SPECIFICATION

A method for press-bonding a reinforcement tape to a slide fastener with a separable end stop and an apparatus therefor.

The present invention relates to a method for press-bonding a reinforcement tape to a slide fastener with a separable end stop and an apparatus therefor.

In order to facilitate opening and closing of a separable end stop provided at the lower end of a slide fastener, it is usual that a reinforcement tape made of a plastic resin film is bonded to portions of the carrier tapes of both fastener stringers adjacent to the lower ends of the rows of the fastener elements to impart improved rigidity. It is also desirable that the reinforcement tape is bonded not only to the space section of the fastener chain void of the fastener elements but also as extending to the side portions of the carrier tapes so that distortion of the lower part of the fastener chain can be prevented which otherwise is often the case.

To simplify and facilitate the assembling and finishing of slide fasteners, it is nowadays the common practice of the slide fastener manufacturers to first prepare a continuous length slide fastener chain carrying thereon uninterrupted rows of the fastener elements and then to remove certain numbers of the fastener elements on sections at regular intervals to form so-called space sections where the fastener chain is subsequently cut into the individual product length. Therefore it is a convenient way to bond a reinforcement tape on to the space section of the fastener chain before cutting into the product length one by one and then the fastener chain with the reinforcement tape is cut along a cutting line within the space section.

In the prior art, a continuous process apparatus for press-bonding reinforcement tapes to a continuous length fastener chain is disclosed (see, for example, Japanese Patent Publication SHO 44-14392) in which a continuous length reinforcement tape and the continuous length fastener chain are transferred in the same direction. The problems with such an arrangement of the apparatus are that exact positioning of the tape relative to the fastener chain is rather a difficult matter with frequent displacement of the reinforcement tape out of the exact positions and that compactness of the apparatus can hardly be obtained. In addition, the reinforcement tape bonded with such an apparatus is necessarily in a rectangular form lying at the lower end of the element rows perpendicularly to the direction of the element rows so that no protection is imparted to several pairs of the elements positioned near the lower end of the element rows which should desirably be protected with a reinforcement tape from deformation by repeated opening and closing of the fastener chain with the separable end stop.

An object of the present invention is to provide a novel method for press-bonding a reinforcement tape to a fastener chain on the portions extending from the lower end of the element rows to the sides of the rows of the fastener elements covering several pairs of the elements and also to present an apparatus for practicing the above method conveniently.

Another object of the present invention is to provide a method for press-bonding a reinforcement tape to a slide fastener chain fully automatically or at least automatically except for the manual transfer of the fastener chain and also to present an apparatus therefor.

Still another object of the present invention is to provide a method for press-bonding a reinforcement tape to a slide fastener chain in which the press-bonding can be effected either by heat-melting or by high-frequency welding and also to present an apparatus therefor.

The method of the present invention comprises the steps of (a) positioning a continuous length slide fastener chain with space sections at intervals passing through the space between a forming die or a lower presser and a forming punch or an upper presser so that a said space section is located between the forming die and the forming punch,

(b) forming a cut-out by punching along a periphery of a continuous length tape of a thermoplastic resin film which is moved in a direction perpendicular to the fastener chain,

(c) transferring the thus punched tape a predetermined distance so that the cut-out is positioned just above the space section of the fastener chain located between the forming die and the forming punch, and

(d) pressing the tape on to the fastener chain by operating the forming die to effect bonding of the tape to the fastener chain.

The apparatus of the present invention designed to conveniently practicing the above method comprises:—

(1) a forming punch or upper presser;

(2) a forming die or lower presser positioned below the forming punch or upper presser and relatively movable for approaching to and being retracted from the forming punch;

(3) a pair of chain guide units positioned on both sides of the forming die to effect guiding and holding of a fastener chain;

(4) a guiding and holding mechanism for a tape provided with a pair of guide rams movable in the direction perpendicular to the tape to enter and exit from the space between the forming die and the forming punch;

(5) a feeding unit for feeding a tape into the guiding and holding mechanism for a tape;

(6) a punching unit for a tape positioned between the tape-feeding unit and the guiding and holding mechanism for a tape; and

(7) a cutting unit for a tape.

The invention will be described by way of examples with reference to the accompanying drawings, wherein:—

Figs. 1 to 9 illustrate an apparatus embodying the present invention, in which:

Fig. 1 is an elevational side view;

Fig. 2 is an elevational side view with part of the cross section as exposed;

Fig. 3 is a cross sectional view of the apparatus along the line III—III in Fig. 1;

Fig. 4 is a similar cross sectional view to Fig. 3 in which individual parts are in the positions of press-bonding;

Fig. 5 is an enlarged elevational front view in the area shown by the line V—V in Fig. 1 partially cut to show the cross section;

Fig. 6 is a cross sectional view of the main part in the moment of press-bonding, punching and cutting;

Fig. 7 is a cross sectional view along the line VII—VII in Fig. 1;

Fig. 8 is a cross sectional view corresponding to Fig. 7 showing the movement of the parts in the elevation of the die plate; and

Fig. 9 is a schematic perspective illustration of main part of the whole apparatus; and

Figs. 10 to 14 illustrate another apparatus embodying the invention, in which:

Fig. 10 is a cross sectional side view of the main part;

Figs. 11 and 12 are cross sectional views of the main part showing the functions of press-bonding, punching and cutting;

Fig. 13 is a cross sectional view along the line A—A in Fig. 10; and

Fig. 14 is a cross sectional view along the line B—B in Fig. 13.

Fig. 15 is a plan view of a finished fastener chain with a reinforcement tape bonded to the space section; and

Fig. 16 is an alternative plan view of a fastener chain showing the bonding condition of the reinforcement tape on to the space section.

In Figs. 1, 2 and 9 of the drawings, there is shown a tape-feeding unit 1, a tape-punching unit 2, a tape-cutting unit 3 and a press-bonding unit 4.

The above mentioned tape-feeding unit 1 is provided with a feeding roller 6 and an idler roller 5 rotating as the roller 6 rotates. The feeding roller 6 is fixed to a shaft 7 through a one-way clutch 8. An arm 9 is fixed to the shaft 7 and is connected via a link 12 to the piston rod 11a of a cylinder 11 fixed to a lower frame 10. A brake shoe 13 is provided to prevent reverse rotation of the feeding roller 6 and also provided is a tape guide 14.

The aforementioned tape-punching unit 2 is positioned at the front of the tape guide 14 and provided with a die 18 and a punch guide 17 fixed to the upper frame 15 with a punch plate 16 therebetween. A tape-guide slit 19 is formed between the punch guide 17 and the die 18 and the punch guide 17 is provided with a punch-guide groove 20 running in the vertical direction, into which a punch 21 fits with free sliding movement. As is shown in Fig. 9, the punch 21 is provided with an outwardly bulged part 21' which comes to fit into the die aperture 22 in the die 18 when the punch 21 is lowered. The punch 21 itself is connected by a connecting piece 24 to the piston rod 23a of a cylinder 23 fixed to the upper frame 15. As shown in Fig. 5, a pivoted cutter 26 pivotally supported by a pivot pin 25 is in contact with the front surfaces of the above mentioned punch guide 17 and the die 18. The cutter 26 is connected by a pin 29 to a holder 28 which is fixed to the punch 21 with a bolt 27.

The above mentioned press-bonding unit 4 is provided with a forming punch or upper presser 31 supported by the above mentioned punch plate 16 with a heat-insulation plate 30 therebetween in the upper part of the unit 4 and a forming die or lower presser 34 supported by a die plate 33 with another heat-insulation plate 32 intervening therebetween in the lower part of the unit 4. Each of the forming punch 31 and the forming die 34 has a built-in heater element (not shown in the figures) in order to effect press-bonding by heat. The die plate 33 is fixedly connected by a connecting piece 36 to the piston rod 35a of a cylinder 35, which in turn is fixed to the lower frame 10, in such a manner as to be vertically movable according to the vertical movement of the piston rod 35a, being guided by guide pins 38 along which guide bushes 37, fixed on the die plate 33, can slide up and down.

A pair of tape-guide mechanisms or units 39, 39 are provided on respective sides of the above mentioned forming punch 31 as shown in Figs. 3, 4 and 9. Each of the tape-guide mechanisms 39, 39 is provided with a guide ram-holder 41 supported by a supporting member 40 fixed to the punch plate 16 to provide free vertical movability of the holder 41 and a guide ram 42 is mounted in the guide ram-holder 41 with free horizontal sliding movement. The above supporting member 40 is provided with a cam groove 43 composed of a horizontal branch 43a and a vertical branch 43b and a guide pin 44 fixed to the guide ram 42 protrudes outwardly through this cam groove 43. The guide pin 44 also serves as a shaft for a cam roller 45. The guide ram-holder 41 is always pushed downwardly by a compressive spring 46. The guide ram 42 is pulled inwardly, i.e. toward the forming punch 31, by a tension spring 49 horizontally bridging a spring-engaging pin 47 fixed thereto and another spring-engaging pin 48 fixed to the supporting member 40. The downwardly stepped inner end of the guide ram 42 forms a tape guide 42' extending below the forming punch 31.

A pair of chain-guide units 50, 50 are provided on respective sides of the forming die 34 as shown in Figs. 3, 4, 7, 8 and 9. Each of the chain guide units 50, 50 is provided with a fixed stationary guide plate 51 and a moving guide plate 52 positioned thereabove. The stationary guide plate 51 is mounted fixedly on to a guide support 53 which in turn is fixed to the die plate 33. The moving guide plate 52 is mounted on a lifter 54 which is in contact with a pin 55 projecting through the die plate 33. The moving guide plate 52 is always pulled downwardly by a compressive spring 56 bridging the guide support 53 and the lifter 54, which is integral with the moving guide plate 52, in such a manner that a

chain guide slit 58 of a definite width can be formed between the stationary guide plate 51 and the moving guide plate 52 when the lifter 54 is pushed upwardly by a pin support 57 which is moved up and down by a cylinder 59. The moving guide plate 52 is provided with a cam 61 fixedly mounted thereon having a cam surface divided into a sloped surface 60a and a horizontal surface 60b coming into contact with the cam roller 45.

At the front of the forming punch 31, i.e. on the right hand side in Fig. 1 or Fig. 2, a tape gripper unit 62 is provided. The tape gripper unit 62 is composed of a holder 63 fixed to the punch plate 16 and a set of upper and lower gripper plates 64, 65 supported by the holder 63 with free vertical movability and with mutual sliding movability. The upper gripper plate 64 is pushed downwardly by a spring 66 and is engageable with the holder 63 by means of a screw stopper 67 while the lower gripper plate 65 is pushed downwardly by a spring 68 and held by a stopper 69.

In the following, the steps for performing press-bonding of the reinforcement tape to a fastener chain by use of the above described apparatus are described in sequence.

First, the guide pin supports 57 are elevated by actuating the cylinders 59 for chain guide by turning, for example, a foot switch (not shown in the figures) on. In this way, the moving guide plates 52 are elevated, pushed by the pins 55 through the lifters 54, so that the chain guide slits 58 between the moving guide plates 52 and the stationary guide plates 51 become widened sufficiently. The end of a fastener chain F separated over a length is passed through the thus widened respective chain guide slits 58 and held gently between the stationary guide plate 51 and the moving guide plate 52 of each of the chain guide units 50, 50 by the lowering of the moving guide plates 52 into the positions as shown in Figs. 3 or 4 by turning the foot switch off to deactivate the cylinder 59. The next step is to pull the fastener chain F manually in the forward direction, i.e. in the direction shown by the arrow a in Fig. 9, until the movement of the fastener chain F is interrupted by the foremost elements of the next-coming rows of the elements E' following a space section coming to hit against a stopper 70 provided in the middle of the forming die 34 to complete the transfer and positioning of the fastener chain F. Thus each of the sets of the stationary guide plates 51 and the moving guide plates 52 press-holds the fastener chain at the foregoing portion of the fastener chain F or at the succeeding portion F' respectively with an appropriate pressure so that a tension of suitable strength is exerted on the space section of the fastener chain so that any distortion or wrinkle is smoothed out.

Then a hand switch provided in an appropriate position of the apparatus (not shown in the figures) for the control of tape-feeding is turned on to actuate the cylinder 11 whereby the piston rod 11a is elevated and the feeding roller 6 is rotated in the direction shown by the arrow b in Fig. 2 to effect a portion-wise transfer of the tape S over a predetermined distance. The tape S passes through the tape guide slit 19 between the punch guide 17 and the die 18 and, being guided by the guide rams 42 of the tape-guide mechanisms 39, the front end S' of the tape S reaches the tape gripper unit 62 where the end S' of the tape S enters the clearance space between the upper and lower gripper plates 64 and 65 a little to complete a portion-wise transfer of the tape. The completion of the transfer of the tape S is detected by a suitable detecting means, for example, by a limit switch LS_1 operated by the movement of the arm 9 to generate a signal which is fed back to cause movement of the cylinder 35 to elevate the die plate 33 together with the forming die 34 and the chain guide units 50. Further the elevation of the die plate 33 brings each of the cams 61 fixed to the moving guide plates 52 into contact with the cam roller 45 whereupon each respective cam roller 45 is pushed first by the sloped surface 60a of the cam 60 to effect an outward shift of the pin 44 in the horizontal branch 43a of the cam groove 43 so that the tape guide ram 42 is horizontally pushed aside to a position out of the track of the forming punch 31. At this moment, the tape guide rams 42 separate from the tape S but the tape S never becomes slackened since the end S' of the tape S is gripped by the tape gripper unit 62. In the next step, each of the cam rollers 45 comes into contact with the cam 61 at the horizontal surface 60b so that the pin 44 is elevated in the vertical branch 43b of the cam groove 43 whereby the tape guide ram 42 is elevated together with the guide ram holder 41 to the positions shown in Figs. 4 and 6, where the upper end of the stopper 71 fixed to the die plate 33 is brought into contact with the lower surface of the lower gripper plate 65 to firmly grip the front end S' of the tape S along with the press-contacting of the forming die 34 with the forming punch 31 so as to start press-bonding of the tape with punching to the space section following the foregoing rows of the elements in the chain F.

The completion of the elevation of the forming die 34 to the position as shown in Fig. 6 is detected by a limit switch (not shown in the figure) to generate a detection signal with which a timer switch is actuated to start timing and, when the time period preset in the timer switch has come to an end, the cylinder 35 is caused to descend to restore the forming die 34, chain-guide units 50 and tape-guide units 39 to the conditions shown in Fig. 3.

Along with the above, another timer switch is turned on and, at the end of the time set in this timer switch the cylinder 23 for the punch 21 is operated to lower the punch 21 whereby punching of the tape is performed in the succeeding portion of the tape before the beginning of the descending of the forming die 34 to form a cut-out 72 along the periphery of the tape as is shown in Fig. 9 or Fig. 15. The scraps of the tape formed by punching slide down along a

scrap chute 81 and collected in a scrap box 82 to be discarded. In linkage motion with the descending of the punch 21, the rotatable cutter blade 26 rotates around the pivotal pin 25 to cut the tape off as is shown in Fig. 5. When the punching and cutting have come to completion, the cylinder 23 immediately is retracted so that the punch 21 and the cutter 26 are restored to their initial positions to complete a cycle of steps. By the repetition of the above described cycle of the steps, a continuous length fastener chain provided with the reinforcement tapes press-bonded on the individual space sections is obtained in a continuous process.

Fig. 15 depicts a fastener chain provided with a reinforcement tape finished in accordance with the present invention. As is shown in the figure, the reinforcement tape 73 with a cut-out 72 is bonded to the space section 74 between two successive portions F, F' of the fastener chain having element rows E, E', respectively. The position of the reinforcement tape on the fastener chain extends over the cutting line 75 along which the fastener chain is cut into separate fastener chains F and F'. In the next step, the fastener chain thus provided with reinforcement tapes at intervals is passed through a cutting apparatus (not shown in the figures) in which cutting of the fastener chain along the cutting lines 75 is performed with simultaneous cutting of the reinforcement tape 73 along the cutting lines 76a and 76b. The thus obtained individual fastener chain has a reinforcement tape bonded in such a manner that the lower end E_1 of the element row E is enclosed at both sides with the cut-out 72 of the reinforcement tape 73 by the length l along the longitudinal direction so that the elements E_1 in this range can be protected by the reinforcement tape 73. The protection obtained with the novel L-shaped reinforcement tape is very significant because the elements in this range have the largest liability to deformation and displacement.

Figs. 10 to 14 are given for illustrating another embodiment of the present invention in which press-bonding of the reinforcement tape to the fastener chain is performed by high-frequency welding. An advantage of high-frequency welding is the possibility of simplification of the structure of the apparatus in comparison with the above described apparatus owing to the absence of heat propagation from the bonding part to the other parts of the apparatus. Thus, as is shown in Figs. 10 and 13, a forming punch-guide 77 is provided at the front of the punch guide 17 and the forming punch 31 is movable vertically within the cavity 78 encircled with this forming-punch guide 77 and the front surface of the punch guide 17. Both of the punch 21 and the forming punch 31 are connected to the piston rod 23a of the cylinder 23 with a connection piece 24. The rear surface of the forming punch 31, i.e. the end surface coming into sliding contact with the front surface of the punch guide 17, is shaped in a form of a cutter blade 79 at the lower end thereof. The forming-punch guide 77 has a guide piece 80 in the lower part thereof as protruded in the cavity 78 in order to prevent distortion of the tape. In this embodiment, no tape gripper unit is provided different from the first embodiment, although it is optional to have such a unit if needed according to the rigidity of the reinforcement tape. No further description will be given on the forming die 34 and the chain-guide unit 50 to avoid redundancy since the structures of them are the same as in the first embodiment except for the fact that the cam 61 in the first embodiment is not necessary in the second embodiment.

In the following, description is given of the functional movement of the apparatus according to this second embodiment. Positioning of the fastener chain F in the insertion to the apparatus, portionwise transfer of the tape S and elevation of the forming die 34 are performed in the same manner as in the first embodiment as is shown in Fig. 11. The next step is the descending of the punch 21 and the forming punch 31 by means of the cylinder 23 to effect simultaneous punching of the tape by the punch 21 and cutting of the tape by the cutter blade 79 formed in the lower end of the rear surface of the forming punch 31 followed by further descending of the forming punch to the position shown in Fig. 12 where high-frequency welding of the tape S to the fastener chain F is performed as pressed onto the chain F.

Apart from the aove description in which the transfer and positioning of the fastener chain are performed manually, it is of course possible to mechanize the steps. For example, suitable means such as chain feed rollers are provided at the front and rear of the chain guide units 50, 50 for the automatic transfer of the fastener chain and the rotation of these chain feed rollers is controlled by a detection signal generated in a limit switch which is turned on when the upper end of the element rows hits against a stopper 70 being capable of appearing and sinking as installed between the chains F, F. After completion of bonding of the tape to the fastener chain, the transfer of the fastener chain is resumed by the retraction of the stopper down to the position below the fastener chain with subsequent protrusion of the stopper when the next space section 74 has reached there to hit against the upper end of the next rows of the elements. With this construction of the apparatus, the whole process of the press-bonding of the reinforcement tape can be operated fully automatically except for the insertion of the tape end at the start of the machine operation.

Fig. 16 depicts an alternative example of the reinforcement tape to be bonded to the fastener chain in which further V-shaped cut-outs 81 are provided along the peripheries of the tape S in addition to the cut-out 72 as in the previous case in positions extending over the cutting lines L by the cutter 26 or cutter blade 79. With this arrangement of the cut-out 81 in the continuous length tape, the resultant reinforcement tape S bonded to the fastener chain and cut along the

cutting lines L has a triangular cutting at each of the four corners to give advantages of facilitating the cutting along the cutting line 76a and prevention of peeling of the bonded tape starting at the corners. The only additional modification of the apparatus required for forming such V-shaped cut-outs is a pair of punches with triangular cross sections provided in the punch guide 17 in addition to the punch 21.

As is described above, the continuous length fastener chain and the continuous length reinforcement tape are each transferred portion-wise in perpendicular crossing with each other to effect press-bonding along with punching and cutting of the tape so that exact positioning of the tape on the fastener chain can be readily obtained with a possibility of full automation for the continuous process of the press-bonding of the reinforcement tape on to the individual space sections of the fastener chain.

In addition, the reinforcement tape bonded to the fastener chain by the method and apparatus of the present invention may have cut-outs to form portions extending to both of the lateral sides of the element rows to give a distinguishable advantage over the prior art method and apparatus so that extended serviceable life is imparted to the resultant slide fasteners with separable end stop by virtue of the reinforcement covering several of the elements in the lower end of the element rows.

Moreover, the apparatus of the present invention has advantages in addition to the above that inexact positioning and deformation of the tape can be avoided because the tape is held just before the press-bonding by the retractable tape guide rams appearing between the chain-guide units and the forming punch and that the fastener chain is guided and held at the exact position by the chain-guide units so that the reinforcement tape can be bonded to the fastener chain in the exact bonding position.

CLAIMS

1. A method for press-bonding a reinforcement tape on to a space section of a continuous length slide fastener chain provided with space sections at intervals which comprises the steps of

(a) placing the slide fastener chain between a forming die and a forming punch in such a manner that a said space section is positioned between the forming die and the forming punch,

(b) forming a cut-out by punching a continuous length tape of a thermoplastic resin film along a periphery thereof, the tape being moved in a direction perpendicular to the fastener chain,

(c) transferring the thus punched tape a predetermined distance so that the cut-out is positioned just above the space section of the fastener chain located between the forming die and the forming punch, and

(d) pressing the tape on to the space section of the fastener chain by moving the forming die toward the forming punch to effect bonding of the tape to the space section of the fastener chain.

2. An apparatus for press-bonding a reinforcement tape of a thermoplastic resin film on to a space section of a continuous length slide fastener chain provided with space sections at intervals which comprises the components of

(1) a forming punch or upper presser,

(2) a forming die or lower presser positioned below the forming punch and relatively movable for approaching to and being retracted from the forming punch,

(3) a pair of chain guide units positioned on both sides of the forming die to effect guiding and holding of a fastener chain,

(4) a guiding and holding mechanism for a tape provided with a pair of guide rams movable in the direction perpendicular to the line connecting the chain guide units to enter and exit from the space between the forming die and the forming punch,

(5) a feeding mechanism for feeding a tape into the guiding and holding mechanism for a tape,

(6) a punching unit for a tape positioned between the feeding unit for feeding a tape and the guiding and holding mechanism for a tape and provided with a vertically movable film punch, and

(7) a cutting unit for a tape.

3. An apparatus as claimed in claim 2 wherein the cutting unit is provided with a cutter blade capable of pivoting in a vertical plane in contact with the side surface of a punch guide of the punching unit for a tape along which the film punch moves vertically, the pivoting of the cutter blade being in linkage motion with the vertical movement of the film punch.

4. An apparatus as claimed in claim 2 wherein the cutting unit for a tape is composed of a cutter blade formed on a side surface of the forming punch at the bottom thereof, the forming punch being capable of moving vertically.

5. An apparatus as claimed in claim 2 wherein the guiding and holding mechanism for a tape is composed of a stationary guide plate and a moving guide plate vertically movable relative to the stationary guide plate and urged by a spring toward the stationary guide plate.

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cutting lines L has a triangular cutting at each of the four corners to give advantages of facilitating the cutting along the cutting line 76a and prevention of peeling of the bonded tape starting at the corners. The only additional modification of the apparatus required for forming such V-shaped cut-outs is a pair of punches with triangular cross sections provided in the punch guide 17 in addition to the punch 21.

As is described above, the continuous length fastener chain and the continuous length reinforcement tape are each transferred portion-wise in perpendicular crossing with each other to effect press-bonding along with punching and cutting of the tape so that exact positioning of the tape on the fastener chain can be readily obtained with a possibility of full automation for the continuous process of the press-bonding of the reinforcement tape on to the individual space sections of the fastener chain.

In addition, the reinforcement tape bonded to the fastener chain by the method and apparatus of the present invention may have cut-outs to form portions extending to both of the lateral sides of the element rows to give a distinguishable advantage over the prior art method and apparatus so that extended serviceable life is imparted to the resultant slide fasteners with separable end stop by virtue of the reinforcement covering several of the elements in the lower end of the element rows.

Moreover, the apparatus of the present invention has advantages in addition to the above that inexact positioning and deformation of the tape can be avoided because the tape is held just before the press-bonding by the retractable tape guide rams appearing between the chain-guide units and the forming punch and that the fastener chain is guided and held at the exact position by the chain-guide units so that the reinforcement tape can be bonded to the fastener chain in the exact bonding position.

CLAIMS

1. A method for press-bonding a reinforcement tape on to a space section of a continuous length slide fastener chain provided with space sections at intervals which comprises the steps of

(a) placing the slide fastener chain between a forming die and a forming punch in such a manner that a said space section is positioned between the forming die and the forming punch,

(b) forming a cut-out by punching a continuous length tape of a thermoplastic resin film along a periphery thereof, the tape being moved in a direction perpendicular to the fastener chain,

(c) transferring the thus punched tape a predetermined distance so that the cut-out is positioned just above the space section of the fastener chain located between the forming die and the forming punch, and

(d) pressing the tape on to the space section of the fastener chain by moving the forming die toward the forming punch to effect bonding of the tape to the space section of the fastener chain.

2. An apparatus for press-bonding a reinforcement tape of a thermoplastic resin film on to a space section of a continuous length slide fastener chain provided with space sections at intervals which comprises the components of

(1) a forming punch or upper presser,

(2) a forming die or lower presser positioned below the forming punch and relatively movable for approaching to and being retracted from the forming punch,

(3) a pair of chain guide units positioned on both sides of the forming die to effect guiding and holding of a fastener chain,

(4) a guiding and holding mechanism for a tape provided with a pair of guide rams movable in the direction perpendicular to the line connecting the chain guide units to enter and exit from the space between the forming die and the forming punch,

(5) a feeding mechanism for feeding a tape into the guiding and holding mechanism for a tape,

(6) a punching unit for a tape positioned between the feeding unit for feeding a tape and the guiding and holding mechanism for a tape and provided with a vertically movable film punch, and

(7) a cutting unit for a tape.

3. An apparatus as claimed in claim 2 wherein the cutting unit is provided with a cutter blade capable of pivoting in a vertical plane in contact with the side surface of a punch guide of the punching unit for a tape along which the film punch moves vertically, the pivoting of the cutter blade being in linkage motion with the vertical movement of the film punch.

4. An apparatus as claimed in claim 2 wherein the cutting unit for a tape is composed of a cutter blade formed on a side surface of the forming punch at the bottom thereof, the forming punch being capable of moving vertically.

5. An apparatus as claimed in claim 2 wherein the guiding and holding mechanism for a tape is composed of a stationary guide plate and a moving guide plate vertically movable relative to the stationary guide plate and urged by a spring toward the stationary guide plate.

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