(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 136 633**
B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **12.07.89**

(51) Int. Cl.^{4}: **A 41 H 37/00**

(21) Application number: **84111294.9**

(22) Date of filing: **21.09.84**

(54) Apparatus for assembling a pair of fastener elements.

(30) Priority: **04.10.83 JP 154057/83**

(43) Date of publication of application:
10.04.85 Bulletin 85/15

(45) Publication of the grant of the patent:
12.07.89 Bulletin 89/28

(84) Designated Contracting States:
BE CH DE FR IT LI NL SE

(56) References cited:
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US-A- 665 211
US-A-1 568 030
US-A-1 568 031
US-A-2 262 150
US-A-4 376 504

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EP 0 136 633 B1

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Courier Press, Leamington Spa, England.

Description

The present invention relates to an apparatus for assembling a pair of fastener elements of a garment fastener, such as a snap fastener, a button or an ornament, with or without a garment fabric disposed between the two fastener elements.

The preamble of claim 1 is based on US—A—4 376 504.

Various fastener-assembling apparatus are known in which a pair of fastener elements of a garment fastener is supported on a lower or die unit and an upper or punch units, respectively; a punch of the upper unit moves toward a die of the lower unit to join the two fastener elements together in clinched condition, with or without a garment fabric sandwiched between the two fastener elements. A common problem with such known apparatus is that the individual garment fastener element, which is relatively small, tends to be displaced particularly on the lower unit before the two fastener elements have been joined together.

A solution has been proposed in which a clamp assembly is vertically movably mounted on an upper portion of the die and includes a pair of clamp jaws to hold the corresponding fastener element in place on the upper end of the die. The clamp jaws are pivotally supported by a support block slidably mounted on the die and normally urged upwardly by a first spring; each clamp jaw is normally urged by a second spring against the die and has a slant undersurface engageable with the fastener element when the support block is in its upper position. At the lower end of the stroke of the upper unit, it depresses the support block against the bias of the first spring, causing the opposed clamp jaws to be moved angularly away from each other against the bias of the second springs to release the fastener element. As the upper unit is retracted from the lower unit after the fastener elements have been joined together as compressed between the die and punch, the support block along with the clamp jaws returns to its original or upper position under the bias of the first spring. As a result the opposed clamp jaws again hold the fastener element (having been joined with its companion fastener element) against the upper end of the die under the bias of the second springs, causing non-easy removal of the joined fastener element pair from the lower unit.

A prior European patent application EP—A—135 885 is considered as prior art by application of Article 54 (3) of European Patent Convention. In this prior application, the lower fastener element project beyond the outline of the top surface of the lower anvil, at least in cross sectional plane. However this prior application fails to specify, neither the shape of the lateral surface or surfaces by which this result is attained, nor the function of such a feature.

According to the present invention, there is provided an apparatus for assembling a pair of fastener elements of a garment fastener, comprising: a frame; a stationary die supported by said frame; a plunger reciprocably supported by said frame and having a punch movable, in response to reciprocating movement of said plunger, toward and away from said die to join the two fastener elements together; a punch clamp assembly carried by said punch for holding the corresponding one of the fastener elements to be joined together, characterized in that it further comprises a die clamp assembly carried by said die (10) for holding the other one of the fastener elements, said die clamp assembly including (a) a support block slidably mounted on said die and movable, in response to the reciprocating movement of said plunger, between an upper position and a lower position, (b) a first spring normally urging said support block toward said upper position, (c) a pair of clamp jaws pivotally mounted on said support block and pivotally movable, in response to vertical movement of said support block, toward and away from each other for holding one of the two fastener elements on an upper end surface of said die when said punch is lowered toward said die, and (d) a pair of second springs normally urging said clamp jaws toward each other; in that said die has on its upper peripheral portion a pair of slant surfaces contiguous to said upper end surface so that a peripheral portion of said one fastener element, as the latter is placed on said upper end surface, projects from each of said slant surfaces, a distal end of each said clamp jaw being slidable upwardly on the respective slant surface to push said one fastener element on such projected peripheral portion thereof away from said die while said support block returns from said lower position to said upper position in response to retraction of said punch away from said die after the two fastener elements have been joined together as compressed between said die and punch; in that said slant surfaces are disposed in diametrically opposite relation with respect to said die; and in that each of said slant surfaces is flat throughout its entire area.

The present invention seeks to provide a fastener-assembling apparatus in which a pair of clamp jaws holds one of a pair of fastener elements in place on a die when a punch is lowered toward the die and in which the opposed clamp jaws do not hold such one fastener element against the die when the punch is retracted from the die after the two fastener elements have been joined together as compressed between the die and the punch.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

Figure 1 is a fragmentary elevational view, partly in cross section, of an apparatus embodying the present invention;

Figure 2 is an exploded perspective view of a lower or die unit of Figure 1;

Figure 3 is an enlarged plan view, with parts omitted, of an upper or punch unit of Figure 1;

Figure 4 is a cross-sectional view taken along line IV—IV of Figure 3; and

Figures 5A, 5B and 5C are views similar to Figure 1, illustrating the operation of the apparatus.

Figure 1 shows an apparatus for attaching a button A (one of a pair of fastener elements) with a tack B (the other fastener element) onto a garment fabric C (Figures 5A, 5B, 5C). The apparatus generally comprises a lower or die unit 1 and an upper or punch unit 2, both supported by a frame (not shown) in opposite relation to each other. The button A has a head A1, and a shank A2 projecting centrally therefrom, while the tack B has a head B1 and a spike B2 projecting centrally therefrom.

As shown in Figures 1 and 2, the lower unit 1 includes a base 3 fixedly supported by a frame (not shown), and a stationary die 10 having a lower end portion fitted in a first vertical bore 14 in the base 3 and non-rotatably fastened to the base 3 by means of a screw 17 (Figure 2). The screw 17, when fastened, extends through the base 3, a washer 16 and a rubber ring 15 and then threadedly extends into the lower end of the die 10. The die 10 has in its upper end surface a recess 11 for receiving the head A1 of the button A with the shank A2 directed upwardly.

The die 10 has on its upper peripheral portion a pair of diametrically opposed slant surfaces 18, 18 contiguous to the upper end of the die 10 so that a segmental portion of the button head A1 project from the respective slant surface 18 of the die 10 (for a purpose described below) when the button A is placed concentrically on the upper end of the die 10. Each of the slant surfaces 18 is flat throughout its entire area.

The lower unit 1 further comprises a first clamp assembly 12 for releasably holding the button A on the upper end of the die 10. The first clamp assembly 12 includes a support block 21 having a second vertical bore 20 and slidably mounted on the die 10. The support block 21 has a pair of opposed first and second flanges 25, 26 between which a pair of clamp jaws 22, 22 is disposed, each clamp jaw 22 having sandwiched between one first flange half 25a and one second flange half 26b and being pivotally mounted thereon by a pin 23. Each clamp jaw 22 is normally urged to pivot toward the support block 21 by means of a torsion spring 24 mounted around the pin 23.

Each clamp jaw 22 is of a generally inverted L-shape having a base portion 30 extending along a side surface of the support block 21, a distal end portion 29 lying over the top surface of the support block 21. The distal end portion 29 of each clamp jaw 22 has a slant undersurface 31 engageable with the first head A1 of the button A when the latter is held on the die 10.

A compression spring 13 extends around the die 10 and is acting between the base 3 and the support block 21 to normally urge the support block 21 upwardly. The upward movement of the support block 21 is restricted by a stop 28 extending through a horizontal hole 27 in the longitudinal groove 19 in the peripheral surface of the die 10.

As shown in Figures 1, 3 and 4, the upper unit 2 includes a support 4 integral with the non-illustrated frame and having a third vertical bore 45, and a plunger 5 of circular cross section reciprocable within the third vertical bore 45 in the support 4. The plunger 5 is operatively connected at its upper end to a suitable drive means, such as an electric motor or a fluid-pressure actuator, for vertical reciprocating movements toward and away from the lower unit 1. At its lower end, the plunger 5 has an integral head 5a of circular cross section extending coaxially with the plunger 5, the diameter of the head 5a being smaller than the diameter of the plunger 5.

An upper holder 40 has a cylindrical portion 46 vertically movably received in the third vertical bore 45 of the support 4, and a cubic portion 47 disposed adjacent to the lower end of the support 4 and integral with the cylindrical portion 46. A punch 6 is secured to the plunger head 5a by means of a horizontal pin 7 extending through the punch 6, the plunger head 5a and a bush 5b and having opposite ends slidably received in a pair of longitudinal slots (not shown) in the cylindrical portion 46. A lower holder 41 is attached to the underside of the cubic portion 47 of the upper holder 40 by means of screws (not shown), and has a fourth vertical bore 49 axially alined with the third vertical bore 48 in the upper holder 40, there being defined between the upper and lower holders 40, 41 a pair of opposed horizontal guide through-holes 50, 50 each communicating at its inner end with the third and fourth vertical bores 48, 49. Also defined between the upper and lower holders 40, 41 is an opening 60 of generally T-shaped cross section extending perpendicularly to the guide through-holes 50, 50 and communicating with the third and fourth vertical bores 48, 49 through which openings the tack B to be joined with the bottom A is introduced.

The upper unit 2 further includes a second clamp assembly for holding the tack B, with the spike B2 directed downwardly, at the joint of the upper and lower holders 40, 41. The second clamp assembly comprises a pair of cooperative clamping fingers 42, 42 slidably received in the respective guide through-holes 50, 50, a pair of springs 43, 43 normally urging the clamping fingers 42, 42 inwardly toward each other to clamp the tack B, and a push member 44 disposed opposite to the openings 60, and slidable perpendicularly to the clamping fingers 42, 42 to push the latter outwardly away from each other and, at the same time, to push the tack B out of the upper unit 2 through the opening 60.

The inner end of each clamping finger 42 has an arcuate surface of a curvature substantially equal to the curvature of a peripheral edge of the tack B, there being in and along the arcuate surface a groove 51 of an arcuate cross section for receiving a portion of the peripheral edge of the tack B.

The push member 44 is of an inverted L shape having a horizontal wall 53 and a vertical wall 54 extending downwardly from one or outer end of the horizontal wall 53. The push member 44 is slidably supported by a horizontal pin 56 mounted on the lower holder 41 and extending through the vertical wall 53 of the push member 44. A compression spring 57 (Figure 4) is mounted around the horizontal pin 56 between the lower holder 41 and the vertical wall 53 of the push member 44 to normally bias the latter outwardly (leftwardly in Figure 4). This outward movement of the push member 44 is limited by a stop ring 58. The other or inner end of the push member 44 has a pair of opposite sloping surfaces 55, 55 (Figure 3).

In operation, the button A is placed upside down in the lower unit 1 with the support block 21 in raised position in which the pair of clamp jaws 22, 22 resiliently holds the head A1 of the button A against the upper end of the stationary die 10. Meanwhile the tack A is placed in the upper unit 2 with the head B1 clamped by the pair of clamping fingers 42, 42. A garment fabric C is then placed over the top surfaces of the flanges 25, 26 of the support block 21. Upon actuation of a non-illustrated drive means, the plunger 5 starts to move downwardly toward the die 10. The upper and lower holders 40, 41 move along with the plunger 5 until the bottom surface of the lower holder 41 contacts the garment fabric C, as shown in Figure 5A.

With continued downward movement of the plunger 5, the lower holder 41 depresses the support block 21 against the bias of the spring 13, causing the opposed clamp jaws 22, 22 to be gradually moved angularly away from each other against the bias of the respective springs 24, 24 to release the button A (Figure 5B), at which time the peripheral edge of the button A slides on the slant undersurfaces 31, 31 of the clamp jaws 22, 22. During that time the punch 6 moves downwardly to push the tack B out of engagement with the opposed clamp fingers 42, 42 against the bias of the springs 43, 43 and continues to push the tack B toward the die 10 until the spike B2 of the tack B pierces the garment fabric C into the shank A2 of the button A, as shown in Figure 5B. As a result, the button A has been joined with the tack B and has thus been attached to the garment fabric C.

Upon completion of attachment of the button A, the plunger 5 is actuated to retract, along with the punch 6 and the upper and lower holders 40, 41 and the clamp fingers 42, 42, from the lower unit 1, allowing the support block 21 to return to its original or upper position under the bias of the spring 13. During this returning of the support block 21, the distal end of each clamp jaw 22 is urged against the respective slant surface 18 of the die 10 and slides upwardly on that slant surface 18. Since a segmental portion of the button head A1 projects from the respective slant surface 18 of the die 10, the distal end of each clamp jaw 22 finally hits the projected segmental portion of the button head A1 to push the joined button A and tack B away from the die 10, as shown in Figure 5C.

Because the opposed clamp jaws 22, 22 do not hold the button A against the die 10 after the attachment of the button A onto the garment fabric C has been completed, it is possible to remove the joined button A and tack C from the lower unit 1 easily without any damage to the button A, the tack B and the garment fabric C.

Claim

An apparatus for assembling a pair of fastener elements (A, B) of a garment fastener, comprising: a frame; a stationary die (10) supported by said frame; a plunger (5) reciprocably supported by said frame and having a punch (6) movable, in response to reciprocating movement of said plunger (5), toward and away from said die (10) to join the two fastener elements (A, B) together; a punch clamp assembly carried by said punch (6) for holding the corresponding one of the fastener elements (A, B) to be joined together, characterized in that it further comprises a die clamp assembly carried by said die (10) for holding the other one of the fastener elements, said die clamp assembly (12) including (a) a support block (21) slidably mounted on said die (10) and movable, in response to the reciprocating movement of said plunger (5), between an upper position and a lower position, (b) a first spring (13) normally urging said support block (21) toward said upper position, (c) a pair of clamp jaws (22, 22) pivotally mounted on said support block (21) and pivotally movable, in response to vertical movement of said support block (21), toward and away from each other for holding one of the two fastener elements (A) on an upper end surface of said die (10) when said punch (6) is lowered toward said die (10), and (d) a pair of second springs (23, 23) normally urging said clamp jaws (22, 22) to pivot toward each other; in that said die (10) has on its upper peripheral portion a pair of slant surfaces (18, 18) contiguous to said upper end surface so that a peripheral portion of said one fastener element (A), as the latter is placed on said upper end surface, projects from each of said slant surfaces (18), a distal end of each said clamp jaw (22) being slidable upwardly on the respective slant surface (18) to push said one fastener element (A) on such projected peripheral portion thereof away from said die (10) while said support block (21) returns from said lower position to said upper position in response to retraction of said punch (6) away from said die after the two fastener elements (A, B) have been joined together as compressed between said die (10) and punch (6); in that said slant surfaces (18, 18) are disposed in diametrically opposite relation with respect to said die (10); and in that each of said slant surfaces (18) is flat throughout its entire area.

Patentanspruch

Vorrichtung zum Zusammenfügen von zwei Verschlußelementen (A, B) eines Kleiderverschlusses, umfassend: einen Rahmen; ein von dem Rahmen abgestütztes ortsfestes Gesenk (10); einen durch den Rahmen hin- und herbewegbar abgestützten Stößel (5) mit einem Stempel (6), der entsprechend der hin- und hergehenden Bewegung des Stößels (5) zu dem Gesenk (10) hin und von diesem weg bewegbar ist, um die beiden Verschlußelemente (A, B) zusammenzufügen; eine Stempelklemmanordnung, die von dem Stempel (6) getragen ist, um eines der miteinander zu verbindenden Verschlußelemente (A, B) festzuhalten, gekennzeichnet durch eine Gesenkklemmanordnung, die von dem Gesenk (10) getragen wird, um das andere Verschlußelement festzuhalten, wobei die Gesenkklemmanordnung (12) aufweist: (a) einen Stützblock (21), der auf dem Gesenk (10) beweglich gelagert und entsprechend der hin- und hergehenden Bewegung des Stempels (5) zwischen einer oberen und einer unteren Stellung bewegbar ist, (b) eine erste Feder (13), die den Stützblock (21) normalerweise in die obere Stellung belastet, (c) zwei Klemmbacken (22, 22), die an dem Stützblock (21) schwenkbar gelagert und entsprechend der vertikalen Bewegung des Stützblocks (21) zueinander hin und voneinander weg verschwenkbar sind, um eines der beiden Verschlußelemente (A) auf einer oberen Endfläche des Gesenks (10) festzuhalten, wenn der Stempel (6) zu dem Gesenk (10) hin abgesenkt wird, und (d) zwei zweite Federn (23, 23), die die Klemmbacken normalerweise zueinander hin verschwenken; wobei das Gesenk (10) an seinem oberen Umfangsbereich zwei geneigte Flächen (18, 18) hat, die an die besagte obere Endfläche angrenzen, so daß ein Umfangsbereich des auf dieser oberen Endfläche angeordneten einen Verschlußelementes (A) über jede dieser geneigten Flächen (18) vorsteht, wobei ein abliegendes Ende einer jeden Gleitbacke (22) an der zugeordneten geneigten Fläche (18) nach oben verschiebbar ist, um dieses eine Verschlußelement (A) an seinem vorspringenden Umfangsbereich von dem Gesenk (10) abzuheben, während der Stützblock (21) von seiner unteren Stellung in seine obere Stellung zurückkehrt, wenn der Stempel (6) von dem Gesenk zurückgezogen wird, nachdem die beiden zwischen dem Gesenk (10) und dem Stempel (6) zusammengedrückten Verschlußelemente (A, B) zusammengefügt wurden; wobei die geneigten Flächen (18, 18) in Bezug auf das Gesenk (10) einander diametral gegenüberliegen; und wobei jede dieser geneigten Flächen (18) in ihrem gesamten Bereich eben ist.

Revendication

Appareil pour assembler deux éléments de fermeture (A, B) d'un moyen de fermeture pour vêtements, comprenant: un bâti; une matrice fixe (10) supportée par ledit bâti; un piston (5) supporté par ledit bâti pour pouvoir effectuer un mouvement alternatif et ayant un poinçon (6) se rapprochant et s'éloignant de ladite matrice (10), en réponse au mouvement alternatif dudit piston, pour unir l'un à l'autre les deux éléments de fermeture (A, B); un agencement de serrage de poinçon porté par ledit poinçon (6) pour tenir celui des éléments de fermeture (A, B) à unir l'un à l'autre qui lui correspond, caractérisé en ce qu'il comprend en outre un agencement de serrage de matrice porté par ladite matrice (10) pour tenir l'autre élément de fermeture, ledit agencement (12) de serrage de matrice comportant (a) un bloc de support (21) monté de manière coulissante sur ladite matrice (10) et mobile, en réponse au mouvement alternatif dudit piston (5), entre une position haute et une position basse, (b) un premier ressort poussant perpendiculairement ledit bloc de support (21) vers ladite position haute, (c) une paire de mors de serrage (22, 22) articulés sur ledit bloc de support (21) et se rapprochant et s'éloignant l'un de l'autre par pivotement, en réponse au déplacement vertical dudit bloc de support, afin de tenir l'un des deux éléments de fermeture (A) sur une surface d'extrémité supérieure de ladite matrice (10) quand le poinçon (5) est abaissé vers la matrice (10), et (d) une paire de seconds ressorts (23, 23) poussant perpendiculairement lesdits mors de serrage (22, 22) pour qu'ils pivotent l'un vers l'autre; en ce que ladite matrice (10) a sur sa partie périphérique supérieure deux surfaces obliques (18, 18) contiguës à ladite surface d'extrémité supérieure de telle sorte qu'une partie périphérique dudit premier élément de fermeture (A), lorsque ce dernier est placé sur ladite surface d'extrémité supérieure, dépasse de chacune desdites surfaces obliques (18), une extrémité distale de chacun desdits mors de serrage (22) pouvant coulisser vers le haut sur la surface oblique (18) correspondante pour pousser ledit premier élément de fermeture (A) sur ladite partie périphérique saillante de celui-ci afin de l'éloigner de ladite matrice (10), tandis que ledit bloc de support (21) revient de ladite position basse à ladite position haute en réponse au recul du poinçon (6) par rapport à la matrice après que les deux éléments de fermeture (A, B) ont été unis l'un à l'autre par compression entre la matrice (10) et le poinçon (6); en ce que lesdites surfaces obliques (18, 18) sont disposées de manière diamétralement opposée par rapport à la matrice (10); et en ce que chacune desdites surfaces obliques (18) est plane sur toute sa superficie.

FIG. 1

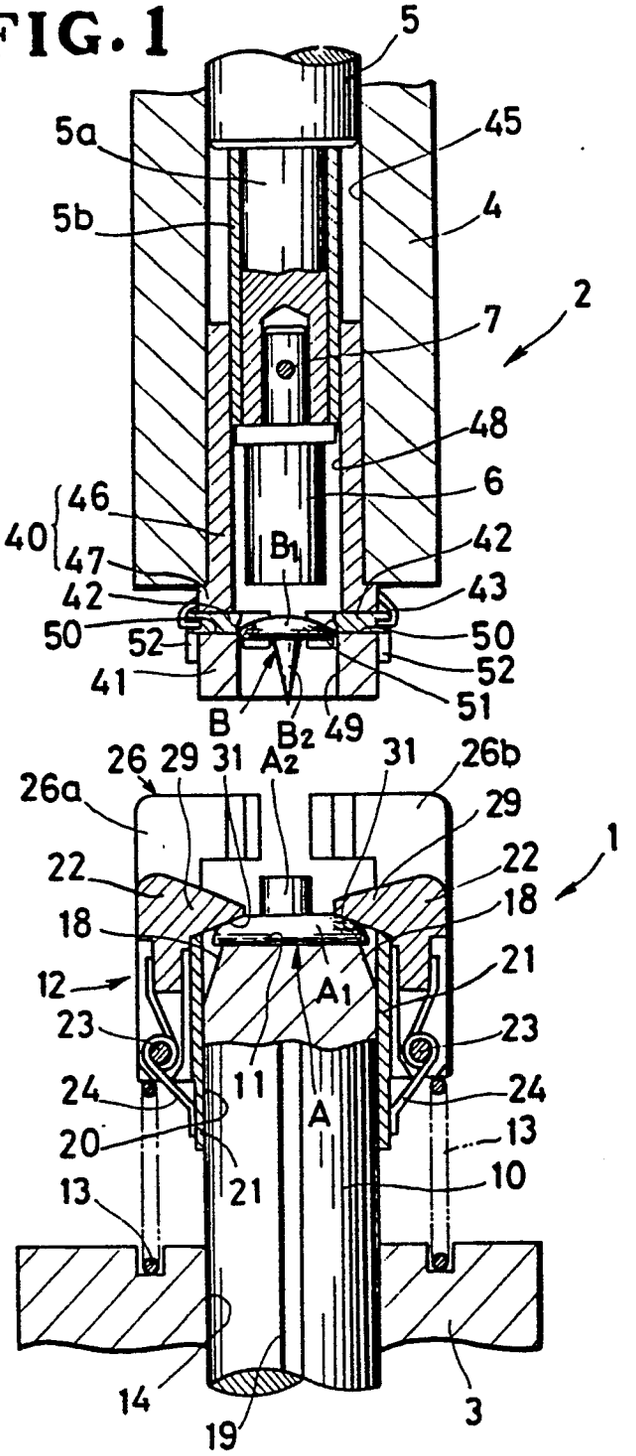
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FIG. 2

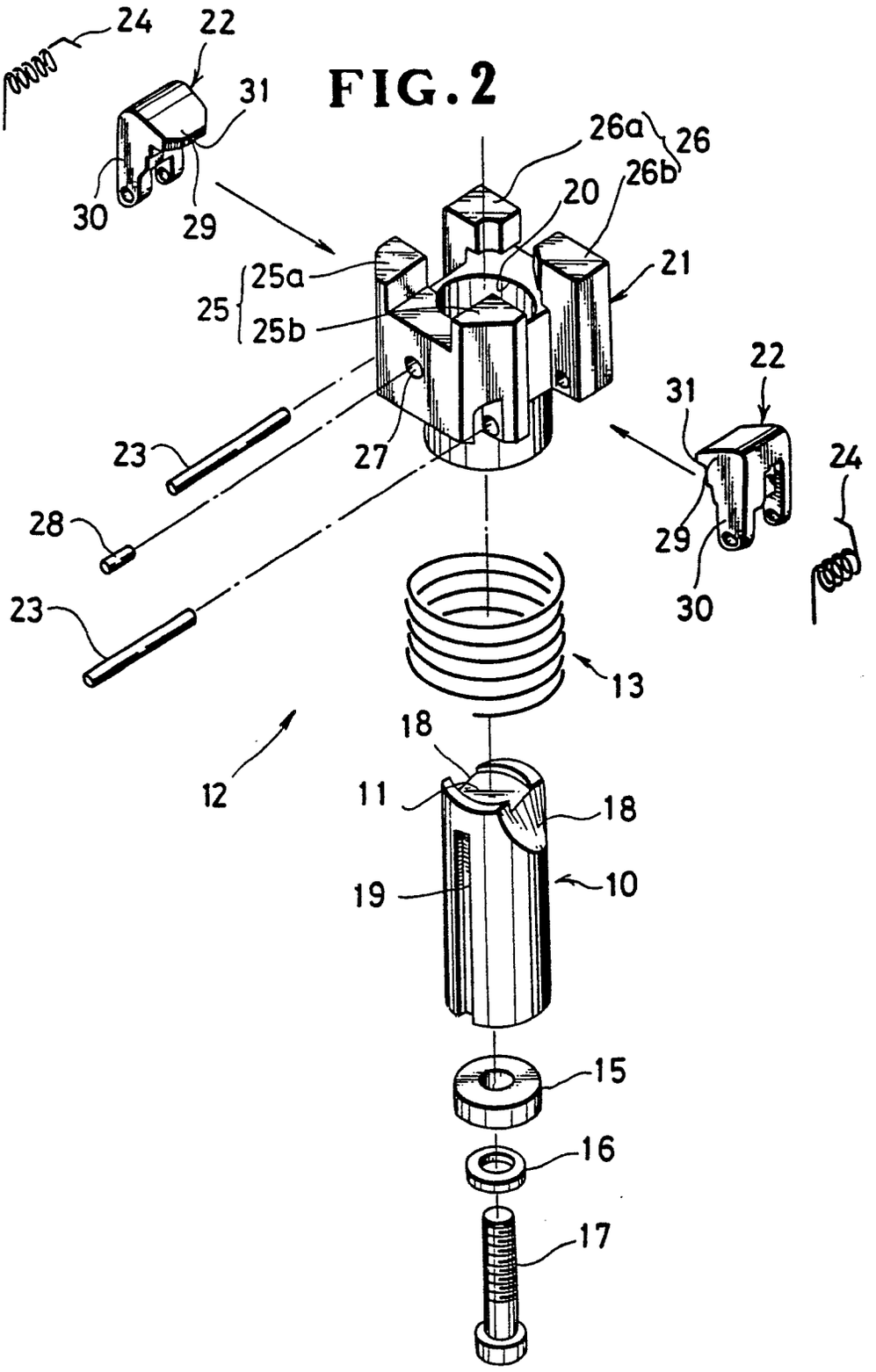
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FIG. 3

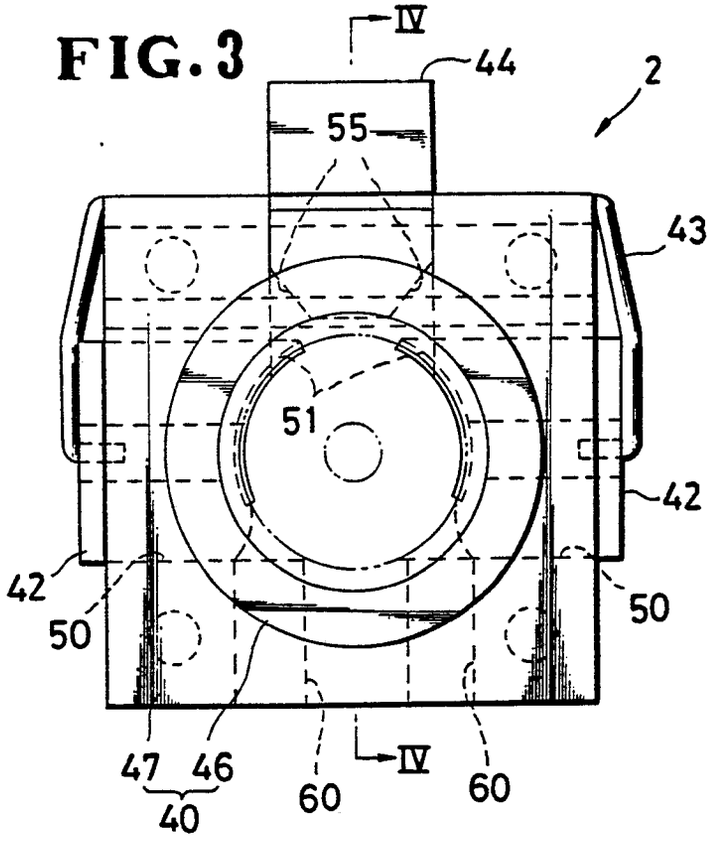
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FIG. 4

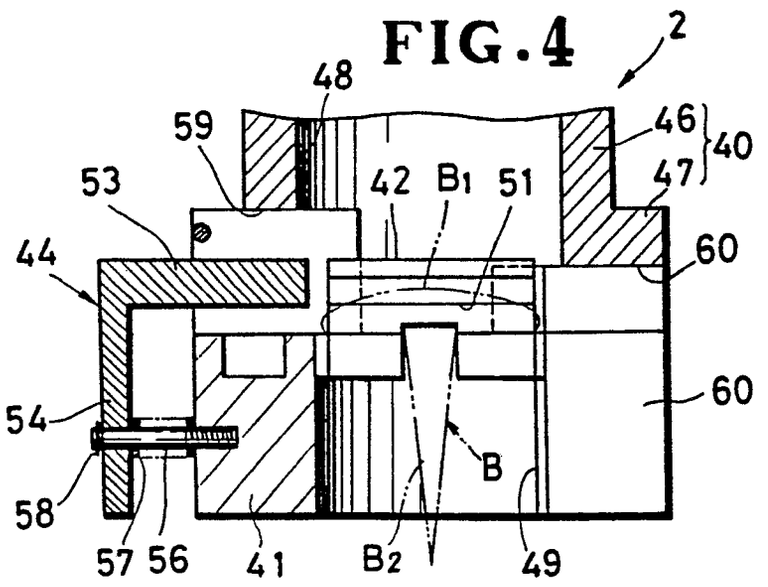
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FIG. 5A

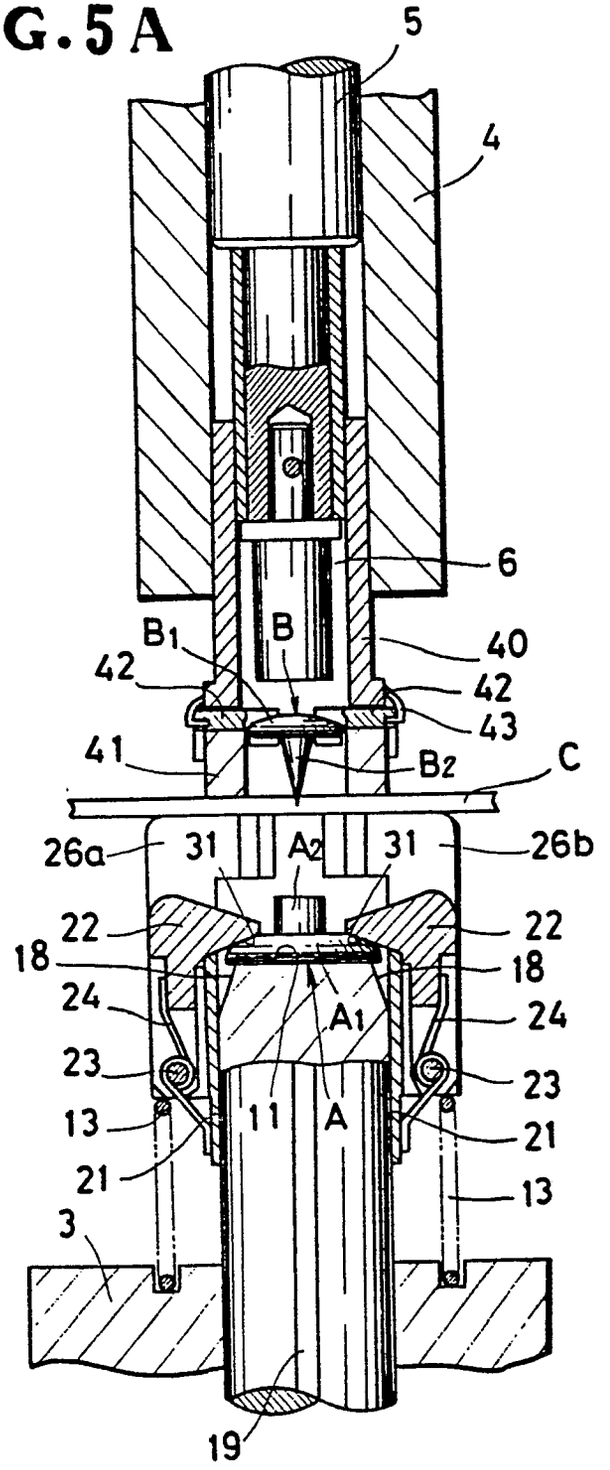
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FIG. 5B

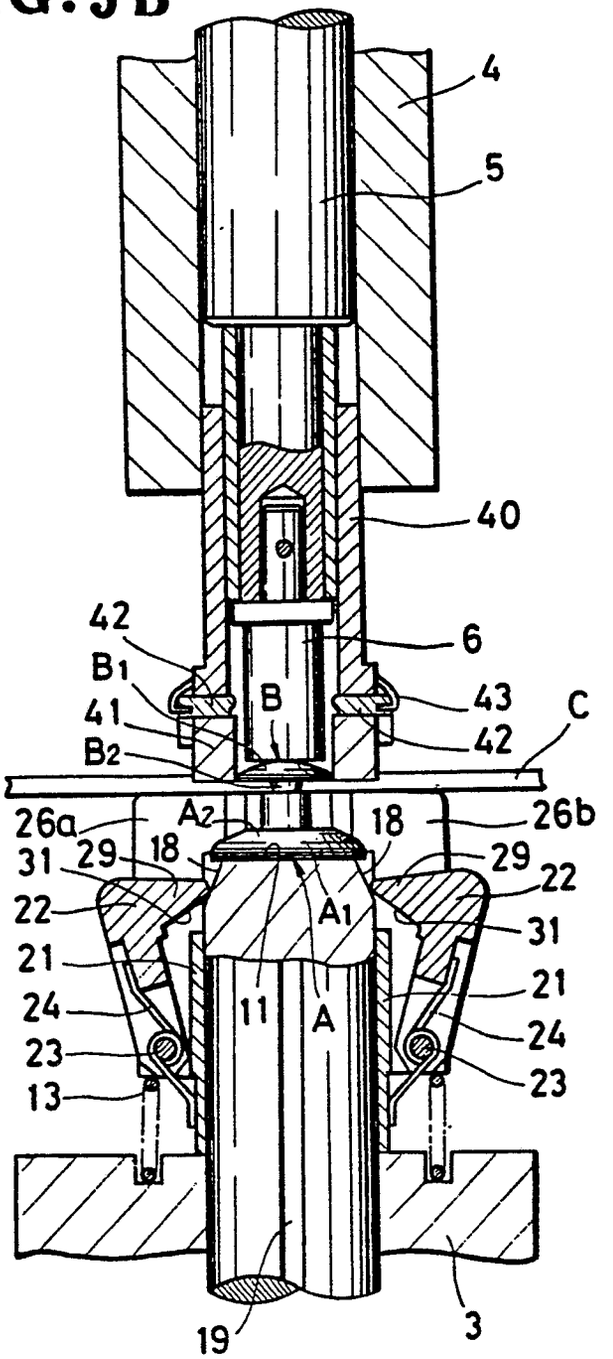
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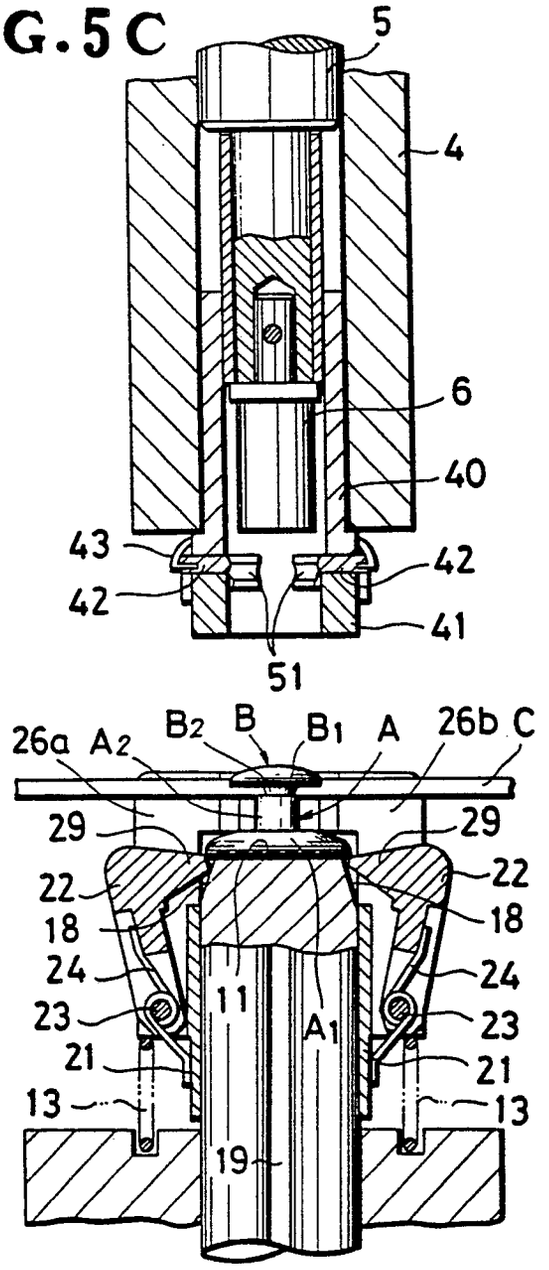
FIG.5C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