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(54) **Gas intake control mechanism for toy gun**

(57) A toy gun gas intake control mechanism (D) includes a holder frame (1), an impact member (2) having an elongated base (21) pivoted with its bottom end to the holder frame (1), a striking block (22), a pivot axle (24) that pivotally connects the striking block (22) to the top end of the elongated base (21) and a first spring member (51) for revering the striking block (22), a retaining block (4) supported on a second spring member (52) in the holder frame (1) and having a retaining notch (41) for retaining the outer end (241) of the pivot axle (24). When firing a bullet, the bolt body (C) of the toy gun moves

forwards, the striking block (22) strikes a seal member (B1) to open a gas inlet (C11), and the pivot axle (24) is moved out of the retaining notch (41) of the retaining block (4) for allowing upward displacement of the retaining block (4). When the bolt body (C) moves backward after firing, the retaining block (4) is forced downwards to the inside of the holder frame (1) by the bolt body (C), the outer end (241) of the pivot axle (24) is engaged into the retaining notch (41), and the striking block (22) is returned, causing the seal member (B1) to close the gas inlet (C11) again.

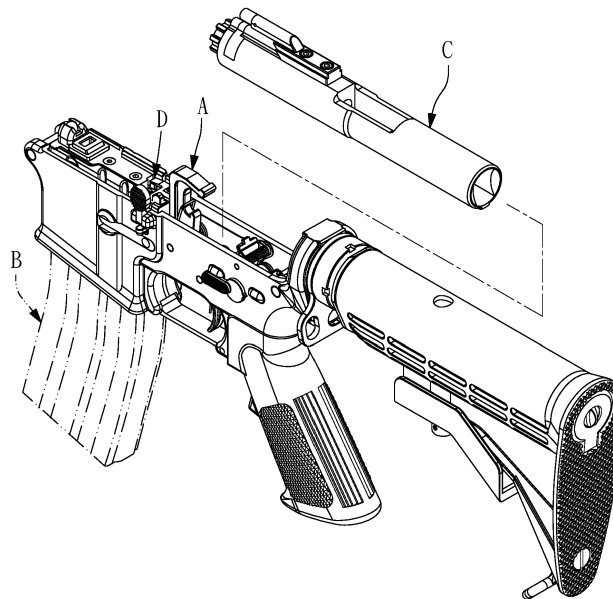


FIG. 4

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to toy guns and more particularly, to a gas intake control mechanism for toy gun, which utilizes the linking arrangement of a retaining block, a holder frame and an impact member to control the intake of compressed gas.

2. Description of the Related Art

[0002] The gas-driven firing unit of a regular air-soft gun, as shown in FIG. 1, generally comprises a bolt body 10, a piston 20, a hammer 30, a gas intake control mechanism 40 and a magazine 50. The bolt body 10 has an accommodation chamber 101 at the front side for accommodating the piston 20, and an opening 102 at the rear side within which the hammer 30 is operable. The gas intake control mechanism 40 is arranged in front of the hammer 30 and behind the magazine 50. The magazine 50 is disposed beneath the piston 20, having accommodated therein a seal member 501. The seal member 501 can be moved forwards to open the gas inlet 201 of the piston 20 for allowing compressed gas to flow out of the magazine 50 into the inside of the piston 20 to force the bolt body 10 backwards, thereby producing a backlash. After production of a backlash, the seal member 501 is moved backwards to close the gas inlet 201, thereby stopping the supply of compressed gas. At this time, the bolt body 10 is moved forwards to its former position.

[0003] According to the aforesaid structure, the seal member 501 is movable forwards/backwards to open/close the gas inlet 201. As shown in FIGS. 1~3, the gas intake control mechanism 40 comprises a holder frame 401, an impact member 402 and a stop block 403 (the stop block 403 is not shown in FIGS. 1 and 3). The impact member 402 is pivotally connected to the holder frame 401, and biasable in and out of the holder frame 401. The stop block 403 is pivotally connected to the top side of the holder frame 401 (see FIG. 2).

[0004] Further, the magazine 50 has a spring-supported retaining block 502 disposed at one lateral side relative to the seal member 501. When the spring-supported retaining block 502 is forced downwards, the seal member 501 can be moved backwards (see FIG. 3). When the toy gun is operated to fire a bullet, the impact member 402 is driven by the hammer 30 to force the seal member 501 forwards in opening the gas inlet 201 of the piston 20 (see FIG. 1). Thereafter, the bolt body 10 is moved backwards to produce a backlash (see FIG. 3). When the bolt body 10 is moved backwards to a predetermined distance, a bottom flange 103 of the bolt body 10 forces the spring-supported retaining block 502 downwards for allowing the seal member 501 to be returned to close the gas inlet 201 of the piston 20, and therefore the supply

of compressed gas is stopped.

[0005] According to the aforesaid prior art design of gas intake control mechanism 40, the spring-supported retaining block 502 which controls forward/backward movement of the seal member 501 is mounted in the magazine 50. This arrangement complicates the structural design of the magazine 50 and its fabrication. Further, because the spring-supported retaining block 502 is located on a place in front of the holder frame 401 and the impact member 402, the supply of gas is quickly stopped, shortening the backward displacement distance of the bolt body 10, and therefore the backlash thus produced is reduced.

15 SUMMARY OF THE INVENTION

[0006] The present invention has been accomplished under the circumstances in view.

[0007] It is the main object of the present invention to provide a gas intake control mechanism for toy gun, which eliminates the drawbacks of the aforesaid prior art design.

[0008] It is another object of the present invention to provide a gas intake control mechanism for toy gun, which has a simple structure.

[0009] It is still another object of the present invention to provide a gas intake control mechanism for toy gun, which utilizes the linking arrangement of a retaining block, a holder frame and an impact member to achieve control of forward and backward movement of a seal member, enhancing the backlash of the toy gun.

[0010] To achieve these and other objects of the present invention, a gas intake control mechanism is installed in a toy gun in front of a hammer and behind a magazine. The toy gun gas intake control mechanism comprises a holder frame, an impact member, a first spring member, a stop block, a retaining block and a second spring member. The holder frame has an opening located on a middle part thereof and an upwardly extending accommodation chamber, an impact member pivotally connected to the holder frame movable forwardly out of the opening by the hammer to strike a seal member in the magazine for causing the seal member to open a gas inlet in a piston inside the toy gun. The impact member comprises an elongated base, a striking block and a pivot axle. The elongated base has a bottom end pivotally connected to the holder and a bumper portion backwardly extended from the top end thereof and strikable by the hammer. The striking block is pivotally connected to the front side of the top end of the elongated base and adapted for striking the seal member. The pivot axle pivotally connects the striking block to the elongated base, having an outer end. The first spring member is mounted between the holder frame and the elongated base of the impact member and adapted to impart a biasing force to the elongated base to hold the impact member in the opening of the holder frame. The stop block is pivotally connected to the top side of the holder frame and biasable

upwards to stop the toy gun from firing a toy bullet. The retaining block is received in the accommodation chamber of the holder frame and movable in and out of the accommodation chamber. Further, the retaining block has a retaining notch adapted for receiving the outer end of the pivot axle to hold the impart member in the opening of the holder frame. The second spring member is mounted in the accommodation chamber of the holder frame and adapted to impart an upward pressure to the retaining block for forcing the retaining block partially out of the accommodation chamber when the outer end of the pivot axle is moved out of the retaining notch upon impact between the hammer and the bumper portion of the elongated base of the impact member.

[0011] Further, the retaining block has an oblong coupling hole pivotally connected to the holder frame by a pivot pin for allowing the retaining block to be moved up and down relative to the holder frame within a predetermined distance.

[0012] Further, the retaining block has a recess located on an outside wall thereof above and adjacent to the oblong coupling hole and adapted for stopping the outer end of the pivot axle when the pivot axle is moved out of the retaining notch.

[0013] Further, the holder frame has a transverse through hole transversely extending through the opening. Further, the elongated base of the impact member has a coupling hole transversely located near the bottom end thereof and pivotally connected to the transverse through hole of the holder frame by a pivot shaft.

[0014] The gas intake control mechanism further comprises a third spring member mounted in the elongated base and connected between the elongated base and the striking block, and adapted for imparting a biasing force to the striking block relative to the elongated base.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG.1 is a schematic drawing showing a gas intake status of a gas intake control mechanism of a toy gun according to the prior art.

FIG.2 is a perspective view of the gas intake control mechanism according to the prior art.

FIG.3 is a schematic drawing showing a gas-off status of the gas intake control mechanism in the toy gun according to the prior art.

FIG.4 is a schematic drawing showing the positioning of a gas intake control mechanism in a toy gun according to the present invention.

FIG.5 is a schematic plain view of the present invention, showing a gas intake status of the gas intake control mechanism.

FIG.6 is an elevational assembly view of the gas intake control mechanism according to the present invention.

FIG.7 corresponds to FIG.6 when viewed from an-

other angle.

FIG.8 is an exploded view of the gas intake control mechanism according to the present invention.

FIG.9 is a schematic drawing of the present invention a gas-off status of the gas intake control mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Referring to FIGS. 4 and 5, a gas intake control mechanism **D** is shown installed in a toy gun in front of the hammer **A** behind the magazine **B** and beneath the bolt body **C**. The bolt body **C** accommodates a backwardly extending piston **C1** (see FIG.5). The magazine **B** has a seal member **B1** movably disposed at the inner top side thereof. When the seal member **B1** is moved forwards, the gas inlet **C11** of the piston **C1** is opened for enabling a flow of compressed gas to go out of the magazine **B** into the inside of the piston **C1** so that a backlash can be produced upon a backward displacement of the bolt body **C** (see FIG.9). The gas intake control mechanism **D** comprises a holder frame **1**, an impact member **2** and a stop block **3** (see FIGS. 6-8).

[0017] The holder frame **1** has an opening **11**, an upwardly extending accommodation chamber **12** and a transverse through hole **13** transversely cut through the opening **11** (see FIG.8). The opening **11** is located on the middle of the holder frame **1**. A retaining block **4** is downwardly inserted into the upwardly extending accommodation chamber **12** and supported on a second spring member **52** in the upwardly extending accommodation chamber **12**. The compression spring **52** imparts an upward pressure to the retaining block **4**. The retaining block **4** has a retaining notch **41**, an oblong coupling hole **42** disposed near the bottom end thereof and a recess **411** located on the outside wall above and adjacent to the oblong coupling hole **42**. A pivot pin **14** is inserted through the upwardly extending accommodation chamber **12** and the oblong coupling hole **42** of the retaining block **4** to couple the retaining block **4** to the holder frame **1**, along the retaining block **4** to be moved up and down (in and out of the upwardly extending accommodation chamber **12**) within a limited range (subject to the length of the major axis of the oblong coupling hole **42**).

[0018] The impact member **2** is received in the opening **11** of the holder frame **1**, comprising an elongated base **21** and a striking block **22** (see FIG.8). The elongated base **21** has a coupling hole **211** transversely cut through the bottom end thereof and pivotally coupled to the transverse through hole **13** of the holder frame **1** by a pivot shaft **23**. Further, a first spring member **51** is mounted around the pivot shaft **23** and stopped with its two opposite ends thereof against the elongated base **21** of the impact member **2** and a part of the holder frame **1** below the opening **11** (see FIG.6) for reversing the impact member **2** after the impact member **2** having been forced forwards. Further, the elongated base **21** has a bumper portion **212** backwardly extended from top end thereof. The

striking block **22** is pivotally connected to the top end of the elongated base **21** in front of the stroke portion **212** by a pivot axle **24**. The pivot axle **24** has an outer end **241**. Further, a third spring member **53** is mounted around the pivot axle **24** and stopped with its two opposite ends against the striking block **22** and the elongated base **21**.

[0019] The stop block **3** (see FIGS. 6–8) is pivotally mounted on the top side of the holder frame **1**. When no bullet is to be fired, the stop block **3** is lifted.

[0020] When the toy gun is operated to fire a bullet, the hammer **A** is driven forwards (see FIG.5) to strike the bumper portion **212** of the elongated base **21** of the impact member **2**, forcing the striking block **22** forwards to strike the seal member **B1** of the magazine **B**. Thus, the seal member **B1** is moved forwards to open the gas inlet **C11** of the piston **C1** for enabling a flow of compressed gas to go out of the magazine **B** into the inside of the piston **C1**. Thereafter, the bolt body **C** is moved backwards to produce a backlash (see FIG.9). During forward displacement of the impact member **2**, the outer end **241** of the pivot axle **24** is moved out of the retaining notch **41** of the retaining block **4** (see FIG. 5). At this time, the retaining block **4** is pushed upwards by the second spring member **52**. After the bolt body **C** has been moved backwards to a predetermined distance, the retaining block **4** is forced downwards by a bottom flange **12** of the bolt body **C** (see FIG.9). At this time, the outer end **241** of the pivot axle **24** is engaged into the retaining notch **41** of the retaining block **4** again, and the impact member **2** is returned, and at the same time the seal member **B1** is moved backwards to close the gas inlet **C11** of the piston **C1**, thereby stopping the supply of compressed gas. Subject to the linking action of the retaining block **4**, the holder frame and the impact member **2**, the seal member **B1** is moved forwards or backwards to control the supply of compressed gas.

[0021] As explained above, the linking arrangement of the retaining block **4**, the holder frame **1** and the impact member **2** simplifies the design of the magazine **B**. Further, because the bolt body **C** is moved backwards to force the retaining block **4** downwards at a late time, the supply of compressed gas is stopped lately, enhancing the backlash and eliminating the drawback of the prior art design.

[0022] A prototype of toy gun gas intake control mechanism has been constructed with the features of FIGS. 4–9. The toy gun gas intake control mechanism functions smoothly to provide all of the features disclosed earlier.

[0023] Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

Claims

1. A gas intake control mechanism (**D**) installed in a toy gun in front of a hammer (**A**) and behind a magazine (**B**), the toy gun gas intake control mechanism (**D**) comprising:

a holder frame (**1**), said holder frame (**1**) having an opening (**11**) located on a middle part thereof and an upwardly extending accommodation chamber (**12**);

an impact member (**2**) pivotally connected to said holder frame (**1**) and movable forwardly out of said opening (**11**) by said hammer (**A**) to strike a seal member (**B1**) in said magazine (**B**) for causing said seal member (**B1**) to open a gas inlet (**C11**) in a piston (**C1**) inside said toy gun, said impact member (**2**) comprising an elongated base (**21**), a striking block (**22**) and a pivot axle (**24**), said elongated base (**21**) having a bottom end pivotally connected to said holder frame (**1**) and a bumper portion (**212**) backwardly extended from a top end thereof and strikable by said hammer (**A**), said striking block (**22**) being pivotally connected to a front side of the top end of said elongated base (**21**) and adapted for striking said seal member (**B1**), said pivot axle (**24**) pivotally connecting said striking block (**22**) to said elongated base (**21**) and having an outer end (**241**);

a first spring member (**51**) mounted between said holder frame (**1**) and said elongated base (**21**) of said impact member (**2**) and adapted to impart a biasing force to said elongated base (**21**) to hold said impact member (**2**) in said opening (**11**) of said holder frame (**1**);

a stop block (**3**) pivotally connected to a top side of said holder frame (**1**) and biasable upwards to stop said toy gun from firing a toy bullet;

a retaining block (**4**) received in said accommodation chamber (**12**) of said holder frame (**1**) and movable in and out of said accommodation chamber (**12**), said retaining block (**4**) having a retaining notch (**41**) adapted for receiving the outer end of said pivot axle (**24**) to hold said impact member (**2**) in said opening (**11**) of said holder frame (**1**); and

a second spring member (**52**) mounted in said accommodation chamber (**12**) of said holder frame (**1**) and adapted to impart an upward pressure to said retaining block (**4**) for forcing said retaining block (**4**) partially out of said accommodation chamber (**12**) when the outer end (**241**) of said pivot axle (**24**) is moved out of said retaining notch (**41**) upon impact between said hammer (**A**) and said bumper portion (**212**) of said elongated base (**21**) of said impact member (**2**)

2. The gas intake control mechanism **(D)** as claimed in claim 1, wherein said retaining block **(4)** further has an oblong coupling hole **(42)** pivotally connected to said holder frame **(1)** by a pivot pin **(14)** for allowing said retaining block **(4)** to be moved up and down relative to said holder frame **(1)** within a predetermined distance. 5
3. The gas intake control mechanism **(D)** as claimed in claim 2, wherein said retaining block **(4)** has a recess **(411)** located on an outside wall thereof above and adjacent to said oblong coupling hole **(42)** and adapted for stopping the outer end **(241)** of said pivot axle **(24)** when said pivot axle **(24)** is moved out of said retaining notch **(41)**. 10
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4. The gas intake control mechanism **(D)** as claimed in any of claims 1 to 3, wherein said holder frame **(1)** has a transverse through hole **(13)** transversely extending through said opening **(11)**; said elongated base **(21)** of said impact member **(2)** has a coupling hole **(211)** transversely located near the bottom end thereof and pivotally connected to the transverse through hole **(13)** of said holder frame **(1)** by a pivot shaft **(23)**. 20
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5. The gas intake control mechanism **(D)** as claimed in claim 4, further comprising a third spring member **(53)** mounted in said elongated base **(21)** and connected between said elongated base **(21)** and said striking block **(22)** and adapted for imparting a biasing force to said striking block **(22)** relative to said elongated base **(21)**. 30
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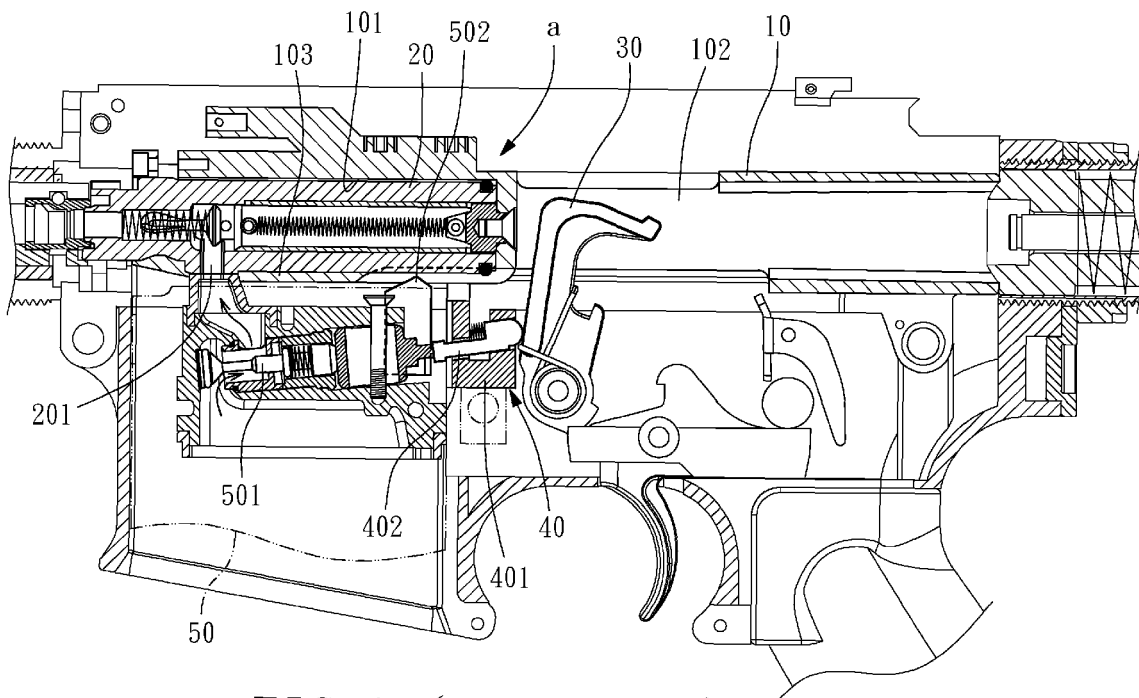


FIG. 1 (PRIOR ART)

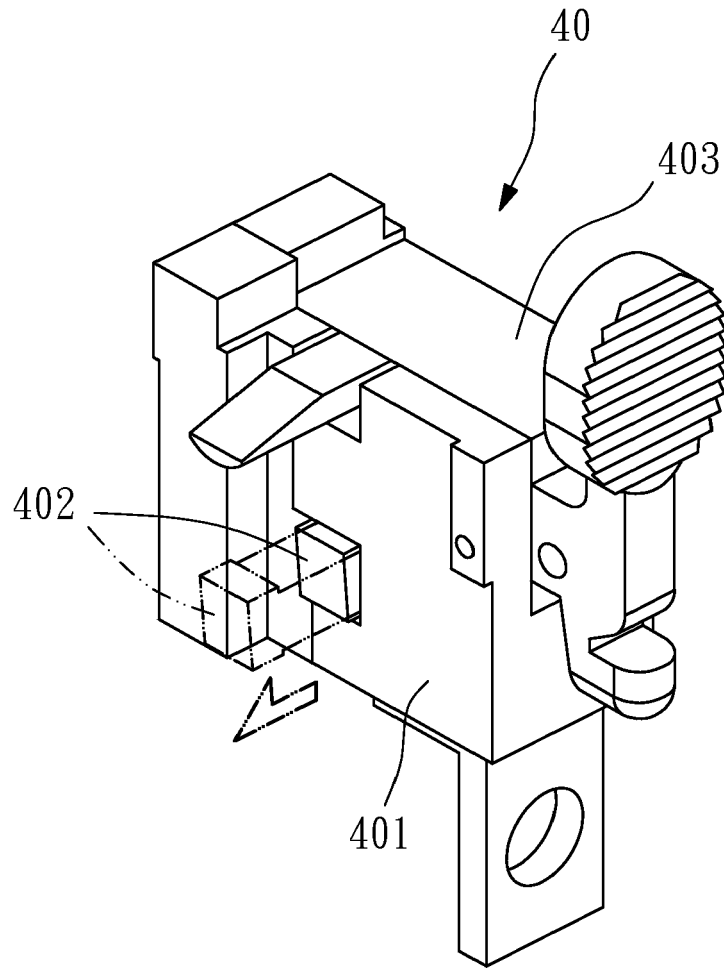


FIG. 2 (PRIOR ART)

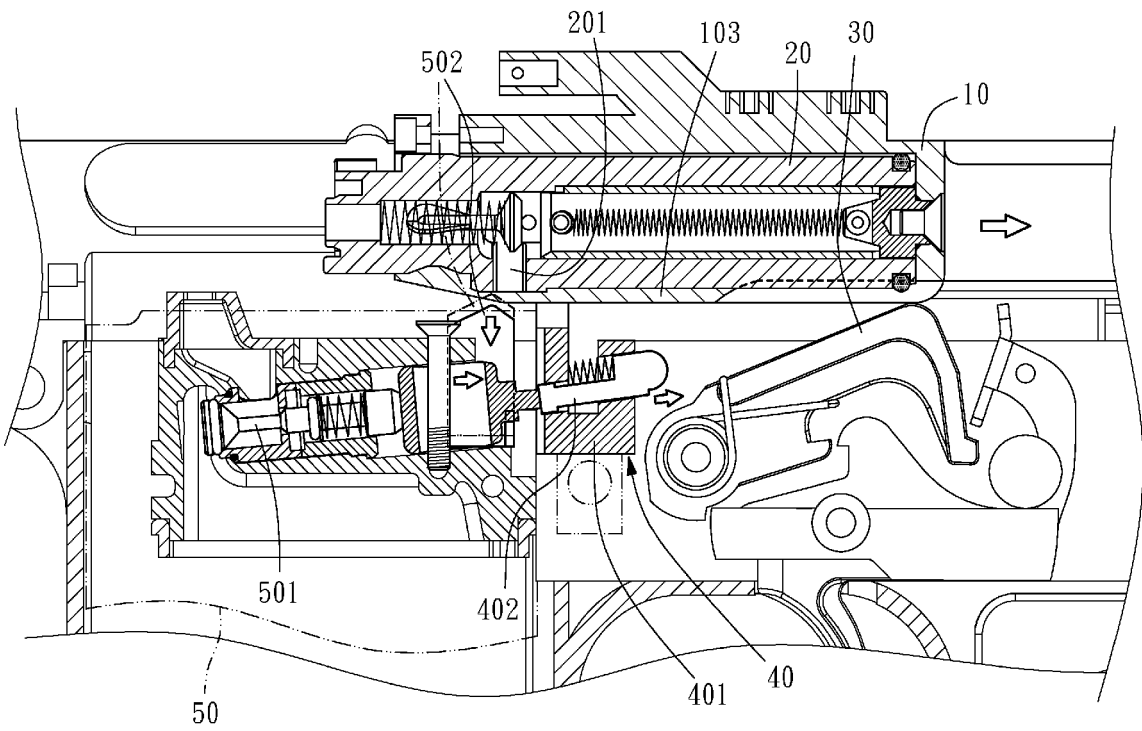


FIG. 3 (PRIOR ART)

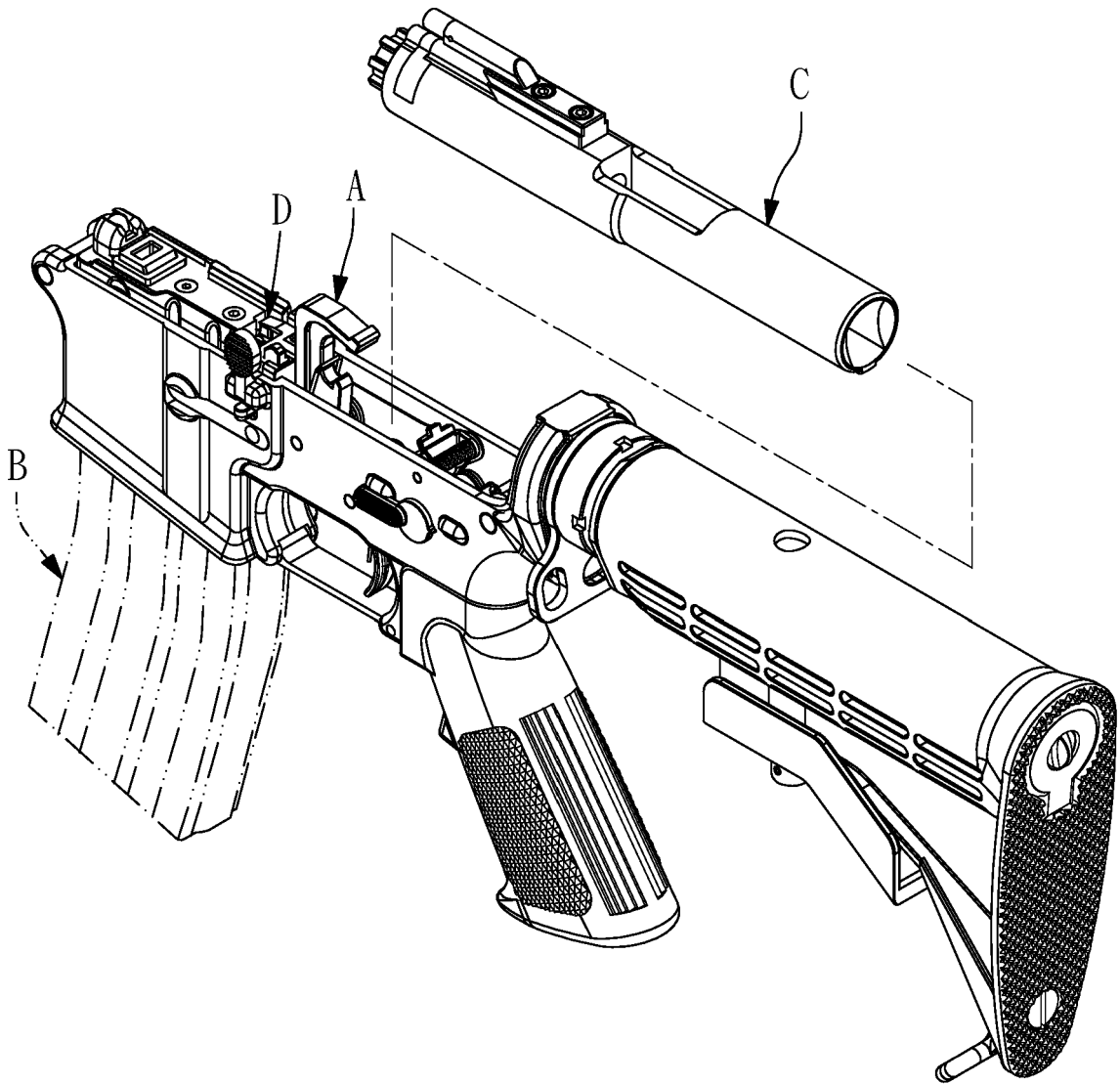


FIG. 4

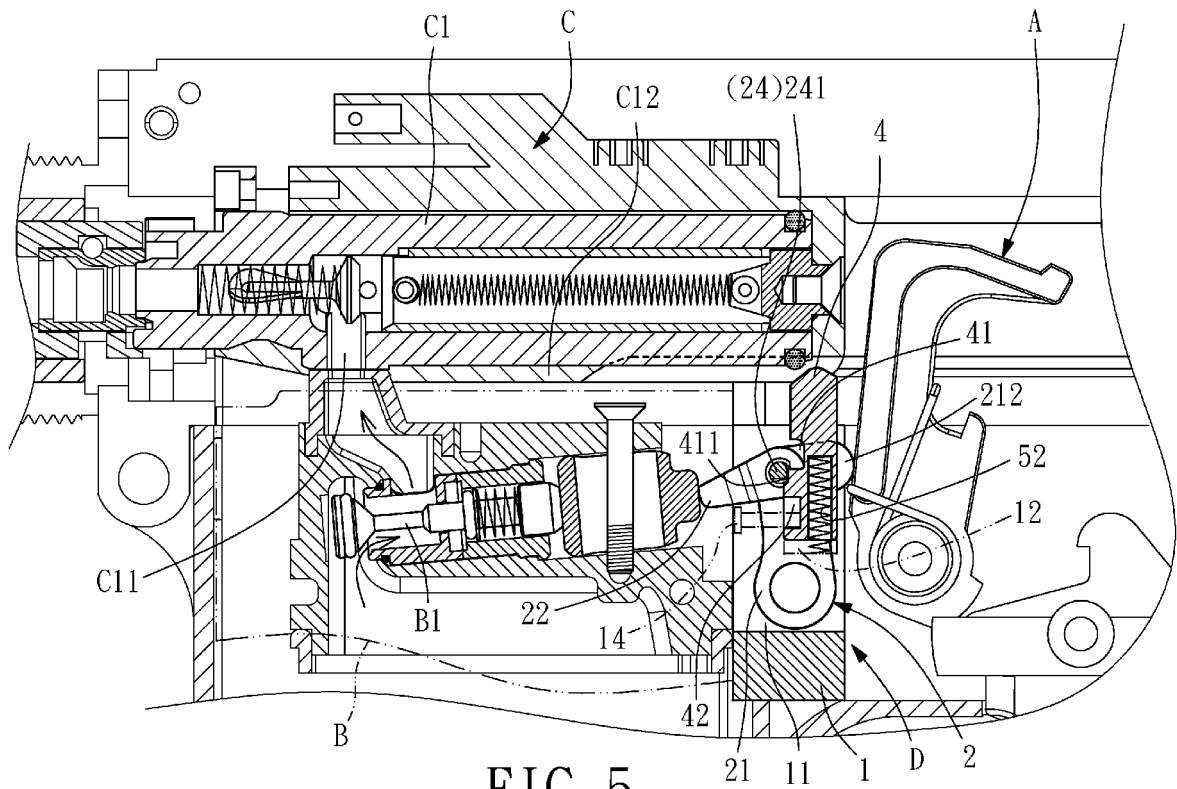


FIG. 5

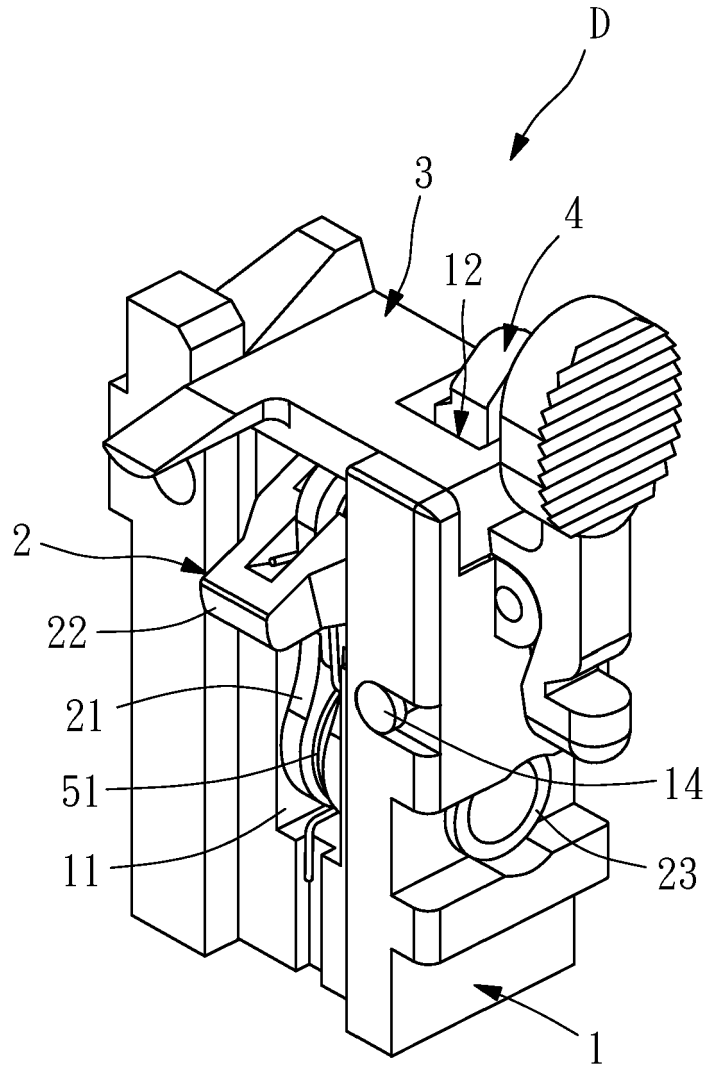


FIG. 6

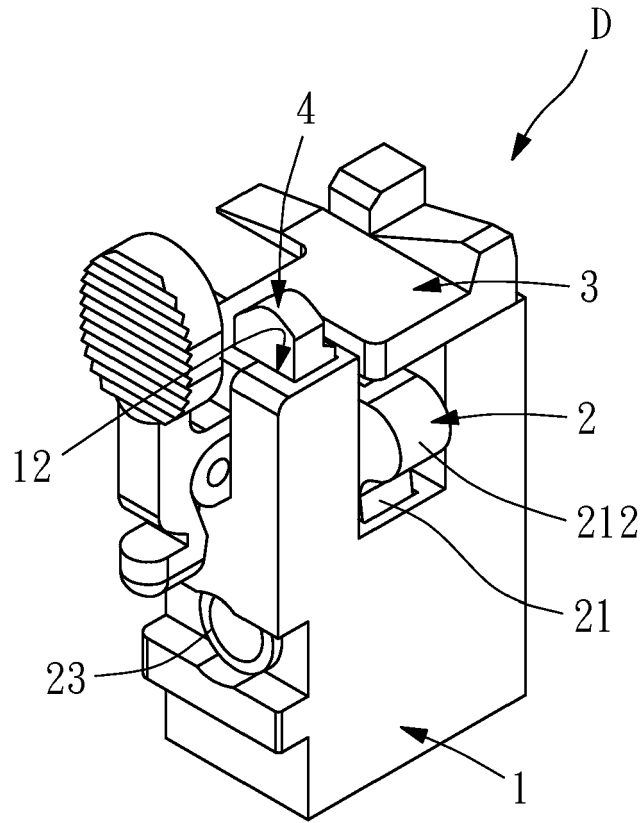


FIG. 7

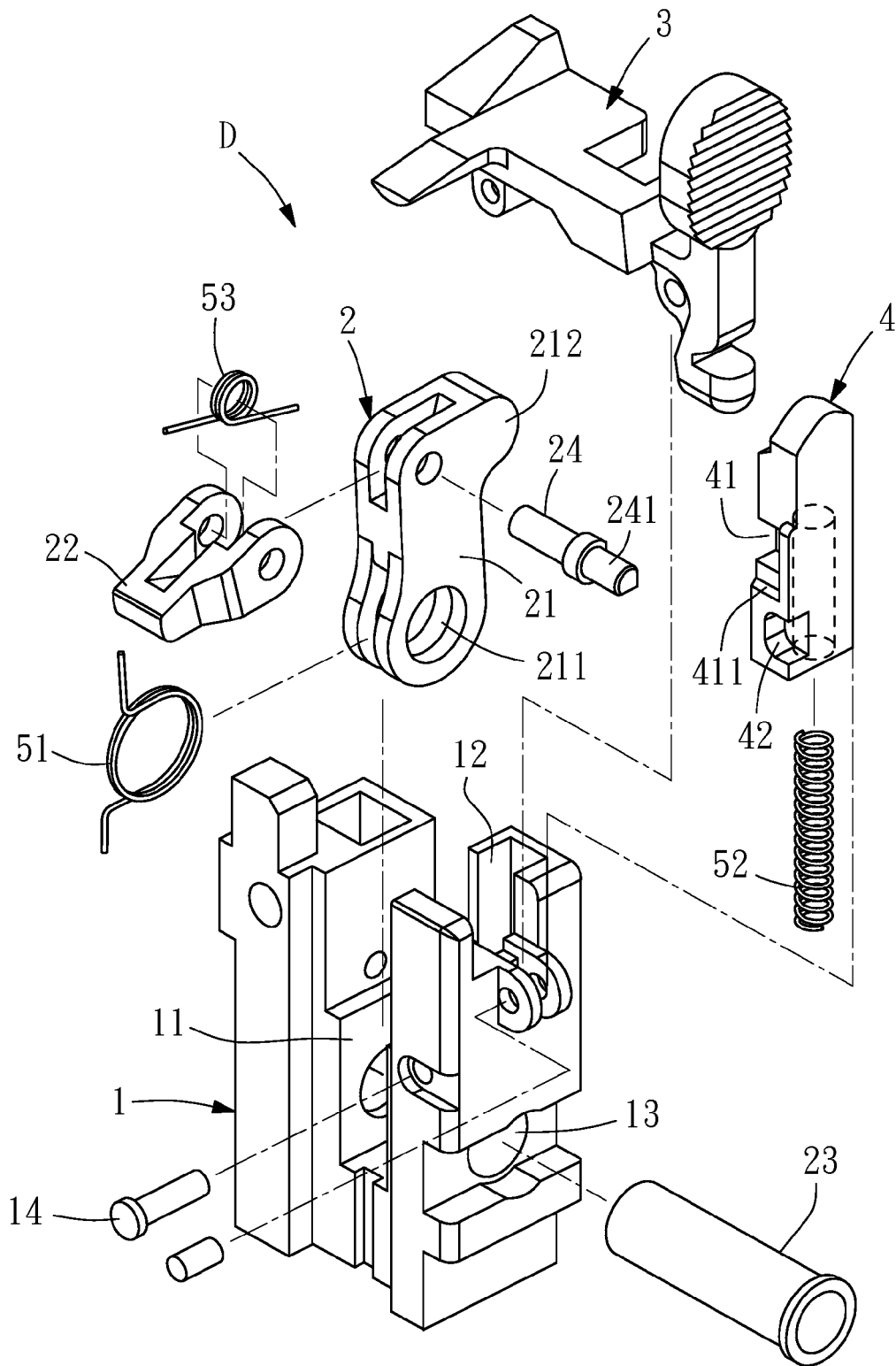


FIG. 8

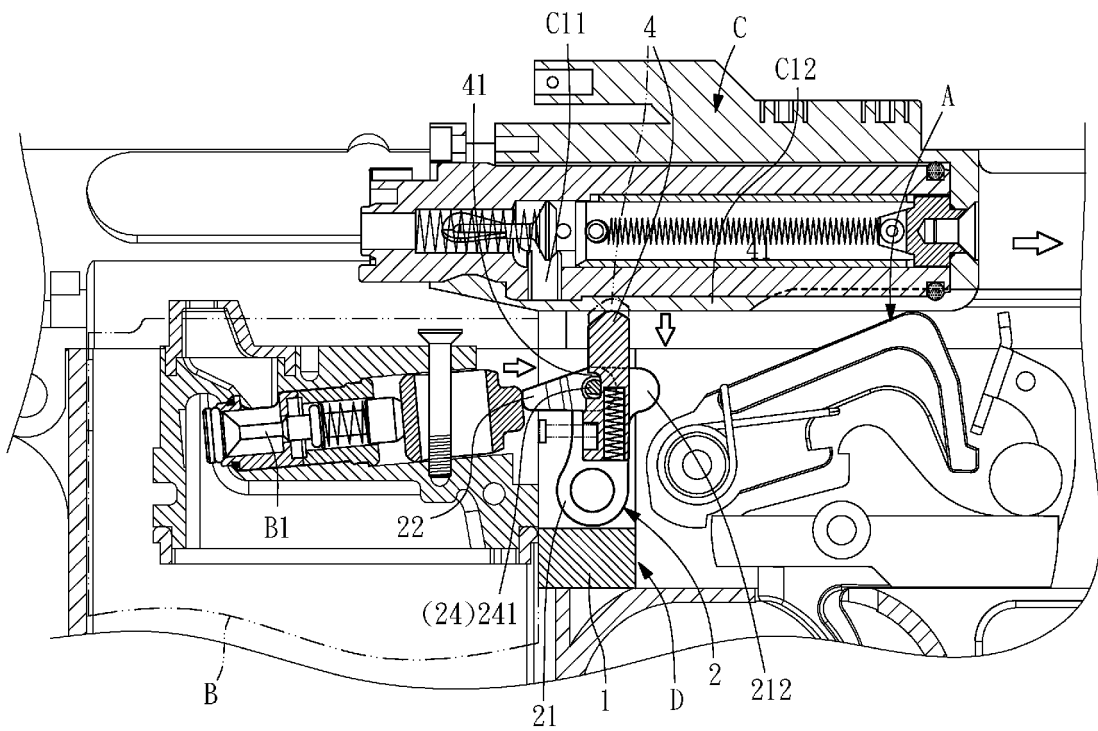


FIG. 9