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(54) CAULKING GUN

(57) A caulking gun includes a housing unit (2), a pushrod unit (4), a propelling unit (5), and a operating unit (6). The housing unit (2) includes an inner housing component (21) formed in one piece. The pushrod unit (4) includes a main pushrod (41) passing through the inner housing component (21) along an axis (L). The propelling unit (5) includes a driving component (51) fitted around the main pushrod (41) and received in the inner housing component (21), and a detent piece (52) sleeved on the main pushrod (41) behind the inner housing component (21). The operating unit (6) extends into the inner housing component (21) and is operable to either actuate the driving component (51) to propel the main pushrod (41) forward along the axis (L) or to swing the detent piece (52) to allow rearward pulling of the main pushrod (41).

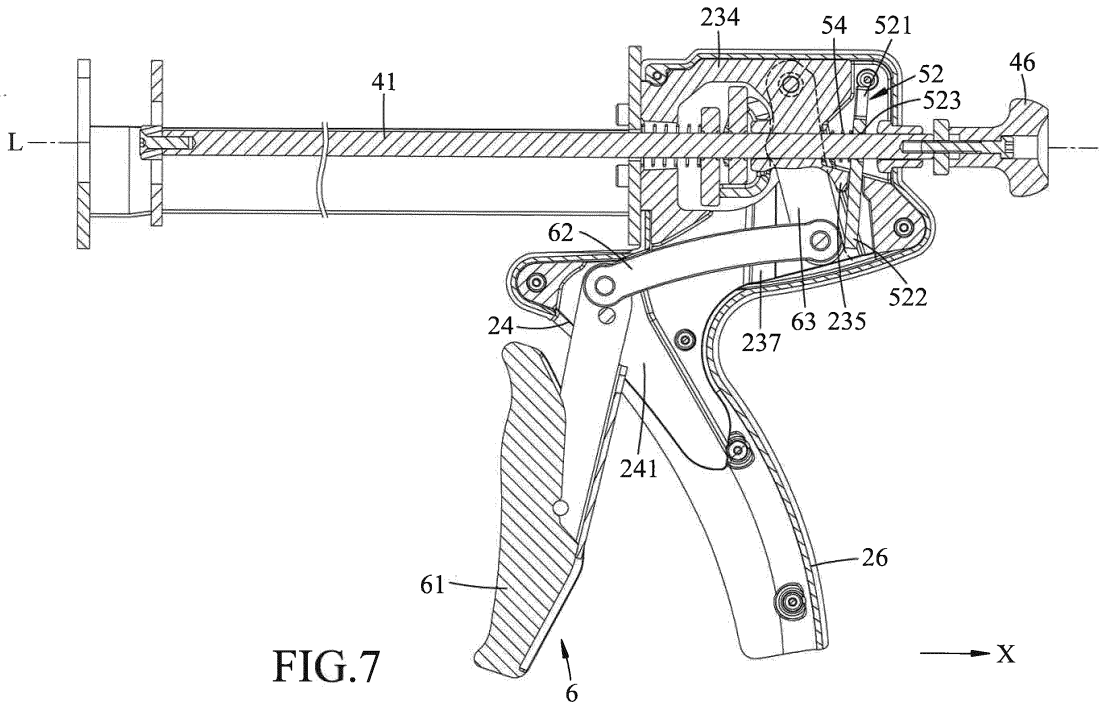

FIG.7

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Description

[0001] The disclosure relates to a caulking gun, more particularly to a caulking gun with enclosed inner housing component.

[0002] Referring to Figures 1 and 2, a conventional caulking gun 1 disclosed in Taiwanese Patent No. 1625168 includes a caulking cartridge holder 11, a gun body 12 disposed to the rear of the caulking cartridge holder 11, a propelling structure 13 disposed in the gun body 12, a handle 14 extending downward from the gun body 12, a trigger component 15 located adjacent to the handle 14, extending through a lower end of the gun body 12 and pivotally mounted to the propelling structure 13, and a pushrod 16 passing through the gun body 12 and the caulking cartridge holder 11. The gun body 12 has a main housing 121 and a side plate 122 shielding one opened side of the main housing 121. The main housing 121 has an assembling groove 123 accommodating the propelling structure 13, and a retention portion 124 projecting into the assembling groove 123. The propelling structure 13 includes a compression spring 131 fitted around the pushrod 16 and resiliently biasing the caulking cartridge holder 11, a pushing component 132 fitted around the pushrod 16 and biased by the compression spring 131 against the retention section 124, an eccentric cam 133 pivotally connected to the trigger component 15 and abutting against the rear side of the pushing component 132, a detent piece 134 fitted around the pushrod 16 and having a bottom end that abuts against the eccentric cam 133, and a restoring spring 135 fitted around the pushrod 16 and resiliently loaded between and abutting against the retention portion 124 and the top end of the detent piece 134.

[0003] This conventional caulking gun 1 is inconvenient to assemble due to the complexity of the connections between the components of the propelling structure 13. In addition, even though the propelling structure 13 is positioned in the assembly groove 123 and is protected by the gun body 12, the cover plate 122 may easily separate from the main housing 121 when the caulking gun 1 falls. At this time, the propelling structure 13 will be exposed and its components may fall out.

[0004] Therefore, the object of the disclosure is to provide a caulking gun that is easy to assemble and that has a sturdy structure.

[0005] According to the disclosure, a caulking gun includes a housing unit, a pushrod unit, a propelling unit, and an operating unit.

[0006] The housing unit includes an inner housing component that is formed in one piece. The inner housing component has a main body that has a front wall, a rear wall spaced apart from the front wall in a front-rear direction, and a bottom wall connected to bottom ends of the front wall and the rear wall. The front wall, the rear wall and the bottom wall cooperatively define an accommodating cavity. The bottom wall has a bottom hole that is in spatial connection with the accommodating cavity.

[0007] The pushrod unit includes a main pushrod that passes through the front wall and the rear wall along an axis extending in the front-rear direction.

[0008] The propelling unit includes a driving component, a first resilient component, a detent piece, and a second resilient component. The driving component is fitted around the main pushrod and is received in the accommodating cavity. The first resilient component is sleeved on the main pushrod and resiliently biases the driving component. The detent piece is sleeved on the main pushrod and is disposed behind the rear wall. The detent piece has a top end, a bottom end, and a through-bore that is located between the top end and the bottom end and that extends along the axis. The main pushrod slidably passes through the through-bore. The second resilient component is sleeved on the main pushrod and has opposite ends resiliently and respectively abutting against the rear wall and a portion of the detent piece which is around the through-bore. Another portion of the detent piece which is under the through-bore is restrained forward and rearward, such that the top end of the detent piece is biased by the second resilient component to deflect rearward to thereby frictionally restrain the main pushrod from moving rearward.

[0009] The operating unit extends through the bottom hole, and is connected to the inner housing component. The operating unit is operable to actuate the driving component to propel the main pushrod forward along the axis, and is further operable to swing rearward the bottom end of the detent piece to make the detent piece being perpendicular to the main pushrod so as to allow rearward movement of the main pushrod.

[0010] Other features and advantages of the disclosure will become apparent in the following detailed description of the embodiment with reference to the accompanying drawings, of which:

Figure 1 is a partly exploded perspective view of a conventional caulking gun disclosed in Taiwanese Patent No. 1625168;

Figure 2 is a fragmentary cutaway perspective view of the conventional caulking gun disclosed in Taiwanese Patent No. 1625168;

Figure 3 is a perspective view of an embodiment of a caulking gun according to the disclosure;

Figure 4 is an exploded perspective view of the embodiment;

Figure 5 is a perspective view of an inner housing component of the embodiment;

Figure 6 is a cross-sectional view of the inner housing component of the embodiment;

Figure 7 is a cross-sectional view of the embodiment illustrating a trigger component in an initial position;

Figure 8 is a cross-sectional view of the embodiment illustrating the trigger component in a depressed position; and

Figure 9 is a cross-sectional view of the embodiment illustrating the trigger component in a forward de-

flected position.

[0011] As shown in Figures 3 and 4, the embodiment of a caulking gun according to the present disclosure is configured to dispense caulk from a caulk cartridge (not shown) . The caulking gun includes a housing unit 2, a cartridge holder 3, a pushrod unit 4, a propelling unit 5, and an operating unit 6.

[0012] Referring to Figures 3 to 6, the housing unit 2 includes an inner housing component 21 and an outer housing component 22 surrounding the inner housing component 21. The inner housing component 21 is formed in one piece, and has a main body 23 and an extension block 24 extending downward from the main body 23. The main body 23 has a front wall 231, a rear wall 232 spaced apart from the front wall 231 in a front-rear direction (X), a bottom wall 233 connected to bottom ends of the front wall 231 and the rear wall 232, a top wall 234 connected to top ends of the front wall 231 and the rear wall 232, and a retention wall 235 extending rearward from the rear wall 232. The front wall 231, the rear wall 232, the bottom wall 233, and the top wall 234 cooperatively define an accommodating cavity 236. The bottom wall 233 has a bottom hole 237 in spatial connection with the accommodating cavity 236. The retention wall 235 is formed with a flared slot 238 extending therethrough and spatially connected to the bottom hole 237. The extension block 24 extends downward from the bottom wall 233 and defines a mounting groove 241 that is in spatial communication with the bottom hole 237 and that opens downward. The outer housing component 22 includes a cover panel 25 disposed outside the main body 23, and a handle portion 26 extending from a bottom end of the cover panel 25 and disposed outside of the extension block 24.

[0013] The cartridge holder 3 is disposed in front of and attached to the front wall 231 for holding the caulking cartridge.

[0014] The pushrod unit 4 includes a main pushrod 41 movably passing through the front wall 231, the rear wall 232, the cover panel 25, and the cartridge holder 3 along an axis (L) which extends in the front-rear direction (X), two auxiliary pushrods 42 extending parallel to and disposed respectively on opposite sides of the main pushrod 41 and said cover panel 25, being co-movable with the main pushrod 41, and movably extending through the cartridge holder 3, a push plate 43 connected to front ends of the auxiliary pushrods 42, a linking plate 44 connected to rear ends of the main pushrod 41 and the auxiliary pushrods 42, a mounting collar 45 extending through a rear end of the cover panel 25, and a pull button 46 screwed with the main pushrod 41. The main pushrod 41 passes through the mounting collar 45. The linking plate 44 is connected between the rear end of the main pushrod 41 and the pull bottom 46.

[0015] The propelling unit 5 includes a driving component 51 that is received in the accommodating cavity 236 and that is fitted around the main pushrod 41, a first resilient component 53 that is sleeved on the main pushrod 41, that passes through the front wall 231 and that has opposite ends resiliently and respectively abutting against the driving component 51 and the cartridge holder 3, a detent piece 52 that is sleeved on the main pushrod 41, that is disposed behind the rear wall 232 and that extends through the flared slot 238, and a second resilient component 54 that is sleeved on the main pushrod 41 and that has opposite ends resiliently and respectively abutting against the rear wall 232 and the detent piece 52. The detent piece 52 is generally rectangular, and has a top end 521, a bottom end 522, and a through-bore 523 located at an upper-middle part of the detent piece 52 between the top end 521 and the bottom end 522 and extending along the axis (L) for the main pushrod 41 to pass through. The second resilient component 54 abuts against a portion of the detent piece 52 which is around the through-bore 523. Under the biasing of the second resilient component 54, another portion of the detent piece 52 which is under the through-bore 523 is restrained by the retention wall 235 to move forward and rearward, such that the top end 521 is deflected rearward to thereby frictionally restrain the main pushrod 41 from moving rearward. In this embodiment, the first resilient component 53 and the second resilient component 54 are both compression springs and may also be flat metal springs in other embodiments.

[0016] Referring to Figure 4 and Figure 7, the operating unit 6 includes a trigger component 61 extending into the mounting groove 241 and pivotally connected to the extension block 24, a first link bar 62 pivotally connected to the trigger component 61 and extending from the mounting groove 241 to the bottom hole 237, and a second link bar 63. The second link bar 63 has a first end segment that is pivotally connected to one end of the first link bar 62 opposite to the trigger component 61, and a second end segment opposite to the first end segment, extending through the bottom hole 237, and pivotally connected to the top wall 234. The second end segment of the second link bar 63 pushes against the bottom end 522 of the detent piece 52 during operation of the operating unit 6 to swing rearward the bottom end 522 of the detent piece 52. With this configuration, the trigger component 61 can be operated to move relative to the handle portion 26 among an initial position, a depressed position, and a forward deflected position.

[0017] Referring to Figure 7, when the trigger component 61 is in the initial position, the first end segment of the second link bar 63 contacts without pressing the bottom end 522 of the detent piece 52. The second resilient component 54, situated surrounding the through-bore 523, urges the top end 521 of the detent piece 52 to deflect rearward and urges the bottom end 522 to deflect forward. As a result, the main pushrod 41 is frictionally restrained by the obliquely-engaging detent piece 52.

[0018] Referring to Figure 8, when the trigger component 61 is depressed toward the handle portion 26 from the initial position to the depressed position, the move-

ment of the trigger component 61 is transmitted to the second link bar 63 and makes the first end segment of the second link bar 63 swing forward about the pivotal connection to the top wall 234, thus pushing the driving component 51 to propel the main pushrod 41 forward for a particular displacement, as well as compressing the first resilient component 53. After which, the elastic restoring force of the compressed first resilient component 53 will return the trigger component 61 from the depressed position to the initial position. It is noted that, since the main pushrod 41 is frictionally bound with the detent piece 52, when the main pushrod 41 is propelled forward, the bottom end 522 of the detent piece 52 cannot move with the main pushrod 41 due to restriction of the retention wall 235, and only the top end 521 of the detent piece 52 can be slightly deflected forward and compresses the second resilient component 54 so that the detent piece 52 becomes perpendicular to the main pushrod 41 to allow the main pushrod 41 to move rearward through the through-bore 523. Then, the elastic restoring force of the second resilient component 54 will press the detent piece 52 at an area around the through-bore 523 to deflect the top end 521 rearward, with the bottom end 522 deflected forward to once again frictionally restrain the sliding of main pushrod 41. Through operating the trigger component 61 to change between the initial position and the depressed position, the main pushrod 41 can propel forward continuously in conjunction with the auxiliary pushrods 42 and the push plate 43 to push the caulking cartridge for dispensing until the linking plate 44 is stopped against the rear end of the mounting collar 45, ending one stroke of propelling of the main pushrod 41.

[0019] Referring to Figure 9, when the trigger component 61 is moved away from the handle portion 26 and changed from the initial position to the forward deflected position, the movement of the trigger component 61 is transmitted to the second link bar 63 and makes it swings rearward about the pivotal connection to the top wall 234; thus the first end segment pushes the bottom end 522 of the detent piece 52 to swing rearward the bottom end 522 of the detent piece 52 and make it vertical to the main pushrod 41, allowing the main pushrod 41 to slide on through the through-bore 523, such that the linking plate 44, the main pushrod 41, the auxiliary pushrod 42, and the push plate 43 can be moved rearward by pulling the pull button 46. After the main pushrod 41 is pulled to the desired position, the trigger component 61 can return from the forward deflect position to the initial position because of the elastic restoration of the first resilient component 53 and the second resilient component 54. The detent piece 52 will then frictionally restrain the main pushrod 41 again.

[0020] During assembling the caulking gun of the present disclosure, the trigger component 61, the first link bar 62, and the second link bar 63 of the operating unit 6 are first connected and assembled in sequence. The assembled operating unit 6 is inserted from the bottom to top into the inner housing component 21 through the mounting groove 241 and the bottom hole 237, with the second end segment of the second link bar 63 installed on the top wall 234, and with the trigger component 61 installed on the extension block 24, thus completing the assembling of the operating unit 6. Subsequently, the cartridge holder 3 is installed on the front side of the front wall 231, the first resilient component 53 and the driving component 51 are installed in the accommodating cavity 236, and the second resilient component 54 is installed on the rear side of the rear wall 232. Afterwards, the detent piece 52 is inserted into the flared slot 238, and the main pushrod 41 is extended through, in sequence, the cartridge holder 3, the front wall 231, the first resilient component 53, the driving component 51, the rear wall 232, the second resilient component 54, the through-bore 523, and the mounting collar 45. Next, the outer housing component 22 of the housing unit 2 is installed outside the inner housing component 21 to assemble the housing unit 2 and the propelling unit 5. Finally, the linking plate 44 and the pull button 46 are screwed to the rear end of the main pushrod 41, and then the auxiliary pushrods 42 are placed respectively on opposite sides of the cartridge holder 3 and the cover panel 25, and are secured to the linking plate 44 to complete the installation of the pushrod unit 4.

[0021] In 'summary, the caulking gun according to the disclosure has a one-piece inner housing component 21 that improves overall structural strength. When the caulking gun is accidentally dropped on the floor and the outer housing component 22 is damaged, the inner housing component 21 would be unaffected. Moreover, the inner housing component 21 is formed with the mounting groove 241 and the bottom hole 237, therefore, the operating unit 6 can be installed in the inner housing component 21 through the mounting groove 241 and the bottom hole 237 from bottom to top, and then the propelling unit 5, the cartridge holder 3, the housing unit 2, and the pushrod unit 4 are installed in sequence.

[0022] In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiment. It will be apparent, however, to one skilled in the art, that one or more other embodiments may be practiced without some of these specific details. It should also be appreciated that reference throughout this specification to "one embodiment," "an embodiment," an embodiment with an indication of an ordinal number and so forth means that a particular feature, structure, or characteristic may be included in the practice of the disclosure. It should be further appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects, and that one or more features or specific details from one embodiment may be practiced together with one or more features or specific details from another embodiment, where appropriate, in the practice of the disclosure.

Claims

1. A caulking gun **characterized by**:

a housing unit (2) including an inner housing component (21) that is formed in one piece, said inner housing component (21) having a main body (23) that has a front wall (231), a rear wall (232) spaced apart from said front wall (231) in a front-rear direction (X), and a bottom wall (233) connected to bottom ends of said front wall (231) and said rear wall (232), said front wall (231), said rear wall (232) and said bottom wall (233) cooperatively defining an accommodating cavity (236), said bottom wall (233) having a bottom hole (237) that is in spatial connection with said accommodating cavity (236);
a pushrod unit (4) including a main pushrod (41) that passes through said front wall (231) and said rear wall (232) along an axis (L) extending in the front-rear direction (X);
a propelling unit (5) including

a driving component (51) that is fitted around said main pushrod (41) and that is received in said accommodating cavity (236),
a first resilient component (53) that is sleeved on said main pushrod (41) and that resiliently biases said driving component (51),
a detent piece (52) that is sleeved on said main pushrod (41) and that is disposed behind said rear wall (232), said detent piece (52) having a top end (521), a bottom end (522), and a through-bore (523) that is located between said top end (521) and said bottom end (522) and that extends along said axis (L), said main pushrod (41) slidably passing through said through-bore (523), and
a second resilient component (54) that is sleeved on said main pushrod (41) and that has opposite ends resiliently and respectively abutting against said rear wall (232) and a portion of said detent piece (52) which is around said through-bore (523), another portion of said detent piece (52) which is under said through-bore (523) being restrained forward and rearward, such that said top end (521) of said detent piece (52) is biased by said second resilient component (54) to deflect rearward to thereby frictionally restrain said main pushrod (41) from moving rearward; and

an operating unit (6) extending through said bottom hole (237), and connected to said inner housing component (21), said operating unit (6) being operable to actuate said driving component (51) to propel said main pushrod (41) forward along said axis (L), and being further operable to swing rearward said bottom end (522) of said detent piece (52) to make said detent piece (52) be perpendicular to said main pushrod (41) so as to allow rearward movement of said main pushrod (41).

2. The caulking gun as claimed in Claim 1, **characterized in that**:

said inner housing component (21) further has an extension block (24) extending downward from said bottom wall (233) of said main body (23) and defining a mounting groove (241) that opens downward and that is in spatial communication with said bottom hole (237);
said main body (23) further has a top wall (234) connected to top ends of said front wall (231) and said rear wall (232); and
said operating unit (6) includes

a trigger component (61) extending into said mounting groove (241) and pivotally connected to said extension block (24),
a first link bar (62) pivotally connected to said trigger component (61) and extending from said mounting groove (241) to said bottom hole (237), and
a second link bar (63) having a first end segment that is pivotally connected to one end of said first link bar (62) opposite to said trigger component (61), and a second end segment that is opposite to said first end segment, that extends through said bottom hole (237), and that is pivotally connected to said top wall (234), said second end segment of said second link bar (63) pushing against said bottom end (522) of said detent piece (52) during operation of said operating unit (6) to swing rearward said bottom end (522) of said detent piece (52).

3. The caulking gun as claimed in any one of Claims 1 and 2, **characterized in that**:
said main body (23) further has a retention wall (235) extending rearward from said rear wall (232) and formed with a flared slot (238), said detent piece (52) extending through said flared slot (238), said another portion of said detent piece (52) being restrained by said retention wall (235) to move forward and rearward, such that said top end (521) of said detent piece (52) is biased by said second resilient component (54) to deflect rearward.

4. The caulking gun as claimed in any one of Claims 2

and 3, **characterized in that** said housing unit (2) further includes an outer housing component (22) surrounds said inner housing component (21), said outer housing component (22) including a cover panel (25) that is disposed outside of said main body (23) of said inner housing component (21), and a handle portion (26) that extends downward from said cover panel (25) and that is disposed outside of said extension block (24) of said inner housing component (21).

5. The caulking gun as claimed in Claim 4, **characterized in that** said pushrod unit (4) further includes:

a pull button (46) connected to a rear end of said main pushrod (41);
two auxiliary pushrods (42) extending parallel to said main pushrod (41), disposed respectively at opposite sides of said main pushrod (41) and said cover panel (25), and co-movable with said main pushrod (41); and
a push plate (43) connected to front ends of said two auxiliary pushrods (42).

6. The caulking gun as claimed in Claim 5, **characterized in that** said pushrod unit (4) further includes:

a linking plate (44) connected between said rear end of said main pushrod (41) and said pull button (46) and connected to rear ends of said auxiliary pushrods (42); and
a mounting collar (45) extending through the rear of said cover panel (25), said main pushrod (41) passing through said mounting collar (45).

7. The caulking gun as claimed in Claim 5, further **characterized by** a cartridge holder (3) disposed in front of said front wall (231), said main pushrod (41), said auxiliary pushrods (42), and said push plate (43) being slidably mounted on said cartridge holder (3), said first resilient component (53) passing through said front wall (231) and having opposite ends that resiliently and respectively abut against said cartridge holder (3) and said driving component (51).

Amended claims in accordance with Rule 137(2) EPC.

1. A caulking gun comprising:

a housing unit (2) including an inner housing component (21) that is formed in one piece, said inner housing component (21) having a main body (23) that has a front wall (231), a rear wall (232) spaced apart from said front wall (231) in a front-rear direction (X), and a bottom wall (233) connected to bottom ends of said front wall (231) and said rear wall (232), said front wall (231), said rear wall (232) and said bottom wall (233) cooperatively defining an accommodating cavity (236), said bottom wall (233) having a bottom hole (237) that is in spatial connection with said accommodating cavity (236);
a pushrod unit (4) including a main pushrod (41) that passes through said front wall (231) and said rear wall (232) along an axis (L) extending in the front-rear direction (X);
a propelling unit (5) including

a driving component (51) that is fitted around said main pushrod (41) and that is received in said accommodating cavity (236),
a first resilient component (53) that is sleeved on said main pushrod (41) and that resiliently biases said driving component (51),
a detent piece (52) that is sleeved on said main pushrod (41) and that is disposed behind said rear wall (232), said detent piece (52) having a top end (521), a bottom end (522), and a through-bore (523) that is located between said top end (521) and said bottom end (522) and that extends along said axis (L), said main pushrod (41) slidably passing through said through-bore (523), and
a second resilient component (54) that is sleeved on said main pushrod (41) and that has opposite ends resiliently and respectively abutting against said rear wall (232) and a portion of said detent piece (52) which is around said through-bore (523), another portion of said detent piece (52) which is under said through-bore (523) being restrained forward and rearward, such that said top end (521) of said detent piece (52) is biased by said second resilient component (54) to deflect rearward to thereby frictionally restrain said main pushrod (41) from moving rearward; and

an operating unit (6) extending through said bottom hole (237), and connected to said inner housing component (21), said operating unit (6) being operable to actuate said driving component (51) to propel said main pushrod (41) forward along said axis (L), and being further operable to swing rearward said bottom end (522) of said detent piece (52) to make said detent piece (52) be perpendicular to said main pushrod (41) so as to allow rearward movement of said main pushrod (41);
characterized in that:
said main body (23) further has a retention wall

(235) extending rearward from said rear wall (232) and formed with a flared slot (238), said detent piece (52) extending through said flared slot (238), said another portion of said detent piece (52) being restrained by said retention wall (235) to move forward and rearward, such that said top end (521) of said detent piece (52) is biased by said second resilient component (54) to deflect rearward.

2. The caulking gun as claimed in Claim 1, wherein:

said inner housing component (21) further has an extension block (24) extending downward from said bottom wall (233) of said main body (23) and defining a mounting groove (241) that opens downward and that is in spatial communication with said bottom hole (237);
said main body (23) further has a top wall (234) connected to top ends of said front wall (231) and said rear wall (232); and
said operating unit (6) includes

a trigger component (61) extending into said mounting groove (241) and pivotally connected to said extension block (24),
a first link bar (62) pivotally connected to said trigger component (61) and extending from said mounting groove (241) to said bottom hole (237), and
a second link bar (63) having a first end segment that is pivotally connected to one end of said first link bar (62) opposite to said trigger component (61), and a second end segment that is opposite to said first end segment, that extends through said bottom hole (237), and that is pivotally connected to said top wall (234), said second end segment of said second link bar (63) pushing against said bottom end (522) of said detent piece (52) during operation of said operating unit (6) to swing rearward said bottom end (522) of said detent piece (52) .

3. The caulking gun as claimed in any one of Claims 1 and 2, wherein said housing unit (2) further includes an outer housing component (22) surrounds said inner housing component (21), said outer housing component (22) including a cover panel (25) that is disposed outside of said main body (23) of said inner housing component (21), and a handle portion (26) that extends downward from said cover panel (25) and that is disposed outside of said extension block (24) of said inner housing component (21).

4. The caulking gun as claimed in Claim 3, wherein said pushrod unit (4) further includes:

a pull button (46) connected to a rear end of said main pushrod (41);
two auxiliary pushrods (42) extending parallel to said main pushrod (41), disposed respectively at opposite sides of said main pushrod (41) and said cover panel (25), and co-movable with said main pushrod (41); and
a push plate (43) connected to front ends of said two auxiliary pushrods (42).

5. The caulking gun as claimed in Claim 4, wherein said pushrod unit (4) further includes:

a linking plate (44) connected between said rear end of said main pushrod (41) and said pull button (46) and connected to rear ends of said auxiliary pushrods (42); and
a mounting collar (45) extending through the rear of said cover panel (25), said main pushrod (41) passing through said mounting collar (45).

6. The caulking gun as claimed in Claim 4, further comprising a cartridge holder (3) disposed in front of said front wall (231), said main pushrod (41), said auxiliary pushrods (42), and said push plate (43) being slidably mounted on said cartridge holder (3), said first resilient component (53) passing through said front wall (231) and having opposite ends that resiliently and respectively abut against said cartridge holder (3) and said driving component (51).

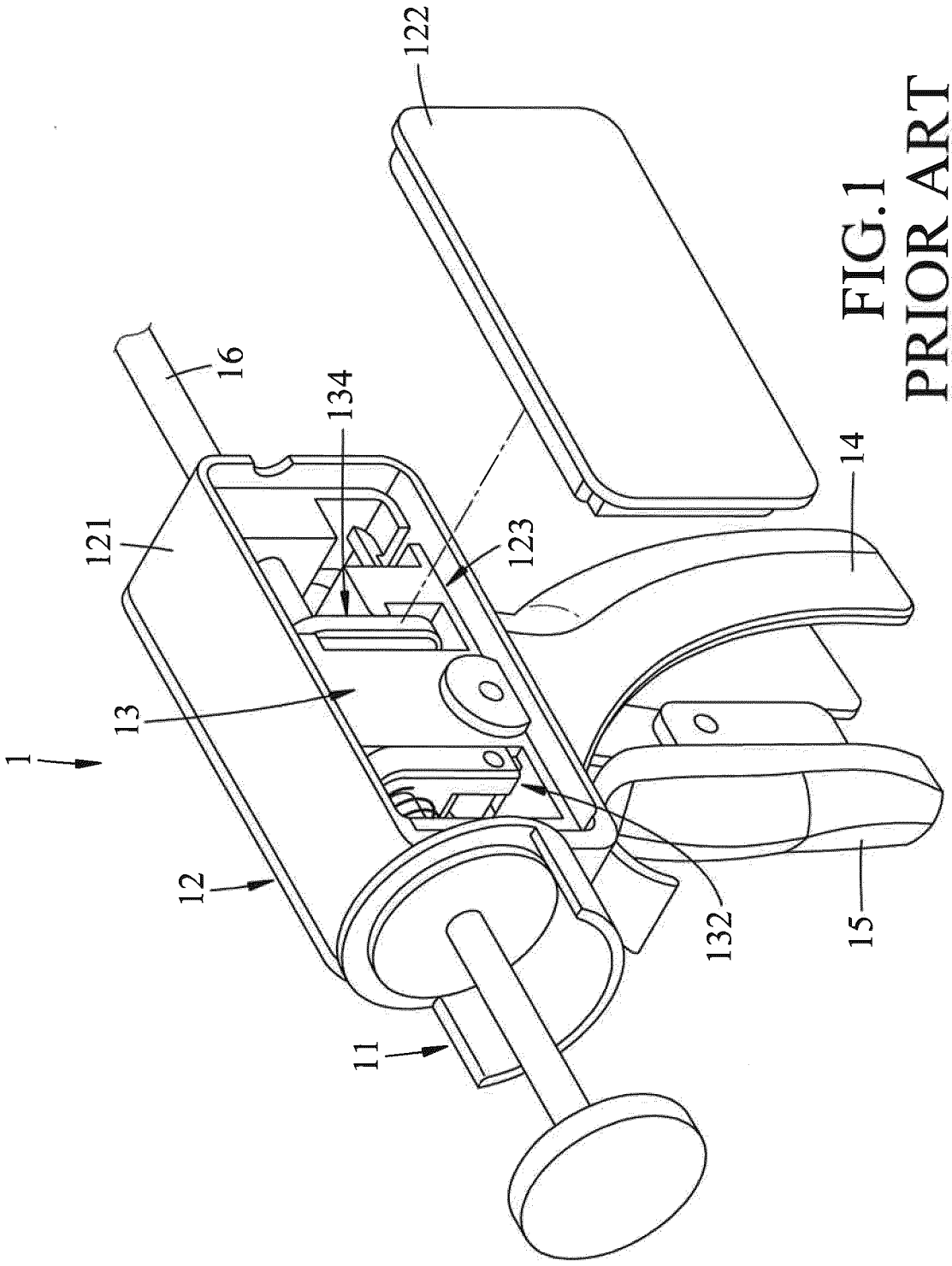

FIG.1
PRIOR ART

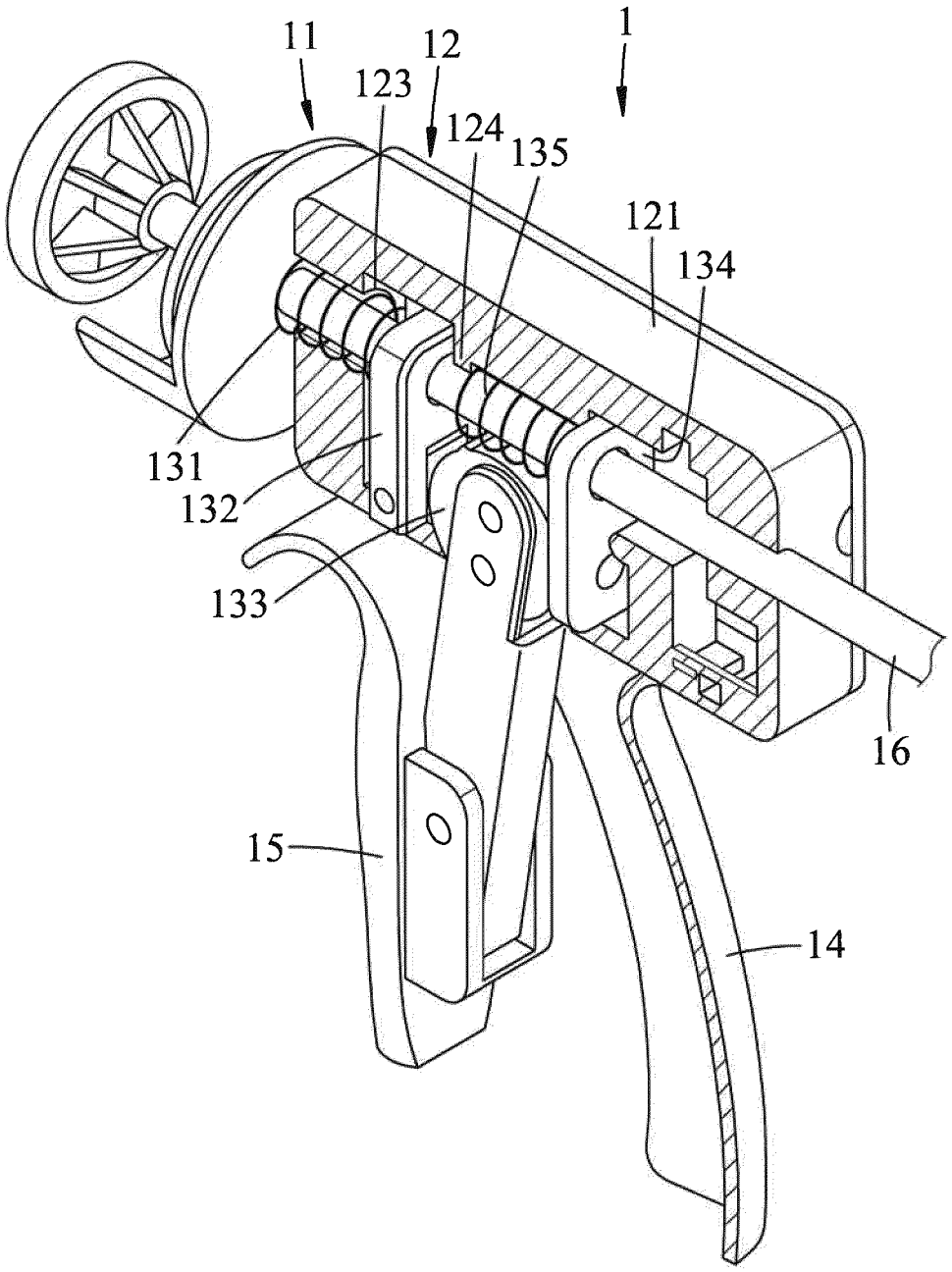

FIG.2
PRIOR ART

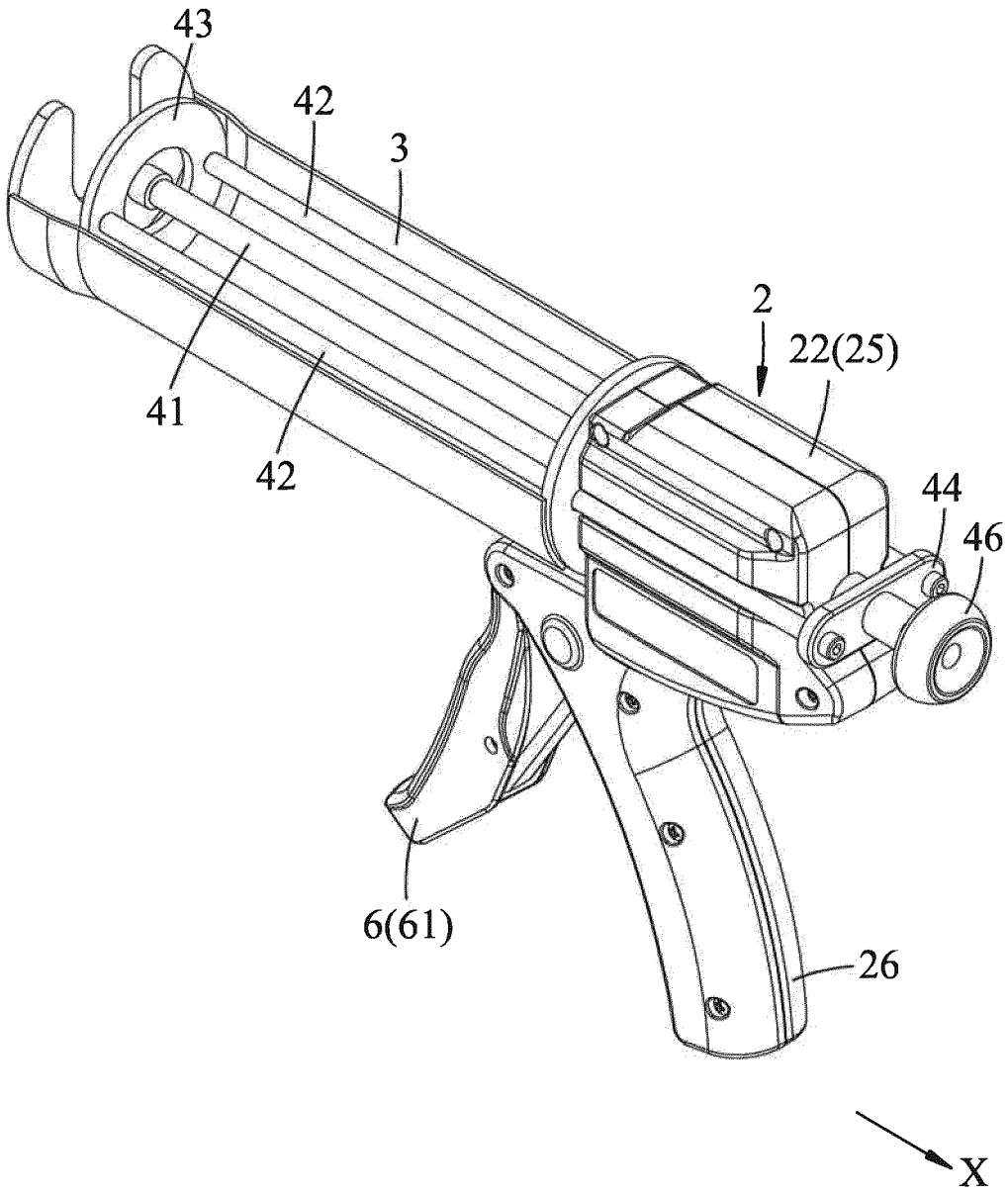

FIG.3

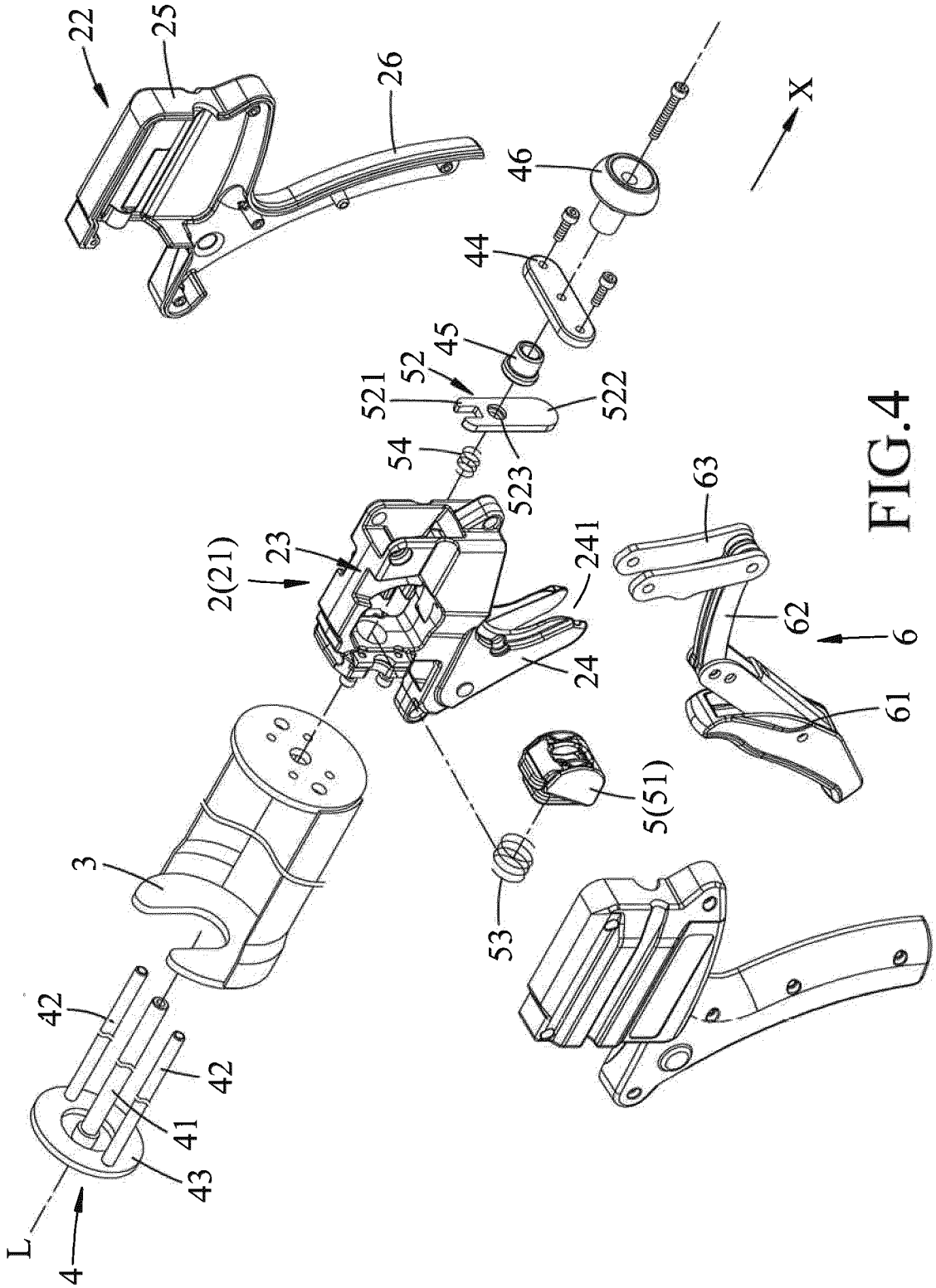
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FIG.4

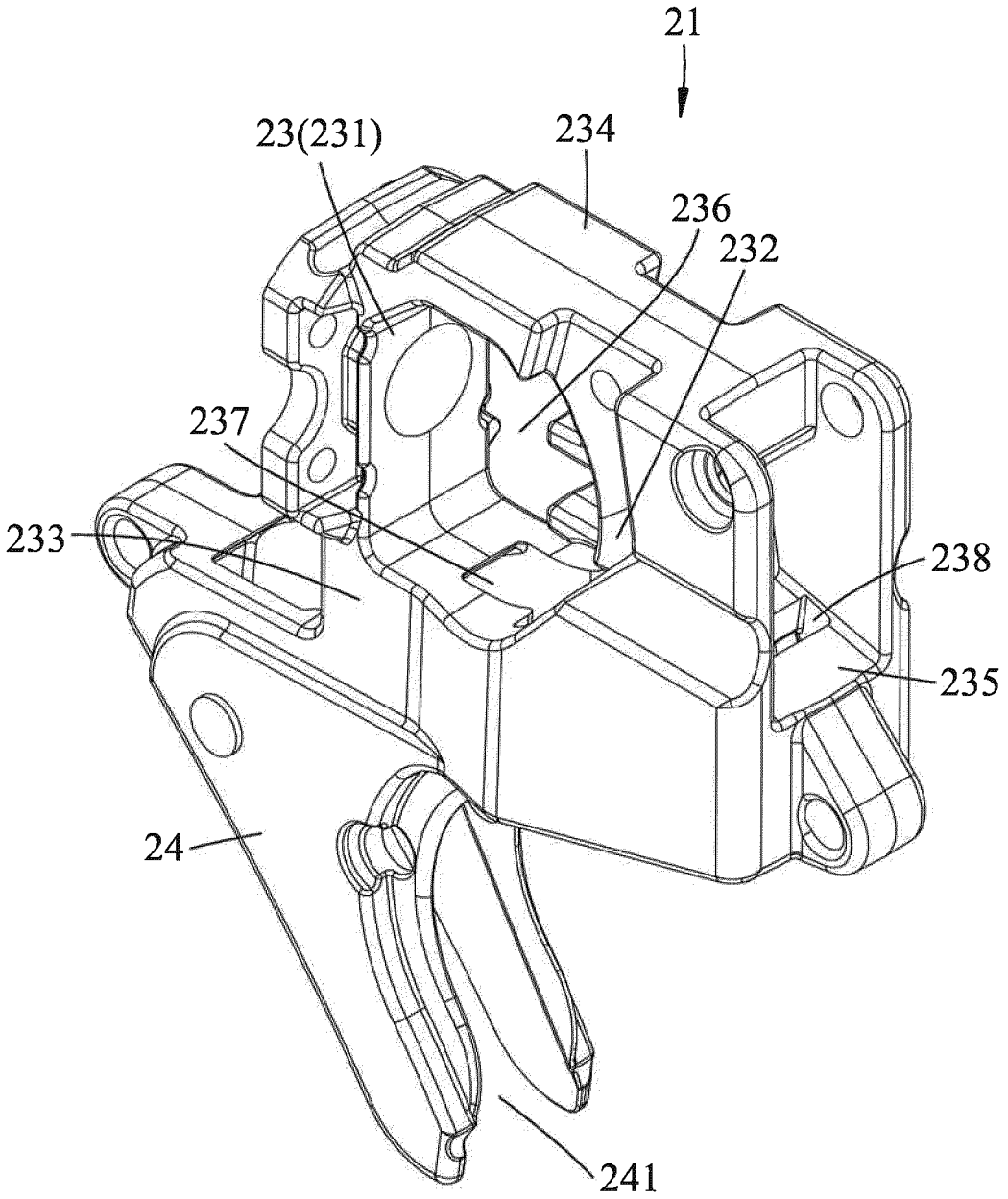

FIG.5

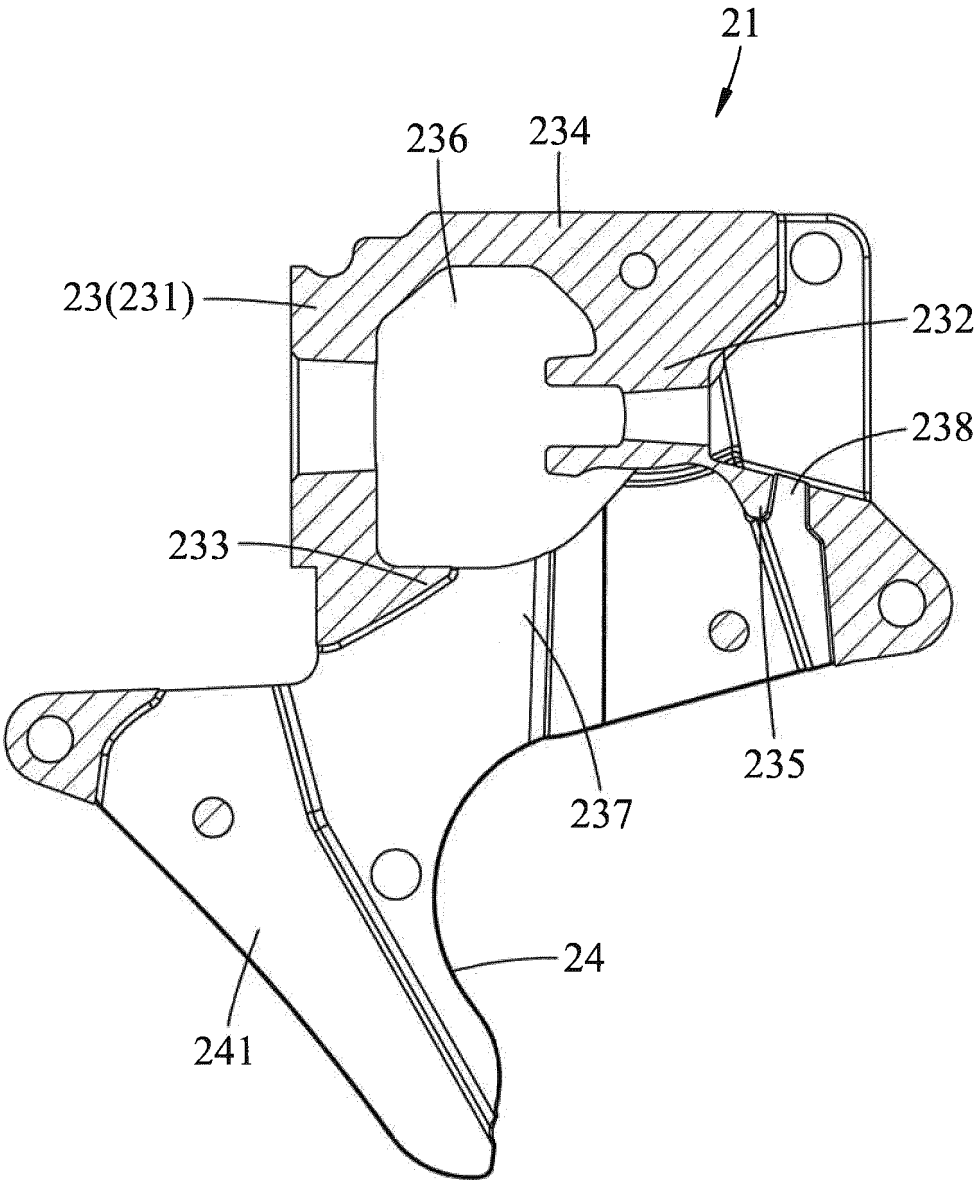

FIG.6

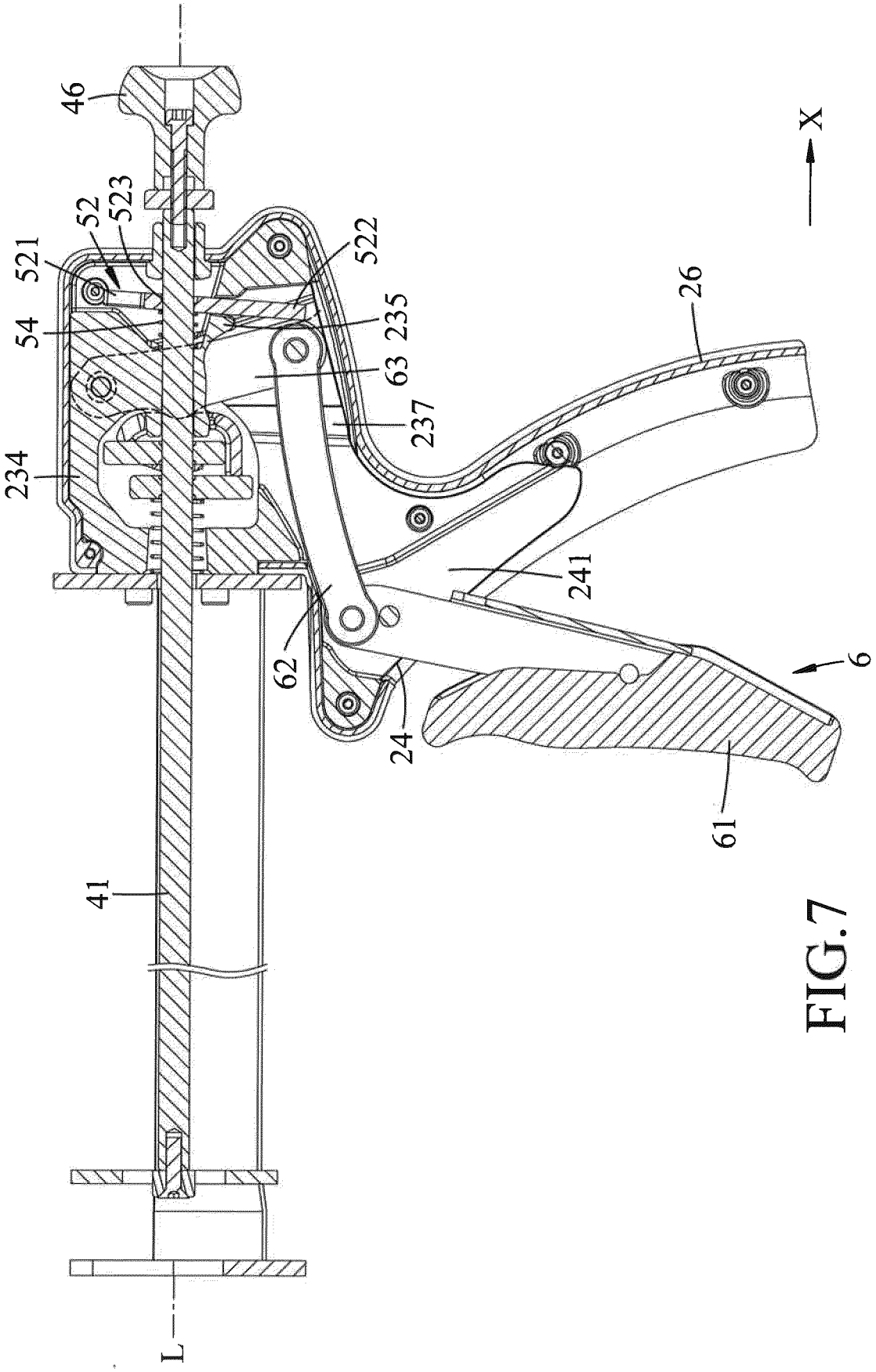

FIG.7

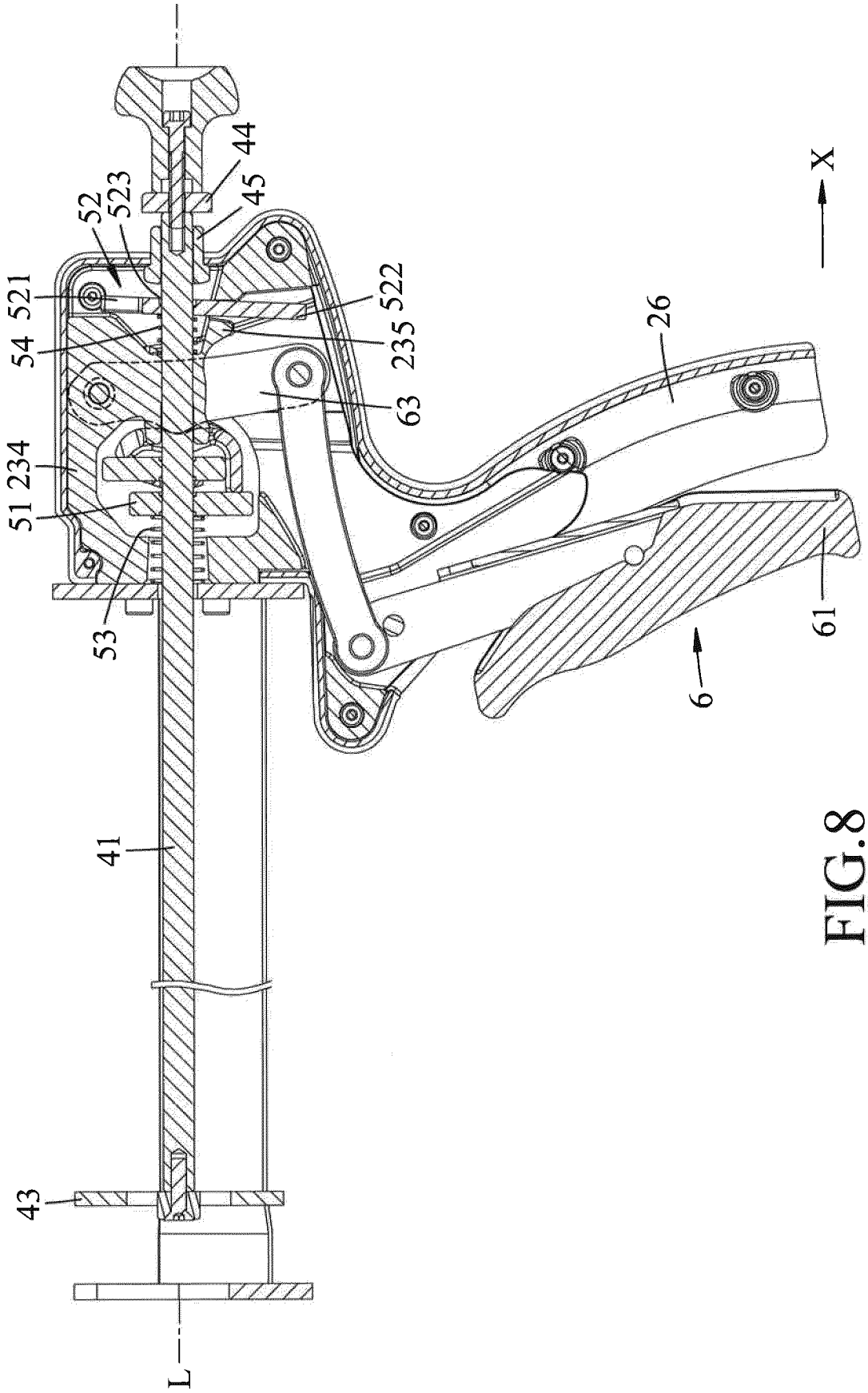

FIG.8

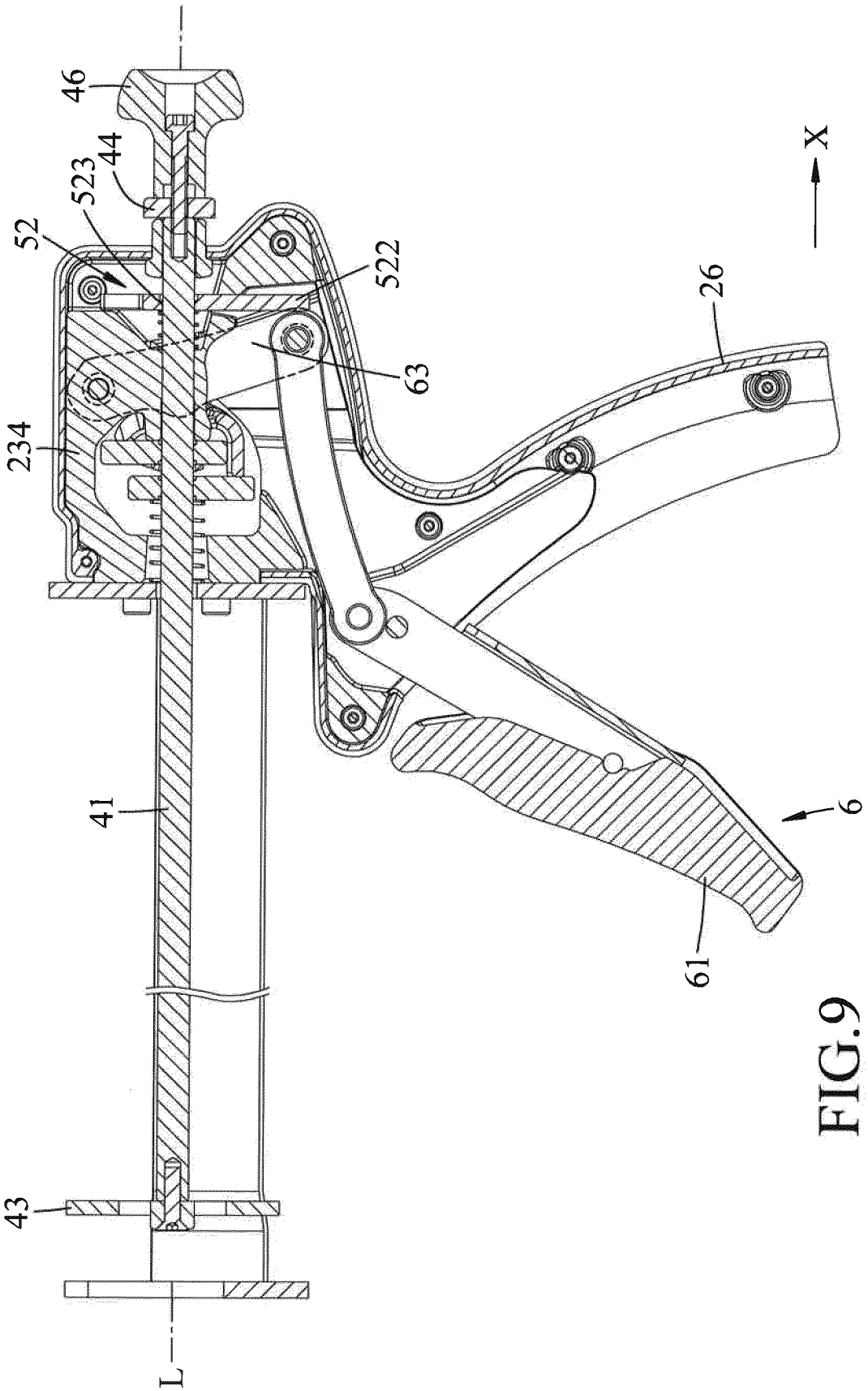

FIG.9

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EUROPEAN SEARCH REPORT

Application Number
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X	GB 879 272 A (EXPANDITE LTD) 11 October 1961 (1961-10-11)	1	INV. B05C17/01
A	* abstract; figures 1-2 *	2-7	
X	US 2012/285982 A1 (STROBEL-SCHMIDT RAINER [DE] ET AL) 15 November 2012 (2012-11-15)	1	
A	* paragraph [0039] - paragraph [0040] * * figures 2,3 *	2-7	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 November 2022	Roldán Abalos, Jaime

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