

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates to a method of removing molded synthetic resin or metal coupling elements, each coupling element comprising a head and a pair of forked legs holding a fastener tape, from a pair of faster tapes of a slide fastener chain to form element-free space portions on the slide fastener chain.

2. Description of the Related Art:

One method of removing molded synthetic resin coupling elements, each of which comprises a head and a pair of forked legs holding a fastener tape, from a slide fastener chain is disclosed in Japanese Patent Publication Sho 48-32222 (1973). With this citation, a pair of punches sandwich interengaged coupling elements, pressing their forklike legs to make them thin enough to deform easily. Then, the legs are freed from the punches to pull the fastener tapes from the coupling elements.

Japanese Patent Publication Sho 56-52565 (1981) discloses another method. Heads of interengaged coupling elements are sandwiched and pressed by push and remove blocks having a pair of claws at their leading edges, so that legs of the coupling elements are loosened and heads of the coupling elements are crushed to move them to the right and left. Then, the claws at the leading edge of a clamp are contacted with the loosened legs to open them further. After this, the push and remove blocks sandwiching the coupling elements are lowered to remove the coupling elements.

With the former above method, not only the legs of the coupling elements but also edges of the fastener tapes are pressed and deformed, which would deteriorate the quality of the tape fabric. Plastic legs would be partially destroyed, remaining stuck to the edges of the fastener tapes, which will cause various troubles in subsequent steps of production. Since the fastener tapes are pulled from the coupling elements, coupling elements near the removed area would be disengaged or cracked. Such disengaged coupling elements would have to be readjusted into their engaging conditions.

With the latter above method, the claws of the push and remove blocks cut into the coupling elements, so that the edges of the fastener tapes would be also moved when the heads are crushed and moved laterally. The tape edges would be damaged as they are caught by the claws. As in the former case, the legs of the coupling elements

would not be disengaged but would remain stuck to the tape edges, thus resulting in incomplete removal of the coupling elements.

US-A-4 131 223 discloses a method of forming an element-free space in a slide fastener chain, said slide fastener chain comprising a pair of opposed fastener tapes and two rows of discrete coupling elements, each said fastener tape having a respective one of said rows of coupling elements provided along one edge of the tape, each said coupling element comprising a head and two legs, with one said leg on either side of the tape, said method comprising the steps of:-

- (a) clamping, between a coacting punch and die, heads of interengaged coupling elements of the two rows along a section thereof where the element-free space is to be formed;
- (b) cutting the two legs off the head of each interengaged coupling element of the two rows along said section thereof; and
- (c) removing each cut coupling element of the two rows along said section thereof.

US-A-4 131 223 also discloses an apparatus for forming an element-free space in a slide fastener chain, said slide fastener chain comprising a pair of opposed fastener tapes and two rows of discrete coupling elements, each said fastener tape having a respective one of said rows of coupling elements provided along one edge of the tape, each said coupling element comprising a head and two legs, with one said leg on either side of the tape, said apparatus comprising:-

- (a) a pair of guides for guiding the fastener tapes of the slide fastener chain along a longitudinal path;
- (b) a coacting punch and die located upwardly and downwardly respectively of a central gap between said guides, for clamping the heads of interengaged coupling elements of the two rows along a section thereof where the element-free space is to be formed; and
- (c) two cutter means each movable vertically for respectively cutting the two legs off the head of each interengaged coupling element of the two rows along said section thereof.

However, US-A-4 131 223 suffers from at least some of the above-mentioned disadvantages.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a method of, and an apparatus for, forming an element-free space in a slide fastener chain without the above-mentioned disadvantages and in particular without damaging the tapes, in the case wherein said slide fastener chain comprises a pair of opposed fastener tapes and two rows of discrete coupling elements, each said fastener tape having

a respective one of said rows of coupling elements provided along one edge of the tape, each said coupling element comprising a head and two legs, with one said leg on either side of the tape.

The invention provides a method of forming an element-free space in a slide fastener chain as claimed in claim 1, to which reference is directed.

The invention also provides an apparatus for forming an element-free space in a slide fastener chain as claimed in claim 6, to which reference is also directed.

The invention will be described by way of example with reference to the drawings, of which there follows a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary cross-sectional view of an apparatus for removing coupling elements, according to one embodiment of this invention; FIG. 2 is a plan view showing a slide fastener chain having an element-free space; and FIG. 3(a) to 3(d) are cross-sectional views showing how coupling elements are removed.

DETAILED DESCRIPTION

An embodiment of this invention will be described by way of example with reference to the figures. An apparatus for removing coupling elements comprises an upper unit and a lower unit. The upper unit includes a punch 10, and a pair of pressure pads 11 symmetrically arranged at opposite sides of the punch 10. The pressure pads 11 are set in motion by a drive mechanism such as a fluid cylinder or a cam mechanism, not shown. The lower unit includes a die 16, and a pair of guides 14 at opposite sides of the die 16. A slide fastener chain 1 is placed on the guides 14 and the die 16.

The punch 10 is located just above a central portion of the fastener chain 1, being reciprocated by a drive mechanism such as a fluid cylinder (not shown). In cooperation with the die 16, the punch 10 sandwiches heads 3 of coupling elements 2 to be removed to form a space 8 on the slide fastener chain 1.

Each pressure pad 11 includes at its edge a number of comb-tooth-like pushers 12, which enter into gaps 9 between coupling elements 2 of the fastener tapes 7 to press the inner edges of the fastener tapes 7. The pressure pads 11 are descended by the drive mechanism via springs, thereby elastically pressing the fastener tapes 7.

Each cutter 13 includes a plurality of bill-like edges, which advance between the pushers 12 of the pressure pad 11 to cut portions between the heads 3 and legs 4 of the coupling elements 2.

The cutters 13 are moved vertically and horizontally by the drive mechanism, such as a fluid cylinder or a cam mechanism for example, as shown in FIGS. 3(a) to 3(d), cutting the legs 4 of the coupling elements 2 and removing cut chips 5.

The guides 14 are fixedly positioned at opposite sides of the die 16 to receive and guide the slide fastener chain 1. Each guide 14 has a step 15 on its upper inner edge near the die 16 as shown in FIGS. 1 and 3. The coupling elements 2 and adjacent areas of the fastener tape fit in the space formed by the steps 15 and the die 16, where they are reliably pressed by the pushers 12 of the descended pressure pads 11.

The die 16 is positioned between the guides 14, being vertically movable by the drive mechanism so as to sandwich the coupling elements 2 of the slide fastener tapes 7 between the die 16 and the punch 10. The die 16 has a width equal to the length of the interengaged coupling elements 2. As shown in FIG. 3(a), the die 16 is brought down lower than the guides 14, forming a concavity 17 defined by its upper surface and the side walls of the guides 14. The lower halves of the coupling elements 2 are received in the concavity 17.

FIG. 3(a) to 3(d) show how coupling elements are removed to form an element-free space on a slide fastener chain 1. Usually, the punch 10, pressure pads 11 and cutters 13 are at their upper standby positions as shown in FIG. 1. When the slide fastener chain 1 is advanced on the guide 14 to a preset extent determined by a distance meter including a supply roller with an encoder, the slide fastener chain 1 is stopped. As shown in FIG. 3(a), the pressure pads 11 are lowered, so that the pushers 12 of the pressure pads 11 are inserted into gaps 9 between coupling elements 2, elastically pushing the fastener tapes along the coupling elements 2 to reliably and immovably hold a portion of the fastener tapes 7 where the coupling elements will be removed to form an element-free space.

Then the punch 10 is lowered to sandwich the heads 3 of the interengaged coupling elements 2, in a region to form the element-free space, in cooperation with the die 16. As shown in FIG. 3(b), the cutter 13 descends to cut the coupling elements 2 between their heads 3 and legs 4 near the core threads along the edges of the fastener tapes 7, thereby cutting and separating the heads 3 and legs 4 on the upper side of the slide fastener tapes 7. Then, the cutters 13 are moved to the right and left, respectively, to move cut chips 5 outwardly of the slide fastener tapes 7. The cut chips will be completely discharged from the slide fastener tapes 7 by a sucking unit or a blower.

As shown in FIG. 3(d), both the punch 10 and die 16 are lowered with the cut heads of the

coupling elements 2 sandwiched between them. The legs 4 and heads 3 of the coupling elements 2 remaining on the under surface of each of the slide fastener tapes 7 will be pushed downwardly, to be removed from the fastener tapes 7. After this, only the punch 10 is raised to release itself from the die 16. The cut chips 6 on the die 16 are put aside by the sucking unit or blower.

The punch 10, pressure pads 11, cutters 13 and die 16 are returned to their standby positions to get ready for a following removal process. The foregoing steps are repeated to form element-free spaces 8 at specified positions of the slide fastener chain 1. Then, the slide fastener chain 1 will be carried to another stage of the production process.

According to this invention, the legs and heads of the coupling elements on one side of the slide fastener tape are firstly cut, and the cut legs are removed from the fastener tapes. Then, the heads and the remaining legs on the other side of the slide fastener tapes are lowered while sandwiched between the punch 10 and the die 16, thereby being detached from the edges of the fastener tapes. Mechanical shocks generated to cut the legs of the coupling elements are applied only to a small area near the tape edges, without any damage to the fastener tapes. The coupling elements can be completely removed, forming neat element-free spaces. Further, since the fastener tapes are reliably held by the pressure pads, interengaged coupling elements near the cut area can remain interengaged, so that the fastener tapes can be guided to a succeeding processing step without any inconvenience.

The apparatus for removing the coupling element comprises the punch and die to sandwich and lower the heads of the coupling elements, and the cutters for cutting only one of the forklike legs. The apparatus is therefore very simple and compact, and easy to operate.

Claims

1. A method of forming an element-free space (8) in a slide fastener chain (1), said slide fastener chain (1) comprising a pair of opposed fastener tapes (7) and two rows of discrete coupling elements (2), each said fastener tape (7) having a respective one of said rows of coupling elements (2) provided along one edge of the tape (7), each said coupling element (2) comprising a head (3) and two legs (4), with one said leg (4) on either side of the tape (7), said method comprising the steps of:-

- (a) clamping, between a coacting punch (10) and die (16), heads (3) of interengaged coupling elements (2) of the two rows along a section thereof where the element-free

space (8) is to be formed;

- (b) cutting only one of the said legs (4) off the head (3) of each interengaged coupling element (2) of the two rows along said section thereof, the other leg (4) being left attached to the head (3);

- (c) removing each cut leg (4) from its respective tape (7) outwardly of the respective coupling element row; and

- (d) removing the remaining leg (4) and head (3), still attached to each other, from the tape (7).

2. A method as claimed in claim 1, wherein the coupling elements are of synthetic resin.

3. A method as claimed in claim 1, wherein the coupling elements are of metal.

4. A method as claimed in any preceding claim, wherein the heads (3) and uncut legs (4) are removed from the opposed fastener tapes (7) by the heads (3) being clamped between said coacting punch (10) and die (16) and being displaced thereby, through a gap between the opposed tapes (7), to the sides of the opposed fastener tapes (7) corresponding to the uncut legs (4).

5. A method as claimed in any preceding claim, wherein spaced-apart portions of the opposed tapes (7), located between adjacent coupling elements (2) on each tape (7), are clamped by pressure pad means (11), provided at edges thereof with comb-like pusher means (12), along the section of the tapes (7) where the element-free space (8) is to be formed, during the aforesaid cutting of legs (4).

6. An apparatus for forming an element-free space (8) in a slide fastener chain (1), said slide fastener chain (1) comprising a pair of opposed fastener tapes (7) and two rows of discrete coupling elements (2), each said fastener tape (7) having a respective one of said rows of coupling elements (2) provided along one edge of the tape (7), each said coupling element (2) comprising a head (3) and two legs (4), with one said leg (4) on either side of the tape (7), said apparatus comprising:-

- (a) a pair of guides (14) for guiding the fastener tapes (7) of the slide fastener chain (1) along a longitudinal path;

- (b) a coacting punch (10) and die (16) located upwardly and downwardly respectively of a central gap between said guides (14), for clamping the heads (3) of interengaged coupling elements (2) of the two



coupling elements 2 sandwiched between them. The legs 4 and heads 3 of the coupling elements 2 remaining on the under surface of each of the slide fastener tapes 7 will be pushed downwardly, to be removed from the fastener tapes 7. After this, only the punch 10 is raised to release itself from the die 16. The cut chips 6 on the die 16 are put aside by the sucking unit or blower.

The punch 10, pressure pads 11, cutters 13 and die 16 are returned to their standby positions to get ready for a following removal process. The foregoing steps are repeated to form element-free spaces 8 at specified positions of the slide fastener chain 1. Then, the slide fastener chain 1 will be carried to another stage of the production process.

According to this invention, the legs and heads of the coupling elements on one side of the slide fastener tape are firstly cut, and the cut legs are removed from the fastener tapes. Then, the heads and the remaining legs on the other side of the slide fastener tapes are lowered while sandwiched between the punch 10 and the die 16, thereby being detached from the edges of the fastener tapes. Mechanical shocks generated to cut the legs of the coupling elements are applied only to a small area near the tape edges, without any damage to the fastener tapes. The coupling elements can be completely removed, forming neat element-free spaces. Further, since the fastener tapes are reliably held by the pressure pads, interengaged coupling elements near the cut area can remain interengaged, so that the fastener tapes can be guided to a succeeding processing step without any inconvenience.

The apparatus for removing the coupling element comprises the punch and die to sandwich and lower the heads of the coupling elements, and the cutters for cutting only one of the forklike legs. The apparatus is therefore very simple and compact, and easy to operate.

Claims

1. A method of forming an element-free space (8) in a slide fastener chain (1), said slide fastener chain (1) comprising a pair of opposed fastener tapes (7) and two rows of discrete coupling elements (2), each said fastener tape (7) having a respective one of said rows of coupling elements (2) provided along one edge of the tape (7), each said coupling element (2) comprising a head (3) and two legs (4), with one said leg (4) on either side of the tape (7), said method comprising the steps of:-

- (a) clamping, between a coacting punch (10) and die (16), heads (3) of interengaged coupling elements (2) of the two rows along a section thereof where the element-free

space (8) is to be formed;

- (b) cutting only one of the said legs (4) off the head (3) of each interengaged coupling element (2) of the two rows along said section thereof, the other leg (4) being left attached to the head (3);

- (c) removing each cut leg (4) from its respective tape (7) outwardly of the respective coupling element row; and

- (d) removing the remaining leg (4) and head (3), still attached to each other, from the tape (7).

2. A method as claimed in claim 1, wherein the coupling elements are of synthetic resin.

3. A method as claimed in claim 1, wherein the coupling elements are of metal.

4. A method as claimed in any preceding claim, wherein the heads (3) and uncut legs (4) are removed from the opposed fastener tapes (7) by the heads (3) being clamped between said coacting punch (10) and die (16) and being displaced thereby, through a gap between the opposed tapes (7), to the sides of the opposed fastener tapes (7) corresponding to the uncut legs (4).

5. A method as claimed in any preceding claim, wherein spaced-apart portions of the opposed tapes (7), located between adjacent coupling elements (2) on each tape (7), are clamped by pressure pad means (11), provided at edges thereof with comb-like pusher means (12), along the section of the tapes (7) where the element-free space (8) is to be formed, during the aforesaid cutting of legs (4).

6. An apparatus for forming an element-free space (8) in a slide fastener chain (1), said slide fastener chain (1) comprising a pair of opposed fastener tapes (7) and two rows of discrete coupling elements (2), each said fastener tape (7) having a respective one of said rows of coupling elements (2) provided along one edge of the tape (7), each said coupling element (2) comprising a head (3) and two legs (4), with one said leg (4) on either side of the tape (7), said apparatus comprising:-

- (a) a pair of guides (14) for guiding the fastener tapes (7) of the slide fastener chain (1) along a longitudinal path;

- (b) a coacting punch (10) and die (16) located upwardly and downwardly respectively of a central gap between said guides (14), for clamping the heads (3) of interengaged coupling elements (2) of the two



rows along a section thereof where the element-free space (8) is to be formed; said punch (10) and die (16) being movable vertically towards each other and movable as a unit upwardly or downwardly with the heads (3) clamped between said punch (10) and said die (16);

(c) cutter means (13) movable vertically for cutting only one of the said legs (4) off the head (3) of each interengaged coupling element (2) of the two rows along said section thereof, and for leaving the other leg (4) attached to the head (3); said cutter means (13) being adapted to be moved horizontally, outwardly of the opposed tapes (7), after the aforesaid cutting of legs (4), for removing the cut legs (4) from their respective tapes (7) outwardly of the coupling element rows; and

(d) said punch (10) and die (16) being operative for removing the remaining leg (4) and head (3), still attached to each other, from the tape (7);

(e) said apparatus comprising no operative cutter means for cutting said other leg (4) off the head (3) of each interengaged coupling element (2) of the two rows along said section thereof;

(f) whereby in use of the apparatus said other leg (4) remains attached to the head (3).

7. Apparatus as claimed in claim 6, wherein said coacting punch (10) and die (16) are adapted to remove the heads (3) and uncut legs (4) from the opposed fastener tapes (7) by clamping the heads (3) between said coacting punch (10) and die (16) and by displacing the clamped heads (3) through a gap between the opposed tapes (7), to the sides of the opposed fastener tapes (7) corresponding to the uncut legs (4).

8. Apparatus as claimed in claim 6 or 7, wherein pressure pad means (11), provided at edges thereof with comb-like pusher means (12), is adapted for clamping spaced-apart portions of the opposed tapes (7), located between adjacent coupling elements (2) on each tape (7), along the section of the tapes (7) where the element-free space (8) is to be formed, during the aforesaid cutting of legs (4).

Patentansprüche

1. Verfahren zur Erzeugung einer Lücke (8) in einer Reißverschlußkette (1), wobei die Reißverschlußkette (1) zwei einander gegenüberlie-

gende Tragbänder (7) und zwei Reihen einzelner Kuppelglieder (2) umfaßt, wobei jedes Tragband (7) eine dieser Kuppelgliederreihen (2) aufweist, die an einem Rand des Tragbandes (7) angeordnet ist, wobei jedes Kuppelglied (2) einen Kupplungskopf (3) und zwei Schenkel (4) hat, wobei sich auf jeder Seite des Tragbandes (7) ein Schenkel (4) befindet, wobei dieses Verfahren folgende Schritte umfaßt:

(a) Einklemmen der Kupplungsköpfe (3) der gekuppelten Kuppelglieder (2) der beiden Reihen entlang einem Abschnitt derselben, wo die Lücke (8) erzeugt werden soll, zwischen einem Stempel (10) und einem zugehörigen Gesenk (16);

(b) Abschneiden lediglich eines der besagten Schenkel (4) vom Kupplungskopf (3) jedes gekuppelten Kuppelglieds (2) der beiden Reihen längs des besagten Abschnitts derselben, wobei der andere Schenkel (4) an dem Kupplungskopf (3) befestigt bleibt;

(c) Beseitigen jedes abgeschnittenen Schenkels (4) von seinem zugehörigen Tragband (7) von der zugehörigen Kuppelgliederreihenach außen; und

(d) Beseitigen des noch miteinander verbundenen Schenkels (4) und des Kupplungskopfes (3) von dem Tragband (7).

2. Verfahren nach Anspruch 1, wobei die Kuppelglieder aus Kunststoff bestehen.
3. Verfahren nach Anspruch 1, wobei die Kuppelglieder aus Metall bestehen.
4. Verfahren nach einem der vorhergehenden Ansprüche, wobei die Kupplungsköpfe (3) und die unzertrennten Schenkel (4) von den gegenüberliegenden Tragbändern (7) durch die Kupplungsköpfe (3) beseitigt werden, die zwischen dem Stempel (10) und dem zugehörigen Gesenk (16) eingeklemmt sind und dadurch verlagert werden, durch einen Spalt zwischen den gegenüberliegenden Tragbändern (7) zu den den unzertrennten Schenkeln (4) entsprechenden Seiten der gegenüberliegenden Tragbänder (7).
5. Verfahren nach einem der vorhergehenden Ansprüche, wobei zwischen benachbarten Kuppelgliedern (2) jedes Tragbandes (7) liegende beabstandete Bereiche der gegenüberliegenden Tragbänder (7) mit Druckpolstermitteln (11), die an ihren Rändern mit kammartigen Andrückmitteln (12) versehen sind, entlang dem Abschnitt der Tragbänder (7), wo während des besagten Zertrennens der Schenke (4) die



Lücke (8) erzeugt werden soll, eingeklemmt werden.

6. Vorrichtung zur Erzeugung einer Lücke (8) in einer Reißverschlußkette (1), wobei die Reißverschlußkette (1) zwei einander gegenüberliegende Tragbänder (7) und zwei Reihen einzelner Kuppelglieder (2) umfaßt, wobei jedes Tragband (7) eine dieser Kuppelgliederreihen (2) aufweist, die an einem Rand des Tragbandes (7) angeordnet ist, wobei jedes Kuppelglied (2) einen Kupplungskopf (3) und zwei Schenkel (4) hat, wobei sich auf jeder Seite des Tragbandes (7) ein Schenkel (4) befindet, wobei diese Vorrichtung umfaßt:

(a) zwei Führungen (14) zum Führen der Tragbänder (7) der Reißverschlußkette (1) entlang einer längsgerichteten Bahn;
 (b) einen Stempel (10) und ein zugehöriges Gesenk (16), die über bzw. unter einem mittigen Spalt zwischen den Führungen (14) angeordnet sind, um die Kupplungsköpfe (3) von gekuppelten Kuppelgliedern (2) der beiden Reihen entlang einem Abschnitt derselben einzuklemmen, wo eine Lücke (8) erzeugt werden soll, wobei der Stempel (10) und das Gesenk (16) vertikal zueinander hin bewegbar und als Einheit nach oben oder nach unten bewegbar sind, wobei die Kupplungsköpfe (3) zwischen dem Stempel (10) und dem Gesenk (16) eingeklemmt sind;
 (c) vertikal bewegliche Schneidmittel (13), um lediglich einen der besagten Schenkel (4) vom Kupplungskopf (3) jedes gekuppelten Kuppelglieds (2) der beiden Reihen entlang dem besagten Abschnitt derselben zu durchtrennen und um den anderen Schenkel (4) an dem Kupplungskopf (3) befestigt zu belassen; wobei die Schneidmittel (13) nach dem Durchtrennen der Schenkel (4) von den gegenüberliegenden Tragbändern (7) horizontal nach außen bewegbar sind, um die durchtrennten Schenkel (4) von den zugehörigen Tragbändern (7) auswärts von den Kuppelgliederreihen zu beseitigen; und
 (d) wobei der Stempel (10) und das Gesenk (16) betätigbar sind, um den verbliebenen Schenkel (4) und den Kupplungskopf (3), die noch miteinander verbunden sind, von dem Tragband (7) zu beseitigen;
 (e) wobei die Vorrichtung keine wirksamen Schneidmittel zum Abtrennen des anderen Schenkels (4) vom Kupplungskopf (3) jedes gekuppelten Kuppelglieds (2) der beiden Reihen längs des besagten Abschnittes derselben umfaßt;
 (f) wobei im Gebrauch der Vorrichtung der besagte andere Schenkel (4) an dem Kupp-

lungskopf (3) befestigt bleibt.

7. Vorrichtung nach Anspruch 6, wobei der Stempel (10) und das zugehörige Gesenk (16) geeignet sind, die Kupplungsköpfe (3) und die unzer trennten Kupplungsschenkel (4) von den gegenüberliegenden Tragbändern (7) zu beseitigen, indem die Kupplungsköpfe (3) zwischen dem Stempel (10) und dem Gesenk (16) eingeklemmt und die eingeklemmten Kupplungsköpfe (3) durch einen Spalt zwischen den gegenüberliegenden Tragbändern (7) zu den den unzer trennten Schenkeln (4) entsprechenden Seiten der gegenüberliegenden Tragbänder (7) verlagert werden.
8. Vorrichtung nach Anspruch 6 oder 7, wobei Druckpolster (11), die an ihren Rändern mit kammartigen Andrückmitteln (12) versehen sind, geeignet sind, beabstandete Bereiche der gegenüberliegenden Tragbänder (7), die zwischen benachbarten Kuppelgliedern (2) jedes Tragbandes (7) angeordnet sind, während des besagten Durchtrennens der Schenkel (4) längs des Abschnitts der Tragbänder (7) einzuklemmen, wo die Lücke (8) erzeugt werden soll.

Revendications

1. Procédé de formation d'un espace (8) exempt d'éléments d'accouplement dans une chaîne (1) de fermeture à glissière, ladite chaîne (1) de fermeture à glissière comprenant une paire de rubans opposés (7) de fermeture à glissière et deux rangées d'éléments d'accouplement discrets (2), chaque ruban précité (7) de fermeture à glissière comportant, le long d'un de ses bords, une desdites rangées d'éléments d'accouplement (2), chaque élément d'accouplement précité (2) comprenant une tête (3) et deux branches (4), à raison d'une branche précitée (4) sur chacun des côtés du ruban (7), ledit procédé comprenant les étapes consistant à :
- (a) serrer, entre un poinçon (10) et une matrice (16) coopérants, les têtes (3) des éléments d'accouplement (2) mutuellement accouplés des deux rangées, le long d'une section de celles-ci où l'espace (8) exempt d'éléments d'accouplement doit être formé;
 (b) à sectionner, de la tête (3) de chaque élément d'accouplement accouplé (2) des deux rangées, le long de ladite section de celles-ci, une seule desdites branches (4), l'autre branche (4) étant laissée fixée à la tête (3);



- (c) à retirer de son ruban respectif (7), vers l'extérieur de la rangée respective d'éléments d'accouplement, chaque branche sectionnée (4); et
- (d) à retirer du ruban (7) la branche restante (4) et la tête (3) encore fixées l'une à l'autre.
2. Procédé selon la revendication 1, dans lequel les éléments d'accouplement sont en résine synthétique. 10
 3. Procédé selon la revendication 1, dans lequel les éléments d'accouplement sont en métal. 15
 4. Procédé selon l'une quelconque des revendications précédentes, dans lequel les têtes (3) et les branches non sectionnées (4) sont retirées des rubans opposés (7) de fermeture à glissière par serrage des têtes (3) entre lesdits poinçon (10) et matrice (16) coopérants et par déplacement, à l'aide de ces derniers, à travers un intervalle compris entre les rubans opposés (7), vers les côtés des rubans opposés (7) de fermeture à glissière qui correspondent aux branches (4) non sectionnées. 20 25
 5. Procédé selon l'une quelconque des revendications précédentes, dans lequel les parties des rubans opposés (7), espacées l'une de l'autre et situées entre des éléments d'accouplement adjacents (2) de chaque ruban (7), sont serrées par des blocs presseurs (11), munis sur leurs bords de moyens de poussée (12) analogues à des peignes, le long de la section des rubans (7) où l'espace (8) exempt d'éléments d'accouplement doit être formé, pendant le sectionnement précité des branches (4). 30 35
 6. Appareil pour former un espace (8) exempt d'éléments d'accouplement dans une chaîne (1) de fermeture à glissière, ladite chaîne (1) de fermeture à glissière comprenant une paire de rubans opposés (7) de fermeture à glissière et deux rangées d'éléments d'accouplement discrets (2), chaque ruban précité (7) de fermeture à glissière comportant une rangée respective desdites rangées d'éléments d'accouplement (2) disposés le long d'un des bords du ruban (7), chaque élément d'accouplement précité (2) comprenant une tête (3) et deux branches (4), à raison d'une branche précitée (4) sur chacun des côtés du ruban (7), ledit appareil comprenant : 40 45
 - (a) une paire de guides (14) pour guider les rubans (7) de fermeture à glissière de la chaîne de fermeture à glissière (1) le long d'un trajet longitudinal;
 - (b) un poinçon (10) et une matrice (16) coopérants situés en dessus et en dessous, respectivement, d'un intervalle central compris entre lesdits guides (14), pour serrer les têtes (3) des éléments d'accouplement (2) mutuellement accouplés des deux rangées le long d'une section de celles-ci où l'espace (8) exempt d'éléments d'accouplement doit être formé; lesdits poinçons (10) et matrice (16) pouvant être déplacés verticalement en direction l'un de l'autre et pouvant être déplacés d'un seul bloc vers le haut ou vers le bas, les têtes (3) étant serrées entre ledit poinçon (10) et ladite matrice (16);
 - (c) un moyen de coupe (13) pouvant être déplacé verticalement pour sectionner, de la tête (3) de chaque élément d'accouplement accouplé (2) des deux rangées, le long de ladite section de celles-ci, une seule desdites branches (4), et pour laisser l'autre branche (4) fixée à la tête (3); ledit moyen de coupe (13) étant adapté pour être déplacé horizontalement, vers l'extérieur des rubans opposés (7), après le sectionnement précité des branches (4), pour retirer de leurs rubans respectifs (7), vers l'extérieur des rangées d'éléments d'accouplement, les branches sectionnées (4); et
 - (d) lesdits poinçon (10) et matrice (13) agissant pour retirer du ruban (7) les branches (4) et tête (3) restantes, encore fixées l'une à l'autre;
 - (e) ledit appareil ne comprenant pas de moyen de sectionnement destiné à sectionner, de la tête (3) de chaque élément d'accouplement (2) accouplé des deux rangées, le long de ladite section de celles-ci, ladite autre branche (4);
 - (f) grâce à quoi, pendant l'utilisation de l'appareil, ladite autre branche (4) reste fixée à la tête (3).
 7. Appareil selon la revendication 6, dans lequel lesdits poinçon (10) et matrice (16) sont adaptés pour retirer, des rubans opposés (7) de fermeture à glissière, les têtes (3) et les branches non sectionnées (4) par serrage des têtes (3) entre lesdits poinçon (10) et matrice (16) coopérants et par déplacement des têtes serrées (3) à travers un intervalle compris entre les rubans opposés (7), vers les côtés des rubans opposés (7) de fermeture à glissière qui correspondent aux branches non sectionnées (4). 50 55



8. Appareil selon la revendication 6 ou 7, dans lequel des blocs presseurs (11), munis à leurs bords de moyens de poussée (12) analogue à des peignes, sont adaptés pour serrer les parties des rubans opposés (7), espacées l'une de l'autre et situées entre les éléments d'accouplement adjacents (2) de chaque ruban (7), le long de la section des rubans (7) où l'espace (8) exempt d'éléments d'accouplement doit être formé, pendant le sectionnement précité des branches (4).

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