia as the protective tape is withdrawn from the reel 59. The sewing machine SM includes a presser foot 63 disposed in the sewing position X in which a sewing needle 64 is driven to reciprocate in a known manner.

The apparatus of the foregoing construction operates as follows.

The cylinder actuator 15 of the intermittent tape feed unit 10 is activated to extend its piston rod 13 whereupon the tape feed member 14 while being biased by the resilient ring 17 into resilient engagement with one surface of the continuous protective tape 9 is lowered to feed the protective tape 9 downwardly along the tape guide groove 18 and the tape guide channel 39 toward the supply portion on the base 7 while keeping the surface of the protective tape 9 facing opposite to the slide fastener feeding direction indicated by the arrow O. The downward movement of the tape feed member 14 is terminated when the piston rod 13 is fully extended. In this instance, a leading end portion of the protective tape 9 is downwardly withdrawn from the bottom surface 37 of the tape guide block 31 by a predetermined length and a substantial part of the leading end portion is laid over the upper surface of the base 7.

Simultaneously with the activation of the cylinder actuator 15, the air nozzle 48 is activated to start issuing a stream of pressurized air upstream along the upper surface of the base 7. The pressurized air thus issued then impinges on the opposite surface of the protective tape 9, thereby bending the leading end portion of the protective tape 9 in a direction opposite to the slide fastener feeding direction indicated by the arrow O as the protective tape 9 is advanced (Figures 1 - 3). Thus, the air nozzle 48 constitutes means for bending the leading end portion of the protective tape 9. The activation of the air nozzle 48 may be retarded until arrival of the piston rod 13 of the cylinder actuator 15 at its fully extended position for saving the amount of consumption of pressurized air.

Then a slide fastener 1 is fed longitudinally along the path through the fastener-receiving space 50 until the leading end of the slide fastener 1 reaches the sewing position X. With this forward movement of the slide fastener 1, the leading end portion of the protec-

tive tape 9 is bent into a U-shape extending from the back to the face of the slide fastener 1 around the leading end of the slide fastener 1 and covering an end portion of a pair of interengaged rows of coupling elements 2.

Upon arrival of the leading end of the slide fastener 1 at the sewing position X, the sewing machine SM is energized to lower the presser foot 63 to thereby force the U-shaped leading end portion of the protective tape 9 against the base 7 with the leading end of the slide fastener 1 firmly gripped by the U-shaped leading end portion of the protective tape 9. Then, the cylinder actuator 15 is operated to retract its piston rod 13, thereby returning the tape feed member 14 to the upper standby position. During this return trip, the tape feed member 14 is held out of contact with the protective tape 9 so as not to withdraw the protective tape 9 upwardly away from the base 7. At the same time, the air nozzle 48 is de-activated to terminate issuing the stream of pressurized air.

While keeping the holding of the leading end portion of the protective tape 9 and the leading end of the slide fastener 1, the cylinder actuator 42 is activated to retract its piston rod 43 and hence the shaft 40 connected to the piston rod 43 via the universal joint 44. The retracting movement of the shaft 40 causes the cutter 39 to be moved into coaction with the cutting edge 38 of the tape guide block 31, thereby cutting off a U-shaped protective strip from the continuous protective tape 9, as shown in Figure 10.

Thereafter, the sewing needle 64 is reciprocated to thereby attach the protective strip 3 to the leading end of the slide fastener 1 by sewing stitches 6 extending transversely across the width of the protective strip 3. The protective strip 3 thus attached covers the end of the interengaged rows of coupling elements 2 to thereby prevent the latter from projecting to the outside of the slide fastener 1.

Upon completion of the sewing, the sewing machine SM is de-energized whereupon the presser foot 63 returns to its upper standby position, thereby releasing the end of the slide fastener 1. At the same time, the cylinder actuator 42 is operated to extend its piston rod 43, thereby moving the cutter 39 from the cutting position of Figure 10 to the standby position of Figure 3. The foregoing sequence of operation of the components (namely, the cylinder actuators 15, 42, the air nozzle 48 and the sewing machine (SM)) is performed under the control of suitable sensors (now shown) which are connected to the components to interlock their operations. The foregoing cycle of operation is repeated after the slide fastener 1 with the protective strip 3 sewn thereto is removed from the sewing position X.

The cutting operation may be performed without holding of the U-shaped leading end portion of the protective tape 9 and the leading end of the slide fastener 1 by the presser foot 63 in which instance the

upward movement of the tape feed member 14 is retarded until after completion of the cutting operation.

Claims

1. A method of applying a protective strip (3) to an end of a slide fastener (1), comprising the steps of:

- (a) extending a continuous protective tape (9) and applying a portion (3) of the protective tape (9) to the end of the slide fastener (1);
- (b) folding said portion (3) of the protective tape (9) around the end of the slide fastener;
- (c) fastening the folded protective tape portion (3) to the end of the slide fastener (1); and
- (d) severing said protective tape portion (3) from the remainder of the protective tape;

characterised in that the continuous protective tape (9) is initially fed downwardly towards a supply position on a base (7) of a sewing machine (SM), said supply position being upstream of a sewing position (X) of the sewing machine (SM) in relation to a direction of feed (O) of said end of the slide fastener (1) towards the sewing position (O), one face of the protective tape (9) facing the direction from which said end of the slide fastener (1) is to be fed to said sewing position (X);

a leading end portion (3) of the protective tape (9) is then bent towards the direction from which the slide fastener (1) is to be fed to said sewing position (X), and the feeding of the protective tape (9) is continued until a predetermined length of the protective tape (9) lies along the sewing machine base (7);

said end of the slide fastener is then fed, over the base (7) of the sewing machine (SM) and over said predetermined length of the protective tape (9), to said sewing position (X), thereby causing said folding of the protective tape (9) around the end of the slide fastener (1);

and the fastening of the folded protective tape portion (3) to the end of the slide fastener (1) is done by sewing at said sewing position (X).

2. A method according to claim 1, wherein said bending (b) of the leading end portion of the protective tape (9) is performed by issuing a stream of pressurized air along an upper surface of the base (7) from a downstream side toward an upstream side of said supply position.

3. A method according to claim 2, wherein said issuing of the stream of pressurized air is maintained during said feeding (c) of the slide fastener (1).

4. A method according to claim 2, wherein said issuing of the stream of pressurized air is maintained during said feeding (a) of the protective strip (9) and said feeding (c) of the slide fastener (1).

5. A method according to claim 1, between said feeding (c) of the slide fastener (1) and said cutting (d)

of the protective tape (9), further including forcing the U-shaped leading end of the protective tape (9) downwardly against the upper surface of the base (7), thereby firmly retaining the U-shaped leading end portion of the protective tape (9) and the leading end of the slide fastener (1) in the sewing position against displacement.

6. An apparatus for applying a protective strip (3) to an end of a slide fastener (1), comprising a sewing machine (SM) including a base (7) and a sewing needle (64) reciprocally disposed above a sewing position (X) defined on an upper surface of said base (7), characterised by said base (7) further defining on its upper surface a tape supply position located upstream of said sewing position (X);

an intermittent tape feed unit (10) disposed above said tape supply position on said base (7) for intermittently feeding a continuous protective tape (9) downwardly toward said tape supply position, while keeping one surface of the protective tape (9) facing in a direction opposite to a direction of feed of a slide fastener (1) toward said sewing position (X), until a leading end portion of the protective tape (9) overlays the upper surface of said base (7) by a predetermined length;

a tape guide block (31) disposed between said intermittent tape feed unit (10) and said base (7) and spaced upwardly from the upper surface of said base (7) so as to define therebetween a fastener-receiving space (50) for the passage of double layers of the protective tape (9) and the slide fastener (1), said tape guide block (31) having a substantially vertical tape guide channel (34) for guiding therealong the protective tape (9);

a cutter assembly (38, 39) disposed adjacent to a lower end of said tape guide channel (34) in said tape guide block (31) for cutting off the leading portion (3) of the protective tape (9) from the continuous protective tape (9); and means (48) for bending the leading end portion (3) of the protective tape (9) toward said direction along the upper surface of said base (7).

7. An apparatus according to claim 6, said sewing machine (SM) further including a presser foot (63) disposed above said sewing station (X) and reciprocally movable toward and away from the upper surface of said base (7).

8. A apparatus according to claim 6, said intermittent tape feed unit (10) including a tape guide plate (12) disposed immediately above said tape guide block (31) and having a vertical tape guide groove (18) extending contiguously upwardly from said tape guide channel (34) for receiving therein the protective tape (9), a tape feed member (14) reciprocally movable along said tape guide groove (18), resilient means (17) for urging said tape feed member (14) into resilient contact with the protective tape (9) received in said tape guide groove (18), a cam device (19) disposed on said tape guide plate (12) and engageable

upward movement of the tape feed member 14 is retarded until after completion of the cutting operation.

Claims

1. A method of applying a protective strip (3) to an end of a slide fastener (1), comprising the steps of:
 (a) extending a continuous protective tape (9) and applying a portion (3) of the protective tape (9) to the end of the slide fastener (1);
 (b) folding said portion (3) of the protective tape (9) around the end of the slide fastener;
 (c) fastening the folded protective tape portion (3) to the end of the slide fastener (1); and
 (d) severing said protective tape portion (3) from the remainder of the protective tape;

characterised in that the continuous protective tape (9) is initially fed downwardly towards a supply position on a base (7) of a sewing machine (SM), said supply position being upstream of a sewing position (X) of the sewing machine (SM) in relation to a direction of feed (O) of said end of the slide fastener (1) towards the sewing position (O), one face of the protective tape (9) facing the direction from which said end of the slide fastener (1) is to be fed to said sewing position (X);

a leading end portion (3) of the protective tape (9) is then bent towards the direction from which the slide fastener (1) is to be fed to said sewing position (X), and the feeding of the protective tape (9) is continued until a predetermined length of the protective tape (9) lies along the sewing machine base (7);

said end of the slide fastener is then fed, over the base (7) of the sewing machine (SM) and over said predetermined length of the protective tape (9), to said sewing position (X), thereby causing said folding of the protective tape (9) around the end of the slide fastener (1);

and the fastening of the folded protective tape portion (3) to the end of the slide fastener (1) is done by sewing at said sewing position (X).

2. A method according to claim 1, wherein said bending (b) of the leading end portion of the protective tape (9) is performed by issuing a stream of pressurized air along an upper surface of the base (7) from a downstream side toward an upstream side of said supply position.

3. A method according to claim 2, wherein said issuing of the stream of pressurized air is maintained during said feeding (c) of the slide fastener (1).

4. A method according to claim 2, wherein said issuing of the stream of pressurized air is maintained during said feeding (a) of the protective strip (9) and said feeding (c) of the slide fastener (1).

5. A method according to claim 1, between said feeding (c) of the slide fastener (1) and said cutting (d)

of the protective tape (9), further including forcing the U-shaped leading end of the protective tape (9) downwardly against the upper surface of the base (7), thereby firmly retaining the U-shaped leading end portion of the protective tape (9) and the leading end of the slide fastener (1) in the sewing position against displacement.

6. An apparatus for applying a protective strip (3) to an end of a slide fastener (1), comprising a sewing machine (SM) including a base (7) and a sewing needle (64) reciprocally disposed above a sewing position (X) defined on an upper surface of said base (7), characterised by said base (7) further defining on its upper surface a tape supply position located upstream of said sewing position (X);

an intermittent tape feed unit (10) disposed above said tape supply position on said base (7) for intermittently feeding a continuous protective tape (9) downwardly toward said tape supply position, while keeping one surface of the protective tape (9) facing in a direction opposite to a direction of feed of a slide fastener (1) toward said sewing position (X), until a leading end portion of the protective tape (9) overlays the upper surface of said base (7) by a predetermined length;

a tape guide block (31) disposed between said intermittent tape feed unit (10) and said base (7) and spaced upwardly from the upper surface of said base (7) so as to define therebetween a fastener-receiving space (50) for the passage of double layers of the protective tape (9) and the slide fastener (1), said tape guide block (31) having a substantially vertical tape guide channel (34) for guiding therealong the protective tape (9);

a cutter assembly (38, 39) disposed adjacent to a lower end of said tape guide channel (34) in said tape guide block (31) for cutting off the leading portion (3) of the protective tape (9) from the continuous protective tape (9); and means (48) for bending the leading end portion (3) of the protective tape (9) toward said direction along the upper surface of said base (7).

7. An apparatus according to claim 6, said sewing machine (SM) further including a presser foot (63) disposed above said sewing station (X) and reciprocally movable toward and away from the upper surface of said base (7).

8. A apparatus according to claim 6, said intermittent tape feed unit (10) including a tape guide plate (12) disposed immediately above said tape guide block (31) and having a vertical tape guide groove (18) extending contiguously upwardly from said tape guide channel (34) for receiving therein the protective tape (9), a tape feed member (14) reciprocally movable along said tape guide groove (18), resilient means (17) for urging said tape feed member (14) into resilient contact with the protective tape (9) received in said tape guide groove (18), a cam device (19) disposed on said tape guide plate (12) and engageable



with said tape feed member (14) for holding the latter out of contact with the protective tape (9) received in said tape guide groove (18) during the rearward stroke of the reciprocation of said tape feed member (14).

9. An apparatus according to claim 8, said intermittent tape feed unit (10) further including a cylinder actuator (15) pivotably connected to a frame (11) of said sewing machine (SM) and having a piston rod (13) connected with said tape feed member (14), said resilient member comprising a resilient ring (17) extending around said cylinder actuator (15) and connected to said tape guide plate (12).

10. An apparatus according to claim 8, said cam device (19) including a rocking lever (23) disposed on one side of said tape guide groove (18) and normally urged against a front face (29) of said tape guide plate (12) in which said tape guide groove (18) extends, a plate cam (22) secured to said rocking lever (23) and being of the shape of a parallelogram in plane having a major axis extending vertically and having a length equal to a stroke of reciprocation of said tape feed member (14), said parallelogram plate cam (22) having an upper oblique side (D) facing toward said front face of said tape guide plate (12), an inner vertical side (E) extending contiguously downwardly from a lower end of said upper oblique side (D) and facing toward said front face of said tape guide plate (12), a lower oblique side (F) extending contiguously upwardly from a lower end of said inner vertical side (E) in parallel relation to said upper oblique side (D), and an outer vertical side (G) extending between an upper end of said lower oblique side (F) and an upper end of said upper oblique side (D) in parallel relation to said inner vertical side (E), said tape feed member (14) having an actuating pin (28) engageable with said cam surface and normally held in contact with said upper oblique side (D) adjacent to a top apex of said parallelogram plate cam (22).

11. An apparatus according to claim 6, said cutter assembly including a stationary cutting edge (38) extending along a front bottom edge of said tape guide block (31) and a movable cutter (39) reciprocably movable toward and away from said stationary cutting edge (38).

12. An apparatus according to claim 11, said tape guide channel (34) having a varying depth progressively reducing in a downward direction such that at its upper end said tape guide channel (34) fully receives therein the protective tape (9) and, at its lower end, said tape guide channel (38) blends into a front face of tape guide block (31).

13. An apparatus according to claim 11, said movable cutter (39) being tapered widthwise from one end to the other end thereof so as to normally define between said stationary cutting edge (38) a substantially triangular space, said one end of said cutter (39) being held in sliding contact with a bottom surface (37)

of said tape guide block (31).

14. An apparatus according to claim 11, said cutter assembly further including a shaft (40) connected at one of its opposite ends to said one end of said movable cutter (39) and extending perpendicularly to said movable cutter (39), a universal joint (44), a cylinder actuator (42) operatively connected to the other end of said shaft (40) via said universal joint (44), and spring means for urging said shaft (40) to turn about its own axis in one direction to bring said cutter (39) into sliding contact with said bottom surface (37) of said tape guide block (31).

15. An apparatus according to claim 6, said bending means comprising an air nozzle (48) disposed downstream of said sewing position for issuing a stream of pressurized air along the upper surface of said base (7) in a direction opposite to the direction of feed of the slide fastener (1).

16. An apparatus according to claim 6, said sewing machine (SM) including a frame (11), further including a side plate (33) pivotably connected to said frame (11) and supporting thereon said tape guide block (31), said cutter assembly (38, 39) and said bending means (48), said side plate (33) being angularly movable in a horizontal plane between a first position in which said tape guide block (31), said cutter assembly (38, 39) and said bending means (48) are disposed in alignment with a path of movement of the slide fastener (1), and a second position in which said tape guide block (31), said cutter assembly (38, 39) and said bending means (48) are disposed laterally outwardly away from the path of movement of the slide fastener (1).

17. An apparatus according to claim 16, said bending means comprising an air nozzle (48) supported on said side plate (33) and disposed downstream of said sewing position, when said side plate (33) is disposed in its first position, for issuing a stream of pressurized air along the upper surface of said base (7) in a direction opposite to the direction of feed of the slide fastener (1).

18. An apparatus according to claim 16, further including means for holding said side plate (33) in said first position.

19. An apparatus according to claim 18, said holding means including a locking lever (51) pivotably connected to said side plate (33) and releasably engageable with a portion of said intermittent feed unit (10) when said side plate (33) is disposed in said first position.

Patentansprüche

1. Verfahren zum Anbringen eines Schutzstreifens (3) an einem Ende eines Reißverschlusses (1), umfassend die Schritte:

(a) Auslegen eines fortlaufenden Schutzbandes



(9) und Anbringen eines Bereichs (3) des Schutzbandes (9) an dem Ende des Reißverschlusses (1);

(b) Herumfalten des besagten Bereichs (3) des Schutzbandes (9) im das Ende des Reißverschlusses;

(c) Befestigen des ingefalteten Schutzbandbereichs (3) an dem Ende des Reißverschlusses (1); und

(d) Abtrennen des besagten Schutzbandbereichs (3) vom Pest des Schutzbandes:

dadurch gekennzeichnet, daß das fortlaufende Schutzband (9) anfänglich nach unten zu einer Lieferposition auf einer Basis (7) einer Nähmaschine (SM) zugeführt wird, wobei sich die besagte Lieferposition in Bezug auf die Zuführrichtung (O) des besagten einen Ende des Reißverschlusses (1) zu einer Nähposition (X) stromaufwärts von der Nähposition (X) befindet, wobei eine Seite des Schutzbandes (9) der Richtung zugekehrt ist, aus der das besagte eine Ende des Reißverschlusses (1) der Nähposition (X) zugeführt wird;

woraufhin ein vorderer Endbereich (3) des Schutzbandes (9) in die Richtung umgebogen wird, aus der der Reißverschluß (1) der Nähposition (X) zugeführt wird und das Zuführen des Schutzbandes (9) wird fortgesetzt, bis sich eine bestimmte Länge des Schutzbandes (9) längs der Nähmaschinenbasis (7) erstreckt;

woraufhin das besagte eine Ende des Reißverschlusses über die Basis (7) der Nähmaschine (SM) und über die bestimmte Länge des Schutzbandes (9) zu der Nähposition (X) zugeführt wird, wodurch das Schutzband (9) um das Ende des Reißverschlusses (1) umgefaltet wird;

und die Befestigung des umgefalteten Schutzbandbereichs (3) am Ende des Reißverschlusses (1) durch Annähen in der Nähposition (X) durchgeführt wird.

2. Verfahren nach Anspruch 1, wobei das Umbiegen (b) des vorderen Endbereichs des Schutzbandes (9) bewirkt wird, indem ein Druckluftstrahl längs einer Oberseite der Basis (7) von einer stromabwärtigen Seite zu einer stromaufwärtigen Seite der Lieferposition ausgestoßen wird.

3. Verfahren nach Anspruch 2, wobei das Ausstoßen des Druckluftstrahles während des Zuführens (c) des Reißverschlusses (1) beibehalten wird.

4. Verfahren nach Anspruch 2, wobei das Ausstoßen des Druckluftstrahles während des Zuführens (a) des Schutzbandes (9) und während des Zuführens (c) des Reißverschlusses (1) beibehalten wird.

5. Verfahren nach Anspruch 1, wobei zwischen dem Zuführen (c) des Reißverschlusses (1) und dem Abschneiden (d) des Schutzbandes (9) das U-förmige vordere Ende des Schutzbandes (9) gegen die Oberfläche der Basis (7) nach unten gedrückt wird, wodurch der U-förmige vordere Endbereich des

Schutzbandes (9) und das vordere Ende des Reißverschlusses (1) gegen eine Verlagerung in der Nähposition gehalten werden.

6. Vorrichtung zum Anbringen eines Schutzstreifens (3) an einem Ende eines Reißverschlusses (1), umfassend eine Nähmaschine (SM) mit einer Basis (7) und einer Nähnaedel (64), die über auf einer Oberseite der Basis (7) definierten Nähposition (X) hin- und herbeweglich gelagert ist,

dadurch gekennzeichnet, daß die Basis (7) auf ihrer Oberseite ferner eine Bandlieferposition definiert die stromaufwärts von der Nähposition (X) angeordnet ist;

daß eine schrittweise arbeitende Bandzuführereinheit (10) über der besagten Bandlieferposition auf der Basis (7) angeordnet ist, um ein fortlaufendes Schutzband (9) schrittweise nach unten zu der Bandlieferposition zuzuführen, wobei eine Seite des Schutzbandes (9) einer der Zuführrichtung eines Reißverschlußbandes (1) zu der Nähposition (X) entgegengesetzten Richtung zugekehrt ist, bis ein vorderer Endbereich des Schutzbandes (9) die Oberseite der Basis (7) mit einer bestimmten Länge überdeckt;

daß ein Bandführungsblock (31) zwischen der schrittweise arbeitenden Bandzuführereinheit (10) und der Basis (7) und im Abstand über der Oberseite der Basis (7) angeordnet ist, um dazwischen einen Reißverschluß-Aufnahmeraum (50) für den Durchgang einer Doppellage des Schutzbandes (9) und des Reißverschlusses (1) zu begrenzen, wobei der Bandführungsblock (31) einen im wesentlichen vertikalen Bandführungs kanal (34) zum Führen des Schutzbandes (9) hat;

daß eine Schneideinrichtung (38,39) neben einem unteren Ende des Bandführungs kanals (34) in dem Bandführungsblock (31) angeordnet ist, um den vorderen Bereich (3) des Schutzbandes (9) von dem fortlaufenden Schutzband (9) abzuschneiden; und

daß eine Einrichtung (48) zum Umbiegen des vorderen Endbereichs (3) des Schutzbandes (9) in die besagte Richtung längs der Oberseite der Basis (7) vorgesehen ist.

7. Vorrichtung nach Anspruch 6, wobei die Nähmaschine (SM) ferner einer Drückerfuß (63) umfaßt, der über der Nähstation (X) angeordnet und zur Oberseite der Basis (7) hin und von dieser weg bewegbar ist.

8. Vorrichtung nach Anspruch 6, wobei die schrittweise arbeitende Bandzuführereinheit (10) umfaßt: eine Bandführungsplatte (12), die unmittelbar über dem Bandführungsblock (31) angeordnet ist und eine vertikale Bandführungs nut (18) hat, die sich ohne Unterbrechung von dem Bandführungs kanal (34) nach oben erstreckt, um das Schutzband (9) aufzunehmen, ein Bandzuführteil (14), das längs der Bandführungs nut (18) hin- und herbewegbar ist, vorspannmittel (17), um das Bandzuführteil (14) mit dem in der Bandführungs nut (18) angeordneten Schutzband (9)



federn in Berührung zu halten, eine Steuerkurveneinrichtung (19), die auf der Bandführungsplatte (12) angeordnet und mit dem Bandzuführteil (14) in Begriff bringbar ist, um diese während seines Rückwärtshubes mit dem in der Bandführungsnut (18) angeordneten Schutzband (9) außer Berührung zu halten.

9. Vorrichtung nach Anspruch 8, wobei die Schrittweise arbeitende Bandzuführeinheit (10) ferner einen Antriebszylinder (15) umfaßt, der mit einem Rahmen (11) der Nähmaschine (SM) schwenkbar verbunden ist und eine mit dem Bandzuführteil (14) verbundene Kolbenstange (13) aufweist, wobei die Vorspannmittel aus einem elastischen Ring (17) bestehen, der den Antriebszylinder (15) umgibt und mit der Bandführungsplatte (12) verbunden ist.

10. Vorrichtung nach Anspruch 8, wobei die Steuerkurveneinrichtung (19) umfaßt: einen Schwenkhebel (23), der an einer Seite der Bandführungsnut (18) angeordnet und normalerweise gegen eine Vorderseite (29) der Bandführungsplatte (12) belastet ist, in der sich die Bandführungsnut (18) erstreckt, eine Steuerkurvenplatte (22) die an dem Schwenkhebel (23) befestigt ist und in der Ansicht die Form eines Parallelogramms hat, deessen Hauptachse Vertikal verläuft und dessen Länge dem Hub der hin-hergehenden Bewegung des Bandzuführteils (14) entspricht, wobei diese parallelogrammförmige Steuerkurvenplatte (22) eine der Vorderseite der Bandführungsplatte (12) zugekehrte obere geneigte Seite (D), eine innere vertikale Seite (E), die von einem unteren Ende der oberen geneigten Seite (D) nach unten verläuft und der besagten Vorderseite der Bandführungsplatte (12) zugekehrt ist, eine untere geneigte Seite (F), die von einem unteren Ende der besagten inneren vertikalen Seite (E) in paralleler Beziehung zu der oberen geneigten Seite (D) nach oben verläuft, und eine äußere vertikale Seite (G) aufweist, die zwischen einem oberen Ende der unteren geneigten Seite (F) und einem oberen geneigten Seite (D) in paralleler Beziehung zu der inneren vertikalen Seite (E) verläuft, wobei das Bandzuführteil (14) einen Betätigungsstift (28) hat, der mit der Steuerkurvenfläche in Eingriff bringbar ist und normalerweise mit der oberen geneigten Seite (D) nahe einem oberen Scheitel der parallelogrammförmigen Steuerkurvenplatte (22) in Berührung gehalten ist.

11. Vorrichtung nach Anspruch 6, wobei die Schneideinrichtung eine stationäre Schneidkante (38), die sich entlang einer vorderen Unterkante des Bandführungsblocks (31) erstreckt, und ein bewegliches Messer (39) umfaßt, das zu der stationären Schneidkante (38) hin und von dieser weg bewegbar ist.

12. Vorrichtung nach Anspruch 11, wobei der Bandführungsblock (34) eine veränderliche Tiefe hat, die in Abwärtsrichtung abnimmt, so daß der Bandführungsblock (34) an seinem oberen Ende das Schutzband (9) vollständig aufnimmt, und daß der

Bandführungsblock (34) an seinem unteren Ende in eine Vorderseite des Führungsblocks (31) übergeht.

13. Vorrichtung nach Anspruch 11, wobei das bewegliche Messer (39) von einem Ende zum anderen eine abnehmende Breite hat, so daß es mit der ortsfesten Schneidkante (38) normalerweise einem im wesentlichen dreieckigen Zwischenraum begrenzt, wobei das besagte eine Ende des Messers (39) mit einer Unterseite (37) des Bandführungsblocks (31) im Gleiteingriff gehalten ist.

14. Vorrichtung nach Anspruch 11, wobei die Schneideinrichtung ferner umfaßt: eine Stange (40), deren eines Ende mit dem beweglichen Messer (39) verbunden ist und die rechtwinklig zu dem beweglichen Messer (39) verläuft, eine Kardangelenk (44), eine Betätigungszyylinder (42), der über das Kardangelenk (44) mit dem anderen Ende der Stange (40) verbunden ist, und Vorspannmittel zum Verdrehen der Stange um ihre Achse in einer Richtung, um das Messer (39) mit der Bodenfläche (37) des Bandführungsblocks (31) in Gleitberührung zu bringen.

15. Vorrichtung nach Anspruch 6, wobei die Biegeeinrichtung eine Luftdüse (48) umfaßt, die stromabwärts von der Nähposition angeordnet ist, und einen Druckluftstrom längs der Oberseite der Basis (7) in einer der Zuführrichtung des Reißverschlusses (1) entgegengesetzten Richtung auszustößen.

16. Vorrichtung nach Anspruch 6, wobei die Nähmaschine (SM) einen Rahmen (11) und eine Seitenplatte (33) aufweist, die mit dem Rahmen (11) schwenkbar verbunden ist und den Bandführungsblock (31), die Schneidkante (38,39) und die Biegeeinrichtung (48) abstützt, wobei die Seitenplatte (33) in einer horizontalen Ebene zwischen einer ersten Position, in der der Bandführungsblock (31), die Schneideinrichtung (38,39) und die Biegeeinrichtung (48) mit der Bewegungsbahn des Reißverschlusses (1) fluchten, und einer zweiten Position verschwenkbar ist, in der der Bandführungsblock (31), die Schneideinrichtung (38,39) und die Biegeeinrichtung (48) gegenüber der Bewegungsbahn des Reißverschlusses (1) seitwärts nach außen versetzt sind.

17. Vorrichtung nach Anspruch 16, wobei die Biegeeinrichtung eine Luftdüse (48) umfaßt, die auf der Seitenplatte (33) abgestützt und stromabwärts von der Nähposition angeordnet ist, wenn sich die Seitenplatte (33) in ihrer ersten Position befindet, um einen Druckluftstrom längs der Oberseite der Basis (7) in einer der Zuführrichtung des Reißverschlusses (1) entgegengesetzten Richtung auszustößen.

18. Vorrichtung nach Anspruch 16, ferner umfassend Mittel zum Halten der Seitenplatte (33) in der ersten Position.

19. Vorrichtung nach Anspruch 18, wobei die besagten Haltemittel einen Sperrhebel (51) umfassen, der mit der Seitenplatte (33) schwenkbar verbunden und mit einem Bereich der schrittweise



arbeitenden Zuführeinheit (10) lösbar in Eingriff bringbar ist, wenn sich die Seitenplatte (33) in der ersten Position befindet.

Revendications

1. Procédé pour appliquer une bande protectrice (3) à une extrémité d'une fermeture à glissière (1), comportant les étapes suivantes :

- (a) extension d'une bande protectrice continue (9) et application d'une partie (3) de la bande protectrice (9) à l'extrémité de la fermeture à glissière (1);
- (b) pliage de ladite partie (3) de la bande protectrice (9) autour de l'extrémité de la fermeture à glissière;
- (c) fixation de la partie de bande protectrice pliée (3) à l'extrémité de la fermeture à glissière (1); et
- (d) séparation de ladite partie de bande protectrice (3) du reste de la bande protectrice ;

caractérisé en ce que la bande protectrice continue (9) est initialement délivrée vers le bas, vers une position d'alimentation sur une base (7) d'une machine à coudre (SM), ladite position d'alimentation étant situé en amont d'une position de couture (X) de la machine à coudre (SM) vis-à-vis d'une direction de délivrance (O) de ladite extrémité de la fermeture à glissière (1), vers la position de couture (O), une face de la bande adhésive (9) regardant dans la direction suivant laquelle ladite extrémité de la fermeture à glissière (1) doit être délivrée dans ladite position de couture (X);

une partie d'extrémité avant (3) de la bande protectrice (9) est ensuite pliée dans la direction suivant laquelle la fermeture à glissière (1) doit être délivrée dans ladite position de couture (X), et la délivrance de la bande protectrice (9) se poursuit jusqu'à ce qu'une longueur prédéterminée de la bande protectrice (9) se trouve le long de la base (7) de la machine à coudre;

ladite extrémité de la fermeture à glissière est ensuite délivrée sur la base (7) de la machine à coudre (SM) et sur ladite longueur prédéterminée de la bande protectrice (9), dans ladite position de couture (X), ce qui provoque par conséquent le pliage de la bande protectrice (9) autour de l'extrémité de la fermeture à glissière (1);

et la fixation de la partie (3) de la bande protectrice pliée à l'extrémité de la fermeture à glissière (1) est faite en la cousant dans ladite position de couture (X).

2. Procédé selon la revendication 1, dans lequel ladite courbure (b) de la partie d'extrémité avant de la bande protectrice (9) est effectuée en délivrant un courant d'air sous pression le long d'une surface supérieure de la base (7) à partir d'un côté aval et vers un côté amont de ladite position de délivrance.

3. Procédé selon la revendication 2, dans lequel ladite délivrance du courant d'air sous pression est maintenue durant ladite délivrance (c) de ladite fermeture à glissière (1).

4. Procédé selon la revendication 2, dans lequel ladite délivrance du courant d'air sous pression est maintenu durant ladite délivrance (a) de la bande protectrice (9) et ladite délivrance (c) de la fermeture à glissière (1).

5. Procédé selon la revendication 1, entre ladite délivrance (c) de la fermeture à glissière (1) et ladite coupe (d) de la bande protectrice (9), comportant de plus le forçage de l'extrémité avant en forme de U de la bande protectrice (9) vers le bas contre la surface supérieure de la base (7) afin de maintenir par conséquent fermement la partie d'extrémité avant en forme de U de la bande protectrice (9) et l'extrémité avant de la fermeture à glissière (1) dans la position de couture pour empêcher son déplacement.

6. Appareil pour appliquer une bande protectrice (3) à une extrémité d'une fermeture à glissière (1), comportant une machine à coudre (SM) comprenant une base (7) et une aiguille à coudre (64) disposées de façon à effectuer un va-et-vient au dessus d'une position de couture (X) définie sur une surface supérieure de ladite base (7),

caractérisé par le fait que ladite base (7) définit sur sa surface supérieure une position de délivrance de bande située en amont de ladite position de couture (X);

une unité de délivrance de bande intermittente (10) disposée au-dessus de ladite position de délivrance de bande sur ladite base (7) pour délivrer par intermittence une bande protectrice continue (9) vers le bas en direction de ladite position de délivrance, tout en maintenant une surface de la bande protectrice (9) qui regarde dans une direction opposée à une direction de délivrance d'une fermeture à glissière (1) vers ladite position de couture (X), jusqu'à ce qu'une partie d'extrémité avant de la bande protectrice (9) recouvre la surface supérieure de ladite base (7) sur une longueur prédéterminée;

un bloc de guidage de bande (31) disposé entre ladite unité de délivrance de bande intermittente (10) et ladite base (7) et espacé vers le haut de la surface supérieure de ladite base (7) de façon à définir entre celles-ci un espace de réception de fermetures (50) pour le passage de doubles couches de la bande protectrice (9) et de la fermeture à glissière (1), ledit bloc de guidage de bande (31) ayant un canal (34) de guidage de bande substantiellement vertical pour guider le long de celui-ci la bande protectrice (9);

un ensemble de coupe (38, 39) disposé au voisinage d'une extrémité inférieure dudit canal (34) de guidage de bande dans ledit bloc (31) de guidage de bande pour couper la partie avant (3) de la bande protectrice (9) vis-à-vis de la bande de protection continue (9); et



des moyens (48) pour incurver la partie d'extrémité avant (3) de la bande protectrice (9), vers ladite direction le long de la surface supérieure de ladite base (7).

7. Appareil selon la revendication 6, ladite machine à coudre (SM) comportant de plus un pied presseur (63) disposé au-dessus dudit poste de couture (X) et pouvant se déplacer en effectuant un mouvement de va-et-vient de façon à se rapprocher et à s'éloigner de la surface supérieure de ladite base (7).

8. Appareil selon la revendication 6, ladite unité (10) de délivrance de bande intermittente comportant une plaque (12) de guidage de bande disposée immédiatement au-dessus dudit bloc (31) de guidage de bande et ayant une rainure (18) de guidage de bande verticale s'étendant de façon continue vers le haut par rapport audit canal (34) de guidage de bande afin de recevoir à l'intérieur de celle-ci la bande protectrice (9), un élément de délivrance de bande (14) pouvant effectuer un mouvement de va-et-vient le long de ladite rainure (18) de guidage de bande, des moyens élastiques (17) pour pousser ledit élément de délivrance de bande (14) de façon à ce qu'il vienne en contact élastique avec la bande protectrice (9) reçue dans ladite rainure (19) de guidage de bande, un dispositif formant came (19) disposé sur ladite plaque (12) de guidage de bande et pouvant s'engrener avec ledit élément de délivrance de bande (14) pour maintenir ce dernier de façon à ce qu'il ne soit pas en contact avec la bande protectrice (9) reçue dans ladite rainure (18) de guidage de bande durant le mouvement arrière du va-et-vient dudit élément de délivrance de bande (14).

9. Appareil selon la revendication 8, ladite unité (10) de délivrance de bande intermittente comportant de plus un vérin à cylindre (15) connecté de façon à pouvoir pivoter à un bâti (11) de ladite machine à coudre (SM) et ayant une tige de piston (13) connectée audit élément de délivrance de bande (14), ledit élément élastique comportant un anneau élastique (17) s'étendant autour dudit vérin à cylindre (15) et connecté à ladite plaque (12) de guidage de bande.

10. Appareil selon la revendication 8, ledit dispositif de came (19) comportant un levier oscillant (23) disposé sur un côté de ladite rainure (18) de guidage de bande et normalement poussé contre une face avant (29) de ladite plaque de guidage de bande (12), dans lequel s'étend ladite rainure (18) de guidage de bande, une plaque de came (22) fixée audit levier oscillant (23) et ayant la forme d'un parallélogramme dans un plan dont l'axe principal s'étend verticalement et ayant une longueur égale à une course de va-et-vient dudit élément de délivrance de bande (14), ladite came de plaque en forme de parallélogramme (22) ayant un côté oblique supérieur (D) regardant vers ladite face avant de ladite plaque (12) de guidage de bande, un côté vertical intérieur (E) s'étendant de façon contiguë et vers le bas depuis une extrémité

inférieure dudit côté oblique supérieur (D) et regardant vers ladite face avant de ladite plaque de guidage de bande (12), un côté oblique inférieur (F) s'étendant de façon contiguë et vers le haut à partir d'une extrémité inférieure dudit côté vertical intérieur (E) en relation parallèle vis-à-vis dudit côté oblique supérieur (D), et un côté vertical extérieur (G) s'étendant entre une extrémité supérieure dudit côté oblique inférieur (F) et une extrémité supérieure dudit côté oblique supérieur (D) en relation parallèle vis-à-vis dudit côté vertical intérieur (E), ledit élément de délivrance de bande (14) ayant une broche d'actionnement (28) pouvant s'engrener avec ladite surface de came et étant normalement maintenu en contact avec ledit côté oblique supérieur (D) au voisinage d'une pointe supérieure de ladite came de plaque en forme de parallélogramme (22).

11. Appareil selon la revendication 6, ledit ensemble de coupe comprenant un bord coupant fixe (38) s'étendant le long d'un bord inférieur avant dudit bloc (31) du guidage de bande, et un dispositif de coupe mobile (39) selon un mouvement de va-et-vient de façon à se rapprocher et à s'éloigner dudit bord de coupe fixe (38).

12. Appareil selon la revendication 11, ledit canal (34) de guidage de bande ayant une profondeur variable se réduisant progressivement vers le bas de telle sorte que, au niveau de son extrémité supérieure, ledit canal (34) de guidage de bande reçoive complètement à l'intérieur de celui-ci la bande protectrice (9) et, à son extrémité inférieure, ledit canal (38) de guidage de bande s'efface dans une face avant du bloc (31) de guidage de bande.

13. Appareil selon la revendication 11, ledit dispositif de coupe mobile (39) étant effilé dans le sens de la largeur d'une extrémité à l'autre extrémité de celui-ci, de façon à définir normalement entre ledit bord de coupe stationnaire (38) un espace substantiellement triangulaire, ladite première extrémité dudit dispositif de coupe (39) étant maintenue en contact de glissement avec une surface inférieure (37) dudit bloc (31) de guidage de bande.

14. Appareil selon la revendication 11, ledit ensemble de coupe comportant de plus un arbre (40) connecté à l'une de ses extrémités opposées à ladite première extrémité dudit élément de coupe mobile (39) et s'étendant perpendiculairement audit dispositif de coupe mobile (39), un joint universel (44), un vérin à cylindre (42) connecté de façon fonctionnelle à l'autre extrémité dudit arbre (40) par l'intermédiaire dudit joint universel (44), et des moyens formant ressort pour pousser ledit arbre (40) de façon à ce qu'il tourne par rapport à son propre axe dans une direction permettant d'amener ledit dispositif de coupe (39) en contact de glissement avec ladite surface inférieure (37) dudit bloc (31) de guidage de bande.

15. Appareil selon la revendication 6, lesdits moyens de courbure comportant une buse d'air (48)



disposée en aval de ladite position de couture pour délivrer un courant d'air sous pression le long de la surface supérieure de ladite base (7) dans une direction opposée à la direction de délivrance de la fermeture à glissière.

16. Appareil selon la revendication 6, ladite machine à coudre (SM) comportant un bâti (11) et comportant de plus une plaque latérale (33) connectée de façon à pouvoir pivoter audit bâti (11) et supportant sur celle-ci le bloc (31) de guidage de bande, ledit ensemble de coupe (38, 39) et lesdits moyens de courbure (48), ladite plaque latérale (33) étant mobile angulairement dans un plan horizontal entre une première position dans laquelle ledit bloc (31) de guidage de bande, ledit ensemble de coupe (38, 39) et lesdits moyens de courbure (48) sont disposés en alignement avec un chemin de déplacement de la fermeture à glissière (11) et une deuxième position dans laquelle ledit bloc (31) de guidage de bande, ledit ensemble de coupe (38, 39) et lesdits moyens de courbure (48) sont disposés latéralement vers l'extérieur de façon à être éloignés du chemin de déplacement de la fermeture à glissière (1).

17. Appareil selon la revendication 16, lesdits moyens de courbure comportant une buse à air (48) supportée sur ladite plaque latérale (33) et disposée en aval de ladite position de couture, lorsque ladite plaque latérale (33) est disposée dans sa première position, afin de délivrer un courant d'air sous pression le long de la surface supérieure de ladite base (7) dans une direction opposée à la direction de délivrance de la fermeture à glissière.

18. Appareil selon la revendication 16, comportant de plus des moyens pour maintenir ladite plaque latérale (33) dans ladite première position.

19. Appareil selon la revendication 18, lesdits moyens de maintien comportant un levier de verrouillage (51) connecté de façon à pouvoir pivoter sur ladite plaque latérale (33) et pouvant s'engrener de façon libérable avec une partie de ladite unité de délivrance intermittente (10) lorsque ladite plaque latérale (33) est disposée dans ladite première position.

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