

Description

The present invention relates to an apparatus for supplying top end stops to a holding portion of a top end-stop attaching machine for applying the top end stops to a continuous slide fastener chain.

One known top end-stop supplying apparatus is disclosed in Japanese Patent Publication No. 48-42582 and reillustrated here in Figure 9 of the accompanying drawings. The known apparatus includes an inclined gravity chute 15 for slidably receiving a multiplicity of generally U-shaped top end stops 16, and a reciprocable pusher arm 17 disposed at the lower end of the chute 15 for supplying the top end stops 16 one at a time to the holding portion 18 of a top end-stop holder 19 in a top end-stop attaching machine.

With the apparatus thus constructed, the top end stops 16 are likely to lie one upon another as they intermittently slide downwardly along the chute 15 in response to the reciprocating movement of the pusher arm 17. The top end stops thus overlapped tend to jam the chute 15 with the result that a reliable top end-stop supplying operation is difficult to achieve.

The present invention seeks to provide an apparatus for supplying top end stops reliably one at a time to a holding position of a top end-stop attaching machine for attaching the top end stops to a continuous slide fastener chain.

According to the present invention, there is provided a top end-stop attaching machine including an apparatus for supplying top end stops of a substantially U-shape one at a time to a holding portion of the attaching machine, said apparatus comprising: a vibrating parts feeder; a first elongate guide rail cantilevered to said parts feeder and extending therefrom toward the holding portion, said first guide rail having an upper longitudinal edge along which the top end stops are fed successively from said parts feeder toward a free end of said cantilevered first guide rail by the vibration of said parts feeder and said first guide rail; a reciprocable second elongate guide rail disposed between the holding portion and said first guide rail and having an upper longitudinal edge extending in flush with said upper longitudinal edge of said first guide rail, said second guide rail being reciprocably movable between a receiving position in which one end of said second guide rail is held in contact with said free end of said first guide rail, and a delivery position in which the other end of said second guide rail is held in registry with the holding portion, said second guide rail being normally held in said receiving position; and a delivery unit disposed above said first guide rail and reciprocably movable toward and away the holding portion to deliver a leading top end stop from said first guide rail through said second guide rail to the holding portion, said delivery unit being engageable with said second guide rail within a limited range of its reciprocating stroke for moving said second guide rail from said receiving position to said delivery position.

Many other advantages, features and objects 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 preferred structural embodiments incorporating the principles of the present invention are shown by way of illustrative example.

Figure 1 is a fragmentary perspective view of a top end-stop attaching machine including an apparatus for supplying top end stops to the machine according to the present invention;

Figure 2 is a fragmentary plan view of a continuous slide fastener chain to which top end stops are to be applied;

Figure 3 is a cross-sectional view taken along line III - III of Figure 2, showing attached top end stops;

Figure 4 is an enlarged fragmentary perspective view of the top end-stop supplying apparatus;

Figure 5 is a fragmentary perspective view of a means associated with a chute of the apparatus for delivering top end stops one at a time;

Figures 6A through 6F are schematic side elevational views showing the manner in which top end stops are supplied two at a time to holding portions of the attaching machine by the supplying apparatus;

Figure 7 is an enlarged fragmentary front elevational view of the holding portions in which top end stops supplied by the apparatus are retained;

Figure 8 is an enlarged fragmentary front elevational view showing the manner in which top end stops are attached to longitudinal marginal edges of a pair of slide fastener stringer tapes by the attaching machine;

Figure 9 is a schematic perspective view of a conventional top end-stop supplying apparatus;

Figure 10 is a view similar to Figure 1, showing a modified top end-stop supplying apparatus;

Figure 11 is an enlarged fragmentary perspective view of the modified apparatus;

Figures 12A through 12D are schematic side elevational, partially cross-sectional views illustrating successive steps of top end-stop applying operation of the modified apparatus; and

Figure 13 is an enlarged fragmentary front elevational view of a holding portion of the attaching machine to which top stops have been supplied by the modified apparatus.

The principles of the present invention are particularly useful when embodied in a top end-stop supplying apparatus, such as shown in Figure 1, generally indicated by the reference numeral 20. The apparatus 20 is associated with a top end-stop attaching machine 21 for supplying top end stops 22 of a substantially U-shape to a holding portion of the machine 21 for attaching the top end stops 22 to a continuous slide fastener chain 23.

The slide fastener chain 23 comprises a pair of slide fastener stringer tapes 24 each having a beaded longitudinal marginal edge 25 (Figure 2) supporting thereon successive rows of coupling elements 26. The slide fastener chain 23 also have a plurality of longitudinally spaced element-free spaces or gaps 27 between the successive rows of cou-

pling elements 26. The top end stops 22 are attached to the beaded marginal edges 25 in the element-free spaces 27 adjacent to ends of each row of coupling elements 26.

The top end-stop attaching machine 21 includes a clamping mechanism 28 which generally comprises a pair of vertical punch arms 29, 29 angularly movably mounted on a vertical punch/die holder 30, and a die 31 fixedly mounted on the punch/die holder 30 and positioned between the lower ends of the punch arms 29, 29. The inner lower surfaces of the punch arms 29, 29 have recesses 32, 32, respectively, defined therein, whereas the opposite outer surfaces of the die 31 have recesses 33, 33, respectively, defined therein and positioned in confronting relation to the recesses 32, 32. These recesses 32, 33 jointly define therebetween a pair of holding portions or cavities 34, 34 for retaining the substantially U-shaped top end stops 22.

The punch/die holder 30 is vertically movable in a channel-shaped holder guide 35 by a suitable actuator (not shown) between an upper position to receive top end stops and a lower position to attach top end stops. The channel-shaped holder guide 35 is fastened to a frame 36 of the machine 21. The punch arms 29, 29 are angularly movably supported by respective pivot pins 37, 37 on the punch/die holder 30, the pivot pins 37 being positioned below the intermediate portions of the punch arms 29, 29, i.e. more closely to the lower ends of the punch arms 29, 29 than to the upper ends thereof. The upper ends of the punch arms 29, 29 are operatively connected first pivot pins 38, 38 to a pair of links 39, 39, respectively, operatively coupled by a second pivot pin 40 to the lower end of a ram 41. The ram 41 is operatively connected to a suitable actuator, such as a pneumatic cylinder (not shown). When the actuator is operated, the ram 41 reciprocates vertically to angularly move the punch arms 40, 40 toward and away from each other about the pivot pins 37.

The top end-stop attaching machine 21 further includes a chain guide 42 disposed below the clamping mechanism 28 for guiding the fastener chain 23 to position one of the element-free space 27 with respect to the clamping mechanism 28 in such a manner that the beaded marginal edges 25 defining the element-free space 27 are directed upwardly for easy application of the U-shaped top end stops 22 to such erected marginal edges 25 adjacent to one ends of the rows of coupling elements 26.

As shown in Figures 1 and 4, the top end-stop supplying apparatus 20 generally comprises a pair of fixed guide rails 45 extending horizontally from a bowl 46 of a vibrating parts feeder 47 (Figure 4) toward the holding portions 34, 34 of the clamping mechanism 28, a pair of movable guide rails 48 (Figure 4) disposed respectively between the fixed guide rails 45 and the clamping mechanism 28 and reciprocally movable between downstream ends of the respective fixed guide rails 45 and the holding positions 34, and a reciprocable delivery unit 49 disposed above the fixed guide rails 45 and reciprocally movable along the fixed and movable guide rails 45, 48 for supplying two top end stops 22 at a

time from the fixed guide rails 45 through the movable guide rails 48 to the holding portions 34.

The fixed horizontal guide rails 45 are composed of a pair of parallel spaced elongate plates connected at their one ends to the vibrating parts feeder 47, these ends communicating with an outlet of the bowl 46. The plates or guide rails 45 have opposite ends or downstream ends disposed short of an upstanding support block 50 disposed in front of the clamping mechanism 28. With this construction, the vibrating parts feeder 47 generates a vibratory motion to cause the U-shaped top end stops 22 to depart from the bowl 46 onto the guide rails 45 with their legs astriding the upper longitudinal edges of the respective guide rails 45, and then to advance progressively toward the downstream ends of the guide rails 45 along the upper longitudinal edges. The cantilevered guide rails 45 oscillates in synchronism with the oscillation of the vibrating parts feeder 47 with the result that the top end stops 22 are advanced in ordinal rows without overlapping with one another.

The advancing movement of the top end stops 22 is temporarily arrested by a gate means 51 disposed slightly upstream of the downstream end of each guide rail 45, as shown in Figure 5. The gate means 51 includes a pair of first and second suction pipes 52, 53 disposed on one side of the guide rail 45 and opening perpendicularly toward the upper longitudinal edges of the guide rail 45 along which the top end stops 22 are advanced. The first and second suction pipes 52, 53 are laterally spaced from one another by a distance slightly larger than the extent of each top end stop 22 along the longitudinal direction of the guide rail 45. The suction pipes 52, 53 are connected respectively through a pair of first and second directional control valves 54, 55 to a main pipe 56 which is connected with a suitable vacuum source (not shown). With this construction, one top end stop 22 is held immovable on the guide rail 45 by a suction force acting between the upper longitudinal edge of the guide rail 45 and each suction pipe 52, 53. The first and second valves 54, 55 are operated to alternately block the first and second suction pipes 52, 53, thereby allowing passage of the top end stops 22 one at a time through the gate means 51 by the vibration of the guide rail 45. The leading top end stop 22 departed from the gate means 51 is automatically stopped at a position immediately upstream of the downstream end of the guide rail 45. To this end, the downstream end portion of the guide rail 45 is so constructed as to substantially reduce the magnitude of the vibrating motion transmitted from the vibrating parts feeder 47. Although not shown, the pneumatic gate means 51 may be replaced by a mechanical gate having a pair of blocking fingers alternately movable across the upper longitudinal edge of the guide rail 45. As a further alternative, it is possible to control the vibration of the guide rail 45.

As shown in Figure 4, the movable guide rails 48 are composed of a pair of parallel spaced elongate plates extending in alignment with the fixed guide rails 45. The guide rails or plates 48 are mounted on an upper surface of a rectangular slide block 57 si-

dably received in an upper recessed portion of the support block 50. The slide block 57 is slidably movable in a direction parallel to the guide rails 48 so that the guide rails 48 are reciprocally movable between a receiving position in which upstream ends of the respective guide rails 48 are held in abutment with the downstream ends of the fixed guide rails 45, and a delivery position in which downstream ends of the respective guide rails 48 are held in registry with the corresponding holding portions 34 of the clamping mechanism 28.

A pair of vertical support plates 58, 58 is secured to an end wall of the slide block 57 facing toward the parts feeder 47, the support plates 58 being disposed adjacent to opposite sidewalls of the slide block 57. The guide plates 58 include a pair of guide holes 59 (only one being shown), respectively, through which a pair of guide rods 60 extend. The guide rods 60 have their one ends connected to a pair of brackets 61, 61 secured to the upper portion of the support block 50 in confronting relation to the support plates 58, 58. The brackets 61 are disposed adjacent to an end of the support block 50 disposed closely to the clamping mechanism 28. The brackets 61 partly overlie the slide block 57 to prevent upward displacement of the latter. The guide rods 60 extend parallel to the movable and fixed guide rails 48, 45 and are secured at their opposite ends to a frame (not shown) of the apparatus 20. Each of the guide rods 60 supports thereon a first compression coil spring 62 disposed between one of the brackets 61 and the corresponding support plate 58. With this construction, the slide block 57 is normally urged by the first compression coil springs 62 toward the parts feeder 47 for thereby holding the movable guide rails 48 in the receiving position. A pair of second compression coil springs 63 of a predetermined length is disposed around the respective guide rods 60 in opposite relation to the first compression coil springs 62 with respect to the support plates 58.

The delivery unit 49 generally comprises, as shown in Figure 4, a generally L-shaped arm holder 64 slidably mounted on the guide rods 60, and a generally L-shaped delivery arm 65 pivotably connected to the arm holder 64 and having a pair of bifurcated delivery fingers 66 projecting from a lower end of the arm 65 toward the movable guide rails 48. Each of the delivery fingers 66 includes a recessed bottom wall 66a (only shown in Figure 6A) slidably engageable with the upper longitudinal edges of the fixed and movable guide rails 45, 48. The upper end of the delivery arm 65 is pivotably connected to a link 67 secured to a piston rod 68 of a pneumatic cylinder 69 horizontally supported by the frame of the apparatus 20, the cylinder 69 extending parallel to the guide rails 45.

As shown in Figures 6A and 6F, a pair of upper and lower stopper bolts 70, 71 is disposed one on each side of the pivot of the delivery arm 65 to limit angular movement of the delivery arm 65 to a certain angular range. The upper stopper bolt 70 projects perpendicularly from the arm 65 toward a vertical end wall 64a of the arm holder 64 and terminates short of the vertical end wall 64a. When the

arm 65 is turned clockwise in the same figures, the stopper bolt 70 is brought into abutment with the vertical end wall 64a, as shown in Figure 6F, thereby preventing further angular movement of the arm 65. On the other hand, the lower stopper bolt 71 extends transversely across the arm 65 to project toward the vertical end wall 64a in underlying relation to a horizontal bottom wall 64b of the arm holder 64. The lower stopper bolt 71 is engageable with the horizontal bottom wall 64b to limit angular movement of the arm 65 in the counter-clockwise direction. The upper and lower stopper bolts 70, 71 are axially movable to adjust the range of angular movement of the arm 65 so as to ensure that the delivery fingers 66 are angularly movable between a horizontal working position of Figure 6A in which the recessed bottom walls 66a of the fingers 66 are held in light contact with the upper longitudinal edges of the guide rails 45, and an upwardly tilted non-working position of Figure 6F in which the fingers 66 are spaced upwardly away from the upper longitudinal edges of the guide rails 45 for allowing passage of the top end stops 22 between the fingers 66 and the upper longitudinal edges.

As shown in Figure 4, a microswitch 72 is disposed adjacent to the downstream end of one fixed guide rail 48. The microswitch 72 is operatively connected with the non-illustrated actuator for the clamping mechanism 28 for controlling the operation of the clamping mechanism 28. One of the support plates 58 supports thereon an actuating bolt 73 engageable with an actuator of the microswitch 72 to activate the microswitch 72. The microswitch 72 and the actuating bolt 73 are positioned such that the actuating bolt 73 is engageable with the microswitch 72 to activate the latter only when the movable guide rails 48 approach their receiving positions. Upon activation of the microswitch 72, the clamping mechanism 28 is lowered toward the slide fastener chain 23 for attaching the top end stops 22 to the beaded marginal edges 25 of the stringer tapes 24. While the actuating bolt 73 is separated from the microswitch 72, the downward movement of the clamping mechanism 28 cannot take place.

The microswitch 72 may be connected with the vibrating parts feeder 37 to interrupt operation of the parts feeder to prevent the top end stops from accidentally falling from the downstream ends of the respective fixed guide rails 45 while the movable guide rails 48 are separated from the fixed guide rails 45.

Operation of the top end-stop supplying apparatus 20 is described below in detail with reference to Figures 6A-6F.

For purposes of illustration, operation of the apparatus 20 begins with parts in the condition shown in Figure 6A. In this condition, the piston rod 68 of the cylinder 69 is slightly extended to locate the delivery fingers 66 immediately upstream of a pair of leading top end stops 22 which have been advanced to the downstream end portions of the guide rails 45 along the upper longitudinal edges of the respective guide rails 45. The movable guide rails 48 are held in the receiving positions and hence they are contiguous to the corresponding fixed guide rails 45. The

punch/die holder 30 (indicated by phantom lines) is held in the uppermost position to receive the top end stops 22.

As the piston rod 68 is further extended to the position of Figure 6B, the arm holder 64 is forced by the cylinder 69 to slide forwardly toward the punch/die holder 30 along the guide rods 60. The forward movement of the arm holder 64 causes the delivery fingers 66 to slide successively along the upper longitudinal edges of the fixed guide rails 45 and the upper longitudinal edges of the movable guide rails 48, thereby moving the leading top end stops 22 from the fixed guide rails 45 to the movable guide rails 48. During that time, the movable guide rails 48 are kept immovable by the force of the first compression coil springs 62.

A further forward movement of the piston rod 68 causes the delivery fingers 66 to advance the leading top end stops 22 to the downstream end portions of the respective movable guide rails 48. During that time, the arm holder 64 is brought into engagement with the second compression coil springs 63 and then urges the support plates 58 forwardly against a combined force of the first and second compression coil springs 62, 63 whereupon the slide block 57 slides forwardly to bring the movable guide rails 48 to their delivery positions, as shown in Figure 6C. In this delivery position, the downstream ends of the respective movable guide rails 48 are held in registry with the holding portions 34 (Figure 7) between the punch arms 29 and the die 31. The second compression coil springs 63 have a length short enough to ensure that the arm holder 64 is brought into compressing engagement with these second springs 63 only after the leading top end stops 22 have been transferred from the fixed guide rails 45 to the movable guide rails 48. Because the second compression coil springs 63 are disposed in series with the first compression coil springs 62, a relatively large forward stroke of the movable guide rails 48 is available with the result that the downstream ends of the respective movable guide rails 48 can reliably be brought into registry with the corresponding holding portions 34 of the clamping mechanism 28.

When the piston rod 68 is fully extended, as shown in Figure 6D, the leading top end stops 22 are supplied by the delivery fingers 66 from the movable guide rails 48 to the holding positions 34.

Upon completion of delivery of the top end stops 22, the cylinder 69 is actuated to retract its piston rod 68, as shown in Figure 6E. Retracting movement of the piston rod 68 tends to cause the delivery arm 65 to pivot clockwise, however, this pivotal movement cannot take place because the arm holder 64 is urged by the force of the second compression coil springs 63 to slide rearwardly along the guide rods 60. When the arm holder 64 is separated from the second springs 63, the delivery arm 65 is turned clockwise in Figure 6E until the stopper bolt 70 abuts against the arm holder 64, bringing the delivery fingers 66 out of engagement with the upper longitudinal edges of the movable guide rails 48. At the same time, the slide block 57 is urged rearwardly by the force of the first springs 62 to return the mov-

able guide rails 48 to their receiving positions. During that time, the next following two top end stops 22 are departed from the gate means 51 (Figure 5) toward the downstream end portions of the fixed guide rails 45.

As the piston rod 68 is further retracted, the delivery fingers 66 pass over the leading top end stops 22, and when the piston rod 68 is fully retracted, the delivery fingers 66 are located slightly upstream of these top end stops, as shown in Figure 6F. Then the piston rod 68 is slightly extended to pivot the arm 65 from the solid-lined position to the phantom-lined position in which the delivery fingers 66 are held in right contact with the upper longitudinal edges of the fixed guide rails 45.

The above cycle is automatically repeated in synchronism with the operation of the clamping mechanism 28 for successively supplying pairs of top end stops to the holding portions 34 of the clamping mechanism 28, thereby enabling the clamping mechanism 28 to attach the top end stops to the continuous slide fastener chain 23 in the element-free spaces 27 at longitudinal intervals. Before the delivery of the top end stops 22, the punch arms 29, 29 are actuated to slightly spread their lower end portions, as indicated by phantom lines in Figure 7, for easy reception of the top end stops 22. After the delivery of the top end stops 22, the punch arms 29, 29 are actuated to move their lower ends toward each other to firmly retain the delivered top end stops 22 in the holding portions 34. Immediately before the arrival of the movable guide rails 48 at the receiving positions, the actuating bolt 73 (Figure 4) activate the microswitch 72 to thereby lower the clamping mechanism 28 (Figure 1) to its lowermost position to place the top end stops 22 over the beaded marginal edges 25 of the stringer tapes 24, as shown in Figure 8. Then the ram 41 (Figure 1) is descended to move the lower end portion of the punch arms 29, 29 toward each other, thereby attaching the top end stops 22 to the stringer tapes 24.

Figure 10 shows a modified top end-stop supplying apparatus 79 associated with the top end-stop attaching machine 21. The apparatus 79 is substantially the same as the apparatus 20 shown in Figure 1 with the exception that a delivery unit 80 includes a pair of stabilizing members 81 mounted on a delivery arm 82 for preventing upward displacement of the top end stops while they are supplied to the holding portion 34 of the clamping mechanism 28 of the machine 21. Because of the close similarity existing between these apparatus 20, 79, the like or corresponding parts are indicated by the like corresponding reference numerals throughout the drawings.

As shown in Figure 12A, the stabilizing members 81 are composed of a pair of rectangular plates mounted on the delivery arm 82 immediately downstream of a pair of delivery fingers 83, 83, and the plates 81 extending in a plane perpendicular to the plane of each guide rail 45. Each of the stabilizing members or plates 81 is connected to one end of a support rod 84 extending through a guide channel 85 in the delivery arm 82. A compression coil spring 86 is disposed around the support rod 84 and acts between the delivery arm 82 and the stabilizing plate

81 to urge the latter toward the punch arms 29. The support rod 84 is retained on the delivery arm 82 by a nut 87 threaded to an externally threaded opposite end portion of the support rod 84. With this construction, by turning the nut 87 in either direction, the stabilizing plate 81 is movable parallel to the guide rail 45 toward and away from the arm 82 so as to accurately locate a lower edge of the stabilizing plate 81 on the leading top end stop 22.

In operation, the pneumatic cylinder 69 of the apparatus 79 is actuated to extend its piston rod 68 to move the delivery arm 82 forwardly from the position of Figure 12A to the position of Figure 12B, thereby feeding a pair of leading top end stops 22 from the fixed guide rails 45 to the downstream ends of the respective movable guide rails 48. During that time, the stabilizing plates 81 continuously engage the top end stops 22 to prevent the latter from being displaced upwardly from the guide rails 45, 48. In the position of Figure 12, the stabilizing plates 81 are urged flatwise against the punch arms 29, as shown in Figure 13.

When the piston rod 68 is fully extended as shown in Figure 12C, the delivery fingers 66 forces the top end stops 22 into the holding portions 34 (Figure 13) against the bias of the compression coil spring 86. Then the piston rod 68 is retracted to return the delivery arm 82 to its original position, as shown in Figure 12D.

Claims

1. A top end-stop attaching machine (21) including an apparatus (20; 79) for supplying top end stops (22) of a substantially U-shape one at a time to a holding portion (34) of the attaching machine (21), said apparatus comprising: a vibrating parts feeder (47); a first elongate guide rail (45) cantilevered to said parts feeder (47) and extending therefrom toward the holding portion (34), said first guide rail (45) having an upper longitudinal edge along which the top end stops (22) are fed successively from said parts feeder (47) toward a free end of said cantilevered first guide rail (45) by the vibration of said parts feeder (47) and said first guide rail (45); a reciprocable second elongate guide rail (48) disposed between the holding portion (34) and said first guide rail (45) and having an upper longitudinal edge extending in flush with said upper longitudinal edge of said first guide rail (45), said second guide rail (48) being reciprocably movable between a receiving position in which one end of said second guide rail (48) is held in contact with said free end of said first guide rail (48), and a delivery position in which the other end of said second guide rail (48) is held in registry with the holding portion (34), said second guide rail (48) being normally held in said receiving position; and a delivery unit (49; 80) disposed above said first guide rail (45) and reciprocably movable toward and away from the holding portion (34) to deliver a leading top end stop (22) from said first guide rail (45) through said second guide rail (48) to the holding portion (34), said delivery unit (49; 80) being engageable with said second guide rail (48) within a limited range of its reciprocating

stroke for moving said second guide rail (48) from said receiving position to said delivery position.

2. An apparatus according to claim 1, further including a gate means (51) associated with said first guide rail (45) for allowing the passage there-through of the top end stops (22) one at a time.

3. An apparatus according to claim 1 or 2, said free end of said first guide rail (45) having a structure capable of substantially reducing the magnitude of the vibrating motion transmitted from said vibrating parts feeder (47).

4. An apparatus according to one of the claims 1 to 3, further including an upstanding support block (50) disposed near the holding portion (34) and having a recessed upper portion, a slide block (57) slidably received in said recessed upper portion of said support block (50) and movable parallel to said first guide rail (45), said second guide rail (48) being disposed on said slide block (57), at least one vertical support plate (58) secured to an end wall of said slide block (57) facing away from the holding portion (34), a bracket (61) secured to an end of said support block (50) remote from said end wall of said slide block (57) in confronting relation to said vertical support plate (58), an elongate guide rod (60) extending from said bracket (61) through said support plate (58) toward said parts feeder (47) in parallel relation to said first and second guide rails (45, 48), and a first compression coil spring (62) disposed around said guide rod (60) and acting between said bracket (61) and said support plate (58).

5. An apparatus according to claim 4, said bracket (61) partially overlying said slide block (57).

6. An apparatus according to claim 4, further including a second compression coil spring (63) freely disposed around said guide rod (60) in opposite relation to said first compression coil spring (62) with respect to said support plate (58), said delivery unit (49; 80) including an arm holder (64) slidably mounted on said guide rod (60), a generally L-shaped delivery arm (65; 82) pivotably connected to said arm holder (64) and engageable with said second compression coil spring (63), said delivery arm (65; 82) having a delivery finger (66; 83) slidably engageable with said upper longitudinal edges of said first and second guide rails (45, 48), and an actuator operatively connected with said delivery arm (65; 82) to reciprocate said delivery arm (65; 82) and said arm holder (64).

7. An apparatus according to claim 6, said delivery finger (66; 83) being normally located slightly upstream of said free end of said first guide rail (45), said second compression coil spring (63) having a length short enough to ensure that said delivery arm (65; 82) is brought into compressing engagement with said second spring (63) only when said delivery finger (66; 83) has moved from said first guide rail (45) to said second guide rail (48).

8. An apparatus according to claim 6 or 7, said delivery arm (65; 82) being angularly movable to move said delivery finger (66; 83) between a working position in which said delivery finger (66; 83) is held in light contact with said upper longitudinal edge of said first guide rail (45), and a non-working position in which said delivery finger (66; 83) is upward-



81 to urge the latter toward the punch arms 29. The support rod 84 is retained on the delivery arm 82 by a nut 87 threaded to an externally threaded opposite end portion of the support rod 84. With this construction, by turning the nut 87 in either direction, the stabilizing plate 81 is movable parallel to the guide rail 45 toward and away from the arm 82 so as to accurately locate a lower edge of the stabilizing plate 81 on the leading top end stop 22.

In operation, the pneumatic cylinder 69 of the apparatus 79 is actuated to extend its piston rod 68 to move the delivery arm 82 forwardly from the position of Figure 12A to the position of Figure 12B, thereby feeding a pair of leading top end stops 22 from the fixed guide rails 45 to the downstream ends of the respective movable guide rails 48. During that time, the stabilizing plates 81 continuously engage the top end stops 22 to prevent the latter from being displaced upwardly from the guide rails 45, 48. In the position of Figure 12, the stabilizing plates 81 are urged flatwise against the punch arms 29, as shown in Figure 13.

When the piston rod 68 is fully extended as shown in Figure 12C, the delivery fingers 66 forces the top end stops 22 into the holding portions 34 (Figure 13) against the bias of the compression coil spring 86. Then the piston rod 68 is retracted to return the delivery arm 82 to its original position, as shown in Figure 12D.

Claims

1. A top end-stop attaching machine (21) including an apparatus (20; 79) for supplying top end stops (22) of a substantially U-shape one at a time to a holding portion (34) of the attaching machine (21), said apparatus comprising: a vibrating parts feeder (47); a first elongate guide rail (45) cantilevered to said parts feeder (47) and extending therefrom toward the holding portion (34), said first guide rail (45) having an upper longitudinal edge along which the top end stops (22) are fed successively from said parts feeder (47) toward a free end of said cantilevered first guide rail (45) by the vibration of said parts feeder (47) and said first guide rail (45); a reciprocable second elongate guide rail (48) disposed between the holding portion (34) and said first guide rail (45) and having an upper longitudinal edge extending in flush with said upper longitudinal edge of said first guide rail (45), said second guide rail (48) being reciprocably movable between a receiving position in which one end of said second guide rail (48) is held in contact with said free end of said first guide rail (48), and a delivery position in which the other end of said second guide rail (48) is held in registry with the holding portion (34), said second guide rail (48) being normally held in said receiving position; and a delivery unit (49; 80) disposed above said first guide rail (45) and reciprocably movable toward and away from the holding portion (34) to deliver a leading top end stop (22) from said first guide rail (45) through said second guide rail (48) to the holding portion (34), said delivery unit (49; 80) being engageable with said second guide rail (48) within a limited range of its reciprocating

stroke for moving said second guide rail (48) from said receiving position to said delivery position.

2. An apparatus according to claim 1, further including a gate means (51) associated with said first guide rail (45) for allowing the passage therethrough of the top end stops (22) one at a time.

3. An apparatus according to claim 1 or 2, said free end of said first guide rail (45) having a structure capable of substantially reducing the magnitude of the vibrating motion transmitted from said vibrating parts feeder (47).

4. An apparatus according to one of the claims 1 to 3, further including an upstanding support block (50) disposed near the holding portion (34) and having a recessed upper portion, a slide block (57) slidably received in said recessed upper portion of said support block (50) and movable parallel to said first guide rail (45), said second guide rail (48) being disposed on said slide block (57), at least one vertical support plate (58) secured to an end wall of said slide block (57) facing away from the holding portion (34), a bracket (61) secured to an end of said support block (50) remote from said end wall of said slide block (57) in confronting relation to said vertical support plate (58), an elongate guide rod (60) extending from said bracket (61) through said support plate (58) toward said parts feeder (47) in parallel relation to said first and second guide rails (45, 48), and a first compression coil spring (62) disposed around said guide rod (60) and acting between said bracket (61) and said support plate (58).

5. An apparatus according to claim 4, said bracket (61) partially overlying said slide block (57).

6. An apparatus according to claim 4, further including a second compression coil spring (63) freely disposed around said guide rod (60) in opposite relation to said first compression coil spring (62) with respect to said support plate (58), said delivery unit (49; 80) including an arm holder (64) slidably mounted on said guide rod (60), a generally L-shaped delivery arm (65; 82) pivotably connected to said arm holder (64) and engageable with said second compression coil spring (63), said delivery arm (65; 82) having a delivery finger (66; 83) slidably engageable with said upper longitudinal edges of said first and second guide rails (45, 48), and an actuator operatively connected with said delivery arm (65; 82) to reciprocate said delivery arm (65; 82) and said arm holder (64).

7. An apparatus according to claim 6, said delivery finger (66; 83) being normally located slightly upstream of said free end of said first guide rail (45), said second compression coil spring (63) having a length short enough to ensure that said delivery arm (65; 82) is brought into compressing engagement with said second spring (63) only when said delivery finger (66; 83) has moved from said first guide rail (45) to said second guide rail (48).

8. An apparatus according to claim 6 or 7, said delivery arm (65; 82) being angularly movable to move said delivery finger (66; 83) between a working position in which said delivery finger (66; 83) is held in light contact with said upper longitudinal edge of said first guide rail (45), and a non-working position in which said delivery finger (66; 83) is upward-



ly spaced from said upper longitudinal edge of said first guide rail (45) by a distance large enough to allow the passage therethrough of the top end stops.

9. An apparatus according to claim 8, including means for preventing said delivery arm (65; 82) from angularly moving beyond said working and non-working positions.

10. An apparatus according to claim 9, said preventing means comprising a pair of stopper bolts (70; 71) disposed on opposite sides of the pivot between said delivery arm (65; 82) and said arm holder (64) and engageable said arm holder (64).

11. An apparatus according to one of the claims 6 to 10, said delivery finger (66; 83) having a recessed bottom wall (66a) receptive of said upper longitudinal edges of said first and second guide rail (45, 48).

12. An apparatus according to one of the claims 6 to 11, said actuator comprising a pneumatic cylinder (69) extending parallel to said first guide rail (45).

13. An apparatus according to claim 1, said delivery unit (80) including stabilizing means (81) continuously engageable with the leading top end stop (22) as it is moved along said upper longitudinal edges of said first and second guide rails (45, 48), for preventing the leading top end stop (22) from displacing upwardly away from said upper longitudinal edges of said first and second guide rails (45, 48).

14. An apparatus according to claim 13, said delivery unit (80) including a delivery arm (82) reciprocally movable along said first and second guide rails (45, 48) and having a delivery finger (83) slidably engageable with said upper longitudinal edges of said first and second guide rails (45, 48), said stabilizing means comprising a rectangular plate (81) vertically disposed adjacent to said delivery finger (83).

15. An apparatus according to claim 14, further including a support rod (84) extending perpendicularly from said vertical plate (81) and slidably supported by said delivery arm (82), and a compression coil spring (86) disposed on said support rod (84) and acting between said vertical plate (81) and said delivery arm (82).

Patentansprüche

1. Maschine (21) zum Anbringen von oberen Begrenzungsteilen mit einer Vorrichtung (20, 79) zum aufeinanderfolgenden Zuführen von im wesentlichen U-förmigen oberen Begrenzungsteilen (22) zu einem Haltebereich (34) der Anbringmaschine (21), wobei diese Vorrichtung umfaßt: eine Vibrationszuführeinrichtung (47); eine erste langgestreckte Führungsschiene (45), die an der Zuführeinrichtung (47) freitragend abgestützt ist und sich von dieser zu dem Haltebereich (34) hin erstreckt, wobei die erste Führungsschiene (45) eine obere Längskante hat, längs welcher die oberen Begrenzungsteile (22) von der Zuführeinrichtung (47) durch die Vibrationen der Zuführeinrichtung (47) und der ersten Führungsschiene (45) nacheinander zu einem freien Ende der freitragenden ersten Führungsschiene (45) zugeführt werden; eine hin- und herbewegbare zweite langgestreckte Führungsschiene (48), die zwischen dem Haltebereich (34)

und der ersten Führungsschiene (45) angeordnet ist und eine mit der oberen Längskante der ersten Führungsschiene (45) fluchtende obere Längskante hat, wobei diese zweite Führungsschiene (48) zwischen einer Aufnahmestellung, in der ein Ende der zweiten Führungsschiene (48) mit dem besagten freien Ende der ersten Führungsschiene (45) in Berührung gehalten ist, und einer Abgabestellung hin- und herbewegbar ist, in der das andere Ende der besagten zweiten Führungsschiene (48) mit dem Haltebereich (34) fluchtend gehalten ist, wobei die zweite Führungsschiene (48) normalerweise in der Aufnahmestellung gehalten ist; und eine Ababeeinheit (48; 80), die über der ersten Führungsschiene (45) angeordnet und zu dem Haltebereich (34) vor und zurückbewegbar ist, um ein oberes Begrenzungsteil (22) von der ersten Führungsschiene (45) über die zweite Führungsschiene (48) an den Haltebereich (34) abzugeben, wobei die Ababeeinheit (49; 80) in einem begrenzten Bereich ihres Bewegungshubes mit der zweiten Führungsschiene (48) in Eingriff bringbar ist, um die zweite Führungsschiene (48) von der Aufnahmestellung in die Abgabestellung zu bewegen.

2. Vorrichtung nach Anspruch 1, ferner umfassend eine der ersten Führungsschiene (45) zugeordnete Toreinrichtung (51), die den Durchtritt jeweils eines oberen Begrenzungsteils (22) erlaubt.

3. Vorrichtung nach Anspruch 1 oder 2, wobei das freie Ende der ersten Führungsschiene (45) so ausgebildet ist, daß es die Stärke der von dem Vibrationsförderer (47) übertragenen Schwingungen erheblich verringert.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, ferner umfassend einen aufrechten Stützblock (50), der nahe dem Haltebereich (34) angeordnet ist und einen vertieften oberen Bereich hat, einen Gleitblock (57), der in dem vertieften oberen Bereich des Stützblocks (50) verschiebbar angeordnet und parallel zu der ersten Führungsschiene (45) bewegbar ist, wobei die zweite Führungsschiene (48) auf dem Gleitblock (57) angeordnet ist, mindestens eine vertikale Stützplatte (58), die an einer von dem Haltebereich (34) abgekehrten Endwand des Gleitblocks (57) befestigt ist, einen Bügel (61), der an einem von der besagten Endwand des Gleitblocks (57) abliegenden Ende des Stützblocks (50) in gegenüberliegender Beziehung zu der vertikalen Stützplatte (58) befestigt ist, eine längliche Führungsstange (60), die sich von dem Bügel (61) durch die Stützplatte (59) hindurch zu der Zuführeinrichtung (47) parallel zu der ersten und zweiten Führungsschiene (45, 48) erstreckt, und eine erste Schraubendruckfeder (62), die auf die Führungsstange (60) aufgesteckt ist und sich an dem Bügel (61) und der Stützplatte (58) abstützt.

5. Vorrichtung nach Anspruch 4, wobei der Bügel (61) den Gleitblock (57) teilweise überragt.

6. Vorrichtung nach Anspruch 4, ferner umfassend eine zweite Schraubendruckfeder (63), die in bezug auf die Stützplatte (58) in gegenüberliegender Beziehung zu der ersten Schraubendruckfeder (62) auf der Führungsstange (60) frei angeordnet ist, wobei die besagte Ababeeinheit (49; 80) einen auf der Führungsstange (60) verschiebbar gelager-



ten Armhalter (64), einen im allgemeinen L-förmigen Abgabearm (65; 82), der mit dem Armhalter (64) schwenkbar verbunden und mit der zweiten Schraubendruckfeder (63) in Eingriff bringbar ist, wobei der Abgabearm (65; 82) einen Abgabefinger (66; 83) hat, der mit den oberen Längskanten der ersten und zweiten Führungsschiene (45, 48) verschiebbar in Eingriff bringbar ist, und eine Betätigungseinrichtung aufweist, die mit dem Abgabearm (65; 82) gekuppelt ist, um den Abgabearm (65; 82) und den Armhalter (64) hin- und her zu bewegen.

7. Vorrichtung nach Anspruch 6, wobei der Abgabefinger (66; 83) normalerweise geringfügig stromaufwärts von dem freien Ende der ersten Führungsschiene (45) angeordnet ist, wobei die zweite Schraubendruckfeder (63) eine hinreichend kleine Länge hat, um zu gewährleisten, daß der Abgabearm (65; 82) nur dann mit der zweiten Schraubenfeder (63) in Druckeingriff gelangt, wenn sich der Abgabefinger (66; 83) von der ersten Führungsschiene (45) zu der zweiten Führungsschiene (48) bewegt hat.

8. Vorrichtung nach Anspruch 6 oder 7, wobei der Abgabearm (65; 82) verschwenkbar ist, um den Abgabefinger (66; 83) zwischen einer Arbeitsstellung, in der dieser Abgabefinger (66; 83) mit der oberen Längskante der ersten Führungsschiene (45) in leichter Berührung gehalten ist, und einer Ruhestellung zu bewegen, in der dieser Abgabefinger (66; 83) in einem hinreichend großen Abstand über der oberen Längskante der ersten Führungsschiene (45) angeordnet ist, damit sich die oberen Begrenzungssteile vorbeibewegen können.

9. Vorrichtung nach Anspruch 8, umfassend Mittel zur Verhinderung einer Verschwenkung des Abgabearms (65; 82) über die Arbeitsstellung und die Ruhestellung hinaus.

10. Vorrichtung nach Anspruch 9, wobei die besagten Mittel zwei Anschlagbolzen (70; 71) umfassen, die auf gegenüberliegenden Seiten des Gelenks zwischen dem Abgabearm (65; 82) und dem Armhalter (64) angeordnet und mit dem Armhalter (64) in Eingriff bringbar sind.

11. Vorrichtung nach einem der Ansprüche 6 bis 10, wobei der Abgabefinger (66; 83) eine vertiefte Bodenwand (66a) hat, die die besagten oberen Längskanten der ersten und zweiten Führungsschiene (45, 48) aufnimmt.

12. Vorrichtung nach einem der Ansprüche 6 bis 11, wobei die besagte Betätigungseinrichtung einen zu der ersten Führungsschiene (45) parallelen Pneumatikzylinder (69) umfaßt.

13. Vorrichtung nach Anspruch 1, wobei die Abgabereinheit (80) Stabilisierungsmittel (81) umfaßt, die mit dem vorderen oberen Begrenzungssteil (22) ständig in Eingriff stehen, während sich dieses längs der oberen Längskanten der ersten und zweiten Führungsschiene (45, 48) bewegt, um zu verhindern, daß das vordere obere Begrenzungssteil (22) von der oberen Längskante der ersten und zweiten Führungsschiene (45, 48) abhebt.

14. Vorrichtung nach Anspruch 13, wobei die Abgabereinheit (80) einen Abgabearm (82) umfaßt, der längs der ersten und zweiten Führungsschienen (45, 48) hin- und herbewegbar ist und einen Abga-

befinger (83) aufweist, der mit den oberen Längskanten der ersten und zweiten Führungsschiene (45, 48) verschiebbar in Eingriff bringbar ist, wobei die besagten Stabilisierungsmittel eine rechteckige Platte (81) umfassen, die vertikal neben dem Abgabefinger (83) angeordnet ist.

15. Vorrichtung nach Anspruch 14, ferner umfassend eine Stützstange (84), die von der besagten vertikalen Platte (81) rechtwinklig absteht und durch den besagten Abgabearm (82) verschiebbar abgestützt ist, und eine Schraubendruckfeder (86) umfaßt, die auf der Stützstange (84) angeordnet ist und sich an der vertikalen Platte (81) und dem besagten Abgabearm (82) abstützt.

Revendications

1. Machine (21) de fixation de butées d'extrémité supérieures comprenant un appareil (20; 79) destiné à alimenter les butées (22) d'extrémité supérieure sensiblement en forme de U à une partie de maintien (34) de la machine de fixation (21), ledit appareil comprenant: un alimentateur vibrant (47) de pièces; un premier rail (45) de guidage de forme allongée en porte-à-faux par rapport audit alimentateur (47) de pièces et s'étendant à partir de celui-ci en direction de la partie de maintien (34), ledit premier rail (45) de guidage comportant un bord longitudinal supérieur le long duquel les butées (22) d'extrémité supérieure sont transportées successivement à partir dudit alimentateur (47) de pièces en direction de l'extrémité libre dudit premier rail (45) de guidage en porte-à-faux grâce à la vibration dudit alimentateur (47) de pièces et dudit premier rail (45); un second rail (48) de guidage de forme allongée susceptible d'effectuer un mouvement de va-et-vient disposé entre la partie de maintien (34) et ledit premier rail (45) de guidage, et comportant un bord longitudinal supérieur qui s'étend au même niveau que ledit bord longitudinal supérieur dudit premier rail (45) de guidage, ledit second rail (48) de guidage de forme allongée étant susceptible de se déplacer en va-et-vient entre une position de réception dans laquelle l'une des extrémités dudit second rail (48) de guidage est maintenue en contact avec ladite extrémité libre dudit premier rail (45) de guidage, et une position de délivrance dans laquelle l'autre extrémité dudit second rail (48) de guidage est maintenue en correspondance exacte avec la partie de maintien (34), ledit second rail (48) de guidage étant normalement maintenu dans ladite position de réception; et une unité (49; 80) de délivrance située au-dessus dudit premier rail (45) de guidage et susceptible d'effectuer un mouvement de va-et-vient en s'approchant et en s'éloignant de la partie (34) de maintien en vue de délivrer hors du premier rail (45) de guidage la butée d'extrémité supérieure (22) placée en avant, par l'intermédiaire dudit second rail (48) de guidage, à ladite partie de maintien (34), ladite unité (49; 80) de délivrance pouvant se mettre en contact avec ledit second rail (48) de guidage sur une partie limitée de sa course de va-et-vient en vue de déplacer ledit second rail (48) de guidage de sa dite position de réception jusqu'à ladite position de délivrance.



2. Appareil selon la revendication 1, comprenant en outre un moyen formant porte (51) associé audit premier rail (45) de guidage, pour permettre le passage une à une des butées (22) d'extrémité supérieures.

3. Appareil selon la revendication 1 ou 2, ladite extrémité libre dudit premier rail (45) de guidage comportant une structure apte à réduire sensiblement l'amplitude du mouvement vibratoire transmis à partir dudit alimentateur vibrant (47) pour pièces.

4. Appareil selon l'une des revendications 1 à 3, comprenant en outre un bloc (50) de support vertical, disposé à proximité de la partie de maintien (34) et comportant une partie supérieure formant un creux, un bloc (57) coulissant reçu de façon coulissante dans ladite partie supérieure comportant un creux dudit bloc (50) de support, et susceptible de se déplacer parallèlement audit premier rail (45) de guidage, ledit second rail (48) de guidage étant disposé sur ledit bloc (57) coulissant, au moins une plaque (58) de support verticale fixée à une paroi d'extrémité dudit bloc coulissant (57) dirigée vers l'opposé de la partie de maintien (34), un support (61) fixé à une extrémité dudit bloc (50) de support, à l'écart de ladite paroi d'extrémité dudit bloc (57) coulissant, faisant face à ladite plaque (58) de support verticale, une longue tige (60) de guidage s'étendant à partir dudit support (61) en traversant ladite plaque (58) de support en direction dudit alimentateur (47) de pièces, parallèlement auxdits premier et second rails (45, 48) de guidage, et un premier ressort (62) hélicoïdal de compression disposé autour de ladite tige de guidage (60) et agissant entre ledit support (61) et ladite plaque de support (58).

5. Appareil selon la revendication 4, ledit support (61) étant disposé partiellement au-dessus dudit bloc (57) coulissant.

6. Appareil selon la revendication 4, comprenant en outre un second ressort (63) hélicoïdal de compression disposé librement autour de ladite tige (60) de guidage, à l'opposé dudit premier ressort (62) hélicoïdal de compression par rapport à ladite plaque de support (58), ladite unité de délivrance (49; 80) comprenant un support (64) de bras monté de façon coulissante sur ladite tige (60) de guidage, un bras de délivrance (65; 82) en forme générale de L, relié de façon pivotante audit support de bras (64) et susceptible de se mettre en prise avec ledit second ressort (63) hélicoïdal de compression, ledit bras (65; 82) de délivrance comportant un doigt (66; 83) de délivrance susceptible de se mettre en contact coulissant avec lesdits bords longitudinaux supérieurs desdits premier et second rails (45, 48) de guidage, et un dispositif d'actionnement relié fonctionnellement audit bras (65; 82) de délivrance en vue de faire aller et venir ledit bras (65; 82) de délivrance et ledit support (64) de bras.

7. Appareil selon la revendication 6, ledit doigt (66; 83) de délivrance étant normalement situé légèrement en amont de ladite extrémité libre dudit premier rail (45) de guidage, ledit second ressort (63) hélicoïdal de compression étant suffisamment court pour que ledit bras (65; 80) de délivrance soit amené en contact avec compression avec ledit second ressort (63) uniquement lorsque ledit doigt (66; 83)

de délivrance s'est déplacé dudit premier rail (45) de guidage audit second rail (48) de guidage.

8. Appareil selon la revendication 6 ou 7, ledit bras (65; 82) de délivrance étant susceptible de se déplacer angulairement pour déplacer ledit doigt (66; 83) de délivrance entre une position de travail dans laquelle ledit doigt (66; 83) de délivrance est maintenu en contact léger avec ledit bord longitudinal supérieur dudit premier rail (45) de guidage et une position de repos dans laquelle ledit doigt (66; 83) de délivrance se trouve à l'écart vers le haut dudit bord longitudinal supérieur dudit premier rail (45) de guidage, avec une distance suffisante pour permettre le passage des butées d'extrémité supérieures.

9. Appareil selon la revendication 8, comprenant des moyens pour empêcher ledit bras (65; 82) de délivrance d'être déplacé angulairement au-delà desdites positions de travail et de repos.

10. Appareil selon la revendication 9, les moyens d'empêchement comprenant une paire de vis d'arrêt d'arrêt (70; 71) disposées sur des côtés opposés du pivot entre ledit bras (65; 82) de délivrance et ledit support (64) de bras et susceptible de se mettre en contact avec ledit support (64) de bras.

11. Appareil selon l'une des revendications 6 à 10, ledit doigt (66; 83) de délivrance comportant une paroi (66a) de base en creux servant à recevoir lesdits bords longitudinaux supérieurs dudit premier et second rails (45; 48) de guidage.

12. Appareil selon l'une des revendications 6 à 11, ledit organe d'actionnement comprenant un vérin pneumatique (69) s'étendant parallèlement audit premier rail (45) de guidage.

13. Appareil selon la revendication 1, ladite unité de délivrance (80) comprenant un moyen de stabilisation (81) susceptible d'être en contact continu avec la butée (22) d'extrémité supérieure située en avant pendant qu'elle se déplace le long des bords longitudinaux supérieurs desdits premier et second rails (45, 48) de guidage pour empêcher la butée (22) d'extrémité supérieure située en avant de se déplacer vers le haut en quittant lesdits bords longitudinaux supérieurs desdits premier et second rails (45, 48) de guidage.

14. Appareil selon la revendication 13, ladite unité de délivrance (80) comprenant un bras (82) de délivrance susceptible d'être déplacé en va-et-vient le long desdits premier et second rails (45, 48) de guidage, et comportant un doigt (83) de délivrance susceptible de se mettre en contact glissant avec lesdits bords longitudinaux supérieurs desdits premier et second rails (45; 48) de guidage, ledit moyen de stabilisation comprenant une plaque rectangulaire (81) disposée verticalement à proximité dudit doigt (83) de délivrance.

15. Appareil selon la revendication 14, comprenant en outre une tige (84) de support qui s'étend perpendiculairement à partir de ladite plaque verticale (81) qui est maintenue de façon glissante par ledit bras (82) de délivrance, ainsi que par un ressort (86) hélicoïdal de compression disposé autour de ladite tige (84) de support et agissant entre ladite plaque verticale (81) et ledit bras (82) de délivrance.