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Description

The present invention relates to a portable rivetting machine of the type indicated in the preamble of Claim 1.

US—A—3.156.920 discloses a magazine construction for a portable rivetting machine in which the channel of the magazine is provided with one pair of longitudinal dividing walls which extend from its base wall such as to define a pair of symmetrically disposed interstices adapted to receive the legs of U-shaped staples of a predetermined width and a central interstice adapted to receive a series of rivets.

A rivetting machine provided with a magazine of the aforesaid known type shows a certain degree of versatility because it is able to receive both U-shaped staples of different height, that is with legs of different lengths, and rivets or nails of different lengths. However, this known magazine is able to receive only staples of the same width.

The magazine according to US—A—3.156.920 is provided with a pusher which comprises three parallel blades, with each blade being housed in an interstice. The blades are interconnected by a yoke which simply rests on the upper edges of the channel. This arrangement is affected by tilting of the pusher. Especially when long staples or rivets are used and when the series of staples or rivets is almost exhausted, an even slight inclination of the pusher has the effect of exerting on the last element of the series a thrust which is not parallel to the direction of movement, with the consequence of jamming of the staples or rivets in the slit at the discharge end of the magazine.

The object of the present invention is to provide a more versatile rivetting machine which not only is able to receive, selectively, series of rivets of different lengths and series of staples of different widths and of different lengths, but is also more reliable than the known rivetting machines in that it is not liable to jamming even in the case of very long rivets or staples.

According to the present invention this object is achieved by means of a riveting machine having the features set forth in the characterizing clause of claim 1.

A stapling machine according to the invention is able to receive, in addition to rivets, also U-shaped staples of two different widths and of many different lengths.

The guide means which prevent the pusher from inclining ensure that the thrust is always exerted by the pusher in a direction parallel to that of movement of the staples or rivets, thus preventing possible jamming.

The characteristics of the invention will be better understood from a reading of the detailed description which follows, made with reference to the appended drawings, given by way of non-limiting example and in which:

Figure 1 is a side elevational view of the rivetting machine,

Figure 2 is an exploded perspective view of the channel and of the parts associated therewith,

Figure 3 is a side elevational view, to an enlarged scale with respect to Figure 1, showing only the lower unit of the rivetting machine, defining the channel,

Figure 4 is a view of the unit of Figure 3 from above,

Figure 5 is a cross-sectional view, to an enlarged scale, taken on line V—V of Figure 4,

Figures 6 to 8 are cross-sections of the channel, which illustrate the manner in which various rivetting elements are guided, and

Figure 9 is a partial section, to an enlarged scale, taken on line IX—IX of Figure 3.

Referring to Figure 1, a rivetting machine comprises, in known manner, a body 10 with a base part 12, a part 14 acting as a handgrip and a head 16. In the head 16 is housed, in known manner, an electromagnet which can be selectively energised by means of a trigger 18 to cause a blade punch for discharging staples from the machine, to descend.

Under the base part 12 is fixed a sheet-metal channel 20 which accommodates a series of rivet elements. As will be seen below, these elements are urged towards the end of the channel 20 underlying the head 16 where the blade punch discharges them one by one through a slit defined by a pair of mating plates 22 and 24 of which more will be said below.

A slidable foot 26 is connected to the channel 20 for supporting the rivetting machine on the working surface P.

Referring to Figures 2 to 5, the channel 20 includes an outer sheet-metal element 28 of substantially U-shaped profile, with side walls 30 and a base wall 32. Within the outer element 28 there is located a further U-shaped, sheet-metal element 34 which has a base wall 36 applied to the wall 32, and two side walls 38.

Within the inner U-shaped element 34 are located two parallel sheet-metal strips 40 provided with tabs 42 along their edges facing the bottom of the channel. The tabs 42 are inserted in respective slits 44 in the internal element 34 and slits 46 in the outer element 28 and are upset to secure all the elements 28, 34 and 40 together in the configuration illustrated in Figures 5 to 8.

As illustrated in Figures 5 to 8, the walls 38 and strips 40 define respective pairs of longitudinal dividing walls which extend up from the base wall of the channel and which define a pair of outermost interstices 50 (between the walls 30 and the walls 38), a pair of innermost interstices 52 (between the dividing walls 38 and 40), as well as a central space 54 (between the dividing walls 40). The dividing walls 38 are higher than the dividing walls 40.

A pusher 56 is slidable in the channel 20 and comprises an outer sheet-metal element 58 in the form of an upturned U with a pair of sides 60 and an upper yoke 62.

An internal sheet-metal element 64 is located within the outer element 58 and has an upturned U profile with a pair of side walls 66 and an upper yoke 67.

Within the internal U-shaped element 64 is located a plate element 68 which has tabs 70 on its upper edge. The tabs are inserted in respective slits 72 in the internal U-shaped element 64 and slits 74 in the outer U-shaped element 58, and are upset to secure the three elements 62, 64, 68 together in the configuration illustrated in Figure 5.

As may be seen in Figure 5, the walls 60, 66 and 68 define respective blades each of which is housed in one of the interstices of the channel 20. As will be understood below, these blades serve to engage the rear end of the respective series of rivet elements and push them towards the discharge end of the channel 20.

Projecting from the upper yoke 62 of the outer U-shaped element 58 is a pair of lugs 76 through which a longitudinal guide rod 78 can slide. A hook member 80 of shaped sheet-metal is fixed to the rear end of the rod 78 and can be hooked, in known manner, to the entry end of the channel 20. A helical spring 82 is interposed between the pusher 56 and the hook member 80 for the purpose of resiliently urging a series of staples along the channel 20 by means of the blades of the pusher 56.

An appendage 84 in the form of a plaque bearing a reference mark 86 is mounted on the rod 78 between the lugs 76. The plaque 84 projects through a slot between the channel 20 and the base part 12 of the body 10 and is movable along a scale 88 (Figure 1) to indicate the position of the pusher 58 in the channel 20 and hence the quantity of rivet elements contained in the channel itself.

The side walls 30 of the channel have respective longitudinal ribs 90 which define corresponding internal grooves 92. In these grooves 92 are guided corresponding longitudinal ribs 94 of the pusher 56. This coupling has the object of preventing the pusher 56 from inclining with respect to its direction of sliding, since inclination of the pusher could cause the rivet elements to jam, especially the last element to be discharged.

The foot 26 is constituted by a substantially U-shaped sheet-metal element. In the upper part of its side wall, it has respective stepped wings 96 which embrace the ribs 90. Tabs 97 are formed in the wings 96 by semi-punching and engage the upper parts of the ribs 90. In this manner, the foot 26 is mounted for sliding movement along the channel 20.

The foot 26 has a front projecting part 98 which, when the foot is in its fully advanced position, is disposed beneath the plates 22, 24 and closes off the discharge slit to provide a safety barrier in periods when the rivetting machine is not in use. The foot 26 can be fixed in this advanced position by means of a side screw 99 (Figure 5) which can be screwed into one of the side walls of the channel 20 through a corresponding hole in the foot 26, one of the ends of which, moreover, is arranged to be in front of the pusher 56 to prevent its advancement.

Referring to Figure 6, a first type of rivetting

element is shown as E_1 and is constituted by a relatively wide, short staple. The transverse or yoke part of the element E_1 rests on the upper edges of the outermost pair of dividing walls 38 and the legs of the element E_1 are located in the outermost interstices 50 and slidably embrace the dividing walls 38.

The pusher 20 (Figure 5) pushes the series of elements E_1 by means of its outermost blades or sides 60.

In Figure 7 is shown a second type of rivet element E_2 which is relatively narrow and long. The points or lower ends of the legs of the element E_2 rest on the base wall of the channel or rather on the base wall 36 of the innermost U-shaped element, and these legs are guided in the interstices 52 between the two pairs of dividing walls 38 and 40.

The pusher 56 (Figure 5) pushes the series of elements E_2 by means of its pair of blades 66.

In Figure 8 is shown a further rivet element E_3 constituted by a rivet. The point of the rivet rests on the base wall 36 and is guided within the central interstice 54 by means of the two dividing walls 40.

The pusher (Figure 5) pushes the series of rivets by means of its middle blade 68.

Referring now to Figure 9, as well as to Figures 2 and 4, the discharge slit at the end of the channel 20 through which the blade punch of the rivetting machine expels the rivet elements one by one, is indicated by 100. The slit 100 is defined between two mating plates, a front plate 22 and a rear plate 24. The front plate 22 is formed with a wide groove 102 of a width such as to guide the rivet element E_1 as well as the blade punch (not shown). The front plate 22 is also formed with a narrow central guide groove 104 for the rivet element or rivet E_3 .

The rear plate 24 is formed with a groove 106 of intermediate width which serves as a guide for the rivet element E_2 .

Claims

1. Portable rivetting machine of the type comprising a channel (20), defined by a base wall and a pair of side walls, for slidably receiving a series of interconnected rivet elements (rivets, U-shaped staples and the like), a resiliently-loaded slidable pusher (56) for pushing the series of elements towards a discharge end of the channel where there is a slit (100) for the discharge of the elements from the bottom of the channel (20), and a blade punch reciprocally movable through the slit (100) to detach the elements one by one from the series and discharge them through the slit (100), the channel (20) being internally provided with longitudinal dividing walls (38, 40) extending up from its base wall such as to define interstices (50, 52) disposed symmetrically with respect to the centre line of the channel as well as a central interstice (54) extending along the centre line of the channel, the symmetrically disposed interstices being arranged to receive the legs of a

series of U-shaped staples of a width corresponding to the distance between the interstices themselves and the central interstice (52) being arranged to receive a series of rivets, and the pusher (56) comprising the same number of parallel blades (60, 66, 68) as the number of interstices with each blade being housed in an interstice, the blades being interconnected by a yoke (62, 68) above the upper edges of the dividing walls of the channel, characterised in that it includes two pairs of dividing walls (38, 40) for defining one pair of outermost interstices (50) and one pair of innermost interstices (52) for the sliding of two series of different U-shaped staples (E_1 , E_2), in that the pusher (56) includes a pair of sides (60) engaged with the internal faces of the walls (30) of the channel (20) and in that the side walls and sides are provided with mutually inter-engaging guide means (92, 94) which serve to prevent the pusher (56) from inclining with respect to its direction of sliding, said guide means being constituted by longitudinal grooves (92) in the side walls (30) of the channel (20) and corresponding longitudinal ribs (94) in the sides (60) of the pusher (56).

2. Rivetting machine according to Claim 1, characterised in that of the two pairs of dividing walls the outermost (38) have a greater height and the innermost (40) a lesser height with respect to the bottom of the channel, the outermost dividing walls being arranged to be slidingly embraced by a series of U-shaped staples (E_1) of greater width and of lesser length, these staples being supported, by means of their yokes, on the upper edges of the outermost dividing walls, and the innermost dividing walls (40) being arranged to be slidingly embraced by a series of U-shaped staples (E_2) of lesser width and greater length, these staples being supported, by means of the tips of their legs, on the base wall of the channel, and the innermost dividing walls (40) being arranged to embrace with sliding coupling a series of rivets (E_3), these rivets being supported by means of their tips on the base wall of channel.

3. Rivetting machine according to claim 1 or 2, characterised in that the channel (20) includes two sheet-metal elements (28, 34) with substantially U-shaped profiles, inserted one in the other to define the walls (30) of the channel and the outermost dividing walls (38) as well as the base wall, and two sheet-metal strips (40) which define the innermost dividing walls, these strips being provided with tabs (42) which pass through respective slits (44, 48) formed in the base wall of the channel and which are upset to secure the strips and the profiled elements together.

4. Rivetting machine according to claim 1 or 2, characterised in that the pusher (56) includes two sheet-metal elements (58, 64) with substantially U-shaped profiles, inserted one in the other to define outermost blades or sides (60) of the pusher as well as a pair of intermediate blades (66) and a central blade (68) which has tabs (70) which pass through respective slits (72, 74) formed in the yokes of the U-shaped elements

and are upset to secure the central blade and the U-shaped elements together.

5. Rivetting machine according to any one of the preceding claims, characterised in that the discharge slit (100) is defined by a pair of mating plates (22, 24) respectively a front one and a rear one with respect to the slit itself, the mating faces of these plates being formed with grooves (102, 104, 106) for guiding the blade punch and the various rivet elements (E_1 , E_2 , E_3) during the discharge movement.

6. Rivetting machine according to any one of claims 1 to 4, characterised in that the pusher (56) is provided with an appendage (84) which projects transversely of the channel (20) and which like the movement of a cursor, moves in front of a scale (88) to indicate the quantity of rivet elements contained in the channel (20).

Patentansprüche

1. Tragbare Nietmaschine, die einen Kanal (20), der von einem Boden und zwei Seitenwänden gebildet wird, um eine Reihe von miteinander verbundenen Nitelementen (Nieten, U-förmigen Klammern und ähnliches) aufzunehmen, ein federnd geladenes, verschiebbares Druckglied (56), um die Reihe von Elementen gegen ein Entladende des Kanals zu drücken, wo sich ein Schlitz (100) befindet, um die Elemente vom Boden des Kanals (20) zu entladen, sowie einen Schneidestempel enthält, der durch den Schlitz (100) hin- und her bewegbar ist, um die Elemente einzeln von der Reihe loszulösen und sie durch den Schlitz (100) zu entladen, wobei der Kanal (20) innen mit Längstrennwänden (38, 40) versehen ist, die von seinem Boden ausgehen, um Zwischenräume (50, 52) zu bilden, die symmetrisch zur Mittellinie des Kanals liegen, sowie einen Mittelzwischenraum (54) zu bilden, der entlang der Mittellinie des Kanals verläuft, wobei die symmetrisch liegenden Zwischenräume so angeordnet sind, daß sie die Schenkel einer Reihe von U-förmigen Klammern aufnehmen, die eine Breite besitzen, die dem Abstand zwischen den Zwischenräumen selbst entspricht, und der Mittelzwischenraum (52) so angeordnet ist, daß er eine Reihe von Nieten aufnimmt, und wobei das Druckglied (56) genau so viele parallele Schneiden (60, 66, 68) aufweist, als Zwischenräume vorhanden sind, wobei jede Schneide in einem Zwischenraum untergebracht ist, wobei die Schneiden oberhalb der Oberkanten der Trennwände des Kanals durch ein Joch (62, 68) miteinander verbunden sind, dadurch gekennzeichnet, daß die Nietmaschine zwei Paare von Trennwänden (38, 40) aufweist, um ein Paar von äußersten Zwischenräumen (50) sowie ein Paar von innersten Zwischenräumen (52) für das Verschieben von zwei Reihen von unterschiedlichen U-förmigen Klammern (E_1 , E_2) zu bilden, daß das Druckglied (56) zwei Seiten (60) aufweist, die mit den Innenflächen der Wände (30) des Kanals (20) im Eingriff stehen, und daß die Seitenwände und die Seiten mit gegenseitig im Eingriff stehenden

Führungen (92, 94) versehen sind, die dazu dienen, um zu verhindern, daß sich das Druckglied (56) zu seiner Gleitrichtung neigt, wobei die Führung von Längsrillen (92) in den Seitenwänden (30) des Kanals (20) sowie von entsprechenden Längsrippen (94) in den Seiten (60) des Druckglieds (56) gebildet wird.

2. Nietmaschine gemäß Anspruch 1, dadurch gekennzeichnet, daß von den beiden Paaren von Trennwänden die äußersten (38) eine größere Höhe und die innersten (40) eine geringere Höhe zum Boden des Kanals besitzen, wobei die äußersten Trennwände so angeordnet sind, daß sie von einer Reihe von U-förmigen Klammern (E1) von größerer Breite und geringerer Länge gleitend umschlossen werden, wobei diese Klammern mit Hilfe ihrer Joche auf den Oberkanten der äußersten Trennwände sitzen, und wobei die innersten Trennwände (40) so angeordnet sind, daß sie von einer Reihe von U-förmigen Klammern (E2) von geringerer Breite und größerer Länge gleitend umschlossen werden, wobei diese Klammern mit Hilfe der Spitzen ihrer Schenkel auf dem Boden des Kanals sitzen, und wobei die innersten Trennwände (40) so angeordnet sind, daß sie eine Reihe von Nieten (E3) gleitend umschließen, wobei diese Nieten mit Hilfe ihrer Spitzen am Boden des Kanals sitzen.

3. Nietmaschine gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Kanal (20) zwei Blechelemente (28, 34) mit einem im wesentlichen U-förmigen Profil aufweist, die ineinander eingesetzt werden, um die Wände (30) des Kanals sowie die äußersten Trennwände (38) als auch den Boden zu bilden, sowie zwei Blechstreifen (40) aufweist, die die innersten Trennwände bilden, wobei diese Streifen mit Nasen (42) versehen sind, die durch entsprechende Schlitze (44, 48) verlaufen, die im Boden des Kanals ausgebildet sind, und gestaucht werden, um die Streifen und die Profilelemente miteinander zu verbinden.

4. Nietmaschine gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Druckglied (56) zwei Blechelemente (58, 64) mit einem im wesentlichen U-förmigen Profil aufweist, die ineinander eingesetzt werden, um die äußersten Schneiden oder Seiten (60) des Druckglieds sowie zwei Zwischenschneiden (66) und eine Mittelschneide (68) zu bilden, die mit Nasen (70) versehen ist, die durch entsprechende Schlitze (72, 74) verlaufen, die in den Jochen der U-förmigen Elemente ausgebildet sind, und gestaucht werden, um die Mittelschneide und die U-förmigen Elemente miteinander zu verbinden.

5. Nietmaschine gemäß jedem der bisherigen Ansprüche, dadurch gekennzeichnet, daß der Entladeschlitz (100) von zwei ineinandergreifenden Platten (22, 24) gebildet wird, d.h. von einer vorderen und einer hinteren Platte im Hinblick auf den Schlitz, wobei die ineinandergreifenden Flächen dieser Platten mit Rillen (102, 104, 106) versehen sind, um den Schneidenstempel und die verschiedenartigen Nietelemente (E1, E2, E3) während der Entladebewegung zu führen.

6. Nietmaschine gemäß jedem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß das Druckglied (56) mit einem Ansatzstück (84) versehen ist, das quer zum Kanal (20) vorspringt und sich gleich einer Zeigerbewegung vor einer Maßeinteilung (88) bewegt, um die Anzahl der Nietelemente anzuzeigen, die im Kanal (20) enthalten sind.

Revendications

1. Machine portative à riveter du type comprenant une gorge (20), définie par une paroi de base et une paire de parois latérales, destinée à recevoir de manière coulissante une série d'éléments de rivetage liés entre eux (rivets, agrafes en U, etc.), poussoir coulissant chargé élastiquement (56) pour pousser la série d'éléments vers une extrémité d'éjection de la gorge, où se trouve une fente (100) pour l'éjection des éléments par le fond de la gorge (20), et un poinçon à lame pouvant se mouvoir par va-et-vient à travers la fente (100) afin de détacher les éléments l'un après l'autre de la série, et de les éjecter à travers la fente (100), la gorge (20) étant munie à l'intérieur de parois séparatrices longitudinales (38, 40) partant de sa paroi de base de façon à définir des interstices (50, 52) disposés symétriquement par rapport à la ligne centrale de la gorge, ainsi qu'un interstice central (54) s'étendant le long de la ligne centrale de la gorge, les interstices disposés symétriquement étant agencés pour recevoir les jambes d'une série d'agrafes en U de largeur correspondant à la distance entre les interstices eux-mêmes et l'interstice central (52) étant agencé pour recevoir une série de rivets, et le poussoir (56) comprenant le même nombre de lames parallèles (60, 66, 68) que le nombre d'interstices, chacune des lames étant logée dans un interstice, les lames étant liées entre elles par une fourche (62, 68) se trouvant au-dessus des bords supérieurs des parois séparatrices de la gorge, caractérisée en ce qu'elle comporte deux paires de parois séparatrices (38, 40) pour définir une paire d'interstices extérieurs (50) et une paire d'interstices intérieurs (52) permettant le coulisement de deux séries d'agrafes en U différentes (E₁, E₂), en ce que le poussoir (56) comporte une paire de côtés (60) en contact avec les faces intérieures des parois (30) de la gorge (20) et en ce que les parois latérales et les côtés sont munis de moyens de guidage s'engageant les uns dans les autres (92, 94) qui servent à empêcher le poussoir (56) de s'incliner par rapport à sa direction de coulisement, lesdits moyens de guidage étant constitués par des rainures longitudinales (92) formées dans les parois latérales (30) de la gorge (20) et des nervures longitudinales correspondantes (94) formées dans les côtés (60) du poussoir (56).

2. Machine à riveter selon la revendication 1, caractérisée en ce que, parmi les deux paires de parois séparatrices, les parois extérieures (38) sont plus hautes et les parois intérieures (40) sont moins hautes par rapport au fond de la gorge, les

parois séparatrices extérieures étant agencées pour être enserrées de manière coulissante par une série d'agrafes en U (E_1) de plus grande largeur et de moindre longueur, ces agrafes prenant appui, par l'intermédiaire de leurs fourches, sur les bords supérieurs des parois séparatrices extérieures, et les parois séparatrices intérieures (40) étant agencées de façon à être enserrées de manière coulissante par une série d'agrafes en U (E_2) de moindre largeur et de plus grande longueur, ces agrafes prenant appui, par l'intermédiaire des extrémités de leurs jambes, sur la paroi de base de la gorge, et les parois séparatrices (40) étant agencées pour enserrer par couplage coulissant une série de rivets (E_3), ces rivets prenant appui par l'intermédiaire de leurs extrémités, sur la paroi de base de la gorge.

3. Machine à riveter selon la revendication 1 ou 2, caractérisée en ce que la gorge (20) comporte deux éléments en feuille métallique (28, 34) sensiblement profilés en U, insérés l'un dans l'autre pour définir les parois (30) de la gorge et les parois séparatrices extérieures (38), ainsi que la paroi de base, et deux bandes de feuille métallique (40) qui définissent les parois séparatrices intérieures, ces bandes étant munies de pattes (42) qui traversent les fentes respectives (44, 48) ménagées dans la paroi de base de la gorge et qui sont rabattues vers le haut pour fixer les bandes et les éléments profilés les uns aux autres.

4. Machine à riveter selon la revendication 1 ou 2, caractérisée en ce que le poussoir (56) comporte deux éléments en feuille métallique (58, 64) sensiblement profilés en U, insérés l'un dans l'autre pour définir des lames ou côtés extérieurs (60) du poussoir ainsi qu'une paire de lames intermédiaires (66) et une lame centrale (68) qui comporte des pattes (70) qui traversent les fentes respectives (72, 74) ménagées dans les fourches des éléments en U, et qui sont rabattues vers le haut pour fixer les uns autres la lame centrale et les éléments en U.

5. Machine à riveter selon l'une quelconque des revendications précédentes, caractérisée en ce que la fente d'éjection (100) est définie par une paire de plaques accolées (22, 24), respectivement une plaque avant et une plaque arrière par rapport à la fente elle-même, les faces accolées de ces plaques étant munies de rainures (102, 104, 106) pour le guidage du poinçon à lame et des divers éléments de rivetage (E_1 , E_2 , E_3) pendant le mouvement d'éjection.

6. Machine à riveter selon l'une quelconque des revendications 1 à 4, caractérisée en ce que le poussoir (56) est muni d'un élément annexe (84) qui fait saillie transversalement sur la gorge (20) et qui, selon le déplacement d'un curseur, se déplace en face d'une graduation (88) indiquant la quantité d'éléments de rivetage contenus dans la gorge (20).

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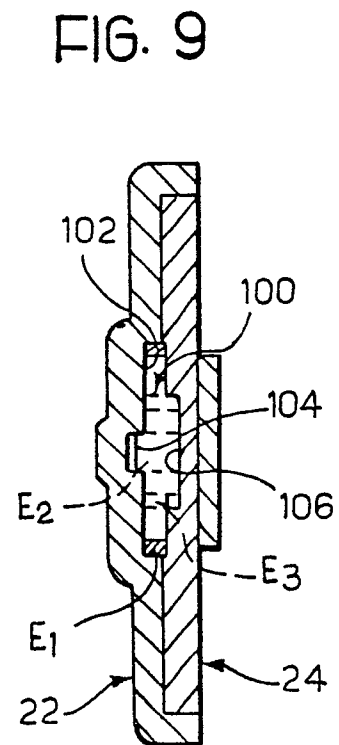
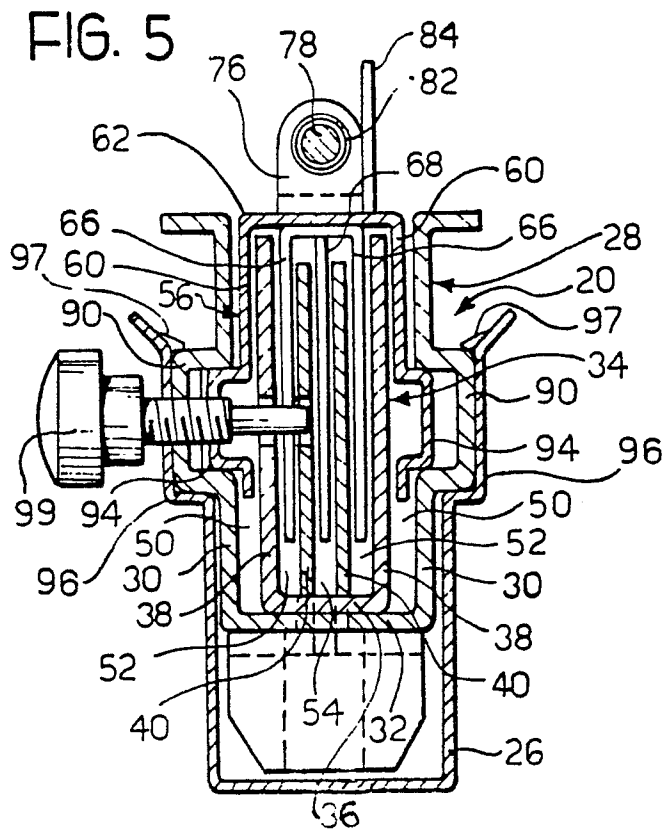
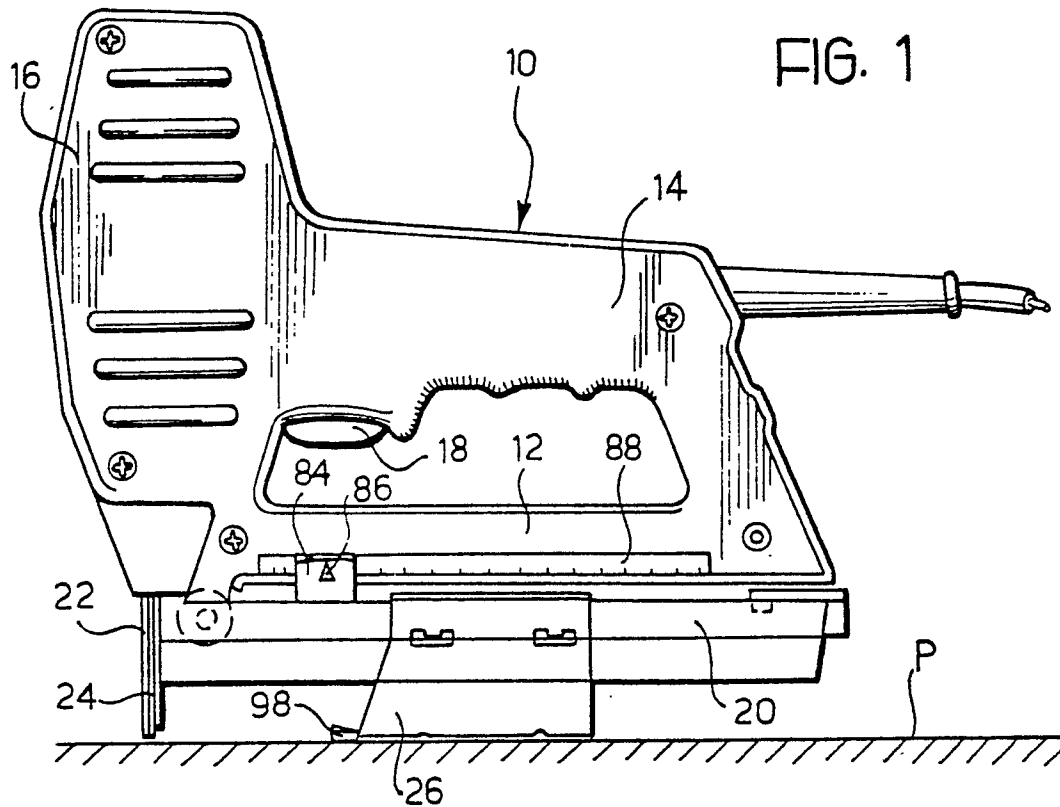
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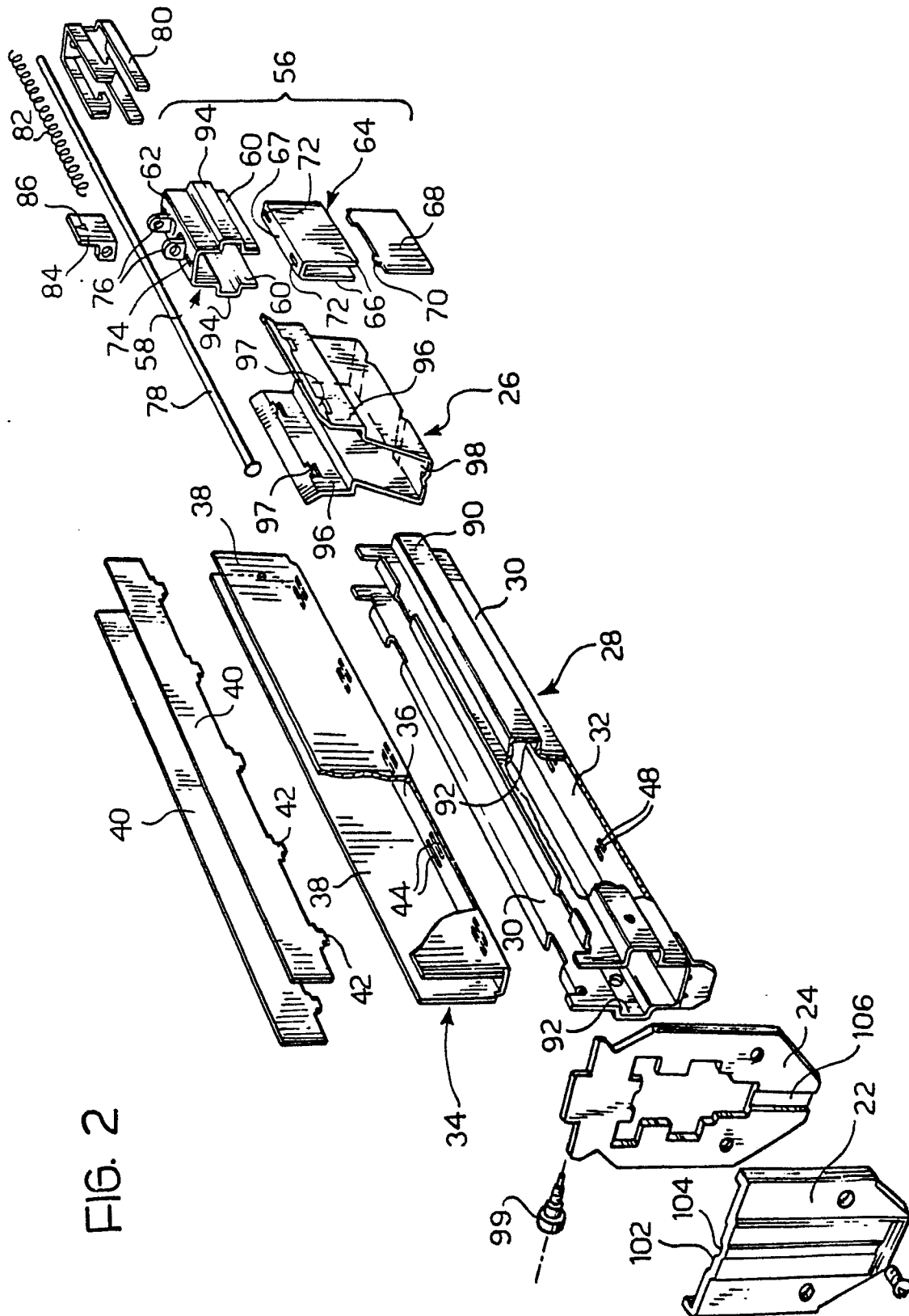
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6





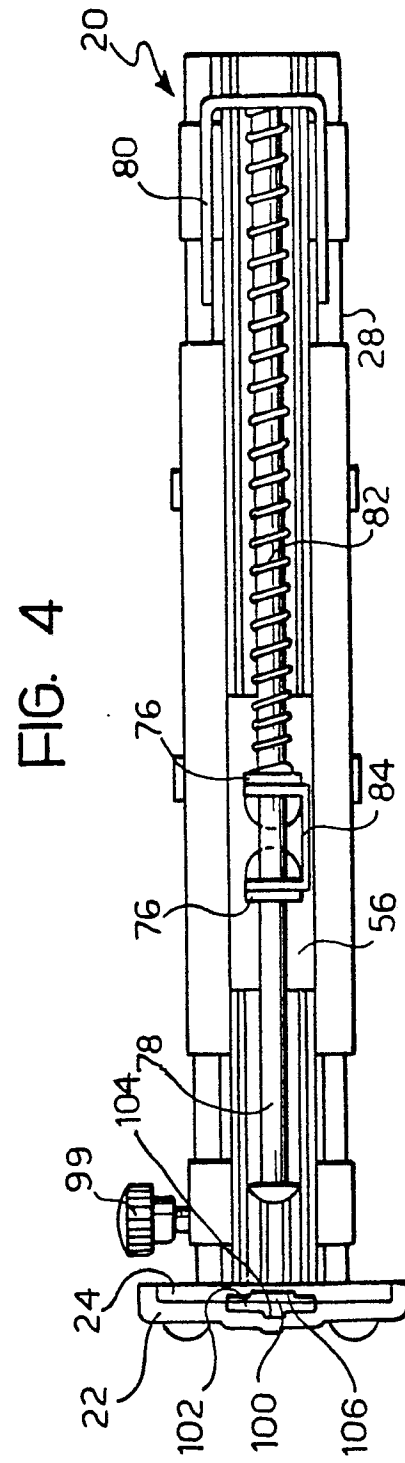
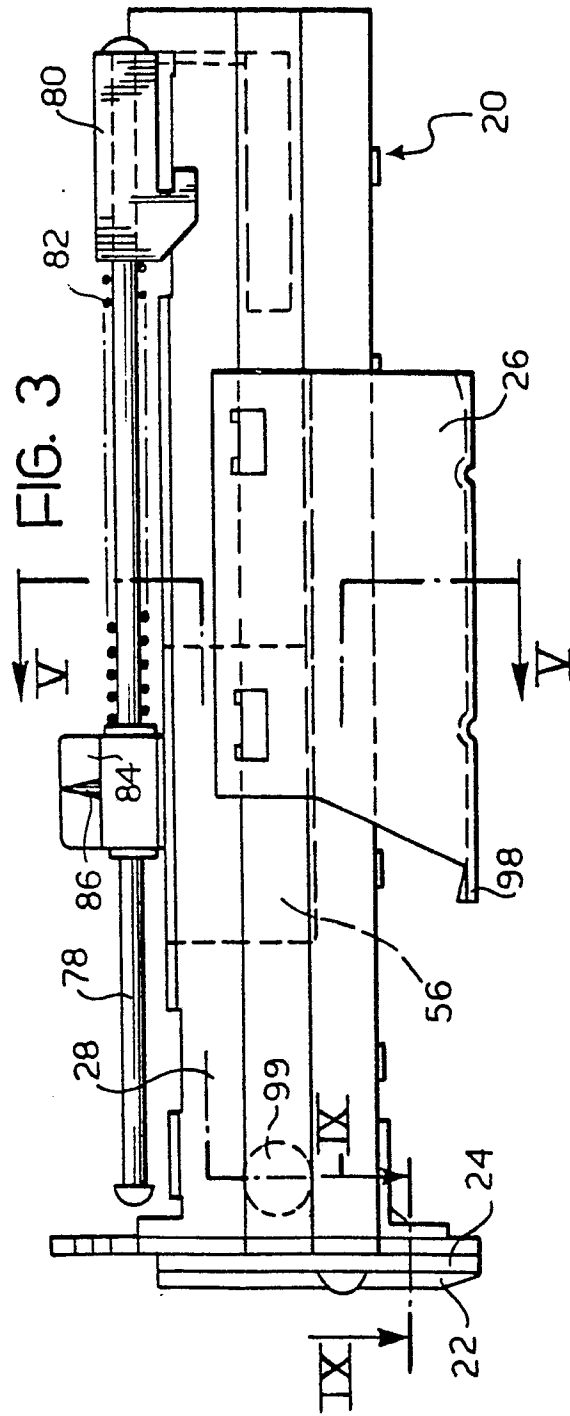


FIG. 6

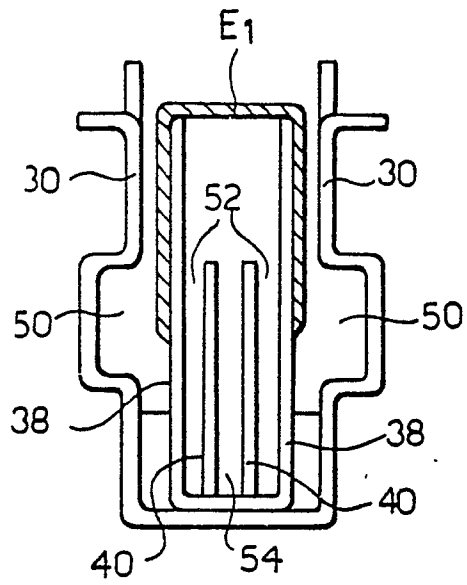


FIG. 7

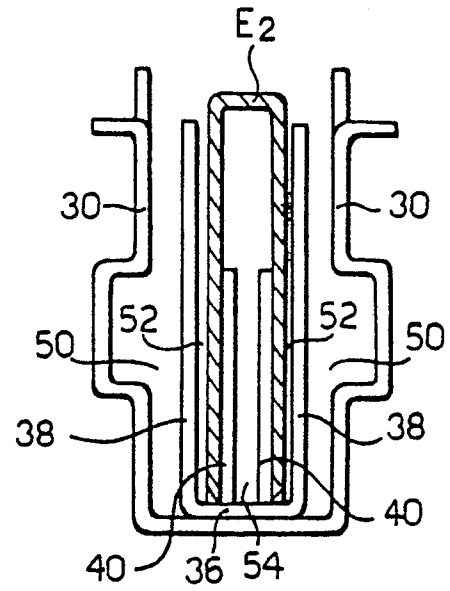


FIG. 8

