

SPECIFICATION

Method for applying sliding clasp fastener end stops

- 5 The present invention relates to a method of applying an end stop to a sliding clasp fastener stringer across a row of coupling elements thereof.
- 10 According to the invention, there is provided a method of applying pairs of staple-like end stops one pair at a time to pairs of sliding clasp fastener stringers, one pair at a time, respectively, each pair of stringers having a pair or rows of coupling elements, comprising the steps of: spacing each pair of sliding clasp fastener stringers apart to disengage the rows of coupling elements at least partly from each other; holding the disengaged rows of coupling elements flatwise against a die; removing each pair of end stops from the ends of two rows of end stops at a first position away from the die and moving said pair of end stops along a curved path of travel from said first position away from the die to a second position just above the die; and forcing the end stops in said second position against the die until they are clinched about the rows of coupling elements, respectively; the staple-like end stops having their pointed legs directed laterally of the die in said first position, progressively inclined during movement from said first to said second position; and directed toward said die in said second position; said path of travel lying in a plane in which the rows of coupling elements extend.
- 15 In our co-pending application No. 8119970 there is claimed an apparatus for applying pairs of end stops one pair at a time to pairs of sliding clasp fastener stringers, one at a time, respectively, each pair of the stringers having a pair of rows of coupling elements, comprising: a frame, a die mounted on said frame for supporting thereon a pair of the stringers, a separator disposed upstream of said die for disengaging at least leading end portions of the coupling element rows as they are moved forwardly past said separator, a chute pivotally mounted on said frame for carrying a pair of series of the end stops, said chute having an opening for discharging one pair of the end stops at a time, a rocker body pivotally mounted on said frame and having a pocket for receiving said one pair of end stops from said chute, and a punch projectable through said pocket, said rocker body being pivotable between a first position in which said one pair of end stops is transferred from said discharge opening into said pocket, and a second position in which said punch projects through said pocket to force said one pair of end stops out of said pocket against said die until they are clinched about the pair of rows of coupling elements, respectively, said chute being pivotable to said rocker body in said

first position for transferring said one pair of end stops from said discharge opening into said pocket.

- The invention will now be described by way of example with reference to the accompanying drawings, wherein;—

Figure 1 is a fragmentary front elevational view of an apparatus constructed to carry out a method in accordance with the invention;

- 75 *Figure 2* is a view similar to Fig. 1, showing the position of working parts in which a rocker body coacts with a chute;

Figure 3 is cross-sectional view taken along line III-III of Fig. 1;

- 80 *Figure 4* is an enlarged cross-sectional view taken along IV-IV of Fig. 2;

Figure 5 is a view similar to Fig. 4, taken along a different plane;

- 85 *Figure 6* is a schematic view illustrative of the way in which a pair of end stops are attached to a pair of sliding clasp fastener stringers; and

Fig. 7 is a fragmentary front view of a pair of sliding clasp fastener stringers with a pair of end stops applied according to a method of the present invention.

- As shown in Figs. 1 and 2, an apparatus 10 for carrying out a method according to the present invention comprises a frame 11, a die holder 12 mounted on the frame 11, a rocker body 13 pivotally mounted on the frame 11 and disposed above the die holder 12, and a chute 14 pivotally mounted on a support (not shown). The die holder 12 supports a die 15 100 that has in its upper surface a pair of clinching grooves (not shown) facing up toward the rocker body 13. The die holder 12 has a surface 16 inclined downwardly for facilitating movement of a pair of sliding clasp fastener stringers 17, 18 onto the upper surface of the die 15. A separator or splitter 19 projects upwardly from the inclined surface 16 and acts to disengage the pair of sliding clasp fastener stringers 17, 18 from each other 110 as they are moved past the separator 19 one on each side thereof, as better shown in Fig. 6.

- In Fig. 3, the rocker body 13 comprises an elongate housing 20 having a slot 21 extending longitudinally therethrough. A hollow drive shaft 22 is disposed in the frame 11 and is connected at one end to a suitable drive mechanism (not shown) so as to be angularly movable or rockable about its own 120 axis substantially through an angle of 75 degrees. The drive shaft 22 has the other end projecting from the frame 11 and has an attachment flange 23 fixed to the housing 20 substantially at its midpoint.

- 125 An axle 24 extends through the hollow drive shaft 22 and is rotatable about its own axis, the axle 24 having an end flange 25 to which is fixed an eccentric pin 26 coupled to a link 27. The link 27 is coupled to a pin 28 130 attached to a punch holder 29 reciprocally

disposed in the slot 21. The punch holder 29 is movable in its longitudinal direction in the slot 21 in response to revolution of the axle 24 about its own axis.

- 5 The housing 20 contains a guide 30 mounted vertically movably within the slot 21 and providing a surface 31 against which the punch holder 29 is slidable. The guide 30 includes a block 32 located adjacent to one of
- 10 the end openings of the slot 21. The block 32 has a pair of recesses 33,34 (better shown in driven through the stringer tapes 62, 63 against the die 15 and surfaces 35, 36, respectively. A pair of arms 37,38 are piv-
- 15 tally disposed in the recesses 33,34 respectively, by a pair of pins 39,40, the arms 37,38 and the block surfaces 35,36 jointly providing a pair of pockets 41,42 which open at said one of the slot openings. A compression coil spring 43 (Fig. 5) acts between the
- 20 arms 37,38 and normally urges them in a direction to close the pockets 41,42.

- The punch holder 29 supports on its one end a pair of punches 44,45 extending down-
- 25 wardly through a pair of apertures 46,47 in the block 32 into the pockets 41,42, respectively. A compression coil spring 48 acts between the punch holder 29 and the block 32 to normally urge them apart. The punch
 - 30 holder 29 has a lateral projection 49 (Fig. 3) extending from the other end thereof remote from the punches 44,45. A guide member 50 (Figs. 2 and 3) is fixed by a screw to the
 - 35 frame 11, the guide member 50 being located just above the flange 23 of the drive shaft 22 and having a vertical slot 51 for guiding the projection 49 of the punch holder 29 when the punch holder 29 moves up and
 - 40 down in the housing 20 of the rocker body 13 that is held vertically.

- The chute 14 as shown in Fig. 4 has a pair of longitudinal rails 52,53 along each of which a row of staple-like end stops 54, top
- 45 end stops in the illustrated embodiment, are to be fed by gravity or suitable means. Each of the end stops 54 comprises a pair of spaced pointed legs 55,56 and is transferred astride the rail 52 or 53 with the legs 55,56 one on each side of the rail. The chute 14 has
 - 50 an opening 57 (Fig. 1) at its distal end for discharging the end stops 54 off rails 52, 53 one pair at a time, the opening 57 being normally closed by a slidable cover 58. The cover 58 is spring-biased in a direction toward
 - 55 the distal end of the chute 14 to close the discharge opening 57. The chute 14 is angularly movable in a vertical plane in which the rocker body 13 pivots and the rows of coupling elements 64,65 extend.

- 60 The angular movement of the rocker body 13 is confined to the above-mentioned angle by a first stop 59 located adjacent to the guide member 50 for engaging one end portion of the rocker body 13 and a second stop
- 65 60 located below the first stop 59 for engag-

ing the other end portion of the rocker body 13. The first stop 59 includes a spring-loaded button 61 for resiliently maintaining the rocker body 13 in the vertical disposition (Fig. 70 1). When the rocker body 13 is held vertically by the first stop 59, the punches 44,45 are kept in vertical registry with the die grooves in the die 15.

- The operation of the end stop applying
- 75 apparatus 10 will be described. As shown in Fig. 6, a pair of coupled sliding clasp fastener stringers 17,18 including a pair of stringer tapes 62,63, respectively are moved along manually or by suitable automatic feeding
 - 80 means onto the die holder 12 with a pair of rows of coupling elements 64,65 being partly uncoupled by the separator 19. The sliding clasp fastener stringers 17,18 are held flatwise against the die 15 so as to maintain
 - 85 the ends of the coupling element rows 64,65 over the die grooves, respectively. In response to angular movement of the hollow drive shaft 22, the rocker body 13 is pivotally moved clockwise in the direction of the arrow 66 in
 - 90 Fig. 1 until it is held against the second stop 60, whereupon the end of the rocker body 13 in which the punches 44,45 are disposed engages and pushes back the cover 58 on the chute 14 to uncover the discharge opening
 - 95 57, as better shown in Fig. 2. Then, the chute 14 is actuated to pivot counterclockwise in the direction of the arrow 67 in Figs. 2 and 4 so as to place a pair of end stops 54,54
 - 100 respectively into the pockets 41,42 in the block 32. Upon complete insertion of the end stops 54,54 into the pockets 41,42 the chute 14 is withdrawn away from the rocker body 13 with the end stops 54,54 pinched between the arms 37,38 and the recess surfaces
 - 105 35,36 and left in the pockets 41,42, respectively.

- The rocker body 13 is then turned counterclockwise by the turning of the drive shaft 22 in the opposite direction until the end portion
- 110 of the rocker body 13 that is remote from the punches 44, 45 is held against the first stop 59, whereupon the rocker body 13 is vertically disposed. During such pivotal movement of the rocker body 13, the end stops 54,54
 - 115 move along an arcuate path of travel indicated by the arrowheads 68 in Fig. 6, such path of travel 68 stretching between a first position located upwardly away from the die 15 and a second position just above the die 15. While
 - 120 progressing along the path 68, the end stops 54,54 have their longitudinal axes extending across the path 68 and their legs 55,56 directed laterally of the die 15 at first, then becoming progressively inclined downwardly,
 - 125 and finally directed toward the die 15.

- With the rocker body 13 being directed vertically, the end stops 54,54 are vertically aligned with the die grooves and hence the rows of coupling elements 64,65 over them.
- 130 Then the axle 24 is rotated to enable the

punch holder 29 and the guide 30 to move until the block 32 contacts the sliding clasp fastener stringers 17,18. The downward movement of the guide 30 is arrested, and the punch holder 29 continues to be lowered against the bias of the spring 48. The punches 44,45 are depressed with the punch holder 29 and force the end stops 54,54 downwardly out of the pockets 41,42. The punches 44,45 continue to be depressed until the legs 55,56 of the end stops 54,54 are driven through the stringer tapes 62,63 against the die 15 and are clinched about the coupling element rows 64,65 by the die grooves. Upon attachment of the end stops 54,54, the punch holder 29 is lifted away from the die 15 by continued rotation of the axle 24. Fig. 7 shows the sliding clasp fastener stringers 17,18 having a pair of such end stops 54,54 thus fixed on the ends of the rows of coupling elements 64,65, respectively.

Since the end stops 54,54 are stably gripped between the arms 37,38 and the block surfaces 35,36, they are prevented from falling out of the pockets 41,42 or shifting therein while they are travelling from the first and the second position. While the end stops 54,54 are being pushed downwardly by the punches 44,45, the end stops 54,54 engage frictionally with the arms 37,38 and the block surfaces 35,36 so that they will maintain their legs 55,56 properly directed downwardly and be reliably attached to the sliding clasp fastener stringers 17,18. An additional advantage accruing from the apparatus is that a relatively large space is available above the die 15 while the rocker body 13 is receiving the end stops 54, 54 from the chute 14, such large space allowing the sliding clasp fastener stringers 17,18 to get easily placed on the die 15 either manually or by automatic means.

45 CLAIMS

1. A method of applying pairs of staple-like end stops one pair at a time to pairs of sliding clasp fastener stringers, one pair at a time, respectively, each pair of stringers having a pair of rows of coupling elements, comprising the steps of: spacing each pair of sliding clasp fastener stringers apart to disengage the rows of coupling elements at least partly from each other; holding the disengaged rows of coupling elements flatwise against a die; removing each pair of end stops from the ends of two rows of end stops at a first position away from the die and moving said pair of end stops along a curved path of travel from said first position away from the die to a second position just above the die; and forcing the end stops in said second position against the die until they are clinched about the rows of coupling elements, respectively; the staple-like end stops having their

pointed legs directed laterally of the die in said first position, progressively inclined during movement from said first to said second position, and directed toward said die in said second position; said path of travel lying in a plane in which the rows of coupling elements extend.

2. A method according to claim 1, said curved path being an arcuate path.

3. A method substantially as herein described with reference to and as illustrated in Fig. 1 to 6 inclusive of the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1982.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.

punch holder 29 and the guide 30 to move until the block 32 contacts the sliding clasp fastener stringers 17,18. The downward movement of the guide 30 is arrested, and the punch holder 29 continues to be lowered against the bias of the spring 48. The punches 44,45 are depressed with the punch holder 29 and force the end stops 54,54 downwardly out of the pockets 41,42. The punches 44,45 continue to be depressed until the legs 55,56 of the end stops 54,54 are driven through the stringer tapes 62,63 against the die 15 and are clinched about the coupling element rows 64,65 by the die grooves. Upon attachment of the end stops 54,54, the punch holder 29 is lifted away from the die 15 by continued rotation of the axle 24. Fig. 7 shows the sliding clasp fastener stringers 17,18 having a pair of such end stops 54,54 thus fixed on the ends of the rows of coupling elements 64,65, respectively.

Since the end stops 54,54 are stably gripped between the arms 37,38 and the block surfaces 35,36, they are prevented from falling out of the pockets 41,42 or shifting therein while they are travelling from the first and the second position. While the end stops 54,54 are being pushed downwardly by the punches 44,45, the end stops 54,54 engage frictionally with the arms 37,38 and the block surfaces 35,36 so that they will maintain their legs 55,56 properly directed downwardly and be reliably attached to the sliding clasp fastener stringers 17,18. An additional advantage accruing from the apparatus is that a relatively large space is available above the die 15 while the rocker body 13 is receiving the end stops 54, 54 from the chute 14, such large space allowing the sliding clasp fastener stringers 17,18 to get easily placed on the die 15 either manually or by automatic means.

45 CLAIMS

1. A method of applying pairs of staple-like end stops one pair at a time to pairs of sliding clasp fastener stringers, one pair at a time, respectively, each pair of stringers having a pair of rows of coupling elements, comprising the steps of: spacing each pair of sliding clasp fastener stringers apart to disengage the rows of coupling elements at least partly from each other; holding the disengaged rows of coupling elements flatwise against a die; removing each pair of end stops from the ends of two rows of end stops at a first position away from the die and moving said pair of end stops along a curved path of travel from said first position away from the die to a second position just above the die; and forcing the end stops in said second position against the die until they are clinched about the rows of coupling elements, respectively; the staple-like end stops having their

pointed legs directed laterally of the die in said first position, progressively inclined during movement from said first to said second position, and directed toward said die in said second position; said path of travel lying in a plane in which the rows of coupling elements extend.

2. A method according to claim 1, said curved path being an arcuate path.
75 3. A method substantially as herein described with reference to and as illustrated in Fig. 1 to 6 inclusive of the accompanying drawings.

Printed for Her Majesty's Stationary Office
by Burgess & Son (Abingdon) Ltd.—1982.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.

