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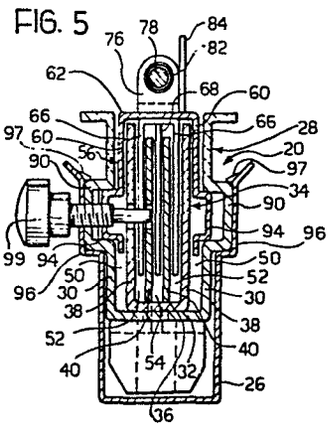
(54) Portable rivetting machine.

(57) A portable rivetting machine of the type including a channel (20) for slidingly receiving a series of interconnected rivet elements (rivets, U-shaped staples and the like), a resiliently-loaded slidable pusher for pushing the series of elements towards a discharge end. The channel (20) is internally provided with more than one pair of longitudinal dividing walls (38, 40) extending up from its base wall so as to define pairs of 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. Each pair of two interstices (50, 52) is arranged to receive the legs of a respective series of U-shaped staples (E_1, E_2) of a width corresponding to the distance between the interstices themselves. The central interstice (52) is arranged to receive a series of rivets (E_3). The pusher (56) includes the same number of parallel blades (60, 66, 68) as the number of interstices with each blade being housed in an interstice itself. The blades are interconnected by a yoke (62, 68) above the upper edges of the dividing walls of the channel (20).

FIG. 5



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"Portable rivetting machine"

The present invention relates to a portable rivetting machine of the type comprising a channel, defined by a base wall and a pair of side walls, for slidingly receiving a series of interconnected rivet elements (rivets, U-shaped staples and the like), a resiliently-loaded slidable pusher for pushing the series of elements towards a discharge end of the channel where there is a slit for the discharge of the elements from the bottom of the channel, and a blade-shaped punch reciprocably movable through the slit to detach the elements one by one from the series and discharge them through the slit itself.

Portable rivetting machines of this type are already known which for the most part operate electromagnetically or pneumatically, the channel of these machines being arranged to receive selectively a series of rivets and a series of U-shaped staples of a given size.

In these known rivetting machines, the channel is constituted by a substantially U-shaped element the width of which is such as to guide the series of metal staples. Along one side wall of the channel the bottom of the latter has a deep groove for guiding the series of rivets.

The main object of the present invention is to provide a more versatile rivetting machine, which is able to receive selectively, in addition to a series of rivets, more than one series of U-shaped staples of a different width and height.

According to the present invention this object is achieved by means of a rivetting machine of the type mentioned at the beginning, characterised in that the channel is internally provided with more than one pair of longitudinal dividing walls extending up from its base wall such as to define pairs of interstices disposed symmetrically with respect to the centre of the channel as well as a central interstice extending

along the centre line of the channel, each pair of two symmetrically-disposed interstices being arranged to receive the legs of a respective series of U-shaped staples of a width corresponding to the distance between the interstices themselves, and the central space being arranged to receive a series of rivets, and in that the pusher comprises the same number of parallel blades as the number of interstices with each blade being housed in an interstice itself, the blades being interconnected by a yoke above the upper edges of the dividing walls of the channel.

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 well 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 slidingly 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, defined by a base wall and a pair of side walls, for slidingly receiving a series of interconnected rivet elements (rivets, U-shaped staples and the like), a resiliently-loaded slidable pusher for pushing the series of elements towards a discharge end of the channel where there is a slit for the discharge of the elements from the bottom of the channel, and a blade punch reciprocably movable through the slit to detach the elements one by one from the series and discharge them through the slit itself, characterised in that the channel (20) is internally provided with more than one pair of longitudinal dividing walls (38, 40) extending up from its base wall such as to define pairs of 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, each pair of two symmetrically-disposed interstices being arranged to receive the legs of a respective series of U-shaped staples (E_1, E_2) of a width corresponding to the distance between the interstices themselves and the central interstice (52) being arranged to receive a series of rivets (E_3), and in that the pusher (56) comprises the same number of parallel blades (60, 66, 68) as the number of interstices with each blade being housed in an interstice itself, the blades being interconnected by a yoke (62, 68) above the upper edges of the dividing walls of the channel.

2. Rivetting machine according to Claim 1, 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), as well as a central interstice (54) for the sliding of a series of rivets (E_3).

3. Rivetting machine according to Claim 2, 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 the channel.

4. Rivetting machine according to Claim 2 or Claim 3, 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.

5. Rivetting machine according to Claim 2 or Claim 3, 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.

6. 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.

7. Rivetting machine according to any one of the preceding claims, characterised 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.

8. Rivetting machine according to Claim 7, characterised in that the guide means are 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).

9. Rivetting machine according to Claim 8, characterised in that the grooves (92) in the side walls (30) of the channel (20) define respective longitudinal ribs (90) on the outside of the channel itself which act as guides for the sliding of a support foot (26) for the rivetting machine, in that the support foot has a front appendage (98) which, in an advanced position of the foot closes off the discharge slit (100), and in that means (99) are provided for selectively locking the foot (26) in its advanced position.

10. Rivetting machine according to any one of Claims 1 to 5, 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 curser, moves in front of a scale (88) to indicate the quantity of rivet elements contained in the channel (20).

FIG. 1

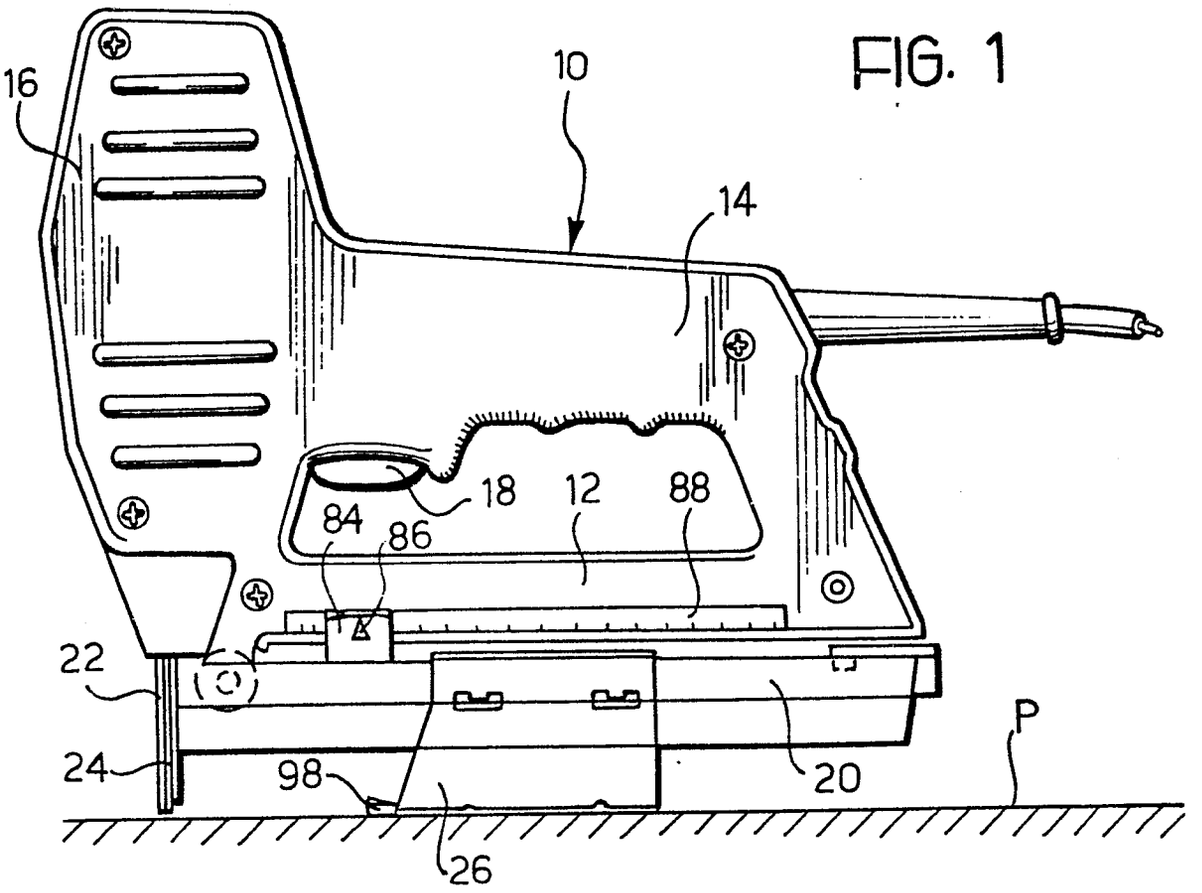


FIG. 5

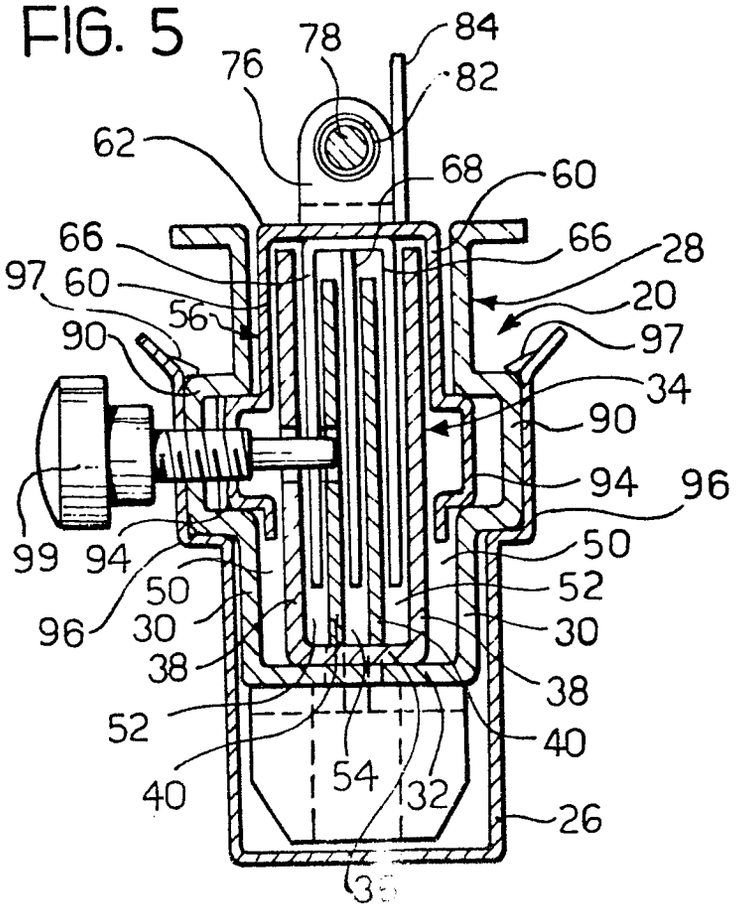
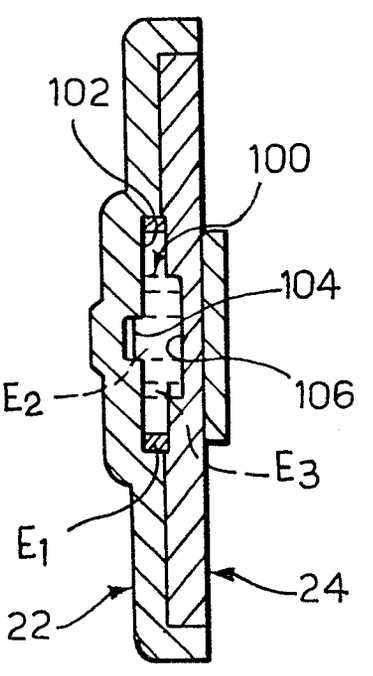


FIG. 9



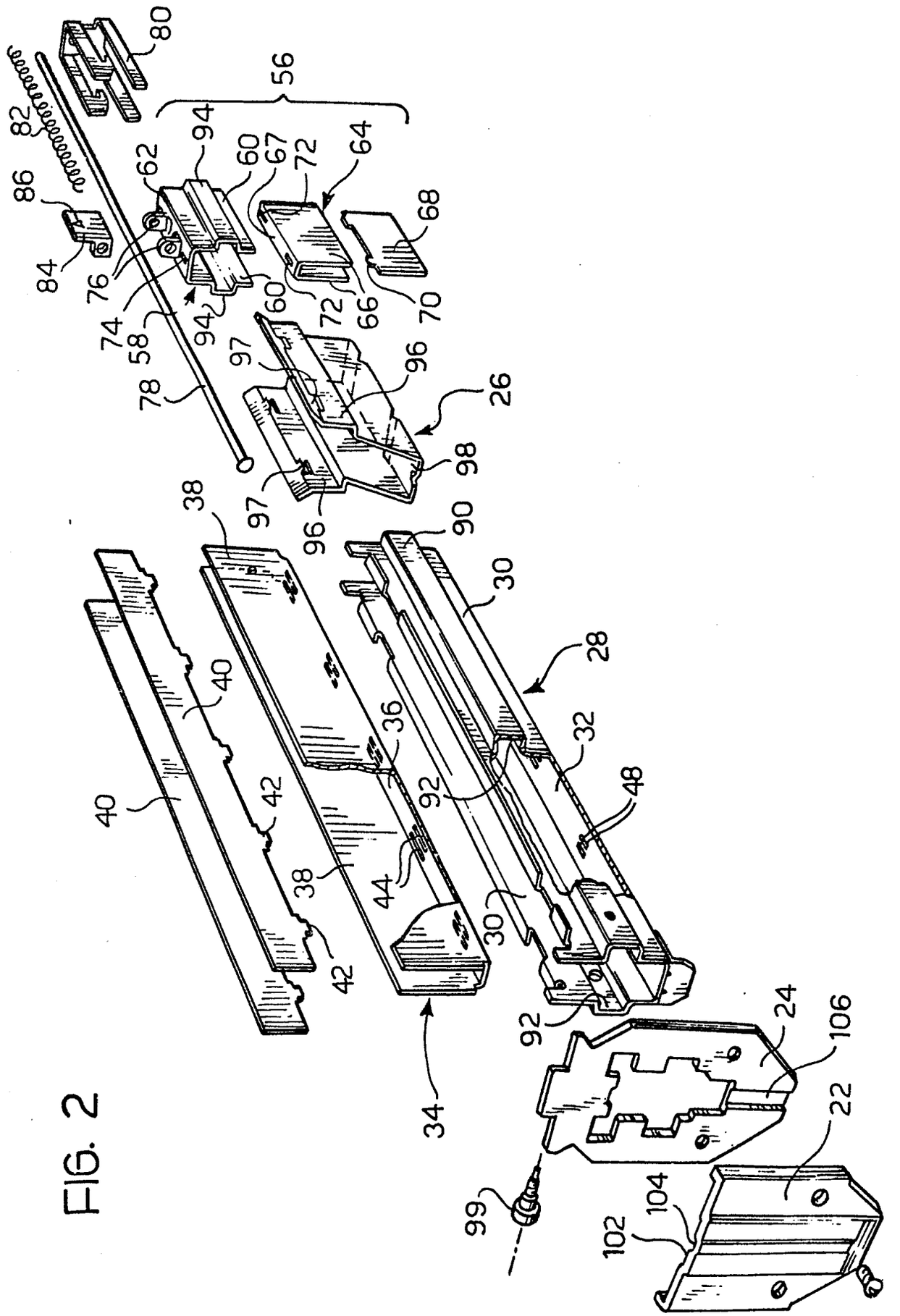

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FIG. 2

FIG. 3

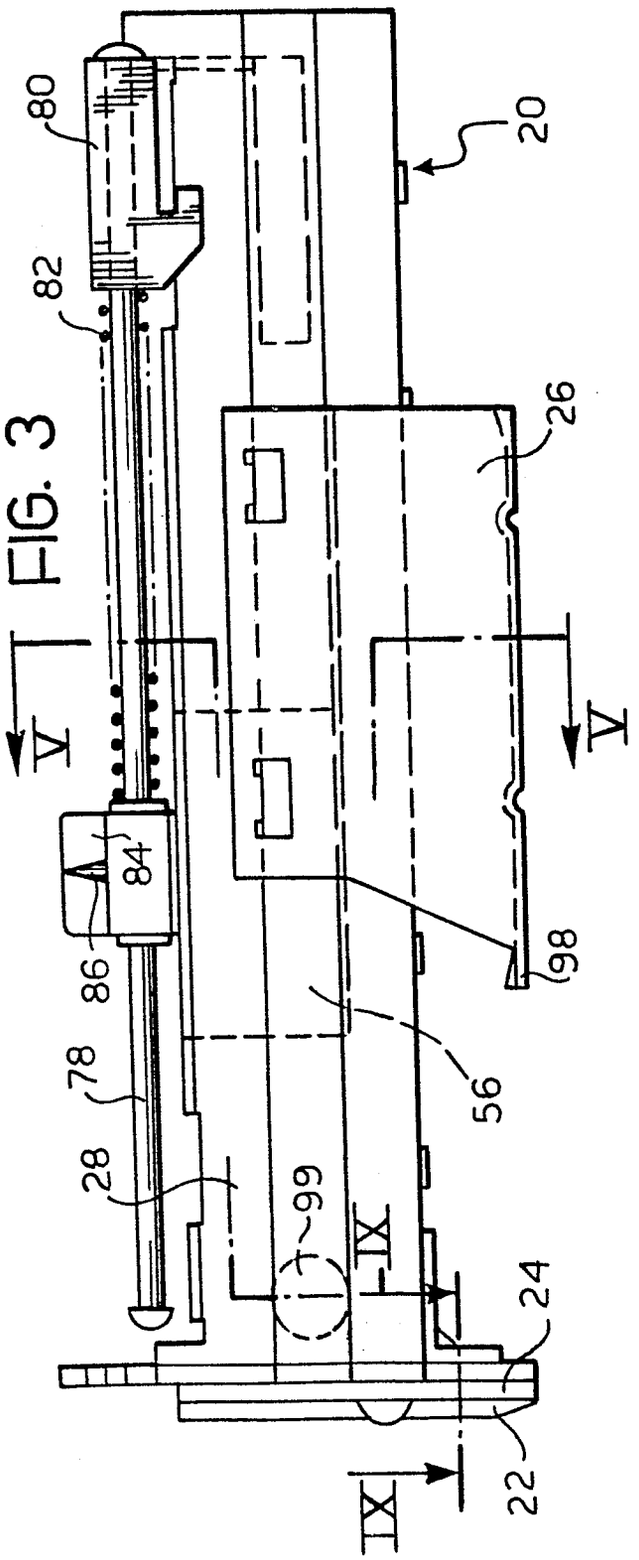
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FIG. 4

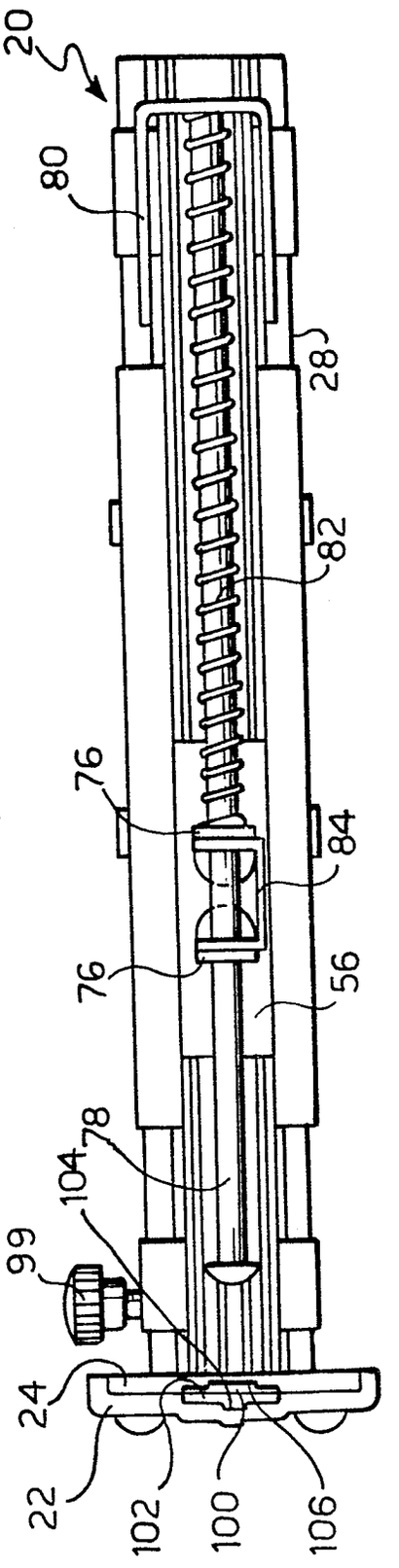
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FIG. 6

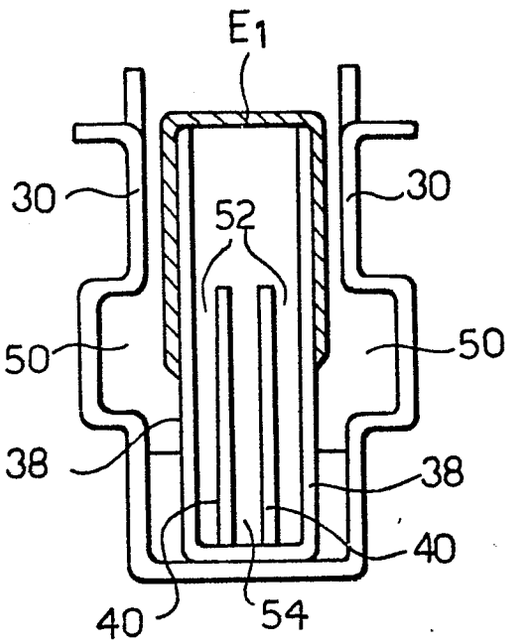

FIG. 7

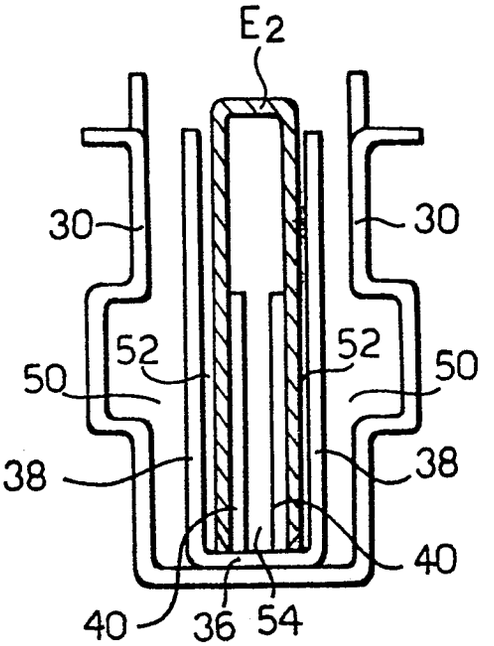

FIG. 8