

Description

This invention relates to an apparatus for forming and planting slide fastener elements comprising: a first ram mounted on a frame for reciprocal movement and having at the forward end thereof a cutting die provided with a passage for the wire to be used for elements extending therethrough and a forming die for forming an engageable head in an element; a cutting punch placed on the upper surface of the first ram for relative movement between the cutting punch and the first ram so that the cutting punch cuts out an element from the wire as the first ram moves backward; a forming punch for forming the engageable head placed above the first ram so that it aligns with the forming die when the first ram is at the end of its backward movement; at least one side punch for planting the fastener elements on a fastener tape; and an output drive shaft having first ram drive cam means.

An apparatus of this kind is disclosed in US-A-2 763 051. In this conventional apparatus a ram is mounted for reciprocal movement in a horizontal direction. The ram is provided at the forward end thereof with a forming die for forming the head of an element and a passage for guiding a formed wire. When the ram moves backward, an element is cut out from the formed wire by a cutting punch mounted for relative movement in the horizontal direction with respect to the ram. The cut-out element is received in the forming die when the ram reaches the end of its backward movement. At the end of the ram's backward movement, a forming punch disposed above the forming die descends to form an engageable head in the element. Then the ram advances to a position in which the legs of the element receive a side portion of a fastener tape therebetween, where the element is planted onto the tape by squeezing the legs onto the tape using side punches.

An object of this invention is to provide an apparatus of the type mentioned above for forming and planting slide fastener elements which can operate at higher speeds and more reliably than conventional apparatuses without using complicated mechanisms and devices.

An apparatus satisfying these requirements is characterized in the appended claim 1. Therefore it is unnecessary to synchronize the operation of a forming punch and side punches with the moving ram. Therefore, the operation for forming the engageable head of the element and planting the element may be done reliably without using a complicated mechanism. Furthermore, the ram begins retraction after the tape having elements secured thereto is fed upward an appropriate distance. Therefore, even when the apparatus is running at speed, the element secured to the tape does not catch on the forming die retracting with the ram to disorder the accurate securement of the

element. The forming punch and the side punches are also driven by cam means formed on the same output drive shaft on which the cam means for the ram is formed. Therefore, the timing of the ram, the forming punch and the side punch operations are kept accurate although their driving mechanisms are simple. Because of the features mentioned above, the apparatus of this invention is very reliable even when operating at high speed.

Particular embodiments of the invention are set out in the dependent claims.

The above mentioned and the other objects and features of this invention as set out in the dependent claims will be clear from the following description of embodiments of the invention referring to the drawings, wherein

Fig. 1 is a plan view of a portion of a fastener stringer made by an apparatus according to this invention;

Fig. 2 is a sectional view of an apparatus for forming and planting slide fastener elements according to one embodiment of this invention taken along a vertical plane;

Fig. 3 is a sectional view of the apparatus of Fig. 2 taken along line III—III;

Fig. 4 is a plan view of the apparatus shown in Fig. 2 with deletion of a cover thereof;

Fig. 5 is a perspective view of operating parts used in the apparatus of Fig. 2;

Figs. 6 to 9 are illustrations showing a first ram and associated members in successive steps of operation;

Fig. 10 is a plan view of cam means for driving a first ram and associated rollers in another embodiment of the invention;

Fig. 11 is a sectional view taken along the center of the arrangement shown in Fig. 10;

Fig. 12 is a plan view of an arrangement for planting an element of a concealed fastener according to another embodiment of the invention; and

Fig. 13 is a plan view similar to Fig. 12 in which a side punch is actuated to plant the element.

With reference to Fig. 2, an apparatus for forming and planting slide fastener elements according to this invention comprises a frame 1 which supports a first ram 2 in a ram guide 3 for reciprocable movement in a horizontal direction. At the forward end of this first ram 2, there are provided, one after another, in the advance direction of the first ram, a cutting die 4 having a passage 4a through which a formed wire W for elements having a cross sectional configuration, such as "Y", extends and a forming die 5 for forming an engageable head in a fastener element E.

The frame 1 has a mounting plate 6 above the forward end of the first ram 2. A ram guide 7 is secured to the mounting plate 6. As shown in Fig. 3, the ram guide 7 is provided with a guide channel 7a in which a second ram 8 is received for vertical movement in a direction perpendicular to the horizontal movement of the

first ram 2. A forming punch 10 for forming an engageable head of an element E and a pressure pad 11 for holding the both legs of the element E as the engageable head is formed are mounted on the front side of the second ram 8 by a punch holder 9 interposed therebetween. A cutting punch 12 is secured to the lower end portion of the ram guide 7 so that the cutting punch slidably engages the upper surface of the forward end of the first ram 2.

As shown in Fig. 5, a pair of side punches 13 are provided on the opposite sides of the forming die 5. The side punches plant the element E which has been formed with the engageable head by squeezing both legs of the element onto a tape T.

As shown in Figs. 2 and 5, a formed wire W for forming the elements extends through the passage 4a in the cutting die 4 and is fed by a feeding roller 14 and a guide roller 15 intermittently each increment corresponding to the thickness of the element E. Like the formed wire W, the tape is fed from the underside of the apparatus and guided by tape guides 16. The elements E are secured to the tape T to form a slide fastener stringer S as shown in Fig. 1. The stringer is intermittently pulled up by the combination of a stringer feeding roller 17 and a pressure roller 18.

For driving the abovementioned operating members, an output drive shaft 19 is provided above the rear end of the first ram 2. The output drive shaft 19 is formed with first ram drive cams 20, forming punch drive cams 21, a side punch drive cam 22, a stringer feeding cam 23 and a wire feeding cam 24. Each of these cams is connected to respective operating members 2, 10, 13, 14 and 17 through respective cam follower mechanisms 25, 26, 27, 29 and 28 to actuate them.

The cam follower mechanism 25 for the first ram 2 includes rollers 25a rotatably mounted on the rear portion of the first ram 2 for rolling engagement with the cams 20. Compression springs 30 forwardly urge the first ram 2 so that rotation of the cams 20 moves the first ram 2 backward against the force of the springs 30 to horizontally reciprocate it. The shapes of the two cams 20 are identical and are so selected that the first ram 2 dwells at the end of each forward and backward movement for respective predetermined times.

The cam follower mechanism 26 for the forming punch 10 comprises rollers 26a mounted for rolling engagement with the cams 21, a lever 26b pivotally mounted at its central portion on the body of the apparatus and having the rollers 26a rotatably mounted at one end thereof, a pin 26c mounted at the other end of the lever 26b and bearing against the top surface of the second ram 8 and a compression spring 37 for returning the lever 26b. A compression spring 31 is contained in the second ram 8 for upwardly biasing the ram. Therefore,

the second ram 8 descends when the lever 26b swings actuated by the cams 21 and the ram 8 returns to its original position by means of the compression spring 31.

The cam follower mechanism 27 for the side punches 13 comprises a roller 27a mounted for rolling engagement with the cam 22, a lever 27b pivotally mounted at the central portion thereof on the frame 1 so that the lever vertically extends, the roller 27 being rotatably mounted on the lever at one end thereof, a link 27c, the central portion of which is pivotally connected to the other end of the lever 27b, a third ram 27d pivotally connected to the forward end of the link 27c and actuating arms 27e swingably supported at the central portion thereof and connected at the upper ends thereof to the side punches 13. As shown in Fig. 5 the side surfaces of the forward end of the third ram 27d function as cam surfaces 27f which go outward as they go forward. Cam follower portions 27g are provided at the lower portion of the actuating arms 27e. The actuating arms 27e are swung by cooperation between the cam surface 27f and the cam follower portions 27g as the third ram 27d moves backward to actuate the side punches 13. Compression springs 32 make the third ram 27d return to its original position.

The cam follower mechanism 28 for feeding the stringer comprises, as shown in Fig. 5, a roller 28a mounted for rolling engagement with the cam 23, a first lever 28b swingably supported at the central portion thereof and having the roller 28a rotatably mounted at one end thereof and a roller 28c rotatably mounted on the other end thereof, and a second lever 28d upwardly biased by a tension spring 33 and adapted to downwardly swing by the roller 28c. A transmission shaft 34 of the stringer feeding roller 17 is connected to the base portion of the second lever 28d with a one way clutch (not shown) interposed therebetween so that the stringer feeding roller 17 intermittently rotates only in one direction to advance the stringer S.

The cam follower mechanism 29 for feeding the wire comprises a roller 29a mounted for rolling engagement with the cam 24, a slide 29b having the roller 29a rotatably mounted on one end thereof, a pawl 29c mounted on the other end of the slide 29b, and a ratchet wheel 29d adapted to intermittently rotate each time by a predetermined angle only in one direction by the reciprocal movement of the pawl 29c. A compression spring 36 urges the slide 29b against the cam 24 so that the slide 29b reciprocates as the cam 24 rotates. The ratchet wheel 29d and the wire feeding roller 14 are connected to each other by a transmission shaft 35 so that the wire feeding roller 14 intermittently advances the wire W.

In the power transmitting mechanism using the cams explained above, the shapes and the mutual operation phases of the cams 20, 21,

22, 23 and 24 are so selected that the respective operation steps are timed as shown

below with respect to the movement of the first ram 2.

operation steps	position of first ram			
	forward dwell	backward movement	backward dwell	forward movement
wire feeding	←→			
wire cutting		←→		
head forming			←→	
deformation of element legs	→			←
stringer feeding	←→			

The operation of the apparatus according to the above-described embodiment will be explained. In the situation shown in Figs. 6A and 6B in which the first ram 2 is in its forward dwell, the formed wire W has been advanced so that it projects by a predetermined amount corresponding to the thickness of one element E above the cutting die 4. In the first half of this dwell time, planting of the element E on the tape T is completed. The slide fastener stringer S is pulled upward immediately after the securing of the element is finished and the side punches 13 are retracted from the element legs L. The first ram 2 moves backward after the upward movement of the stringer S removes the engageable head C of the lastly secured element E from the forming die 5. Therefore, it never happens that the planted element hitches on the forming die 5 retracting together with the first ram 2.

Then, the formed wire W is cut as the first ram 2 moves backward as shown in Fig. 7. During this retraction of the first ram, the upward feeding of the stringer is completed. The formed wire W is cut during the backward movement of the first ram 2 in which the ram is positively driven by the cams 20. Therefore, the cutting of the wire is done reliably.

As the first ram 2 reaches the end of its backward movement, the cut-out element is received in the forming die 5 and the forming punch 10 which aligns the forming die 5 in this position descends as shown in Fig. 8A so that the engageable head C is formed as the first ram 2 is in the backward dwell. As shown in Fig. 8B, the side punches 13 start their operation when the first ram is in the backward dwell so that they engage the element E at the opposite outer sides of the legs L.

Fig. 9 shows the first ram 2 on the way of the forward movement. At this time, side punches

13 begin deformation of the legs L of the element E. However, the deformation of the legs L is such that they do not engage the tape T. The side punches continue their operation so that after the first ram 2 reaches the forward end of its movement, the legs L of the element E are squeezed onto the tape T. Then the firstly explained steps of Figs. 6A and 6B follow.

Various modifications may be made in the embodiment explained above. For example, it is possible to positively drive the first ram 2 by cams on both ways of its reciprocation to avoid a condition in which the force of the springs 30 is not enough for keeping contact between the cams 20 and the rollers 25a in a high speed operation, resulting in inaccurate reciprocal movement of the first ram 2. Figs. 10 and 11 show an apparatus for achieving this purpose in which a first ram and an output drive shaft are designated by the same numerals used in the preceding embodiment. The output drive shaft 19 is provided with two identical cams 38 and a cam 39 disposed therebetween. The cams 38 and 39 engage rollers 40 and 41 rotatably mounted on the first ram 2, respectively. As the drive output shaft 19 rotates, the first ram 2 is driven backward by engagement between the cams 38 and the roller 40 and forward by engagement between the cam 39 and the roller 41. Since the cams 38 and 39 are independent as explained above, the curves of the cams can be selected so that they are optimum for the forward and backward movements of the first ram 2, respectively. Furthermore, the dwell times for the first ram at the end of its forward and backward movements may be selected independently. Furthermore, it is easy to decide the configurations of the cams so that there is no play between the cams 38 and the roller 40 and between the cam 39 and the roller 41 in any angular position of the output drive shaft

19. Similar constructions for driving reciprocable members positively in the both ways may be used at will for the actuating members other than the first ram 2.

Figs. 12 and 13 show another embodiment in which the invention is applied to a concealed fastener. It shall be appreciated that the components not shown in these drawings are the same as the corresponding ones in the preceding embodiment. The configuration of the element EC is such that it has only one leg. Accordingly, only one side punch 63 is provided. The mechanism for reciprocating the side punch 63 is similar to the corresponding one in the preceding embodiment. However, the operation timing and the stroke of the mechanisms are changed according to the configuration of the element EC. Such change can be done by adjusting only the driving mechanism for the side punch 63 without affecting the other mechanism since the driving mechanisms for the actuating members are independent. A forming die 55 provided in a first ram 52 is formed to have a deep cavity so that as the element EC is clamped on the tape T by the side punch 63 as shown in Fig. 13, the die 55 holds the head portion of the element EC against the force imparted from the side punch. A cutting punch 62 is shaped to facilitate cutting the element EC.

For making the relation among the cams variable in either embodiment, it is possible to adapt the cams so that they are rotatable relative to the output drive shaft and can be fixed thereto at any angular position. Alternatively, it is possible to replace the output drive shaft with one having cams in a different arrangement.

Claims

1. An apparatus for forming and planting slide fastener elements comprising: a first ram (2) mounted on a frame (1) for reciprocal movement and having at the forward end thereof a cutting die (4) provided with a passage (4a) for the wire (W) to be used for elements (E) extending therethrough and a forming die (5) for forming an engageable head (C) in an element; a cutting punch (12) placed on the upper surface of the first ram (2) for relative movement between the cutting punch (12) and the first ram (2) so that the cutting punch (12) cuts out an element (E) from the wire (W) as the first ram (2) moves backward; a forming punch (10) for forming the engageable head (C) placed above the first ram (2) so that it aligns with the forming die (5) when the first ram (2) is at the end of its backward movement; at least one side punch (13) for planting the fastener elements (E) on a fastener tape (T); and an output drive shaft (19) having first ram (2) drive cam means (20) characterized in that the output drive shaft (19) further has forming punch (10) drive cam means (21) and side punch (13) drive cam

means (22); and that the apparatus includes cam follower mechanisms (25, 26, 27) connecting said cam means (20, 21, 22) to the first ram (2), the forming punch (10) and the side punch (13), respectively; a second ram (8) to which said forming punch (10) is connected, said second ram (8) being mounted for reciprocal movement in the direction perpendicular to the movement of the first ram (2) and adapted to be actuated by the cam follower mechanisms (26) for the forming punch (10), said first ram (2) drive cam means (20) being so shaped that the first ram (2) dwells for a predetermined time at the end of each forward and backward movement, the shapes of said cam means (20, 21, 22) and their mutual relation being so selected that the side punch (13) secures the element (E) to the tape (T) during the dwell of the first ram (2) at the end of its forward movement and the forming punch (10) is actuated during the dwell time of the first ram (2) at the end of its backward movement.

2. An apparatus for forming and planting slide fastener elements according to claim 1, further characterized in that said first ram (2) drive cam means includes two cam members (38, 39) and said cam follower mechanism for the first ram includes two rollers (40, 41) contacting said cam members (38, 39) at the opposite sides of said output drive shaft (19) so that there is no play between the rollers and the cam members during the reciprocal movements of the first ram (2). (Figs. 10 and 11).

3. An apparatus for forming and planting slide fastener elements according claim 1 or 2, further characterized in that the apparatus further comprises tape feeding cam means (23) formed on said output drive shaft (19) and a cam follower mechanism (28) for feeding the tape (T), the relation between the first ram (2) drive cam means (20) and the tape feeding cam means (23) being such that the first ram (2) moves backward after the upward movement of the tape (T) removes the engageable head (C) of the lastly secured element (E) from said forming die (5).

Revendications

1. Un appareil pour former et implanter des éléments d'accouplement de fermeture à glissière comprenant: un premier piston (2) monté sur un bâti (1) en vue d'un mouvement de va-et-vient et comportant à son extrémité avant une matrice de découpage (4) pourvue d'un passage (4a) destiné à un fil métallique (W) devant être utilisé pour les éléments d'accouplement (E) et s'étendant à travers ce passage, et une matrice de formage (5) pour former dans un élément une tête d'accouplement; un poinçon de découpage (12) placé sur la surface supérieure du premier piston (2) en vue d'un déplacement relatif entre le poinçon de découpage (12) et le premier piston (2) de telle sorte que le poinçon de découpage (12)

19. Similar constructions for driving reciprocable members positively in the both ways may be used at will for the actuating members other than the first ram 2.

Figs. 12 and 13 show another embodiment in which the invention is applied to a concealed fastener. It shall be appreciated that the components not shown in these drawings are the same as the corresponding ones in the preceding embodiment. The configuration of the element EC is such that it has only one leg. Accordingly, only one side punch 63 is provided. The mechanism for reciprocating the side punch 63 is similar to the corresponding one in the preceding embodiment. However, the operation timing and the stroke of the mechanisms are changed according to the configuration of the element EC. Such change can be done by adjusting only the driving mechanism for the side punch 63 without affecting the other mechanism since the driving mechanisms for the actuating members are independent. A forming die 55 provided in a first ram 52 is formed to have a deep cavity so that as the element EC is clamped on the tape T by the side punch 63 as shown in Fig. 13, the die 55 holds the head portion of the element EC against the force imparted from the side punch. A cutting punch 62 is shaped to facilitate cutting the element EC.

For making the relation among the cams variable in either embodiment, it is possible to adapt the cams so that they are rotatable relative to the output drive shaft and can be fixed thereto at any angular position. Alternatively, it is possible to replace the output drive shaft with one having cams in a different arrangement.

Claims

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means (22); and that the apparatus includes cam follower mechanisms (25, 26, 27) connecting said cam means (20, 21, 22) to the first ram (2), the forming punch (10) and the side punch (13), respectively; a second ram (8) to which said forming punch (10) is connected, said second ram (8) being mounted for reciprocal movement in the direction perpendicular to the movement of the first ram (2) and adapted to be actuated by the cam follower mechanisms (26) for the forming punch (10), said first ram (2) drive cam means (20) being so shaped that the first ram (2) dwells for a predetermined time at the end of each forward and backward movement, the shapes of said cam means (20, 21, 22) and their mutual relation being so selected that the side punch (13) secures the element (E) to the tape (T) during the dwell of the first ram (2) at the end of its forward movement and the forming punch (10) is actuated during the dwell time of the first ram (2) at the end of its backward movement.

2. An apparatus for forming and planting slide fastener elements according to claim 1, further characterized in that said first ram (2) drive cam means includes two cam members (38, 39) and said cam follower mechanism for the first ram includes two rollers (40, 41) contacting said cam members (38, 39) at the opposite sides of said output drive shaft (19) so that there is no play between the rollers and the cam members during the reciprocal movements of the first ram (2). (Figs. 10 and 11).

3. An apparatus for forming and planting slide fastener elements according claim 1 or 2, further characterized in that the apparatus further comprises tape feeding cam means (23) formed on said output drive shaft (19) and a cam follower mechanism (28) for feeding the tape (T), the relation between the first ram (2) drive cam means (20) and the tape feeding cam means (23) being such that the first ram (2) moves backward after the upward movement of the tape (T) removes the engageable head (C) of the lastly secured element (E) from said forming die (5).

Revendications

1. Un appareil pour former et implanter des éléments d'accouplement de fermeture à glissière comprenant: un premier piston (2) monté sur un bâti (1) en vue d'un mouvement de va-et-vient et comportant à son extrémité avant une matrice de découpage (4) pourvue d'un passage (4a) destiné à un fil métallique (W) devant être utilisé pour les éléments d'accouplement (E) et s'étendant à travers ce passage, et une matrice de formage (5) pour former dans un élément une tête d'accouplement; un poinçon de découpage (12) placé sur la surface supérieure du premier piston (2) en vue d'un déplacement relatif entre le poinçon de découpage (12) et le premier piston (2) de telle sorte que le poinçon de découpage (12)



découpe un élément (E) dans le fil métallique (W) lorsque le premier piston (2) se déplace vers l'arrière; un poinçon de formage (10) destiné à former la tête d'accouplement (C) et placé au-dessus du premier piston (2) de manière à être aligné avec la matrice de formage (5) lorsque le premier piston (2) se trouve à l'extrémité de son déplacement vers l'arrière; au moins un poinçon latéral (13) pour implanter les éléments d'accouplement (E) de fermeture à glissière sur un ruban (T) de fermeture à glissière et un arbre de sortie (19) destiné à un entraînement et comportant un moyen (20) formant came d'entraînement du premier piston (2), caractérisé par le fait que l'arbre de sortie (19) comporte en outre un moyen (21) formant came d'entraînement du poinçon de formage (10) et un moyen (22) formant came d'entraînement du poinçon latéral (13); et que l'appareil comprend le mécanisme (25, 26, 27) suiveur de came reliant lesdits moyens formant came (20, 21, 22) au premier piston (2), au poinçon de formage (10) et au poinçon latéral (13), respectivement; un second piston (8) auquel est relié ledit poinçon de formage (10), ledit second piston (8) étant monté en vue d'un mouvement de va-et-vient dans une direction perpendiculaire au déplacement du premier piston (2) et étant adapté pour être actionné par le mécanisme (26) suiveur de came destiné au poinçon de formage (10), ledit moyen (20) formant came d'entraînement du premier piston (2) étant profilé de manière que le premier piston (2) s'arrête pendant un temps prédéterminé à la fin de chaque déplacement vers l'avant et vers l'arrière, les formes desdits moyens formant comes (20, 21, 22) et leurs relations mutuelles étant choisies de manière telle que le poinçon latéral (13) fixe l'élément (E) au ruban (T) pendant l'arrêt du premier piston (2) à la fin de son déplacement vers l'avant et que le poinçon de formage (10) est actionné pendant le temps d'arrêt du premier piston (2) à la fin de son déplacement vers l'arrière.

2. Un appareil pour former et implanter des éléments de fermeture à glissière selon la revendication 1, caractérisé en outre par le fait que ledit moyen formant came d'entraînement du premier piston (2) comprend deux éléments (38, 39) formant comes et que ledit mécanisme suiveur de came destiné au premier piston comprend deux galets (40, 41) en contact avec lesdits éléments (38, 39) formant comes de part et d'autre dudit arbre de sortie (19) destiné à un entraînement de telle sorte qu'il n'existe aucun jeu entre les galets et les éléments formant comes pendant les déplacements de va-et-vient du premier piston (2). (figures 10 et 11)

3. Un appareil pour former et implanter des éléments de fermeture à glissière selon la revendication 1 ou 2, caractérisé en outre par le fait que l'appareil comprend en outre un moyen (23) formant came d'avance de ruban formé sur ledit arbre de sortie (10) destiné à un entraînement et un mécanisme (28) suiveur de came

pour avancer le ruban (T), la relation entre le moyen (20) formant came d'entraînement du premier piston (2) et le moyen (23) formant came d'avance de ruban étant tel que le premier piston (2) se déplace vers l'arrière après que le déplacement ascendant du ruban (T) évacue de ladite matrice de formage (5) la tête d'accouplement (C) de l'élément venant d'être fixé.

10 Patentansprüche

1. Vorrichtung zur Ausbildung und Anbringung von Reißverschluß-Kuppelgliedern, bestehend aus einem ersten Stößel (2), der in einem Rahmen (1) zu einer hin- und hergehenden Bewegung gelagert ist und an seinem vorderen Ende ein Schneidgesenk (4) aufweist, das mit einer Öffnung (4a) für den Durchtritt eines für die Kuppelglieder (E) verwendeten Drahtes (W) versehen ist, und ein Formgesenk (5) zur Ausbildung eines Kupplungskopfes (C) an einem Kuppelglied aufweist, einem Schneidstempel (12), der an der Oberseite des ersten Stößels (2) zu einer Relativbewegung zwischen dem Schneidstempel (12) und dem ersten Stößel (2) angeordnet ist, so daß der Schneidstempel (12) aus dem Draht (W) ein Kuppelglied (E) ausschneidet, wenn sich der erste Stößel (2) nach hinten bewegt, einem Formstempel (10) zur Ausbildung des Kupplungskopfes (C), der auf dem ersten Stößel (2) derart angeordnet ist, daß er mit dem Formgesenk (5) fluchtet, wenn sich der erste Stößel (2) am Ende seiner nach hinten gerichteten Bewegung befindet, mindestens einem seitlichen Stempel (13) zum Anbringen des Kuppelglieds (E) an einem Reißverschlußtragband (T) und einer Antriebswelle (19), die einen Nocken (20) zum Antreiben des ersten Stößels (2) aufweist, dadurch gekennzeichnet, daß die Antriebswelle (19), ferner einen Nocken (21) zum Antreiben des Formstempels (10) und einen Nocken (22) zum Antreiben des seitlichen Stempels (13) aufweist, und daß die Vorrichtung Kurvennachläufer (25, 26, 27) umfaßt, welche die Nocken (20, 21, 22) mit dem ersten Stößel, dem Formstempel (10) bzw. dem seitlichen Stempel (13) verbinden und einen zweiten Stößel (8) umfaßt, mit dem der Formstempel (10) verbunden ist, wobei der zweite Stößel (8) zu einer hin- und hergehenden Bewegung in einer zur Bewegung des ersten Stößels (2) rechtwinkligen Richtung gelagert ist und durch den Kurvennachläufer (26) für den Formstempel (10) antreibbar ist, wobei der Nocken (20) zum Antreiben des ersten Stößels (2) so geformt ist, daß der erste Stößel (2) an Ende seiner nach vorne und nach hinten gerichteten Bewegung jeweils eine bestimmte Zeitdauer verharzt, wobei die Form und die Relativstellung der Nocken (20, 21, 22) so gewählt ist, daß der seitliche Stempel (13) das Kuppelglied (E) am Tragband (T) befestigt, während der erste Stößel (2) am Ende seiner Vorwärtsbewegung verharzt, und der





Formstempel (10) betätigt wird, während der erste Stößel (2) am Ende seiner Rückwärtsbewegung verharret.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Nocken Antrieb für den ersten Stößel (2) aus zwei Nocken (38, 39) besteht und daß der dem ersten Stößel (2) zugeordnete Kurvennachläufer aus zwei Rollen (40, 41) besteht, die auf gegenüberliegenden Seiten der Abtriebswelle (19) an den Nocken (38, 39) anliegen, so daß während der hin- und hergehenden Bewegung des ersten Stößels (2) kein Spiel zwischen den Rollen und den Nocken besteht. (Fig. 10 und 11)

3. Vorrichtung nach Anspruch 1 oder 2, gekennzeichnet durch einen an der Abtriebswelle (19) angeordneten Nocken (23) und einen Kurvennachläufer (28) für den Vorschub des Tragbandes (T), wobei die Relativstellung zwischen dem Nocken (20) zum Antrieb des ersten Stößels (2) und dem Nocken (23) für den Vorschub des Tragbandes derart ist, daß sich der erste Stößel (2) nach hinten bewegt, nachdem die Aufwärtsbewegung des Tragbandes (T) den Kupplungskopf (C) des zuletzt befestigten Kuppelglieds (E) vom Formgesenk (5) abhebt.



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