

Description

This invention relates to stripping and restraining devices of the type which are used on stamping and forming machines for restraining movement of the stock metal with the pilot pins or punches when the punches and pilot pins move away from the stock metal after holes have been punched in the material by the punches. A machine according to the pre-characterising part of claim 1 is, for example, known from US-A-4624162. The principles of invention can be used with many types of stamping and forming machines, however the invention is described below in conjunction with a machine of the type described in US-A-4,497,196.

In a conventional stamping and forming operation, strip material is fed through an operating zone between a punch assembly and a die assembly. The punch and die assemblies move relatively towards each other and the punch punches a hole in the strip and moves into a die opening in the die assembly. Thereafter, the punch assembly and die assembly move apart and the strip is again fed for the next operating cycle. It is also common practice to provide pilot pins on, or adjacent to, the punch assembly which enter previously provided pilot holes in the strip. The pilot pins precisely locate the strip in the operating zone of the machine so that the holes punched by the punches will be precisely located and/or any forming tools will engage the strip at a precisely predetermined position so that precisely dimensioned parts will be produced.

When the pilot pins and the punches move away from the strip after the punches have formed holes therein, there is often times a tendency for the strip material to move with the punches and/or the pilot pins laterally of the plane occupied by the strip in the center of the operating zone of the machine. Such movement of the strip results from the fact that the pilot holes will have a diameter only slightly greater than the diameter of the pilot pins and the holes produced by the punching operation will be only very slightly larger than the punches themselves. The friction developed between the punches and pilot pins and the strip therefore prevents the strip from remaining stationary when the punches and pilot pins are withdrawn and it tends to be dragged for a short distance with the punches and pilot pins when the punch assembly is moved from its closed position to its retracted or open position.

In order to overcome the problem discussed above, it is common practice in conventional stamping and forming machines to provide a stripping mechanism which restrains the movement of the strip when the punch assembly moves away from the strip to its open position. Where the machine has a conventional punch and die assembly comprising spaced apart die shoes which have the punches and dies

mounted therein, it is common to provide a spring loaded rod or the like which bears against the strip and which is constructed such that when the die shoes move relatively towards each other, the spring which biases the rod is compressed. When the die shoes move relatively away from each other, the rod remains against the strip while the punches and pilot pins move away from the strip thus restraining the strip against movement and stripping the material from the pilot pins and the punches.

US-A-4,497,196 discloses a stamping and forming machine in which the punches and dies are mounted on opposed spaced apart tooling assemblies which move relatively towards and away from each other during each operating cycle. For several reasons, conventional known types of stripping mechanisms are not practical for machines of the general type described in that patent.

The present invention is directed to the achievement of an improved stock retaining and stripping means which can be used to advantage on many types of stamping and forming machines and which is particularly adapted for use on machines of the general type described in US-A-4497196.

There is disclosed in US-A-4624162, a machine for punching holes in strip material, the machine comprising strip feeding means for feeding strip material along a strip feed path which extends through an operating zone, a punch assembly and a die assembly in the operating zone on opposite sides of the strip feed path, the punch and die assemblies being in opposed confronting relationship and being movable relatively towards and away from each other along a punch and die assembly path of reciprocation between an open position, in which the punch and die assemblies are remote from each other, and a closed position, in which the punch and die assemblies are proximate to each other, the punch assembly being biased to an extended position and being movable relatively towards a ram block when the punch assembly moves to its closed position, punch means fixed to the ram block extending into an opening in a face plate assembly for removing the strip material from the punch means when the punch and die assemblies move from their closed positions to their open positions, the die assembly having die opening means dimensioned to receive the punch means, the punch means being movable relatively towards, and into, the die opening means along a punch means path of reciprocation when the punch and die assemblies move from their open positions to their closed positions thereby to punch at least one hole in the strip material, the punch assembly having pilot pin means extending therefrom and, in use, the strip material having pilot hole means which are dimensioned to receive the pilot pin means thereby precisely to position the strip material in the operating zone prior to the arrival of the punch assembly and the die assembly at

their closed positions, the pilot pins means being fixed to the ram block and extending slidably through, and beyond, the face plate assembly when the punch assembly is in its extended position.

US-A-4624162 does not, however, disclose any means for stripping the strip material from the pilot pin means.

According to the present invention, the machine is characterized in that a strip retainer is provided for stripping the strip material from the pilot pin means when the punch assembly and the die assembly move from their closed positions to their open positions, the strip retainer comprising at least one static member which is beside, and adjacent to, the strip feed path, the static member being between the punch assembly and the strip feed path and intersecting the punch and die assembly path of reciprocation, the strip retainer being in non-intersecting relationship with the punch means path of reciprocation and with the pilot pin path of reciprocation, the strip retainer comprising a wire which extends laterally beyond the punch and die path of reciprocation on two opposite sides thereof and having retainer ends which are secured to fixed securing means, whereby during each operating cycle, the pilot pin means moves into the pilot hole means in the strip material, and during subsequent movement of the punch assembly to its open position, the strip retainer restrains the strip material from being carried with the pilot pin means laterally of the strip feed path and thereby strips the strip material from the pilot pin means.

EP-A-0116447 discloses a machine for performing operations on strip material but which does not employ pilot pins for positioning the strip material relative to the working tooling of the machine.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which :

FIGURE 1 is a perspective diagrammatic view showing a punch assembly, a die assembly, and a strip restraining or retaining means in accordance with a preferred embodiment of the invention.

FIGURES 2 and 3 are views similar to Figure 1 showing the positions of the parts at different stages of the punching operation.

FIGURE 4 is a top plan view of an individual module of a machine of the type described in US-A-4,497,196.

FIGURES 5 and 6 are views looking in the directions of the arrows 5-5 and 6-6 of Figure 4.

FIGURE 7 is a fragmentary sectional view looking in the direction of the arrows 7-7 of Figure 6.

FIGURE 8 is a perspective exploded view showing the parts of the inlet and outlet guides of the machine shown in Figure 4 and showing particularly the manner in which the strip retainer is secured to these guides.

FIGURE 9 is a side view of the parts shown in Figure 8 with the parts assembled to each other and mounted on the sides of the tooling assembly housing of the machine.

FIGURES 10, 11, and 12 are views looking in the direction of the arrows 10-10, 11-11, and 12-12 of Figure 9.

FIGURE 13 is a top plan view of the tooling assembly housing of a machine of the type shown in Figure 4 having a strip retainer in accordance with an alternative embodiment incorporated therein.

FIGURE 14 is a view looking in the direction of the arrows 14-14 of Figure 13.

FIGURE 15 is a view looking in the direction of the arrows 15-15 of Figure 14.

FIGURE 16 shows a short portion of strip material which is in the operating zone of a machine module and illustrates the location of strip retainers relative to the punches and the pilot holes.

The essential features of the invention can be understood from an inspection of Figures 1-3 which show a strip of material 2 which is fed through an operating zone between a punch assembly 4 and a die assembly 6. The punch and die assemblies are movable towards and away from each other between the positions of Figures 1 and 2. The punch assembly 4 carries a single punch 8 and the die assembly 6 has a die opening 10 in its face which is dimensioned to receive the punch so that a square or rectangular hole will be formed in the material when the punch and die assemblies move to their closed positions. The punch assembly 4 also has fixed pilot pins 14 extending therefrom having outer free ends 16 which are located beyond the end of the punch 8. These pilot pins enter previously punched pilot holes 12 in the strip and precisely position the strip in the operating zone prior to the movement of the punch against the surface of the strip and formation of the hole in the strip.

In the absence of a restraining means or a stripping means for the strip 2, there would be a tendency for the strip material to move with the pilot pins 14 and the punch 8 rightwardly as viewed in Figure 2 when the punch and die assemblies move to their open positions. A retaining or restraining means 18 is provided in the form of a fine wire which extends parallel to the strip feed path and parallel to the strip between the face of the punch assembly 4 and the surface of the strip 2. This wire necessarily intersects the path of reciprocation of the punch assembly 4 but it is in non-intersecting relationship with the paths of reciprocation of the pilot pins 14 and the punch 8. The ends 20 of the wire 18 are fixed or secured at fixed securing means 22 so that the intermediate portion of the wire restrains movement of the strip material when the parts move from the position of Figure 2 to the position of Figure 3 and thereby strip the material from the punch 8 and the pilot pins 14.

It will be noted that a shallow groove 21 must be provided for the wire retainer 18 when the parts are in their closed positions and that openings 17 are provided in the die assembly 6 for the end portions of the pilot pins 14. These openings may merely be blind holes of a depth sufficient to accept the end portions of the pins when the parts are in their closed positions.

Figures 8-12 show a manner of incorporating the invention into a stamping and forming machine module of the type described in US-A-4,497,196. Figures 4-7 show details of the machine module. Only those portions of the module which must be described for an understanding of the present invention will be described below and the stock stripper is not shown in Figures 4-7.

The machine module 36 comprises a module housing 38 having an upper surface 40 on which a tooling assembly housing 42 is mounted. The tooling assembly housing has a cover plate 44, a bottom plate 46 which is on the surface 40, and side plates 48 as shown in Figure 7. These housing plates define a passageway 50 having a rectangular cross-section in which are contained the first and second tooling assemblies 52, 54. The side plates have slots 56 through which the strip material is fed. Inlet and outlet guide assemblies 58, 60 are provided which guide the strip along its feed path. The strip is fed by an intermittent strip feeding mechanism 61 comprising a feed sprocket 62 which is indexed during each feeding interval by a motor 64. The strip is held against the teeth of the sprocket during feeding intervals by a movable guide 66 which is pivoted at 68 so that it can be moved away from the sprocket during non-feeding intervals. Such movement of the guide 66 is accomplished by a bell crank having one arm 70 which has a slidable connection with the guide 66 and which has a second arm 74 which is pivoted to an eccentric 76.

The first tooling assembly 52 has a backplate 78 thereon which is adjacent to the upper end 82 of an oscillating lever and is spaced from the lever end 82 by a spacer 80. The second tooling assembly 54 is similarly spaced from the upper end of an identical lever as shown. The manner in which these levers are oscillated is described fully in US-A-4,497,196. The backplate 78, the lever 82 and spacer 80 are not shown in Figure 7 in the interest of simplicity and in view of the fact that these features are shown in Figure 6.

The first tooling assembly 52 (Figures 6 and 7) comprises a ram block 84 and a face plate assembly 86. The ram block has a spacer plate 88 on its left hand side as viewed in Figure 6 and the tools in the form of punches 94 are held on the ram block by a tool holder plate 90, a retainer plate 92, and keys which pass through notches in the punches 94. The face plate assembly 86 comprises a face plate 96 and a backup plate 98 which is secured to the face plate by fasteners. The punches extend through aligned open-

ings in the face plate and the backup plate and their leading or free ends are recessed within the face plate when the first tooling assembly is in its open position. The face plate assembly 86 is movable between an extended position, in which it is spaced by a short distance from the retainer plate 92, to a retracted position in which it is against the retainer plate 92. The face plate assembly is normally biased to its extended position by springs 106 which are between the retainer plate 92 and the backup plate 98. The face plate assembly must move to its retracted position so that the outer or free ends of the punches will move relatively beyond the surface of the face plate and perform their punching function.

As described in US-A-4,819,476, published on 11. April 1989 top and bottom guide plates 101 and side guide or bearing plates 103 are interposed between the surface of the ram block and the internal surfaces of the passageway 50. These bearing and guide plates are secured to the face plate assembly and extend rightwardly as viewed in Figure 6 over portions of the ram block. Their function is to guide the face plate and the ram block precisely during reciprocation of the tooling assembly.

The second tooling assembly 54 comprises a die plate 108, a die backup plate 110, and a ram block 112. The die plate 108 has die openings 114 therein in alignment with the punches and passageways 116 extend through the backup plate 110 to a recess 118 which extends transversely through the ram block 112. The scrap slugs which are produced in the punching operations are pushed through these passageways and into the transverse passageway 118. Disposal of the slugs can be accomplished by a belt disposal system, not shown, as described in US-A-4,809,576 published on 7. March 1989.

Figures 8-12 illustrate the manner in which the wire 18 is secured such that its intermediate portion extends across the operating zone of the machine, that is, through the passageway 50. These views show only the inlet and outlet guide assemblies 58, 60 and the manner in which the ends 20 of the wire are secured in these guide assemblies. The tooling assemblies themselves and the tooling assembly housing are not shown in the interest of clarity.

The inlet guide assembly 58 comprises a guide plate 120 which is secured against the associated sidewall 48 as shown in Figure 11. This guide plate 120 has a right hand side 122 as viewed in Figure 8 across which the strip is fed and has an end 124 which is against the housing side plate 48. A locator plate 126 is also secured against the end 122 and a positioner plate 128 is secured to the rightwardly facing side surface of the locator 126. The positioner 128 has a channel 130 through which the strip 2 is fed and has a rightwardly facing side surface 131 (Figure 8) against which the end portion 20 of the wire is clamped by means of a clamping plate 132. The parts are

secured to each other by suitable fasteners as indicated by the screw holes shown in Figure 8. Advantageously a V-notch is provided in the side surface 132 for the end 20 of the wire. The intermediate portion of the wire thus extends parallel to, and immediately beside, the portion of the strip 2 which is located in the passageway 50 of the tooling assembly housing 42. The securing means indicated at 22 in Figure 1 thus comprises the plates 128, 130.

The outlet strip guide assembly 60 comprises a guide plate 134 having a channel 135 for the strip. The end surface of plate 134, which is substantially against the side plate 48 at the outlet of the tooling assembly housing, has a locator 136 secured thereto on which there is provided a ledge 137. A V-notch is provided on the surface of the locator 136 and the end 20 of the wire is clamped in this V-notch by a clamping plate 138. The plate 138 also has a ledge over which the strip moves as indicated in Figure 9.

A recess (not specifically shown) must be provided in the face plate 96 for the wire 18 when the two assemblies are in their closed positions and the face plate is substantially against the strip material. The wire itself will have a diameter of no more than about 0.014 inches and the recess in the face plate is therefore relatively shallow.

The intermediate portion of the wire 18 obviously has to intersect the path of reciprocation of the tooling assembly 52 in which the punches and pilot pins are carried, but it must not intersect the path of reciprocation of the punches or the pilot pins themselves. Ordinarily a single wire will serve the purpose of stripping the material from the pilot pins and the punches but if required, a second wire can be provided and secured in the manner shown in Figure 8.

Figures 13-16 illustrate the manner in which stripping and retaining wires 140 can be mounted in the operating zone of the machine with the axes of the wires extending transversely of the direction of strip feed through the operating zone. The wires 140 have upper ends 142 and lower ends 144. The lower ends are clamped by means of a clamping plate 146 which is secured against the surface of the lower or bottom housing plate 46 by means of fasteners 150. The ends of the wires are secured to the plate 146 by set screws 148 as shown in Figure 15. The upper ends 142 of the wires are similarly secured in a clamping plate 152 which is clamped between the top plate 44 and the side plates 48 of the tooling assembly housing.

Figure 16 shows the operations which may be carried out in a typical module on the strip material 2. In these views, four sets of punches are indicated at 154, 156, 158, and 160. Each set of punches comprises four individual punches so that the die station is referred to as a "four out station" for the reason that four blanks are produced during each operating cycle. The die station is also referred to as a "two out two feed" die station; two rows of blanks are produced

and the feeding stroke feeds two blanks in each row. Two stripping and retaining wires 140 are provided in Figure 16, the right hand wire being located between a pilot hole and the first set of punches 154. The left hand wire 140 is located between the set of punches 158 and the set of punches 160. Note that the left hand wire 140 crosses openings in the strip which were produced by the punches 158.

Under some circumstances, it will be necessary to mount the stripping wires as shown in Figure 16 rather than as shown in Figure 1 for the reason that it would be impossible to locate a horizontally extending wire (parallel to the direction of strip feed and parallel to the strip) without intersecting one or more of the sets of punches shown in Figure 16. Under many circumstances, however, the strip may have a continuous carrier strip which is not engaged by any of the punches and the stripper wire can extend along this carrier strip.

The invention can be employed to remove the strip 2 from pilot pins in all stamping and forming machines which have the pilot pins fixed to the first tooling assembly 86 or its equivalent.

It will be apparent from the foregoing description that an extremely effective stock stripper or retainer has been disclosed which is extremely simple in that it has no moving parts and which occupies no space in the tooling area of a stamping and forming machine. The invention can be applied to a variety of types of stamping and forming machines and is particularly adapted for machines having horizontally mounted tooling assemblies as described above which are themselves quite compact in many instances and which do not permit the inclusion of previously known types of stock stripping and retaining devices.

Claims

1. A machine (36) for punching holes in strip material (2), the machine comprising strip feeding means (61) for feeding strip material (2) along a strip feed path which extends through an operating zone (42), a punch assembly (52) and a die assembly (54) in the operating zone (42) on opposite sides of the strip feed path, the punch and die assemblies (52, 54) being in opposed confronting relationship and being movable relatively towards and away from each other along a punch and die assembly path of reciprocation between an open position, in which the punch and die assemblies are remote (10) from each other, and a closed position, in which the punch and die assemblies are proximate to each other, the punch assembly (52) being biased to an extended position and being movable relatively towards a ram block (84) when the punch assembly (52) moves to its closed position, punch means (94) fixed to the ram block (84) extending into an opening in a face plate assembly



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The invention can be employed to remove the strip 2 from pilot pins in all stamping and forming machines which have the pilot pins fixed to the first tooling assembly 86 or its equivalent.

It will be apparent from the foregoing description that an extremely effective stock stripper or retainer has been disclosed which is extremely simple in that it has no moving parts and which occupies no space in the tooling area of a stamping and forming machine. The invention can be applied to a variety of types of stamping and forming machines and is particularly adapted for machines having horizontally mounted tooling assemblies as described above which are themselves quite compact in many instances and which do not permit the inclusion of previously known types of stock stripping and retaining devices.

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1. A machine (36) for punching holes in strip material (2), the machine comprising strip feeding means (61) for feeding strip material (2) along a strip feed path which extends through an operating zone (42), a punch assembly (52) and a die assembly (54) in the operating zone (42) on opposite sides of the strip feed path, the punch and die assemblies (52, 54) being in opposed confronting relationship and being movable relatively towards and away from each other along a punch and die assembly path of reciprocation between an open position, in which the punch and die assemblies are remote (10) from each other, and a closed position, in which the punch and die assemblies are proximate to each other, the punch assembly (52) being biased to an extended position and being movable relatively towards a ram block (84) when the punch assembly (52) moves to its closed position, punch means (94) fixed to the ram block (84) extending into an opening in a face plate assembly



(86) for removing the strip material from the punch means (94) when the punch and die assemblies (52, 54) move from their closed positions to their open positions, the die assembly (54) having die opening means dimensioned to receive the punch means (94), the punch means (94) being movable relatively towards, and into, the die opening means along a punch means path of reciprocation when the punch and die assemblies (52, 54) move from their open positions to their closed positions thereby to punch at least one hole in the strip (19) material, the punch assembly, (52) having pilot pin means (14) extending therefrom and, in use, the strip material (2) having pilot hole means (12) which are dimensioned to receive the pilot pin means (14) thereby precisely to position the strip material (2) in the operating zone prior to the arrival of the punch assembly (52) and the die assembly (54) at their closed positions, the pilot pins means (14) being fixed to the ram block (84) and extending slidably through, and beyond, the face plate assembly (86) when the punch assembly (52) is in its extended position, the machine being characterised in that a strip retainer (18) is provided for stripping the strip material (2) from the pilot pin means (14) when the punch assembly (52) and the die assembly (54) move from their closed positions to their open positions, the strip retainer (18) comprising at least one static member which is beside, and adjacent to, the strip feed path, the static member being between the punch assembly (4, 52) and the strip feed path and intersecting the punch and die assembly path of reciprocation, the strip retainer being in non-intersecting relationship with the punch means (8) path of reciprocation and with the pilot pin (14) path of reciprocation, the strip retainer comprising a wire (18) which extends laterally beyond the punch and die path of reciprocation on two opposite sides thereof and having retainer ends (20) which are secured to fixed securing means (22), whereby

during each operating cycle, the pilot pin means (14) moves into the pilot hole means (12) in the strip material (2), and during subsequent movement of the punch assembly (4, 52) to its open position, the strip retainer (18) restrains the strip material (2) from being carried with the pilot pin means laterally of the strip feed path and thereby strips the strip material from the pilot pin means.

2. A machine as set forth in claim 1 characterized in that the strip retainer (18) extends parallel to the strip feed path.

3. A machine as set forth in claim 1 characterized in that the strip retainer (18) extends transversely of the strip feed path.

4. A machine as set forth in claim 1 characterized in that the punch assembly (4, 52) and the die assembly (6, 54) both move when the punch assembly and the die assembly move between their open and closed positions.

5. A machine as set forth in any of one of claims 1, 2 or 4 characterized in that upstream and downstream strip guides (58, 60) are provided on the strip feed path on opposite sides of the operating zone (42), the upstream and downstream strip guides being respectively upstream and downstream, relative to direction of strip feed, from the operating zone, the fixed securing means (22) being proximate to the upstream and downstream strip guides.

6. A machine as set forth in claim 5, characterised in that the fixed securing means (22) is on the upstream and downstream strip guides (58, 60).

7. A machine as set forth in claim 4, characterised in that the punch and die assemblies (4, 6, 52, 54) are in horizontal opposed confronting relationship.

8. A machine as set forth in claim 3, characterised in that a plurality of strip retainers (18) are provided at spaced intervals along the strip feed path in the operating zone (42).

9. A machine as set forth in claim 1, characterised in that the strip is free to move in the feeding direction in either direction along the strip feed path a short distance whereby the pilot pin precisely positions the strip in the operating zone.

10. A machine as set forth in claim 9, characterised in that the strip feeding means comprises a sprocket wheel.

30 Revendications

1. Machine (36) destinée à poinçonner des trous dans une bande (2), la machine comportant des moyens (61) d'avance de bande destinés à faire avancer une bande (2) le long d'un trajet d'avance de bande qui s'étend à travers une zone de travail (42), un ensemble à poinçons (52) et un ensemble à matrice (54) dans la zone de travail (42) sur des côtés opposés du trajet d'avance de la bande, les ensembles (52, 54) à poinçons et matrice étant dans une disposition opposée et en vis-à-vis et pouvant être rapprochés et éloignés l'un de l'autre suivant un trajet de mouvement alternatif des ensembles à poinçons et matrice entre une position ouverte, dans laquelle des ensembles de poinçons et matrice sont éloignés (10) l'un de l'autre, et une position fermée, dans laquelle les ensembles à poinçons et matrice sont rapprochés l'un de l'autre, l'ensemble à poinçons (52) étant rap-
pelé vers une position en extension et pouvant être déplacé vers un bloc coulisseau (84) lorsque l'ensemble à poinçons (52) se déplace vers sa position fermée, des moyens à poinçons (94), fixés au bloc coulisseau (84), pénétrant dans une ouverture d'un ensemble à plaque frontale (86) pour enlever la bande des moyens à poinçons (94) lorsque les ensembles à poinçons et matrice (52, 54) se déplacent de leurs positions fermées vers leurs positions ouvertes, l'ensemble à matrice (54) comportant des



moyens à ouvertures de matrice dimensionnés pour recevoir les moyens à poinçons (94), les moyens à poinçons (94) pouvant être déplacés vers et introduits dans les moyens à ouvertures de matrice suivant un trajet de mouvement alternatif des moyens à poinçons lorsque les ensembles à poinçons et matrice (52, 54) se déplacent de leurs positions ouvertes vers leurs positions fermées afin de poinçonner au moins un trou dans la matière de la bande (19), l'ensemble à poinçons (52) comportant des moyens (14) à broches de guidage qui en font saillie et, lors de l'utilisation, la bande (2) comportant des moyens à trous de guidage (12) qui sont dimensionnés pour recevoir les moyens à broches de guidage (14) afin de positionner avec précision la bande (2) dans la zone de travail avant l'arrivée de l'ensemble à poinçons (52) et de l'ensemble à matrice (54) dans leurs positions fermées, les moyens à broches de guidage (14) étant fixés au bloc coulisseau (84) et s'étendant en coulisant à travers et au-delà de l'ensemble à plaque frontale (86) lorsque l'ensemble à poinçons (52) est dans sa position en extension, la machine étant caractérisée en ce qu'un élément (18) de retenue de bande est prévu pour dévêtir la bande (2) des moyens à broches de guidage (14) lorsque l'ensemble à poinçons (52) et l'ensemble à matrice (54) se déplacent de leurs positions fermées vers leurs positions ouvertes, l'élément (18) de retenue de bande comportant au moins un élément statique qui est à côté et à proximité immédiate du trajet d'avance de la bande, l'élément statique étant entre l'ensemble à poinçons (4, 52) et le trajet d'avance de la bande et intersectant le trajet du mouvement alternatif des ensembles à poinçons et matrice, l'élément de retenue de la bande n'étant pas en intersection avec le trajet du mouvement alternatif des moyens à poinçons (8) et avec le trajet du mouvement alternatif des broches de guidage (14), l'élément de retenue de bande comportant un fil métallique (18) qui s'étend latéralement au-delà du trajet de mouvement alternatif des poinçons et la matrice sur deux côtés opposés de celui-ci et ayant des extrémités de retenue (20) qui sont assujetties à des moyens fixes (22) d'assujettissement, de manière que durant chaque cycle de travail, les moyens à broches de guidage (14) pénètrent dans les moyens à trous de guidage (12) situés dans la bande (2) et, durant un mouvement suivant de l'ensemble à poinçons (4, 52) vers sa position ouverte, l'élément (18) de retenue de bande empêche la bande (2) d'être entraînée avec les moyens à broches de guidage latéralement au trajet d'avance de la bande et dévêtisse ainsi la bande des moyens à broches de guidage.

2. Machine selon la revendication 1, caractérisée en ce que l'élément (18) de retenue de la bande s'étend parallèlement au trajet d'avance de la bande.

3. Machine selon la revendication 1, caractérisée en ce que l'élément (18) de retenue de la bande

s'étend transversalement au trajet d'avance de la bande.

4. Machine selon la revendication 1, caractérisée en ce que l'ensemble à poinçons (4, 52) et l'ensemble à matrice (6, 54) se déplacent tous deux lorsque l'ensemble à poinçons et l'ensemble à matrice se déplacent entre leurs positions ouvertes et fermées.

5. Machine selon l'une quelconque des revendications 1, 2 ou 4, caractérisée en ce que des guides de bande (58, 60) d'amont et d'aval sont prévus sur le trajet d'avance de la bande sur des côtés opposés de la zone de travail (42), les guides d'amont et d'aval de la bande étant respectivement en amont et en aval, par rapport au sens d'avance de la bande, de la zone de travail, les moyens fixes (22) d'assujettissement étant approximativement les guides d'amont et d'aval de la bande.

6. Machine selon la revendication 5, caractérisée en ce que les moyens fixes (22) d'assujettissement se trouvent sur les guides d'amont et d'aval (58, 60) de la bande.

7. Machine selon la revendication 4, caractérisée en ce que les ensembles (4, 6, 52, 54) des poinçons et matrices sont dans une disposition horizontale opposée en vis-à-vis.

8. Machine selon la revendication 3, caractérisée en ce que plusieurs éléments (18) de retenue de bande sont prévus à intervalles espacés le long du trajet d'avance de la bande dans la zone (42) de travail.

9. Machine selon la revendication 1, caractérisée en ce que la bande peut se déplacer librement dans la direction d'avance, dans un sens ou dans l'autre, le long du trajet d'avance de la bande, sur une courte distance, afin que la broche de guidage positionne avec précision la bande dans la zone de travail.

10. Machine selon la revendication 9, caractérisée en ce que les moyens d'avance de la bande comprennent une roue dentée.

Patentansprüche

1. Maschine (36) zum Stanzen von Löchern in Streifengut (2), die Streifenzuführeinrichtungen (61) aufweist, um Streifengut (2) entlang einem Streifenzuführweg zuzuführen, der sich durch einen Betriebsbereich (42) erstreckt, wobei die Maschine eine Stanzeinrichtung (52) und eine Matrizeneinrichtung (54) in dem Betriebsbereich (42) auf gegenüberliegenden Seiten des Streifenzuführweges aufweist, wobei die Stanz- und Matrizeneinrichtungen (52, 54) in entgegengesetzter, gegenüberliegender Beziehung zueinander stehen und relativ aufeinander zu und voneinander weg entlang einem Weg beweglich sind, auf dem sich die Stanz- und Matrizeneinrichtungen zwischen einer offenen Stellung, in der die Stanz- und Matrizeneinrichtungen entfernt voneinander sind



(10), und einer geschlossenen Stellung, in der die Stanz- und Matrizenrichtungen nahe beieinander sind, hin und her bewegen, und wobei die Stanzeinrichtung (52) in eine ausgefahrene Stellung vorgespannt und relativ zu einem Rammblock (84) beweglich ist, wenn sich die Stanzeinrichtung (52) in ihre geschlossene Stellung bewegt, wobei weiterhin Stanzmittel (94) an dem Rammblock (84) befestigt sind, die sich in eine Öffnung in einer Frontplattenanordnung (86) erstrecken, um das Streifengut von den Stanzmitteln (94) zu entfernen, wenn sich die Stanz- und Matrizenrichtungen (52, 54) von ihren geschlossenen Stellungen in ihre offenen Stellungen bewegen, wobei die Matrizenrichtung (54) Matrizenöffnungsmittel aufweist, die so ausgelegt sind, daß sie die Stanzmittel (94) aufnehmen, wobei die Stanzmittel (94) relativ zu den Matrizenöffnungsmitteln und in diese hinein entlang einem Weg beweglich sind, auf dem sich die Stanzmittel hin und her bewegen, wenn sich die Stanz- und Matrizenrichtungen (52, 54) von ihren offenen Stellungen in ihre geschlossenen Stellungen bewegen, wodurch sie mindestens ein Loch in das Streifengut (19) stanzen, und wobei die Stanzeinrichtung (52) weiterhin Führungsstifteinrichtungen (14) aufweist, die sich von ihr erstrecken, und wobei das Streifengut (2) im Betrieb Führungslocheinrichtungen (12) aufweist, die so ausgelegt sind, daß sie die Führungsstifteinrichtungen (14) aufnehmen, wodurch sie das Streifengut (2) exakt in dem Betriebsbereich anordnen, bevor die Stanzeinrichtung (52) und die Matrizenrichtung (54) ihre geschlossenen Positionen einnehmen, wobei die Führungsstifteinrichtungen (14) an dem Rammblock (84) befestigt sind und sich verschiebbar durch die Frontplattenanordnung (86) hindurch und über diese hinaus erstrecken, wenn sich die Stanzeinrichtung (52) in ihrer ausgefahrenen Stellung befindet, wobei die Maschine durch folgende Merkmale gekennzeichnet ist:

— Ein Streifenguthalter (18) ist vorgesehen, um das Streifengut (2) von den Führungsstifteinrichtungen (14) abzustreifen, wenn sich die Stanzeinrichtung (52) und die Matrizenrichtung (54) von ihren geschlossenen Stellungen in ihre offenen Stellungen bewegen;

— Der Streifenguthalter (18) weist mindestens ein feststehendes Glied auf, das seitlich und benachbart zu dem Streifenzuführweg angeordnet ist, wobei das feststehende Glied zwischen der Stanzeinrichtung (4, 52) und dem Streifenzuführweg angeordnet ist und den Weg der Hin- und-Her-Bewegung der Stanz- und der Matrizenrichtungen schneidet, wobei der Streifenguthalter in nicht-schneidender Beziehung zu dem Weg der Hin- und-Her-Bewegung des Stanzmittels (8) und zu dem Weg der Hin- und-Her-Bewegung des Führungstiftes (14) steht;

— Der Streifenguthalter weist einen Draht (18) auf, der sich seitlich über den Weg der Hin- und-Her-Bewegung der Stanz- und der Matrizenrichtung hinaus an zwei gegenüberliegenden Seiten davon erstreckt und Halterenden (20) aufweist, die an festen Befestigungseinrichtungen (22) angebracht sind;

— Während jedes Betriebszyklusses bewegen sich dadurch die Führungsstifteinrichtungen (14) in die Führungslocheinrichtungen (12) in dem Streifengut (2), und während der darauffolgenden Bewegung der Stanzeinrichtung (4, 52) in ihre offene Stellung hält der Streifenguthalter (18) das Streifengut (2) davon zurück, mit den Führungsstifteinrichtungen in seitlicher Richtung zu dem Streifenzuführweg bewegt zu werden und streift dadurch das Streifengut von den Führungsstifteinrichtungen ab.

2. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß der Streifenguthalter (18) sich parallel zu dem Streifenzuführweg erstreckt.

3. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß der Streifenguthalter (18) sich quer zu dem Streifenzuführweg erstreckt.

4. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß sich die Stanzeinrichtung (4, 52) und die Matrizenrichtung (6, 54) beide bewegen, wenn sich die Stanzeinrichtung und die Matrizenrichtung zwischen ihrer offenen und ihrer geschlossenen Stellung bewegen.

5. Maschine nach einem der Ansprüche 1, 2 oder 4, dadurch gekennzeichnet, daß zuführungssseitige und ausgangssseitige Streifenführungen (58, 60) an dem Streifenzuführweg auf gegenüberliegenden Seiten des Betriebsbereichs (42) vorgesehen sind, wobei die zuführungssseitigen und die ausgangssseitigen Streifenführungen zuführungssseitig und ausgangssseitig von dem Betriebsbereich, bezogen auf die Richtung der Streifenzuführung, angeordnet sind, wobei die festen Befestigungseinrichtungen (22) benachbart zu den zuführungssseitigen und den ausgangssseitigen Streifenführungen sind.

6. Maschine nach Anspruch 5, dadurch gekennzeichnet, daß die festen Befestigungseinrichtungen (22) an den zuführungssseitigen und den ausgangssseitigen Streifenführungen (58, 60) angeordnet sind.

7. Maschine nach Anspruch 4, dadurch gekennzeichnet, daß die Stanz- und die Matrizenrichtungen (4, 6, 42, 54) in horizontaler, entgegengesetzter, gegenüberliegender Beziehung zueinander stehen.

8. Maschine nach Anspruch 3, dadurch gekennzeichnet, daß eine Vielzahl von Streifenguthaltern (18) mit Abständen längs des Streifenzuführweges in dem Betriebsbereich (42) angeordnet ist.

9. Maschine nach Anspruch 1, dadurch gekennzeichnet, daß der Streifen sich frei in der Zuführrichtung in jeder Richtung längs des Streifenzuführweges über eine kurze Entfernung bewegen kann, wodurch

der Führungsstift den Streifen exakt in dem Betriebsbereich anordnet.

10. Maschine nach Anspruch 9, dadurch gekennzeichnet, daß die Streifenzuführeinrichtung ein Kettenrad aufweist.



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