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(54) **Nailing device for driving roofing nails.**

(57) A nailing device is adapted for sequentially driving a plurality of roofing nails (40) into a targeted framing structure, and includes a shearing unit which is actuated by a shear initiating unit to displace to a shearing position, where a leading roofing nail (40) is shorn off from the remainder of the roofing nails (40), and a trigger member (34) which is disposed synchronously activate a shot initiating unit (31) toblastastrikingrod (33) for driving the leading roofing nail (40), and the shear initiating unit, so as to enable consecutive driving of the roofing nails (40) into the targeted framing structure to thereby enabling installation of roofing shingles (8).

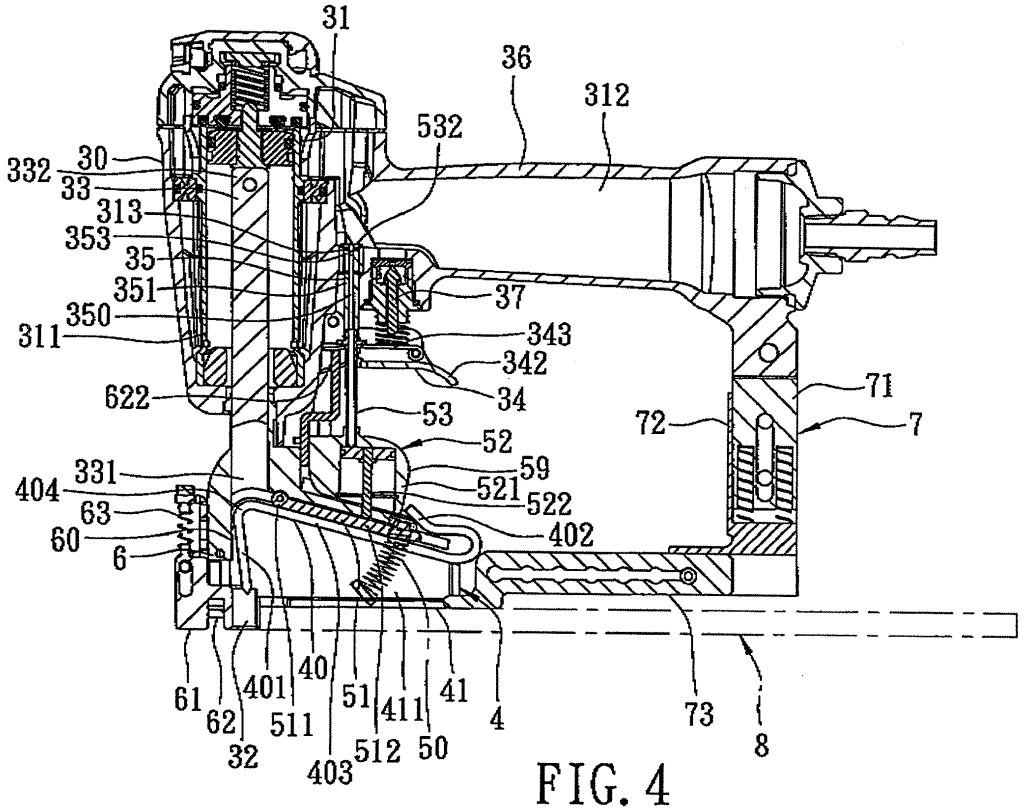

FIG. 4

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Description

[0001] This invention relates to a nailing device for installing roofing shingles or tiles, more particularly to a nailing device for sequentially driving a plurality of roofing nails into a framing structure to enable installation of the roofing shingles.

[0002] Referring to Fig. 1, in a conventional roof constructed of a plurality of laminated roofing tiles or shingles 11, a plurality of S-shaped roofing nails 12 are generally utilized to anchor the roofing shingles 11 and to be affixed to a framing assembly 13 of a roofing structure, such as rafters. Each of the nails 12 includes a pointed end 121 to extend into and be affixed to the framing assembly 13, and a bent clip end 122 to anchor the superimposed shingle 11. Conventionally, the pointed ends 121 of the nails 12 are manually inserted into the framing assembly 13 with a hammer, which is effort consuming and requires a skillful technician. Moreover, if a nailing gun is used, since such nails 12 are larger than those that can be loaded into a magazine of a conventional nailing gun, when the nails 12 are arranged in a row with a relatively high gluing strength, malfunctioning may occur during driving the nails 12. Thus, the nails 12 must be fed separately into the magazine, which is inconvenient and time-consuming.

[0003] An object of the present invention is to provide a nailing device which can sequentially drive a plurality of roofing nails into a targeted framing structure conveniently and with relatively less effort.

[0004] According to this invention, the nailing device includes a head frame body defining a stroke path, a stricking rod which is mounted in the head frame body and which is movable along the stroke path to ram a bent impacted region of a leading roofing nail, a magazine unit defining a loading space which extends to terminate at a dock end that borders an outlet port, and which is adapted to be loaded with a plurality of roofing nails, and a shot initiating unit disposed to act on the striking rod to drive a pointed end of the leading roofing nail into a targeted framing structure. The nailing device further comprises an under frame body disposed downwardly of the head frame body, a shearing unit mounted in the under frame body to be displaceable between a non-shearing position, where the shearing unit is disposed rearwardly of the shear lines, and a shearing position, where the shearing unit extends beyond the shear lines, a shear initiating unit disposed to act on and to force the shearing unit to the shearing position for pressing the shank segment of the leading roofing nail such that the leading roofing nail is shorn off from the remainder of the roofing nails along the corresponding shear line, and a trigger member disposed to synchronously activate the shot and shear initiating units to enable consecutive driving of the roofing nails into the targeted framing structure.

[0005] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments of the invention, with reference to the accompanying drawings, in which:

Fig. 1 is a schematic perspective view of a conventional roofing structure by means of a plurality of roofing nails;
Fig. 2 is a perspective view of the first embodiment of a nailing device according to this invention;
Fig. 3 is another perspective view of the first embodiment;
Fig. 4 is a sectional view of a first embodiment;
Fig. 5 is a fragmentary side view of a magazine unit of the first embodiment;
Fig. 6 is a fragmentary perspective view showing a nose unit of the first embodiment;
Fig. 7 is a sectional view of the first embodiment, showing a shearing unit in a shearing position;
Fig. 8 is a sectional view of the first embodiment, showing a striking rod in a striking position;
Figs. 9 to 11 are fragmentary front views of the first embodiment, showing the nose unit pressed in different positions;
Fig. 12 is a fragmentary perspective view showing the nose unit of the first embodiment pressed in a space between two roofing shingles;
Fig. 13 is a schematic side view showing a leading roofing nail supported by a nail supporting unit;
Fig. 14 is a fragmentary perspective view of the second embodiment of a nailing device according to this invention;
Fig. 15 is a sectional view of the third embodiment of a nailing device according to this invention;
Fig. 16 is a sectional view of the fourth embodiment of a nailing device according to this invention;
Fig. 17 is a sectional view of the fifth embodiment of a nailing device according to this invention; and
Fig. 18 is a sectional view of the sixth embodiment of a nailing device according to this invention.

[0006] Before the present invention is described in greater detail, it should be noted that same reference numerals have been used to denote like elements throughout the specification.

[0007] Referring to Figs. 2 to 4, the first embodiment of a nailing device according to the present invention is adapted to drive a plurality of roofing nails 40 into a targeted framing structure (not shown) for installing roofing shingles 8. Each of such roofing nails 40 generally includes a bent clip end 402, a shank segment 403 extending from the bent clip end 402 in a lengthwise direction to terminate at a bent impacted region 404, and a pointed end 401 opposite to the bent impacted region 404 in a longitudinal direction transverse to the lengthwise direction. The roofing nails 40 are arranged to have the shank segments 403 juxtaposed with, and bonded to one another along a plurality of shear lines.

[0008] The nailing device of the first embodiment comprises a head frame body 30 defining a stroke path that

extends in the longitudinal direction, a handgrip 36 which extends downwardly from the head frame body 30 to terminate at a butt end, and which has a pressurized air chamber 312 for accommodating pressurized air, an under frame body 59 disposed downwardly from the head frame body 30, a magazine unit 4 defining a loading space 411 which is adapted to be loaded with the roofing nails 40 and which extends in a transverse direction relative to the longitudinal direction to terminate at a dock end 410, and a nose piece 6 which is disposed forwardly of the head frame body 30 and which has a nail ejection portion that defines an ejecting line aligned with the stroke path, and that has an alignment surface 60 parallel to the ejecting line to cooperate with the dock end 410 to define an outlet port 32. The magazine unit 4 is coupled with the head frame body 30 and the under frame body 59 such that the lengthwise direction is oriented to be transverse to both the transverse direction and the longitudinal direction.

[0009] Particularly, referring to Figs. 3 and 5, the magazine unit 4 includes a magazine body 41 has a pair of parallel guide rails 412 which extend in the transverse direction to permit sliding movement of the roofing nails 40, and a pusher 42 which is disposed to push the roofing nails 40 toward the dock end 410. The guide rails 412 have elevated ends disposed opposite to and configured to gradually descend toward the dock end 410 so as to facilitate sliding movement of the roofing nails 40 toward the dock end 410.

[0010] The nailing device further comprises a striking rod 33, a shot initiating unit 31, a trigger member 34, a shearing unit 51, 522, a shear initiating unit 52, first and second safety units 61, 62, and a nail supporting unit 7.

[0011] The striking rod 33 has ram and forced ends 331, 332 opposite to each other, and is mounted in the head frame body 30 to be movable along the stroke path from a non-striking position to a striking position, where the ram end 331 is disposed for ramming the bent impacted region 404 of the leading roofing nail 40.

[0012] The shot initiating unit 31 is disposed to act on the forced end 332 of the striking rod 33 to blast the ram end 331 to the striking position to ram the bent impacted region 404 of the leading roofing nail 40, thereby driving the pointed end 401 into the targeted framing structure. In this embodiment, the shot initiating unit 31 is activated by a burst of pressurized air of a cylinder 311 in the head frame body 30. The pressurized air can be supplied from a selected one of a pressurized air source via the pressurized air chamber 312, and combustion explosion in a combustion chamber.

[0013] The trigger member 34 includes a trigger 342 pivotally mounted on the head frame body 30, and a trigger arm 343 pivotally mounted to a free portion of the trigger 342 to control movement of a plunger 37 so as to control entrance of the burst of the pressurized air into the cylinder 311, thereby activating the shot initiating unit 31.

[0014] The shearing unit includes a force-transmitting lever 51 and a plunger 522. The force-transmitting lever 51 has a pivoted end 511 pivotally mounted to the under frame body 59, and a pressing segment 512 which extends from the pivoted end 511 and which is swung relative to the under frame body 59 between a non-shearing position, as shown in Fig. 4, where the pressing segment 512 is disposed rearwardly of and oriented parallel to the shear lines, and a shearing position, as shown in Fig. 7, where the pressing segment 512 extends beyond and is angularly inclined to the shear lines. The plunger 522 extends and is movable in the longitudinal direction to a pressing position, where the pressing segment 512 is pressed toward the shearing position. A biasing member 50 is disposed in the magazine body 41 to bias the pressing segment 512 to the non-shearing position.

[0015] The handgrip 36 has a branched port 313 disposed downstream of the pressurized air chamber 312. The shear initiating unit 52 includes a tube 35 which is connected to the branched port 313 and which has a conduit 351 defining a passage 350 that is communicated with the pressurized air chamber 312 through a through hole 353, a pneumatic cylinder-and-piston assembly 521 disposed in the under frame body 59 to pneumatically displace the plunger 522 to the pressing position, and a valve 53 which has a tubular valve body disposed to communicate the passage 350 with the cylinder-and-piston assembly 521 and connected to the trigger arm 343, and a plug 532 disposed to close the branched port 313 such that the tubular valve body is movable between a closed position, where the air communication between the through hole 353 and the cylinder-and-piston assembly 521 is interrupted, and an opened position, where the plug 532 and the through hole 353 are remote from the branch port 313 to permit the pressurized air to enter into the cylinder-and-piston assembly 521 so as to displace the plunger 522 to the pressing position. Hence, when the valve 53 is actuated by a triggering action of the trigger 342 to move from the closed position to the opened position, the force-transmitting lever 51 is forced for pressing the shank segment 403 of the leading roofing nail 40 such that the leading roofing nail 40 is shorn off from the remainder of the roofing nails 40 along the corresponding shear line.

[0016] Referring to Figs. 4 and 6, the first safety member 61 is disposed on and is movable relative to the nose piece 6 in the longitudinal direction, and has a first surface-engaging surface 611 disposed more forwardly from the nose piece 6 and adapted to press against the targeted framing structure so as to be subj ected to a rearward moving force. The second safety member 62 is disposed on and is movable relative to the nose piece 6 in the longitudinal direction, is coupled with the first safety member 61 by virtue of anchoring and anchored portions 621, 612, and has a second surface-engaging surfaces 623 disposed less forwardly from the nose piece 6. The second safety member 62 further has a trigger-engaging end 622 that is engaged with the trigger arm 343 such that, when the first safety member 61 is sub-

jected to the rearward moving force, the trigger-engaging end 622 is moved to result in a pivotal movement of the trigger arm 343, thereby allowing for the triggering action. Each of the first and second safety member 61, 62 are biased by a biasing member 63 against the rearward moving force.

[0017] Referring to Figs. 2, 3 and 13, the nail supporting unit 7 extends forwardly from the butt end of the grip 36 to terminate at a carrier segment 71, and has an adjusting segment 72 mounted on and retainingly movable relative to the carrier segment 71 in the longitudinal direction, and an elongated holder 73 mounted on and retainingly movable relative to the adjusting segment 72 in the lengthwise direction so as to be adjustably displaced to a holding position, where the bent clip end 402 of the leading roofing nail 40 is held from being movable toward the targeted framing structure during the operation of nailing.

[0018] As shown in Figs. 4, 7 and 8, the processes for consecutively driving the roofing nails are as follows. Firstly, a pressurized air source is connected to the nailing device to store the pressurized air in the cylinder 111. Subsequently, the first safety member 61 is pressed against the targeted framing structure to be subjected to the rearward moving force, and the second safety member 62 is moved to result in the pivotal movement of the trigger arm 343 toward the plunger 37 so as to enable the trigger 342 to effect the triggering action. At this stage, the valve 53 is kept closed. Thereafter, upon an initial stage of the triggering action, the trigger arm 343 is further pivotally moved so as to move the valve 53 to the opened position. The pressurized air flows into the cylinder-and-piston assembly 521 to press the force-transmitting lever 51 to the shearing position so as to shear the leading nail 40 off from the remainder of the nails 40. Meanwhile, as a result of displacement of the pressing segment 512 to the shearing position, the pointed end 401 of the leading roofing nail 40 is tilted to abut against the alignment surface 60 so as to vertically point toward the targeted framing structure, as shown in Fig. 7. Immediately after the initial stage, the trigger 342 is further pressed to effect the final stage of the triggering action. Upon the final stage, the shot initiating unit 31 is activated to act on the striking rod 33 to ram the shorn leading nail 40 so as to drive the nail 40 into the targeted framing structure. The force-transmitting lever 51 is bounced back to the non-shearing position by the biasing member 50 for being ready to shear the next roofing nail 40. As illustrated, with the nailing device of this invention, the roofing nails 40 can be consecutively driven into the targeted framing structure conveniently and with relatively less effort.

[0019] In use, as shown in Figs. 9 to 11, depending on the angle and position of the shingle 8, the second surface-engaging surface 623 of the second safety member 62 is pressed on a roofing shingle 8 at different sides and the first safety member 61 abuts against a side edge of the shingle 8. Alternatively, the first safety member 61 is positioned between (among) the shingles 8, as shown in Fig. 12. The first surface-engaging surface 611 is pressed on a roofing shingle 8, as shown in Fig. 13. Additionally, the nail 40 can be held by the holder 73 of the nail supporting unit 7. Accordingly, the nailing device is suitable for installation of shingles 8 with different thickness.

[0020] Referring to Fig. 14, the second embodiment of the nailing device according to this invention is similar to the first embodiment. In the second embodiment, the first and second safety members 61, 62 are coupled with and are spaced apart from each other in the longitudinal direction. A spacing adjusting member 64 is disposed to adjust the distance between the first and second safety members 61, 62.

[0021] Referring to Fig. 15, the third embodiment of the nailing device according to this invention is similar to the first embodiment. In the third embodiment, the shot initiating unit 31 is activated by electromagnetism that is controlled by a triggering action of the trigger member 34. The shear initiating unit 54 includes a solenoid member 541 controlled by the triggering action of the trigger member 34 to move the plunger 542 to the pressing position.

[0022] Referring to Fig. 16, the fourth embodiment of the nailing device according to this invention is similar to the third embodiment. In the fourth embodiment, the shear initiating unit 55 includes a spring 553 disposed to bias the plunger 552 to the pressing position, and a solenoid member 555 configured to be actuated to move between a latched position, where a latch rod 5551 of the solenoid member 555 is engaged with a hole 5521 of the plunger 552 to prevent the plunger 552 from being biased toward the pressing position, and an unlatched position, where the plunger 552 is set free to be biased to the pressing position. Further, the shear initiating unit 55 includes a servomotor 554 with an output shaft which has a camming region 5541. The plunger 552 has a cammed region which is configured to mate with the camming region 5541 such that a counteracting force against the biasing action of the spring 553 is generated as a result of an angular displacement of the output shaft that is made in response to the triggering action of the trigger member 34. By virtue of the counteracting force, the solenoid member 555 is facilitated to move toward the unlatched position.

[0023] Referring to Fig. 17, the fifth embodiment of the nailing device according to this invention is similar to the first and third embodiments. In the fifth embodiment, the shot initiating unit 31 is activated by a burst of pressurized air or electromagnetism. The shear initiating unit 56 includes an actuating lever 56 having a fulcrum which is pivotallymounted to the under frame body 59, a power segment 561 which is configured to be moved with the first safety member 61, and a weight segment 562 which, in response to the rearward moving force passed from the first safety member 61 onto the power segment 561, is actuated to turn to urge a biasing member 563 for pressing the force-transmitting lever 51 to the shearing

position.

[0024] Referring to Fig. 18, the sixth embodiment of the nailing device according to this invention is similar to the fifth embodiment. In the sixth embodiment, the shearing unit further includes a pressing lever 576 which has a pressing arm and an actuated arm, and which is pivotally mounted in the under frame body 59 such that the pressing arm is angularly displaceable to a treading position, where the pressing segment 512 is pressed toward the shearing position. The shear initiating unit 57 has an actuated member which includes a tubular chamber 571, an upper rod segment 572, a spring 573, a lower rod segment 574, and a roller 575 which are configured to be actuated, in response to the movement of the striking rod 33 toward the striking position, to force the actuated arm to turn the pressing lever 576 so as to displace the pressing arm to the treading position.

Claims

1. A nailing device for sequentially driving a plurality of roofing nails (40) into a targeted framing structure, thereby enabling installation of roofing shingles (8), each of the roofing nails (40) including a bent clip end (402), a shank segment (403) which extends from the bent clip end (402) in a lengthwise direction to terminate at a bent impacted region (404), and a pointed end (401) which is opposite to the bent impacted region (404) in a longitudinal direction transverse to the lengthwise direction, the roofing nails (40) being arranged to have the shank segments (403) juxtaposed with, and bonded to one another along a plurality of shear lines, said nailing device comprising:

   a head frame body (30) defining a stroke path that extends in the longitudinal direction;
   a striking rod (33) which has ram and forced ends (331, 332) opposite to each other, and which is mounted in said head frame body (30) to be movable along the stroke path from a non-striking position to a striking position, where said ram end (331) is disposed for ramming the bent impacted region (404) of the leading roofing nail (40);
   a magazine unit (4) defining a loading space (411) which extends in a transverse direction relative to the longitudinal direction to terminate at a dock end (410) that borders an outlet port (32), and which is adapted to be loaded with the plurality of roofing nails (40), said magazine unit (4) being coupled with said head frame body (30) such that the lengthwise direction is oriented to be transverse to both the transverse direction and the longitudinal direction, and such that the bent impacted region (404) of the leading roofing nail (40) confronts said ram end (331) to be urged into said outlet port (32);
   a shot initiating unit (31) disposed to act on said forced end (332) of said striking rod (33) to blast said ram end (331) to the striking position to ram the bent impacted region (404) of the leading roofing nail (40), thereby driving the pointed end (401) into the targeted framing structure; and
   a trigger member (34) disposed to activate said shot initiating unit (31) to enable consecutive driving of the roofing nails (40) into the targeted framing structure, **characterized in that** said nailing device further comprises:

      an under frame body (59) disposed downwardly from said head frame body (30), and coupled with said magazine unit (4);
      a shearing unit (51,522;542;552;576) mounted in said under frame body (59) to be displaceable between a non-shearing position, where said shearing unit is disposed rearwardly of the shear lines, and a shearing position, where said shearing unit extends forwardly and beyond the shear lines; and

   a shear initiating unit (52;54;55;55;57) disposed to act on and to force said shearing unit (51,522;542;552;576) to the shearing position for pressing the shank segment (403) of the leading roofing nail (40) such that the leading roofing nail (40) is shorn off from the remainder of the roofing nails (40) along the corresponding shear line.

2. The nailing device according to Claim 1, **characterized in that** said shearing unit includes a force-transmitting lever (51) having a pivoted end (511) which is pivotally mounted to said under frame body (59), and a pressing segment (512) which extends from said pivoted end (511) and which, in actuation of said a shear initiating unit, is swung relative to said under frame body (59) between the non-shearing position, where said pressing segment (512) is oriented parallel to the shear lines, and the shearing position, where said pressing segment (512) is angularly inclined to the shear lines.

3. The nailing device according to Claim 2, **characterized in that** said shearing unit further includes a plunger (522;542;552) which is coupled to and actuated by said shear initiating unit (52;54;55) to move to a pressing position, where said pressing segment (512) is pressed toward the shearing position.

4. The nailing device according to Claim 3, **characterized in that** said shot initiating unit (31) is activated by a burst of pressurized air supplied from a selected one of a pressurized air source and a combustion explosion in a combustion chamber;

said nailing device further comprising a handgrip (36) which extends downwardly from said head frame body (30) and which has a pressurized air chamber (312) for accommodating the pressurized air, and a branched port (313) disposed downstream of said pressurized air chamber (312);
said shear initiating unit (52) including
a pneumatic cylinder-and-piston assembly (521) disposed in said under frame body (59) to pneumatically displace said plunger (522) to the pressing position,
a conduit (351) defining a passage (350) which is disposed downstream of said branched port (313), and upstream of said cylinder-and-piston assembly (521), and
a valve (53, 532) disposed to be movable between a closed position, where communication between said branched port (313) and said cylinder-and-piston assembly (521) is interrupted, and an opened position, where the pressurized air is permitted to enter into said cylinder-and-piston assembly (521) so as to displace said plunger (522) to the pressing position.

5. The nailing device according to Claim 4, **characterized in that** said trigger member (34) includes a trigger arm (343) which is pivotally mounted relative to said head frame body (30), which is connected to said valve (53, 532), and which is actuated by a triggering action of said trigger member (34) to move said valve (53, 532) from the closed position to the opened position.

6. The nailing device according to Claim 2, **characterized in that** said shot initiating unit (31) is activated by electromagnetism that is controlled by a triggering action of said trigger member (34), said trigger member (34) including a trigger arm (343) pivotally mounted relative to said head frame body (30) and which is actuated by a triggering action of said trigger member (34).

7. The nailing device according to Claim 6, **characterized in that** said shearing unit further includes a plunger (542) which is disposed to move to a pressing position, where said pressing segment (512) is pressed toward the shearing position;
said shear initiating unit (54) including a solenoid member (541) controlled by the triggering action of said trigger member (34) to move said plunger (542) to the pressing position.

8. The nailing device according to Claim 6, **characterized in that** said shearing unit further includes a plunger (552) which is disposed to move to a pressing position, where said pressing segment (512) is pressed toward the shearing position;
said shear initiating unit (55) including
a spring (553) disposed to bias said plunger (552) to the pressing position, and a solenoid member (555) configured to be actuated to move between a latched position, where said plunger (552) is prevented from being biased toward the pressing position, and an unlatched position, where said plunger (552) is set free to be biased to the pressing position, and
a servomotor (554) with an output shaft which has a camming region (5541), said plunger (552) having a cammed region which is configured to mate with said camming region (5541) such that a counteracting force against the biasing action of said spring (553) is generated as a result of an angular displacement of said output shaft that is made in response to the triggering action, and such that, by virtue of the counteracting force, said solenoid member (555) is facilitated to move toward the unlatched position.

9. The nailing device according to any one of Claims 5 and 6, further **characterized by**:

a nose piece (6) disposed forwardly of said head frame body (30) and having a nail ejection portion which defines an ejecting line that is aligned with the stroke path, and which has an alignment surface (60) that cooperates with said dock end (410) to define said outlet port (32), and that is parallel to the ejecting line;
a first safety member (61) disposed on and movable relative to said nose piece (6) in the longitudinal direction to be adapted to press against the targeted framing structure so as to be subjected to a rearward moving force;
a second safety member (62) which is disposed on and movable relative to said nose piece (6) in the longitudinal direction, which is coupled with said first safety member (61), and which has a trigger-engaging end (622) that is engaged with said trigger arm (343) such that, when said first safety member (61) is subjected to the rearward moving force, said trigger-engaging end (622) is moved to result in a pivotal movement of said trigger arm (343), thereby allowing for the triggering action; and
a biasing member (63) disposed to bias at least one of said first and second safety members (61, 62) against the rearward moving force.

10. The nailing device according to Claim 9, **characterized in that** said shear initiating unit (56) includes an actuating lever (56) having a fulcrum which is pivotally mounted to said under frame body (59), a power segment (561) which is configured to be moved with said first safety member (61), and a weight segment (562) which, in response to the rearward moving force passed from said first safety member (61) onto said power segment (561), is actuated to turn to urge saidpressing segment (512) to the shearing

position.

11. The nailing device according to Claim 9, **characterized in that** said force-transmitting lever (51) is configured such that, as a result of displacement of said pressing segment (512) from the non-shearing position to the shearing position, the pointed end (401) of the leading roofing nail (40) is tilted to abut against said alignment surface (60) so as to vertically point toward the targeted framing structure.

12. The nailing device according to Claim 2, **characterized in that** said magazine unit (4) includes a magazine body (41) which has a pair of parallel guide rails (412) which extend in the transverse direction to permit sliding movement of the plurality of roofing nails (40), and a pusher (42) which is disposed to push the roofing nails (40) toward said dock end (410).

13. The nailing device according to Claim 12, further **characterized by** a biasing member (50) disposed in said magazine body (41) to bias said pressing segment (512) to the non-shearing position.

14. The nailing device according to Claim 12, **characterized in that** said guide rails (412) have elevated ends disposed opposite to and configured to gradually descend toward said dock end (410) so as to facilitate sliding movement of the roofing nails (40) toward said dock end (410).

15. The nailing device according to Claim 1, further **characterized by**:

a handgrip (36) which extends downwardly from said head frame body (30) to terminate at a butt end; and
a nail supporting unit (7) which extends forwardly from said butt end to terminate at a carrier segment (71), and which has an elongated holder (72, 73) mounted on said carrier segment (71) and retainingly movable relative to said carrier segment (71) so as to be adjustably displaced to a holding position, where the bent clip end (402) of the leading roofing nail (40) is held from being movable toward the targeted framing structure during the operation of nailing.

16. The nailing device according to Claim 2, **characterized in that** said shearing unit further includes a pressing lever (576) which has a pressing arm and an actuated arm, and which is pivotally mounted in said under frame body (59) such that said pressing arm is angularly displaceable to a treading position, where said pressing segment (512) is pressed toward the shearing position;
said shear initiating unit (57) including an actuated member (571,572,573,574,575) which is configured to be actuated, in response to the movement of said striking rod (33) toward the striking position, to force said actuated arm to turn said pressing lever (576) so as to displace said pressing armto the treading position.

17. A nailing method for a nailing device to drive a plurality of roofing nails (40) into a targeted framing structure, the nailing device including a striking rod (33) which is actuated by a shot initiating unit (31) to perform a nail-driving operation, a magazine unit (4) for accommodating the roofing nails (40) , a trigger member (34) disposed to activate the shot initiating unit (31), and a shearing unit (51, 522;542;552;576) displaceable relative to the magazine unit (4), **characterized by** said nailing method comprising:

storing an energy into the nailing device that is sufficient to activate the shot initiating unit (31);
displacing the nailing device to a ready position, where the nailing device is engaged with the targeted framing structure to enable the trigger member (34) to effect a triggering action for the nail-driving operation;
actuating the shearing unit (51, 522;542;552; 576) to shear a leading roofing nail (40) off from the remainder of the roofing nails (40); and
activating the shot initiating unit (31) to actuate the striking rod (33) to drive the shorn leading roofing nail (40) into the targeted framing structure.

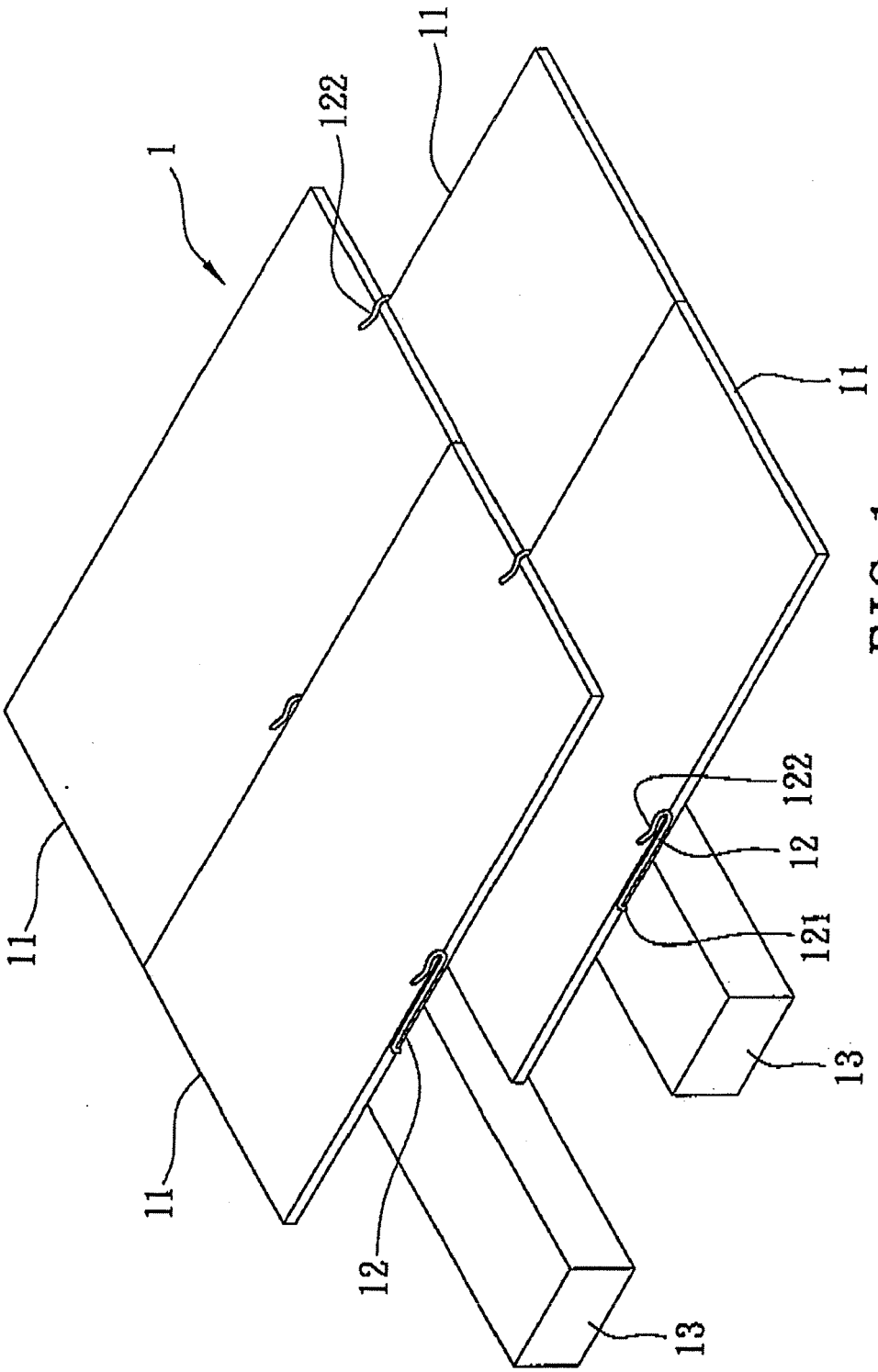

FIG. 1
PRIOR ART

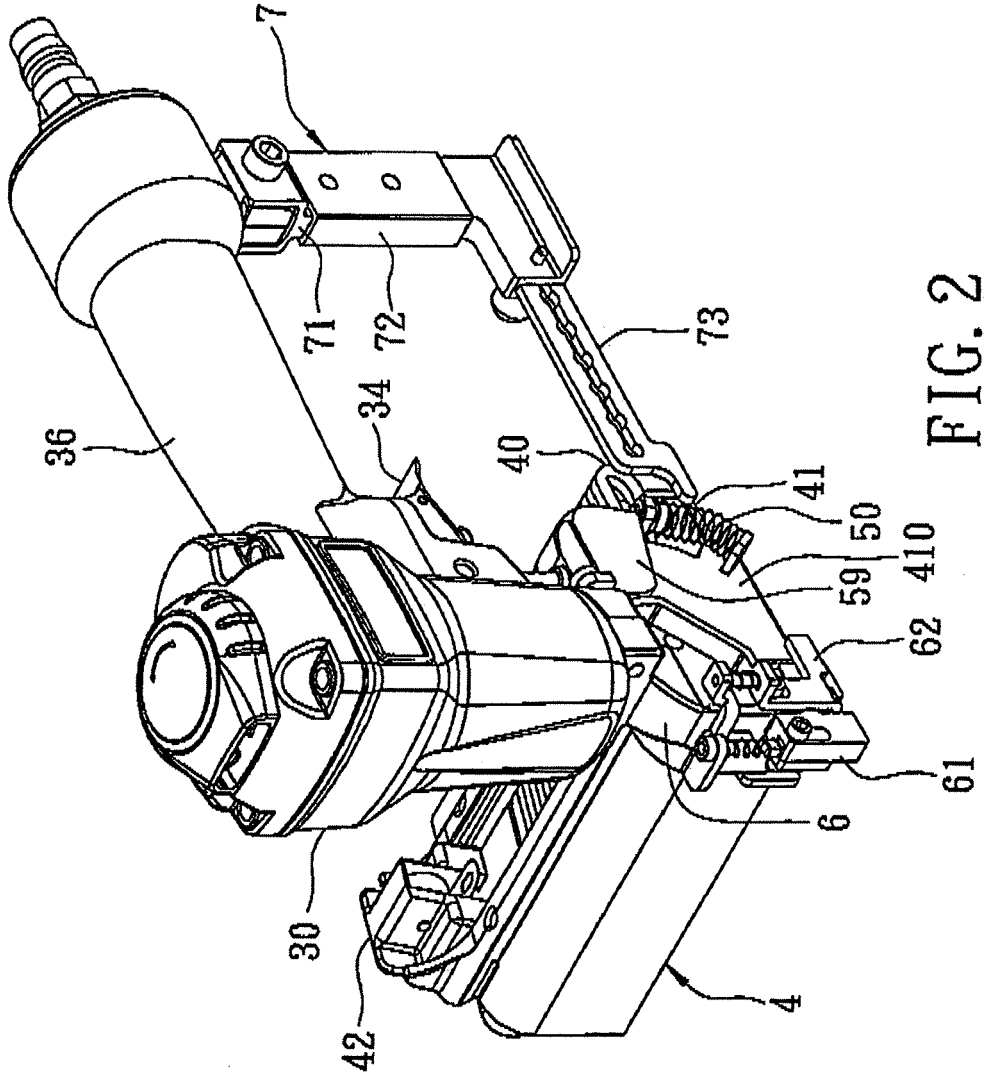

FIG. 2

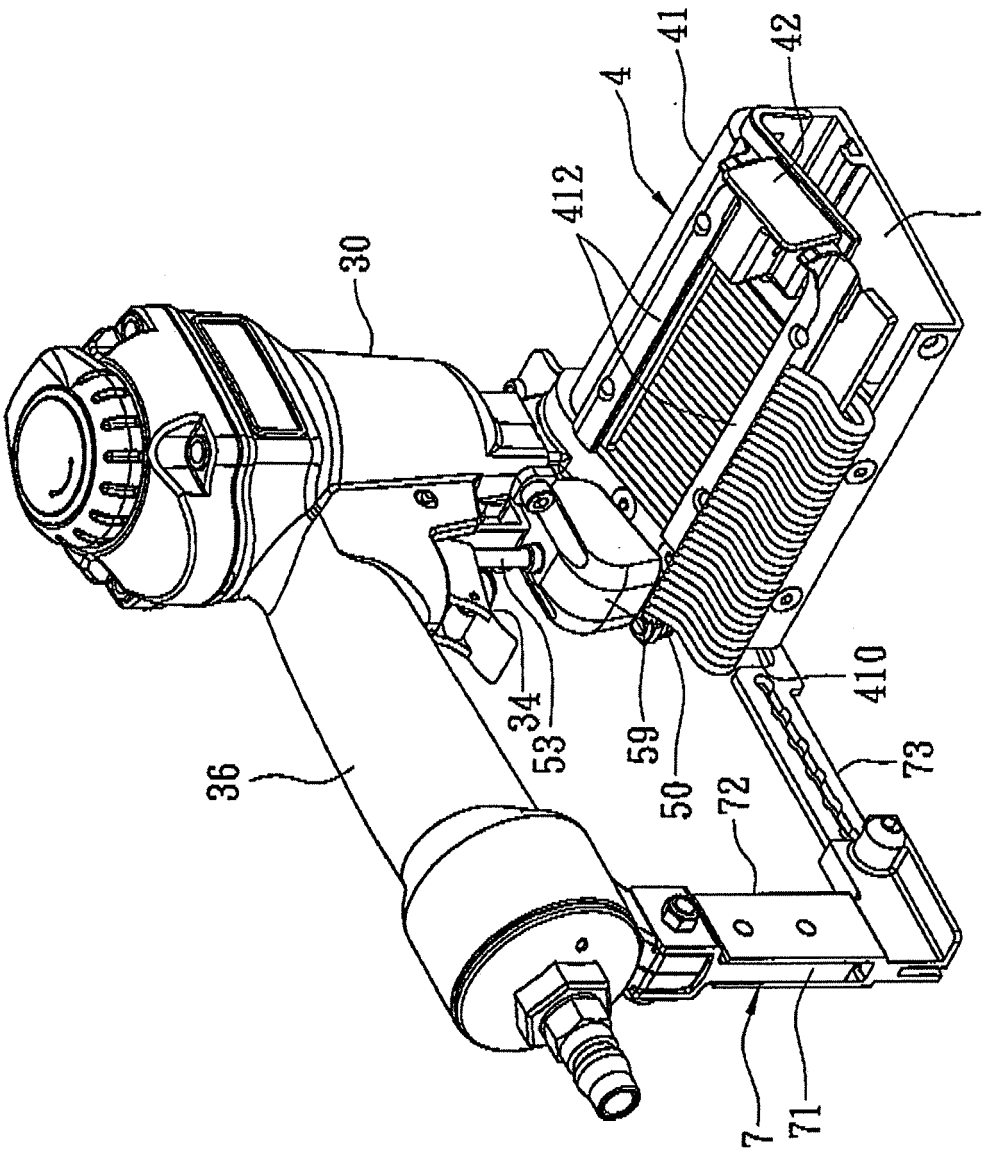

FIG. 3

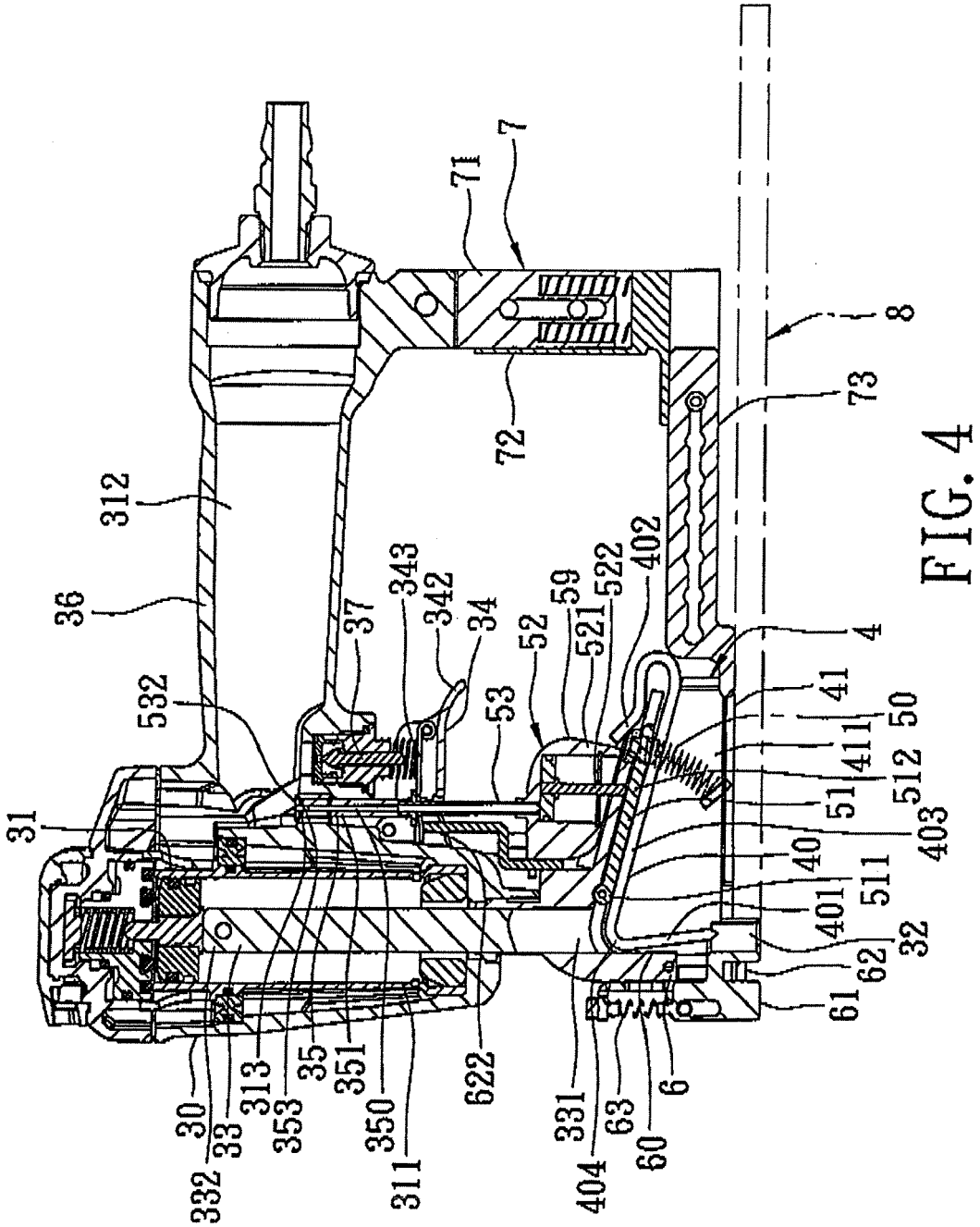
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FIG. 4

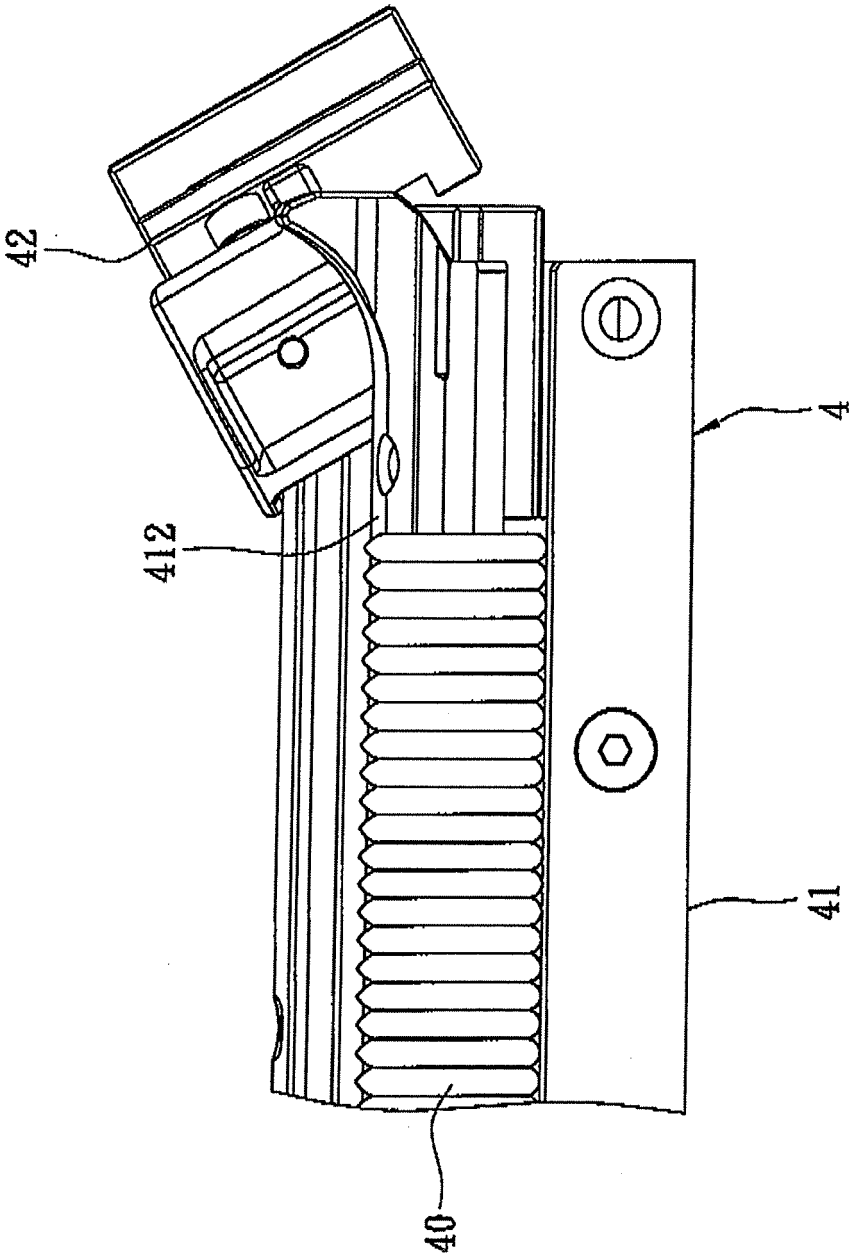

FIG. 5

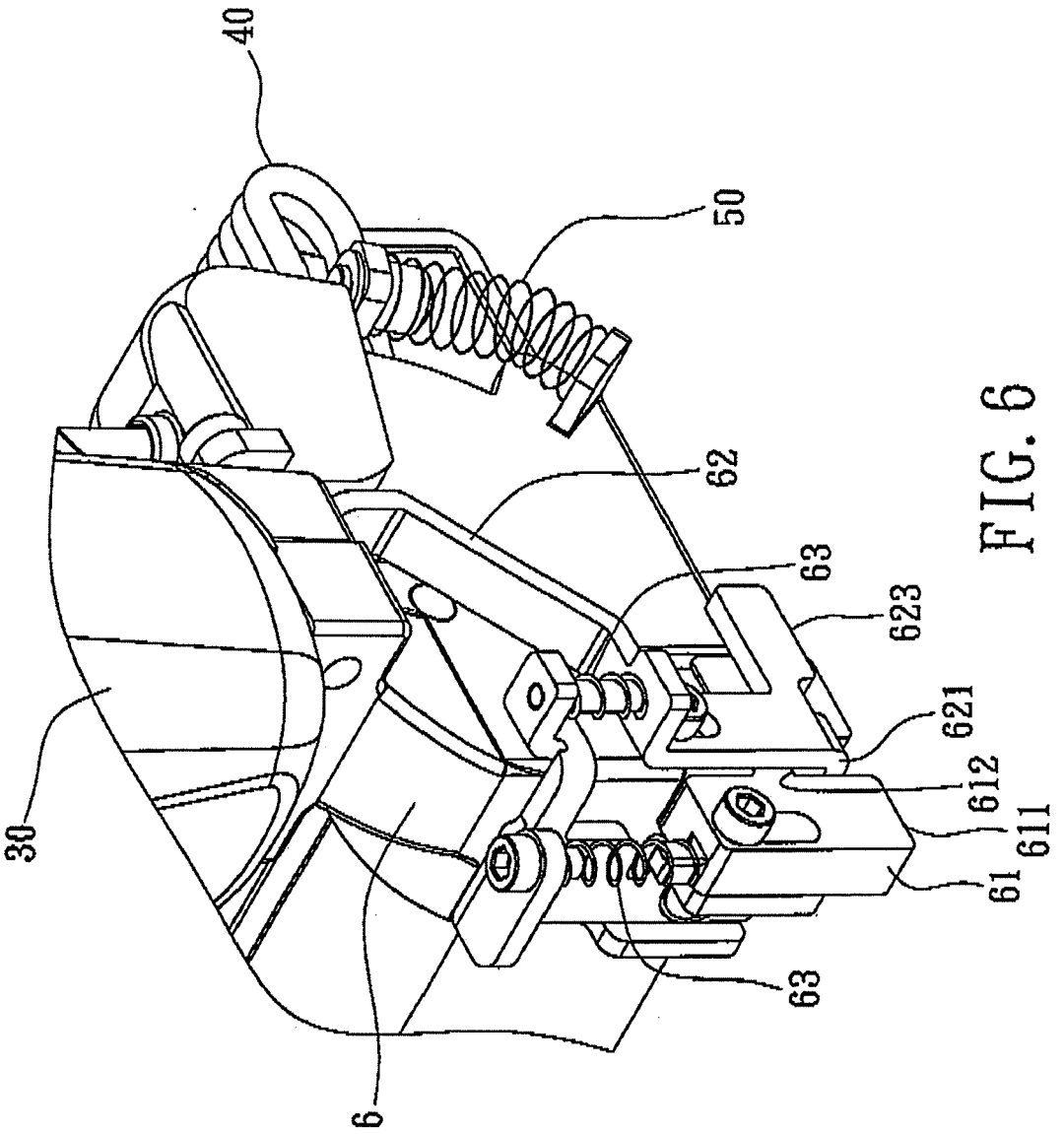

FIG. 6

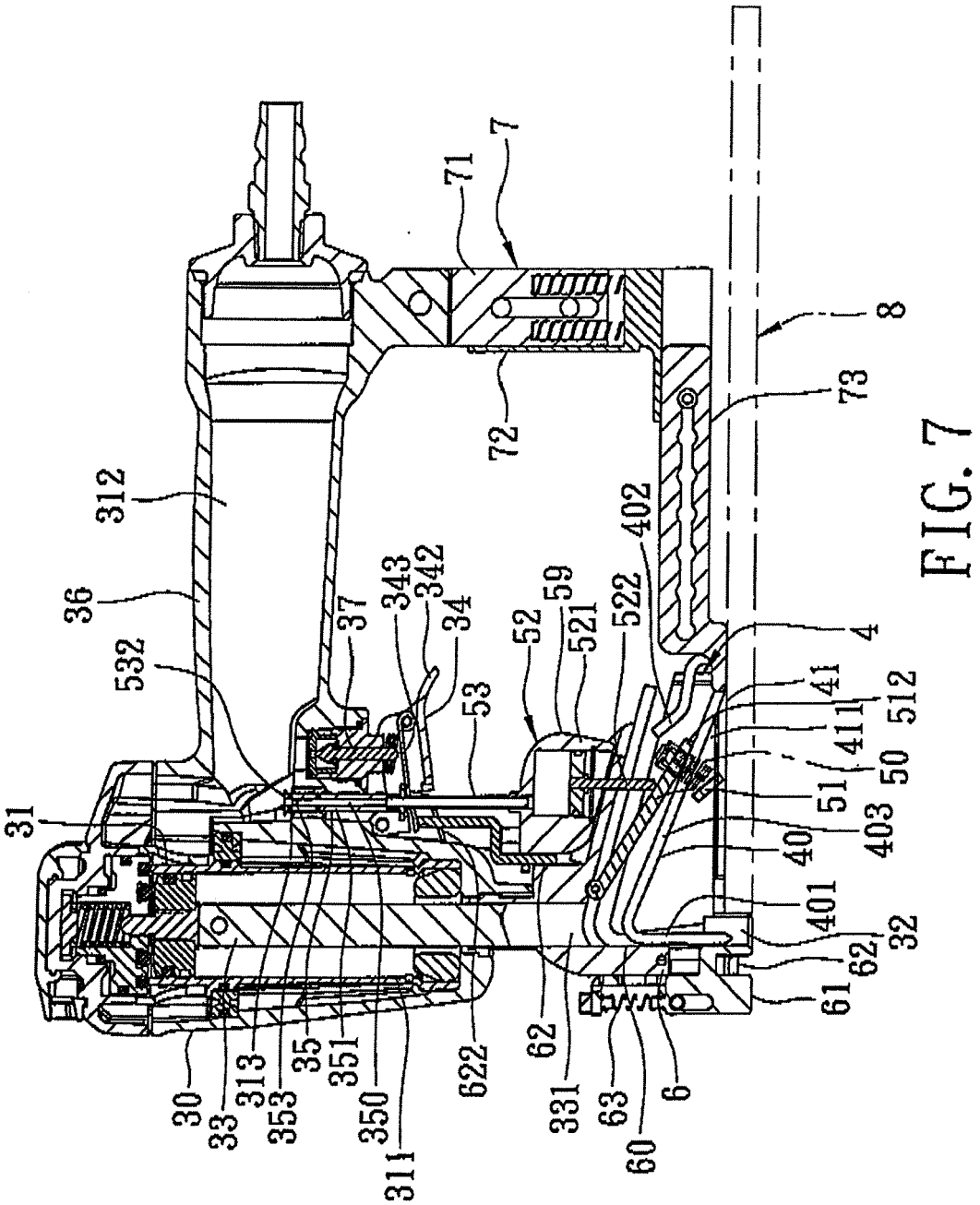
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FIG. 7

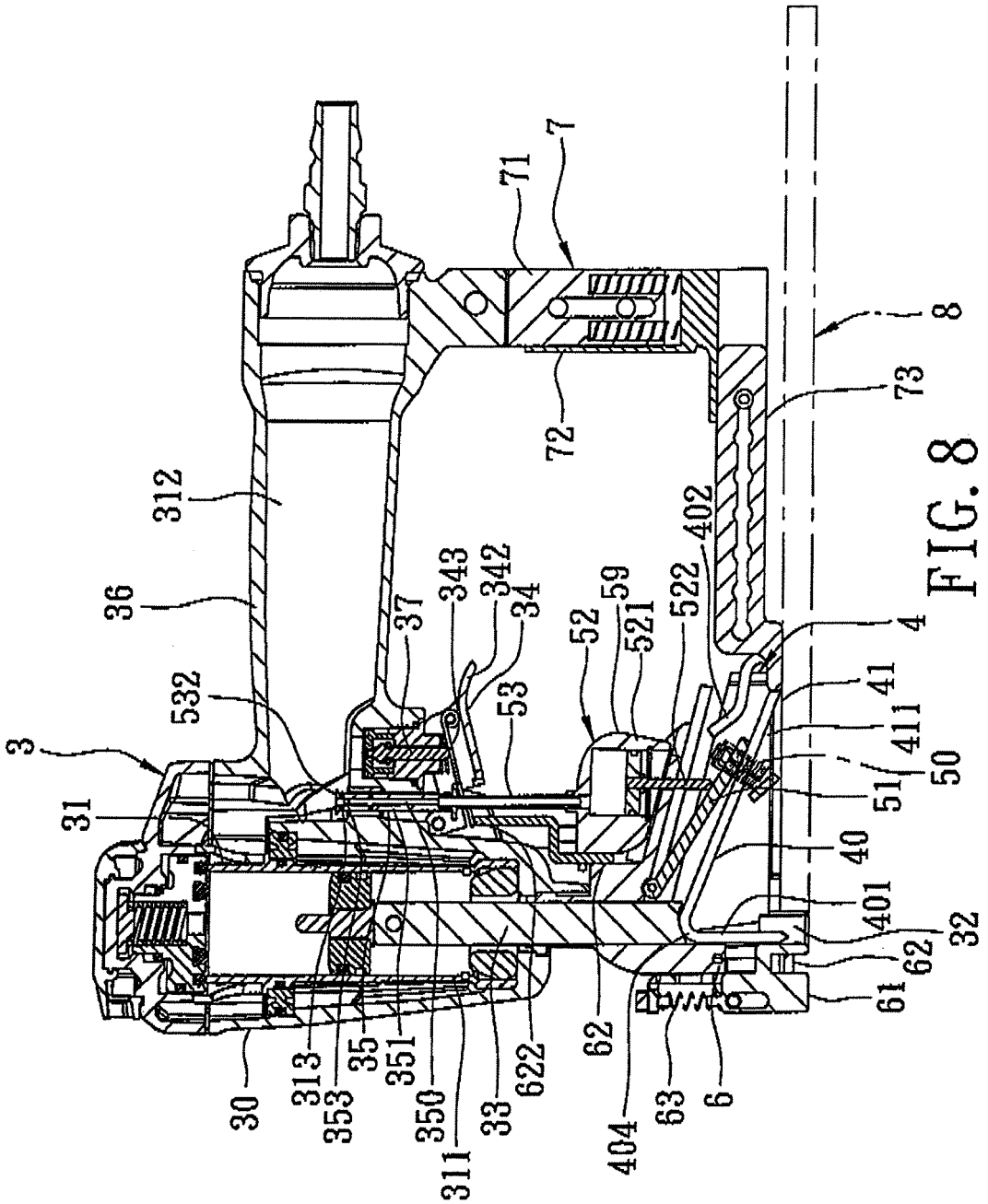
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FIG. 8

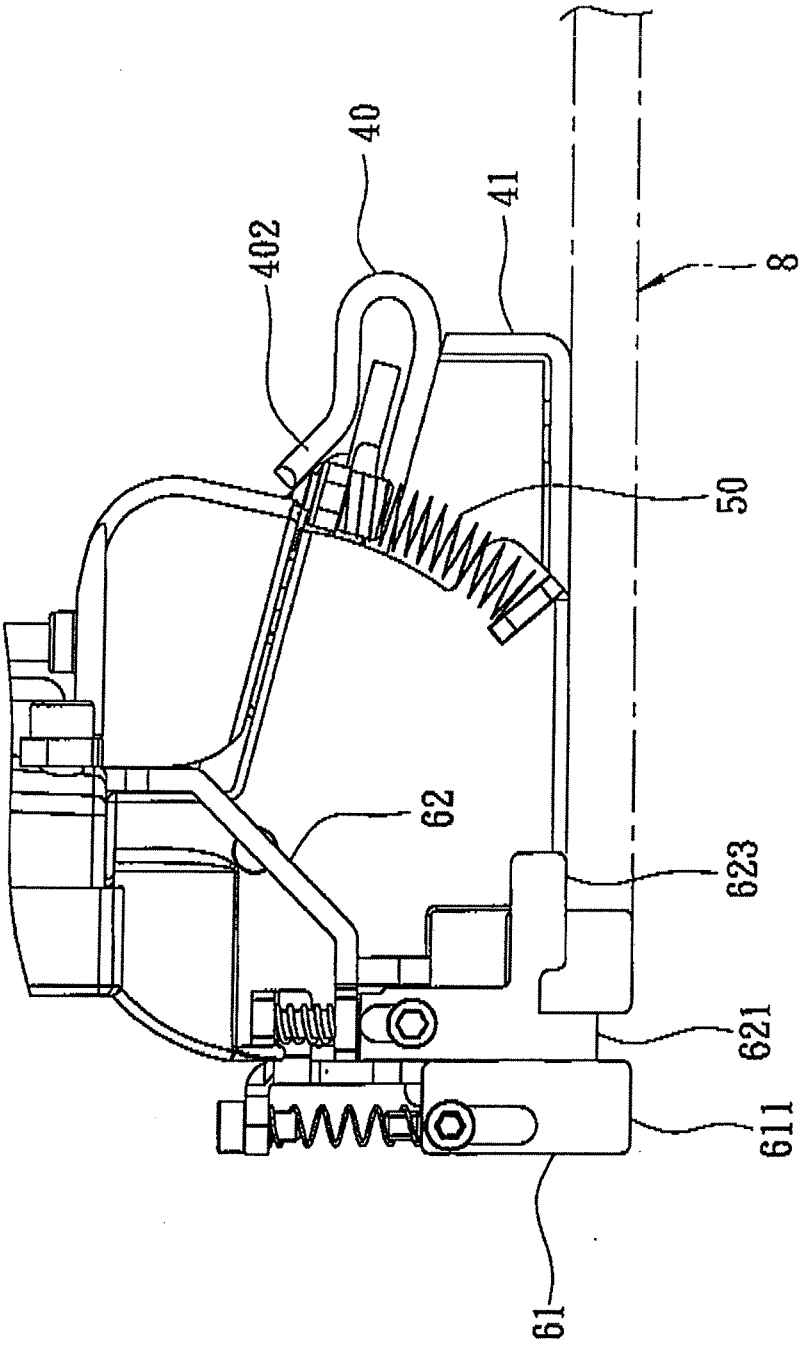

FIG. 9

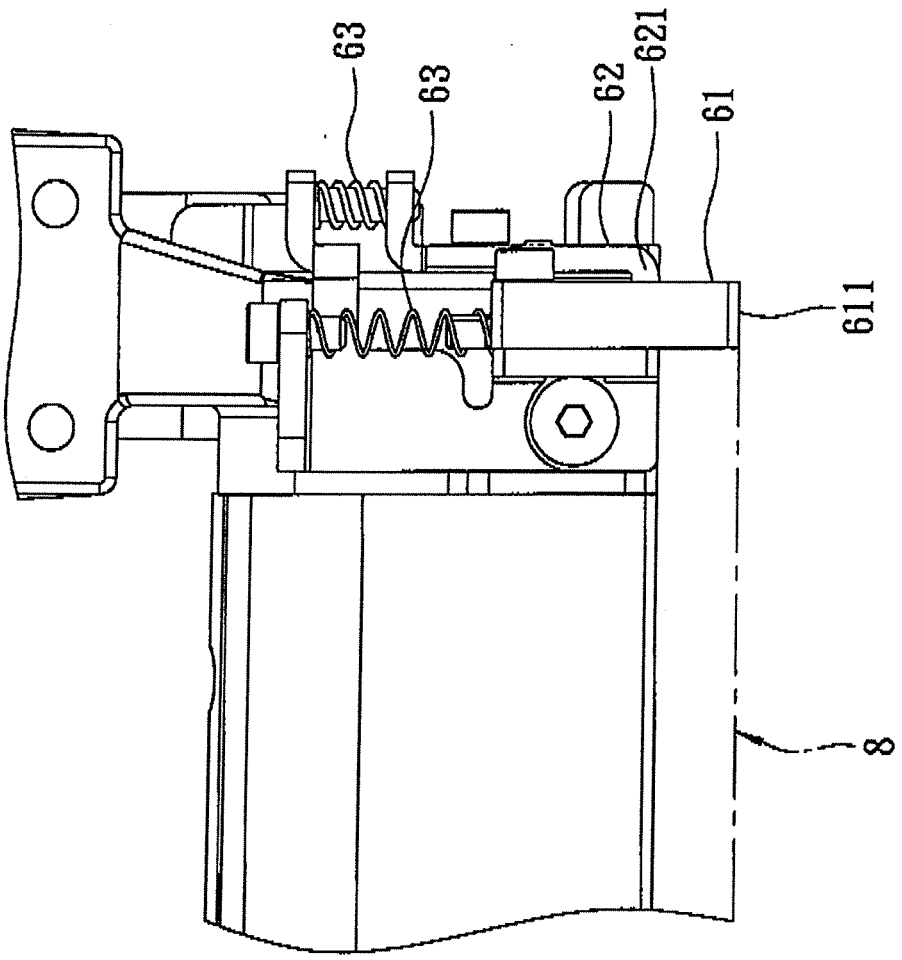

FIG. 10

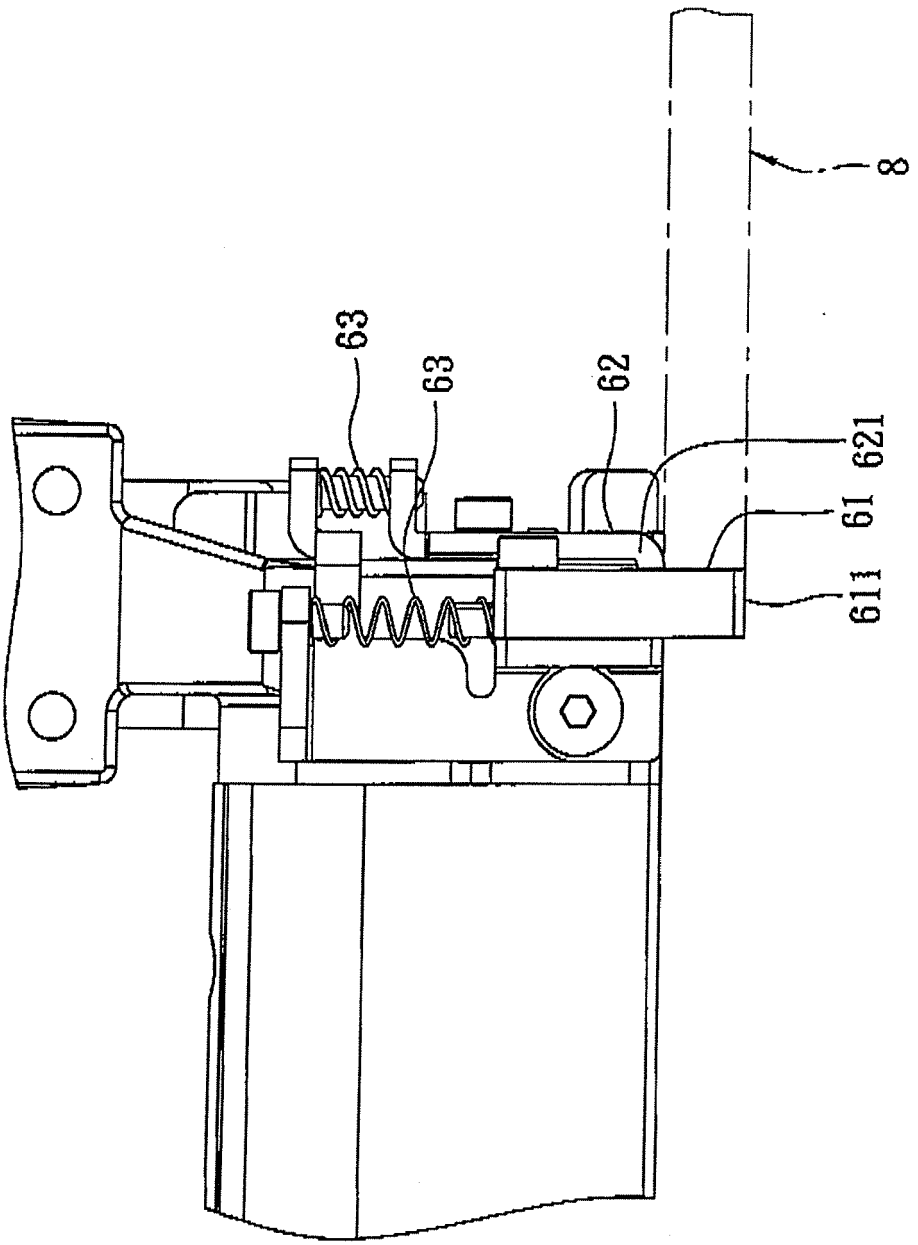

FIG. 11

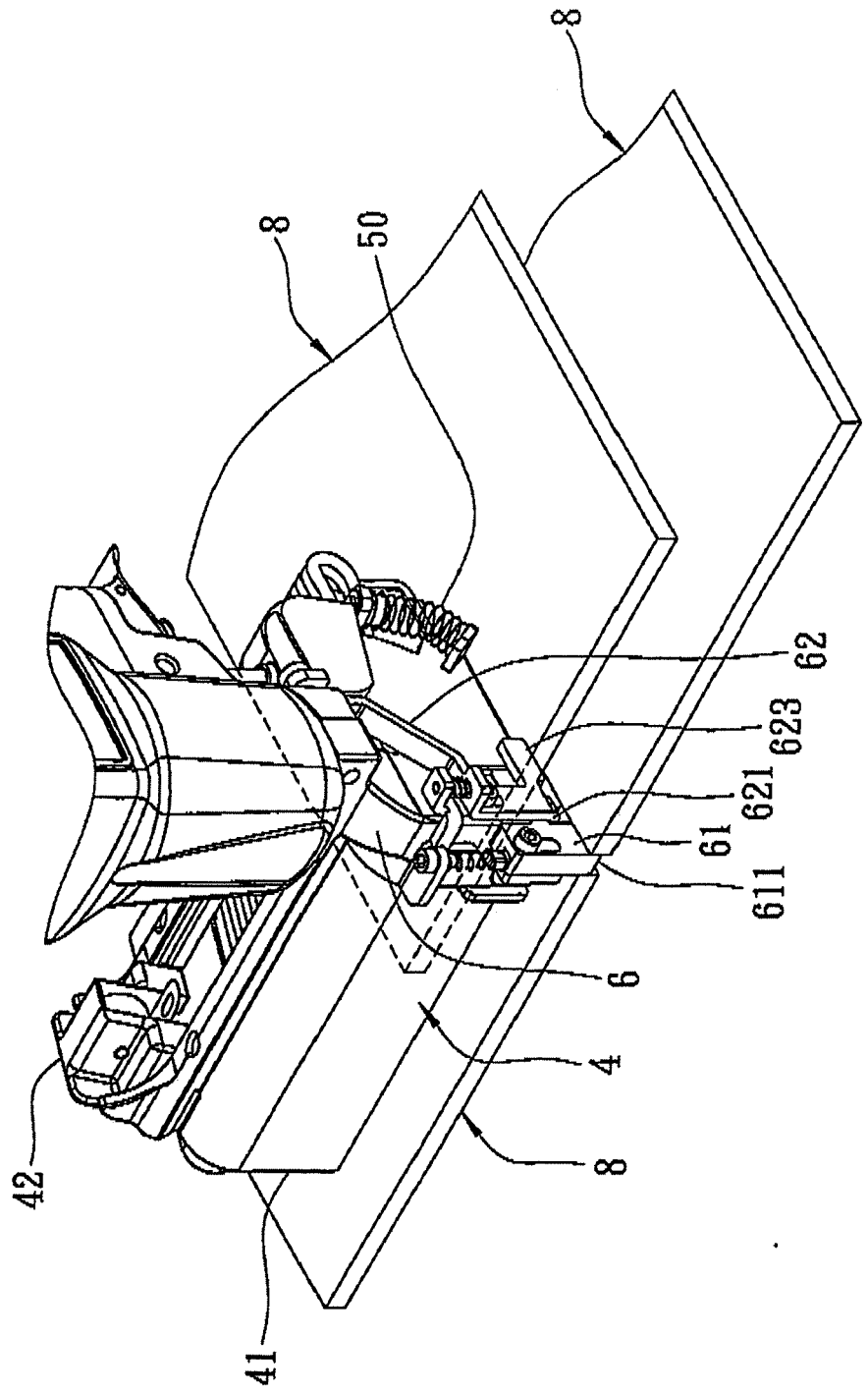

FIG. 12

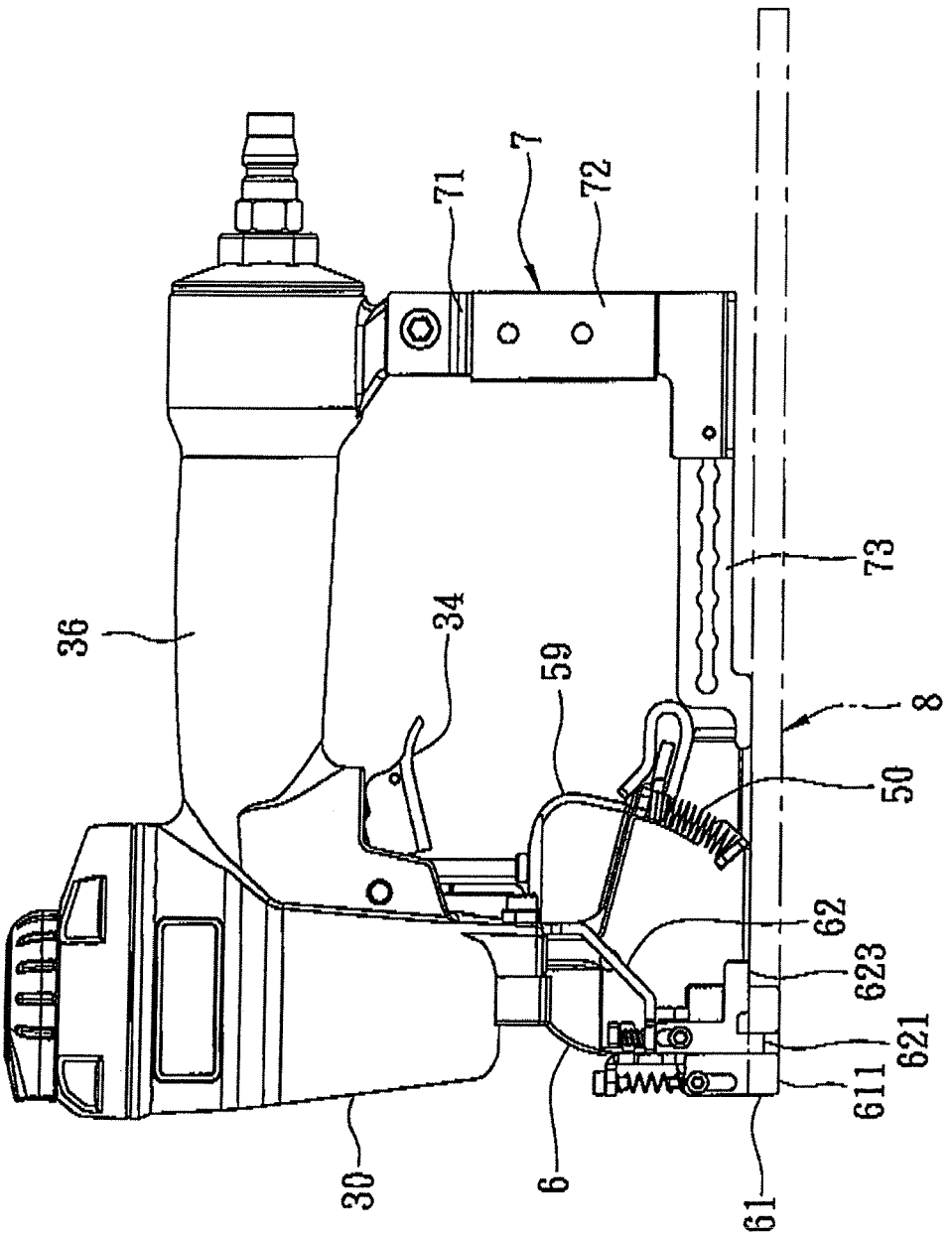

FIG. 13

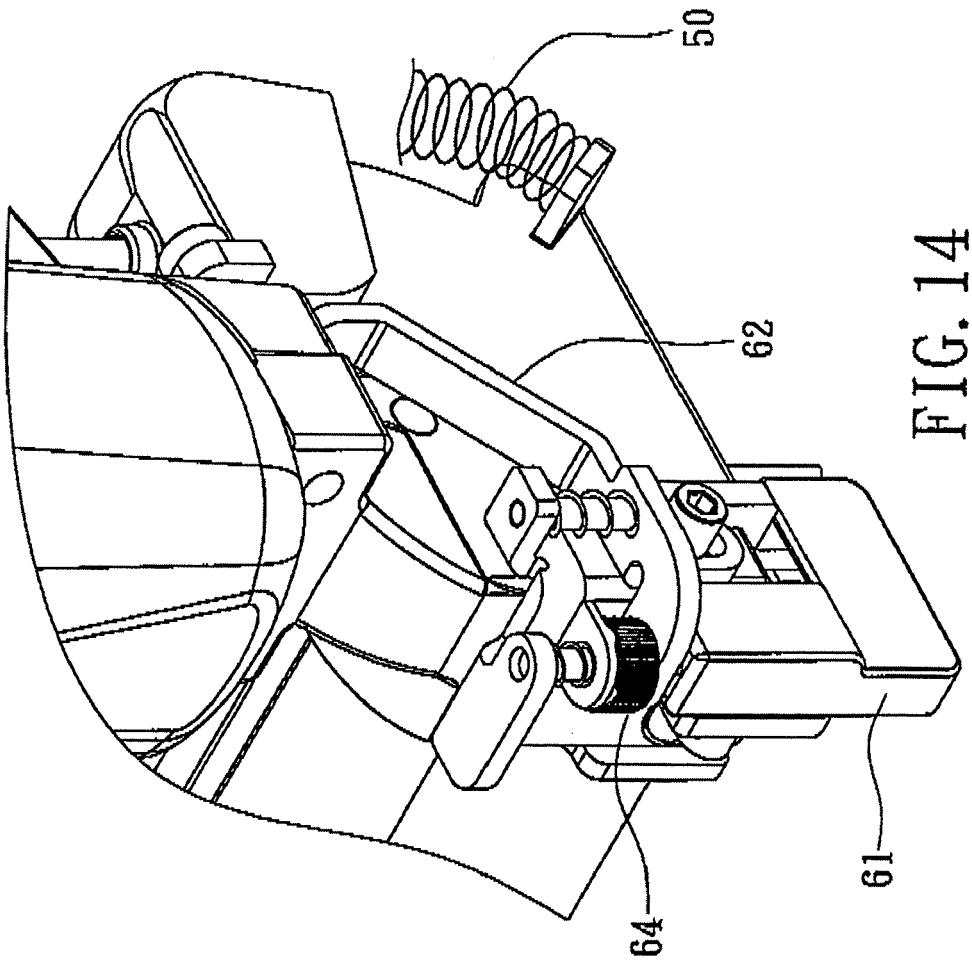

FIG. 14

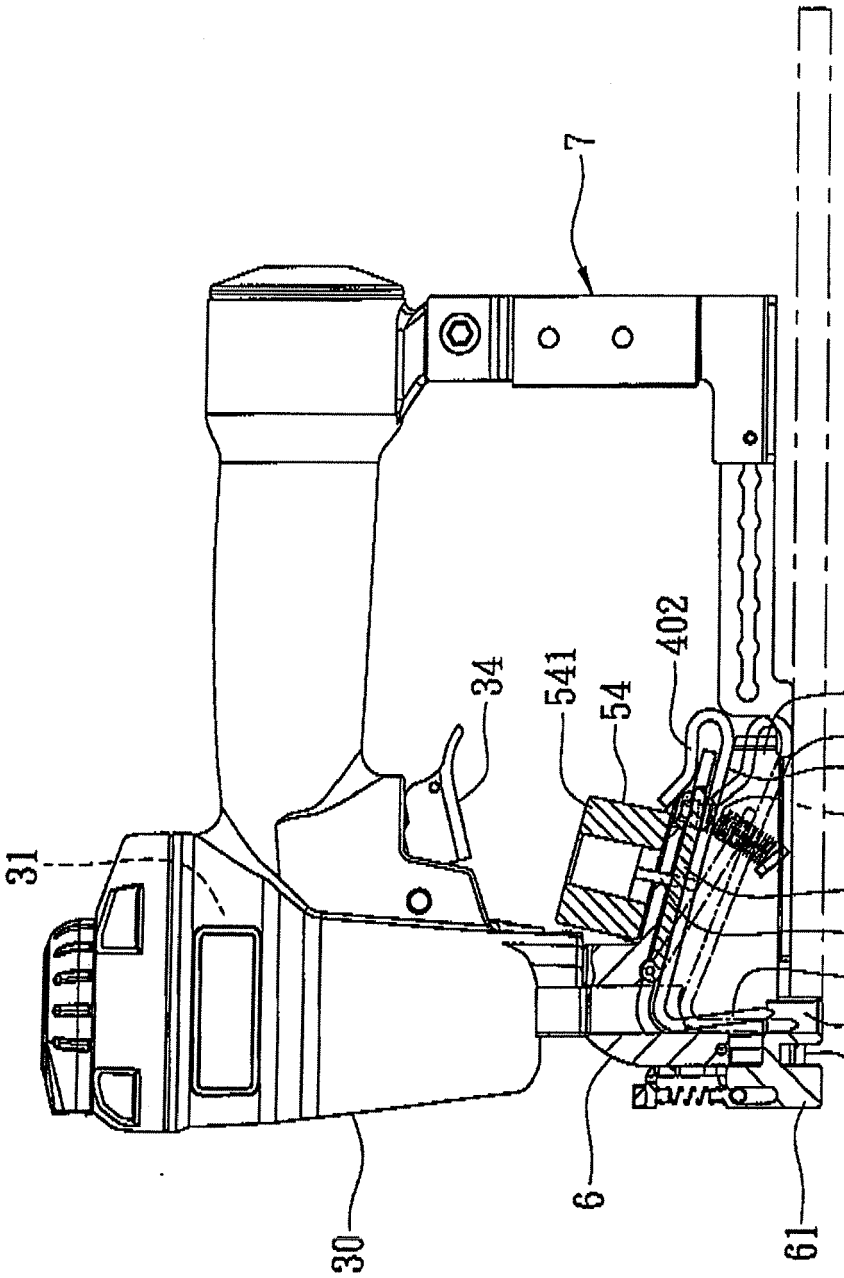

FIG. 15

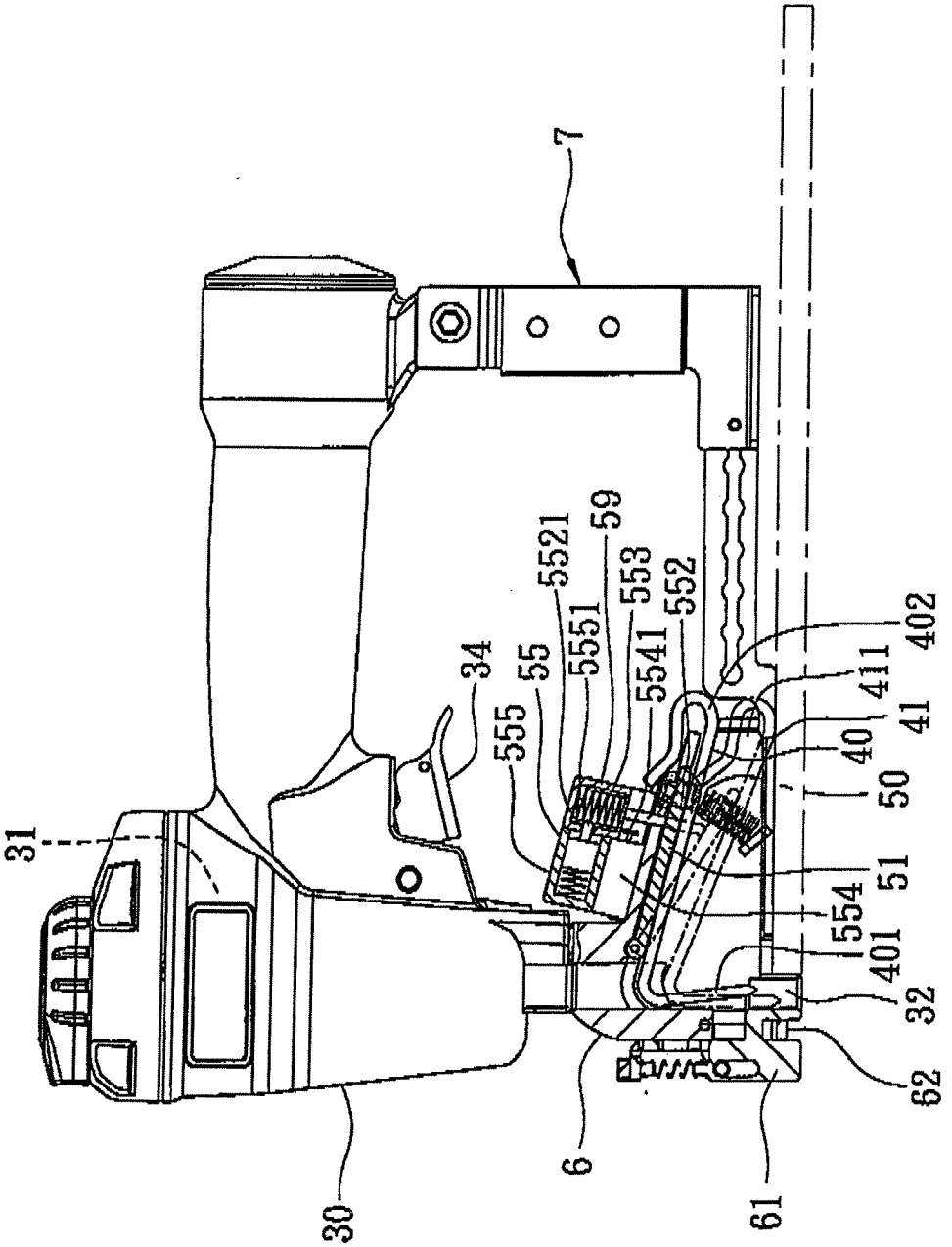
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FIG. 16

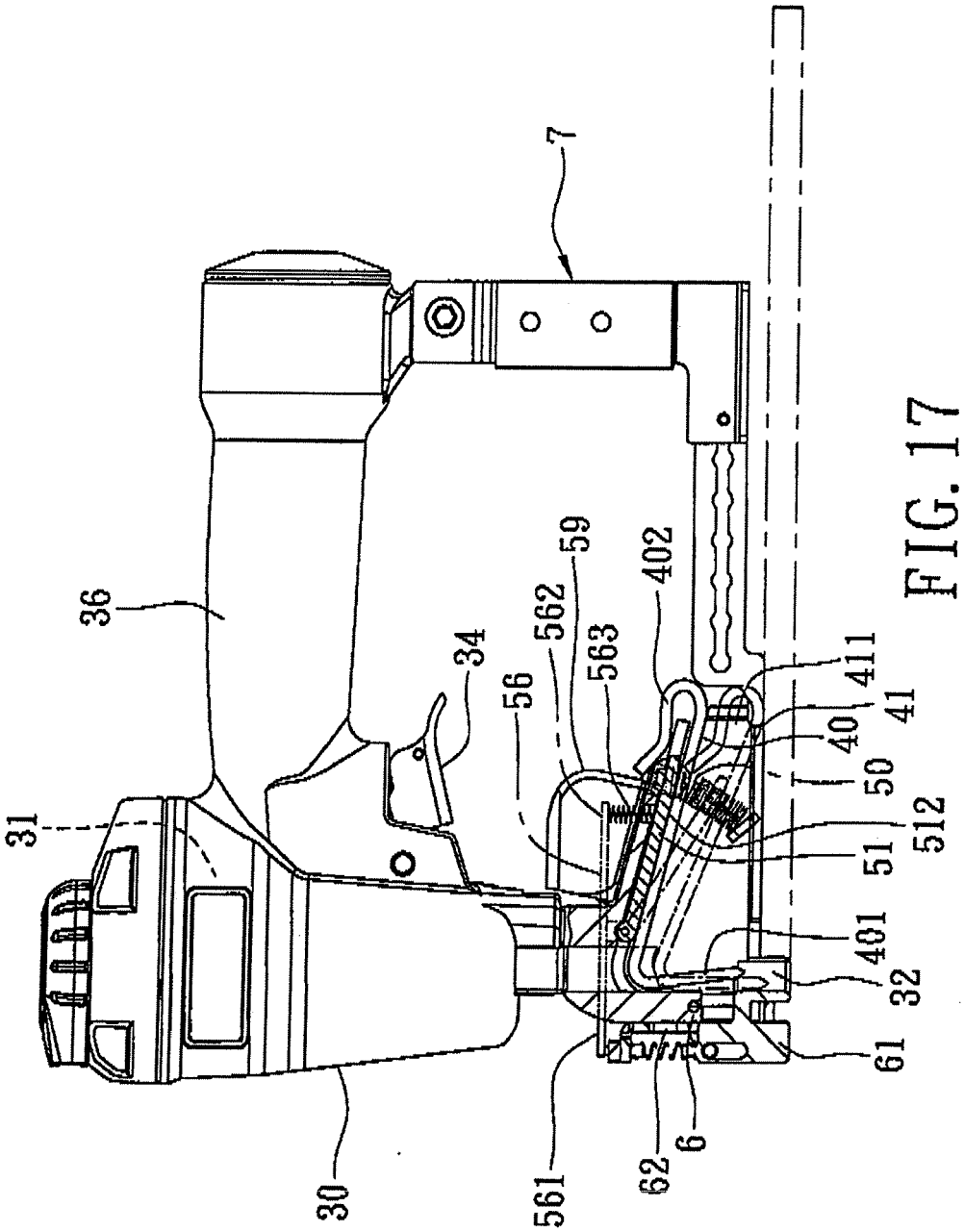

FIG. 17

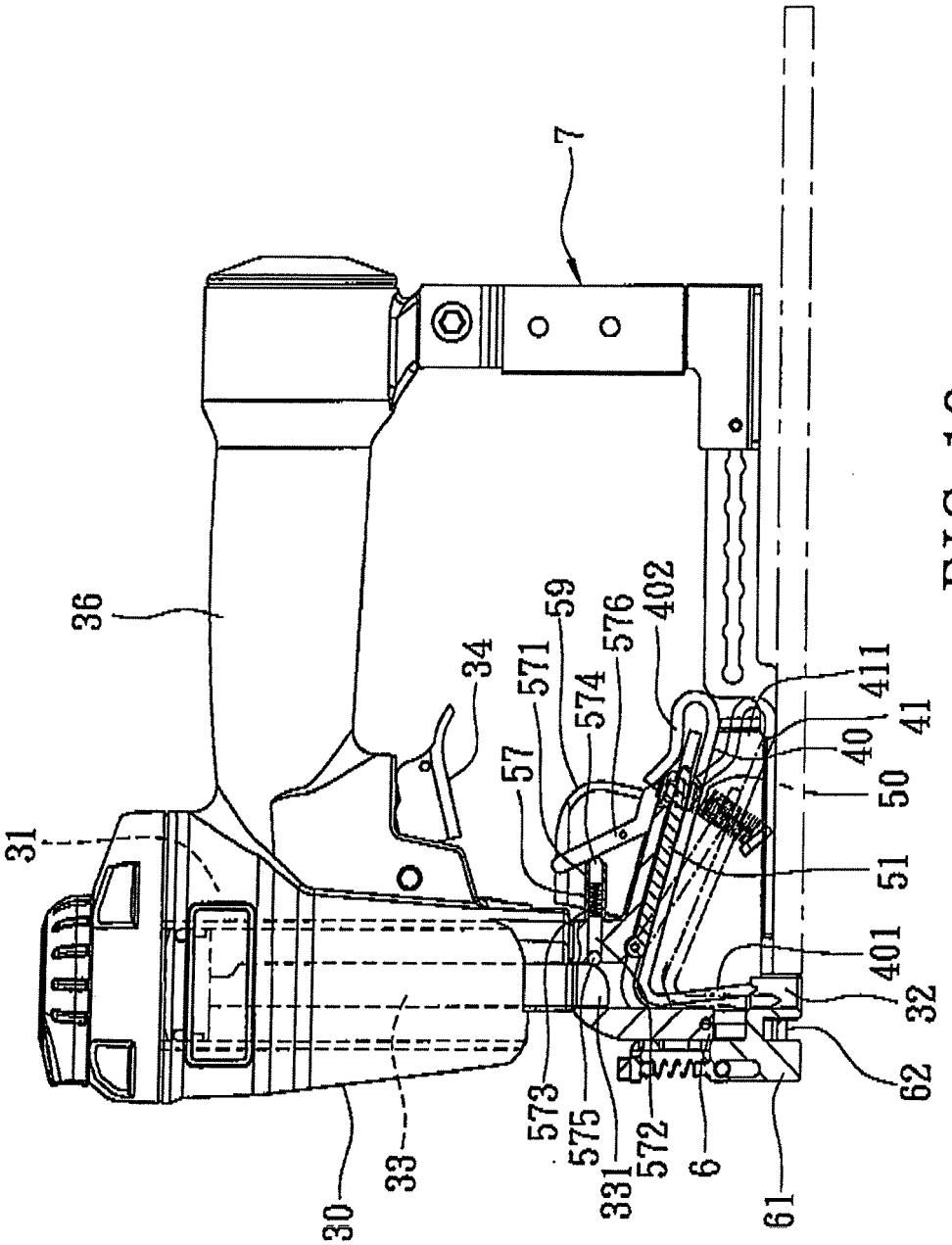
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FIG. 18