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Wei

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(45) **Date of Patent: Aug. 19, 2025**

(54) **SINGLE-SHOT/REPEATING SWITCHING DEVICE OF TOY GUN**

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(72) Inventor: **Ho-Sheng Wei**, New Taipei (TW)

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F41B 11/723 (2013.01)
F41B 11/89 (2013.01)

(52) **U.S. Cl.**
CPC ***F41B 11/723*** (2013.01); ***F41B 11/89*** (2013.01)

(58) **Field of Classification Search**
CPC F41B 11/54; F41B 11/723; F41B 11/89; F41A 17/38; F41A 17/64; F41A 17/72; F41A 17/80
See application file for complete search history.

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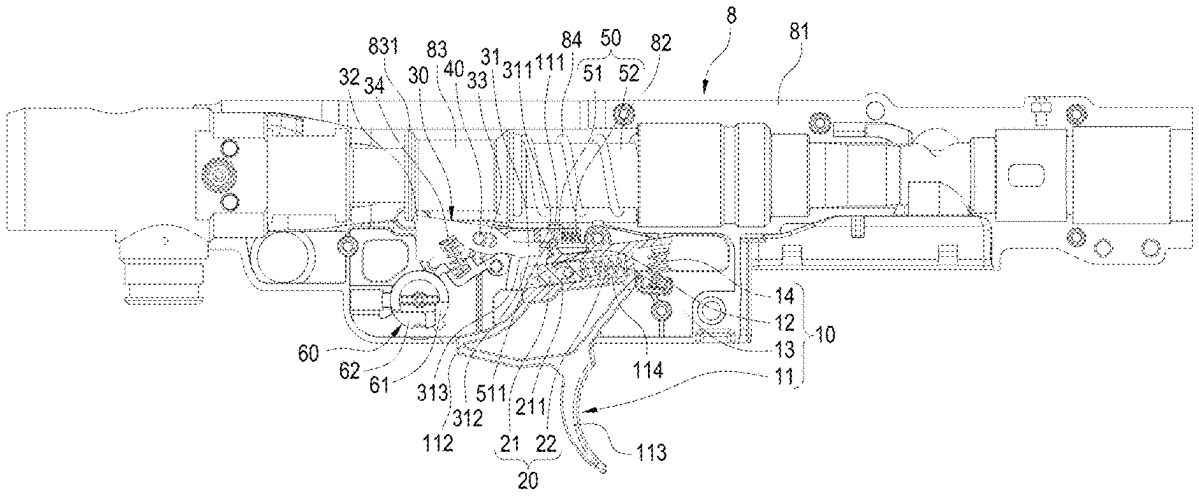
(57) **ABSTRACT**

A single-shot/repeating switching device includes a trigger, a trigger buffer, a release connecting plate, a positioning bar, and a safety blocker. The trigger includes a trigger body, a pushing block and an abutting end. The trigger buffer includes a moving block. The release connecting plate has an activating end and a fastened end. The single-shot/repeating switching button has a repeating opening. In a repeating mode, the trigger body is moved to make the abutting end enter the repeating opening, the pushing block pushes the safety blocker to move, and the moving block pushes the activating end to move upward to make the fastened end escape from locking to generate a first firing. The firing cylinder touches the fastened end to make the release connecting plate rotate about the positioning bar when returning. The activating end is pressed by the trigger buffer to slow down a subsequent repeating speed.

10 Claims, 17 Drawing Sheets



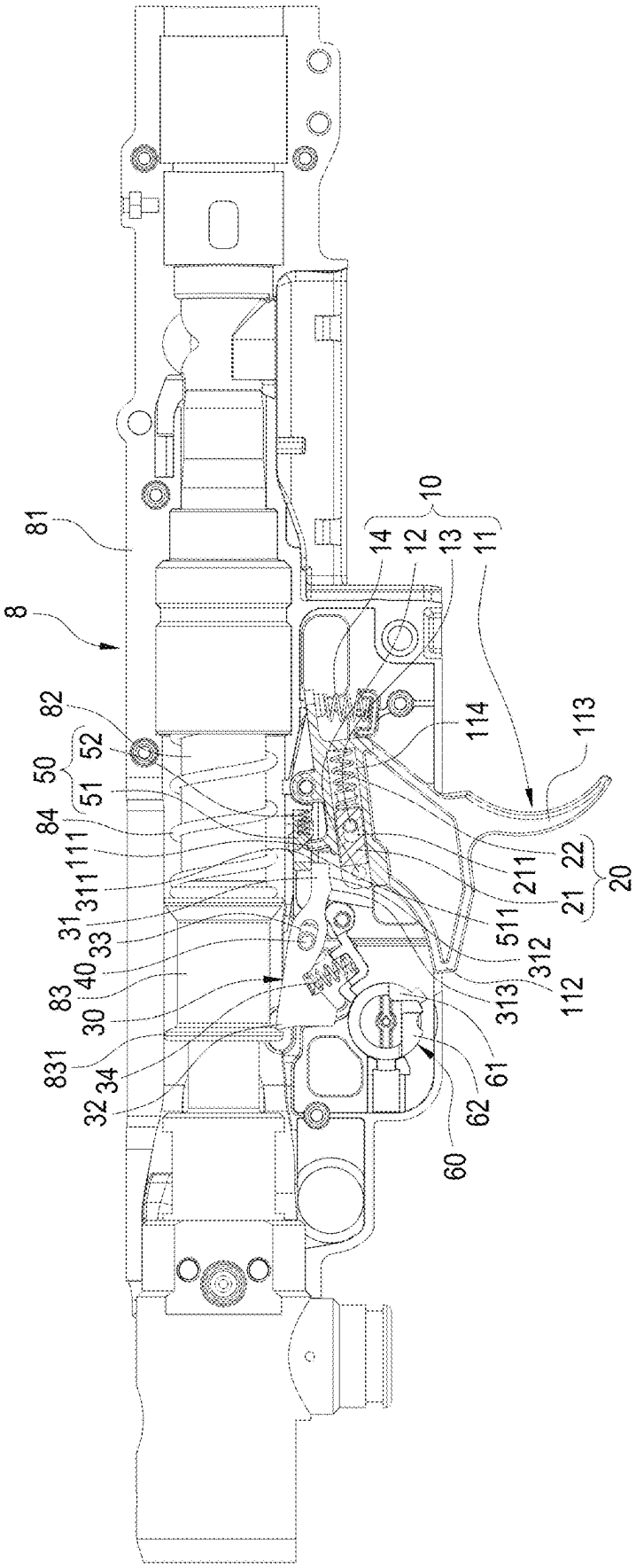

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FIG.1

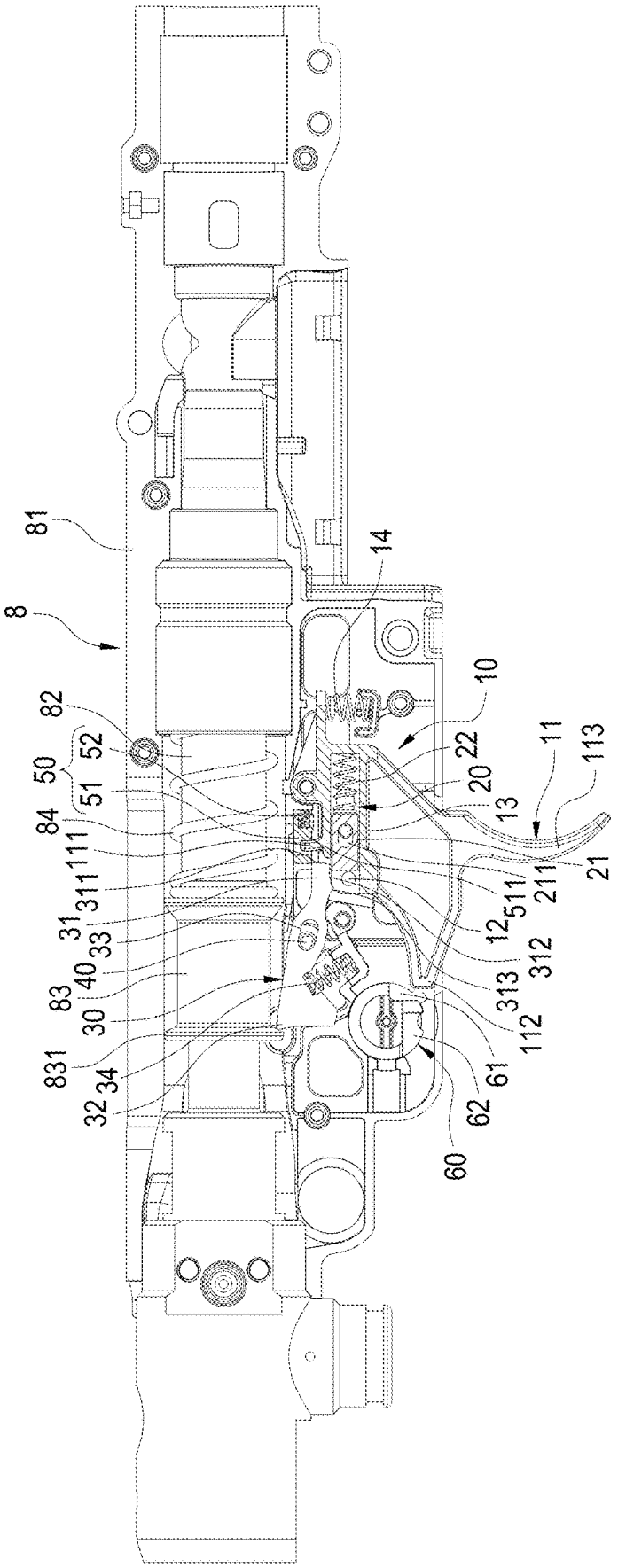
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FIG.2

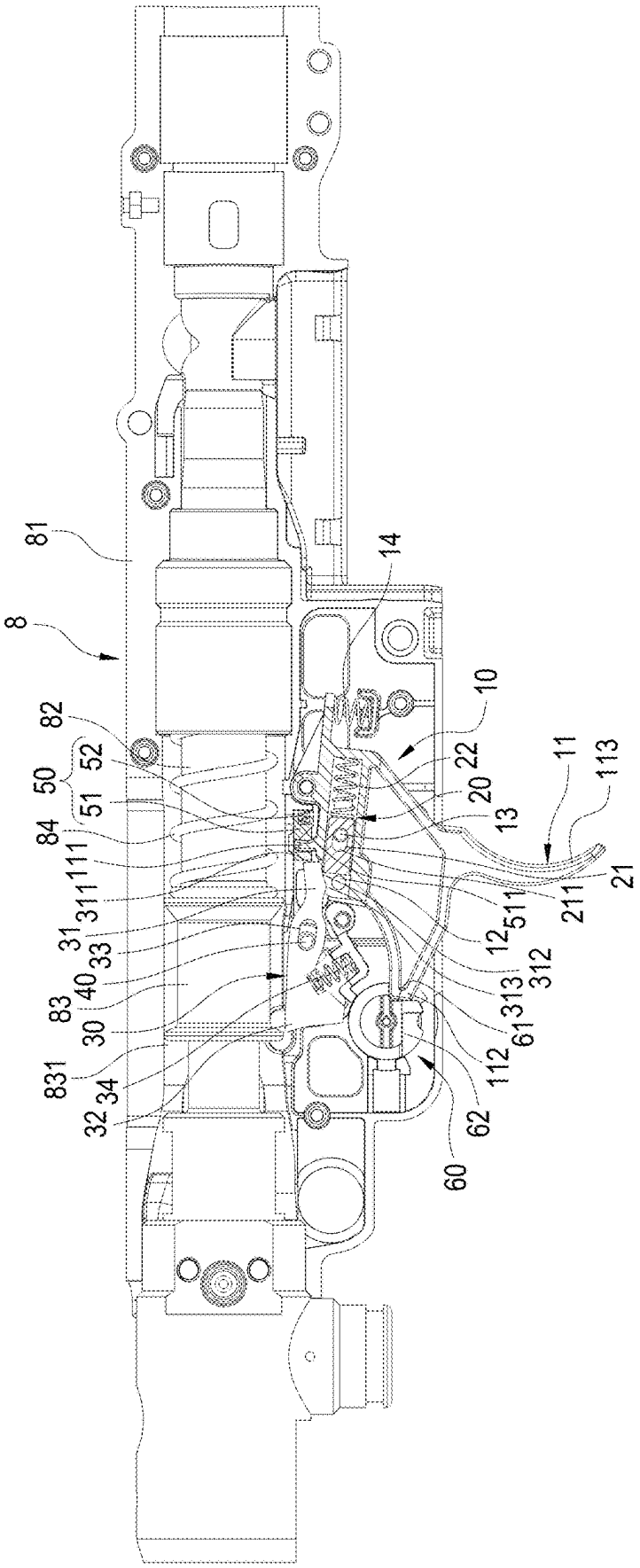
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FIG.3

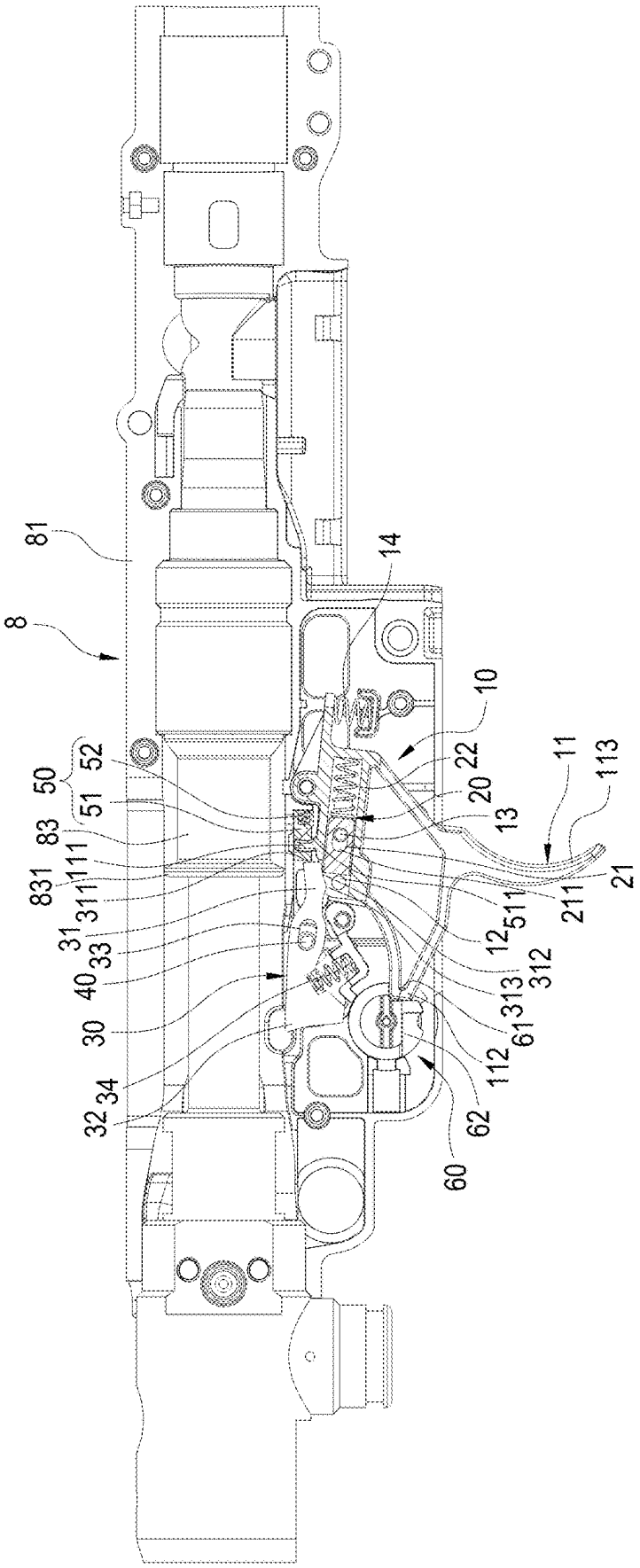
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FIG.4

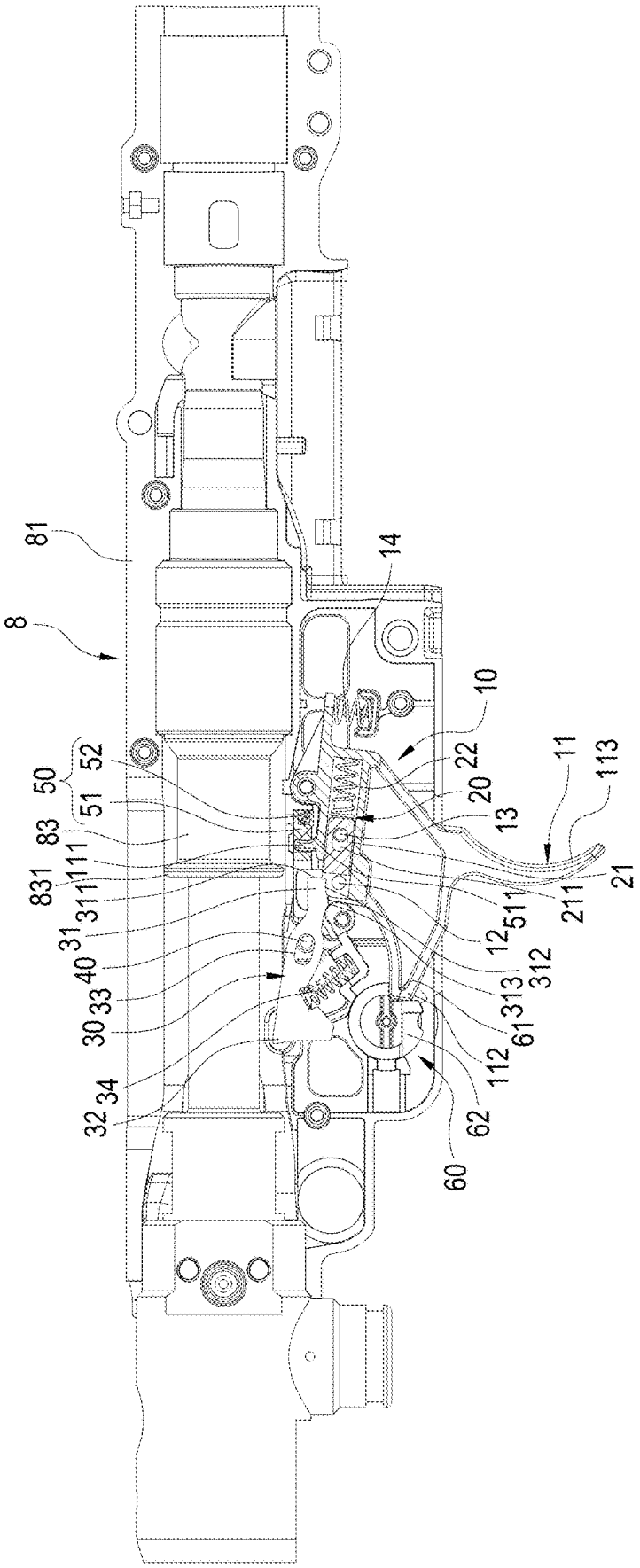
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FIG.5

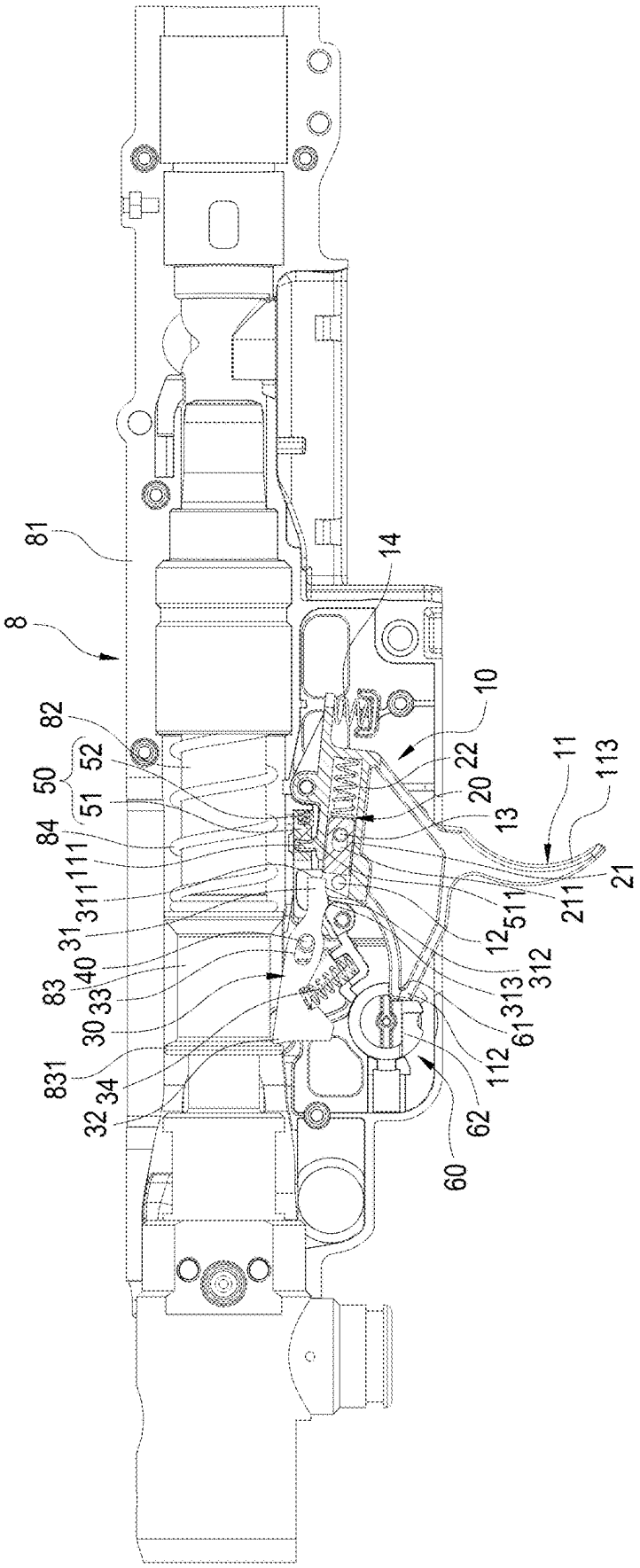
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FIG.6

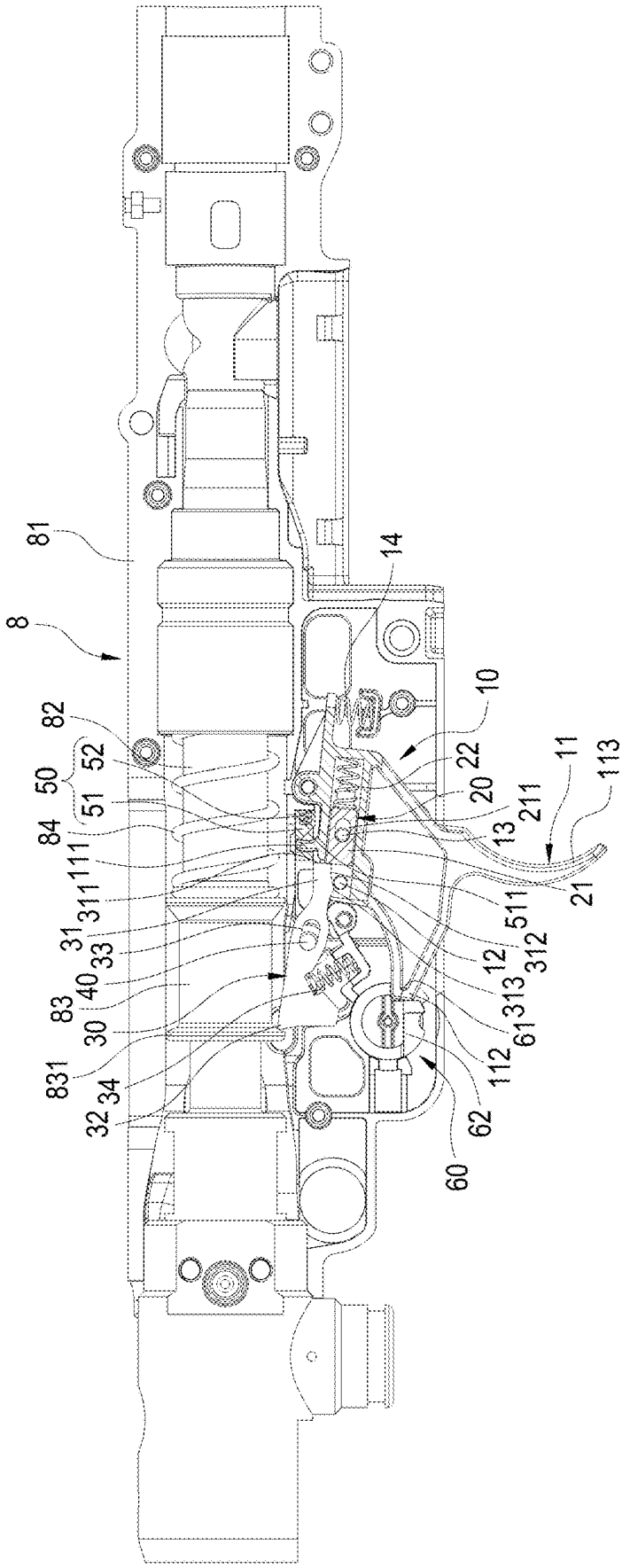
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FIG.7

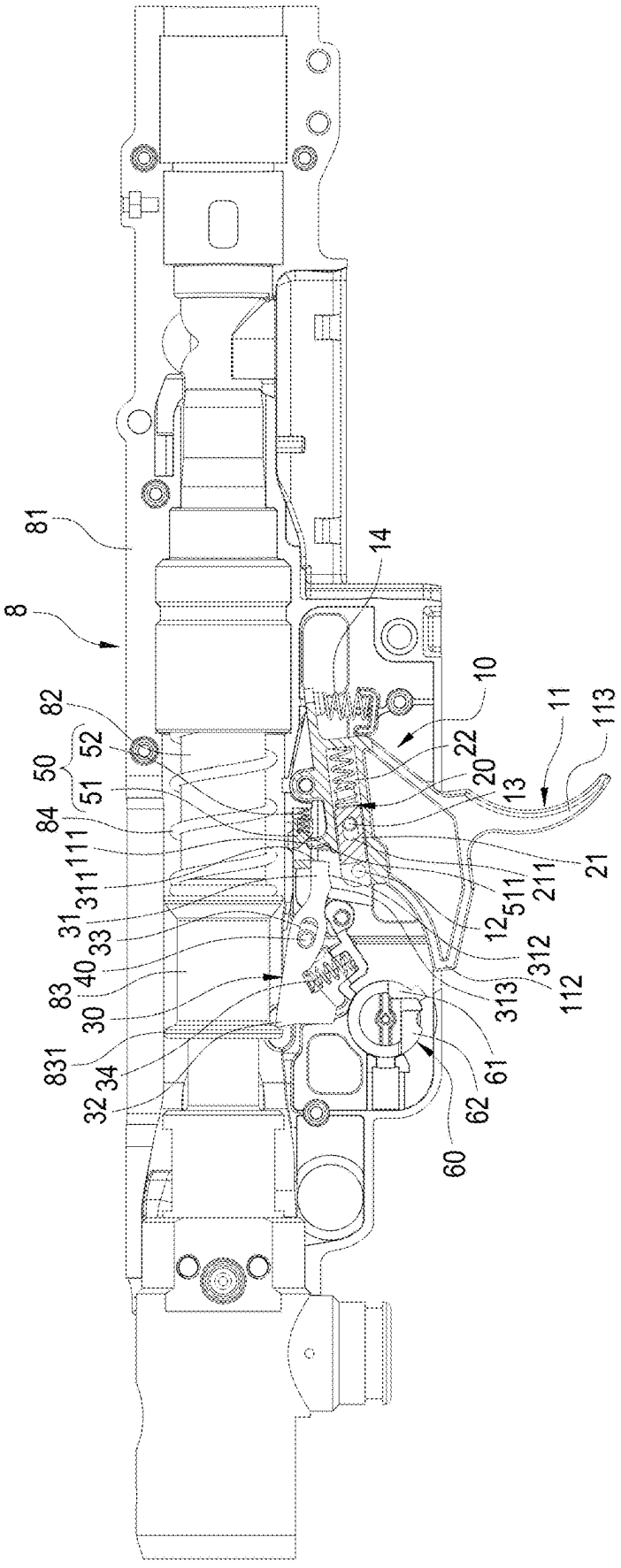
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FIG.8

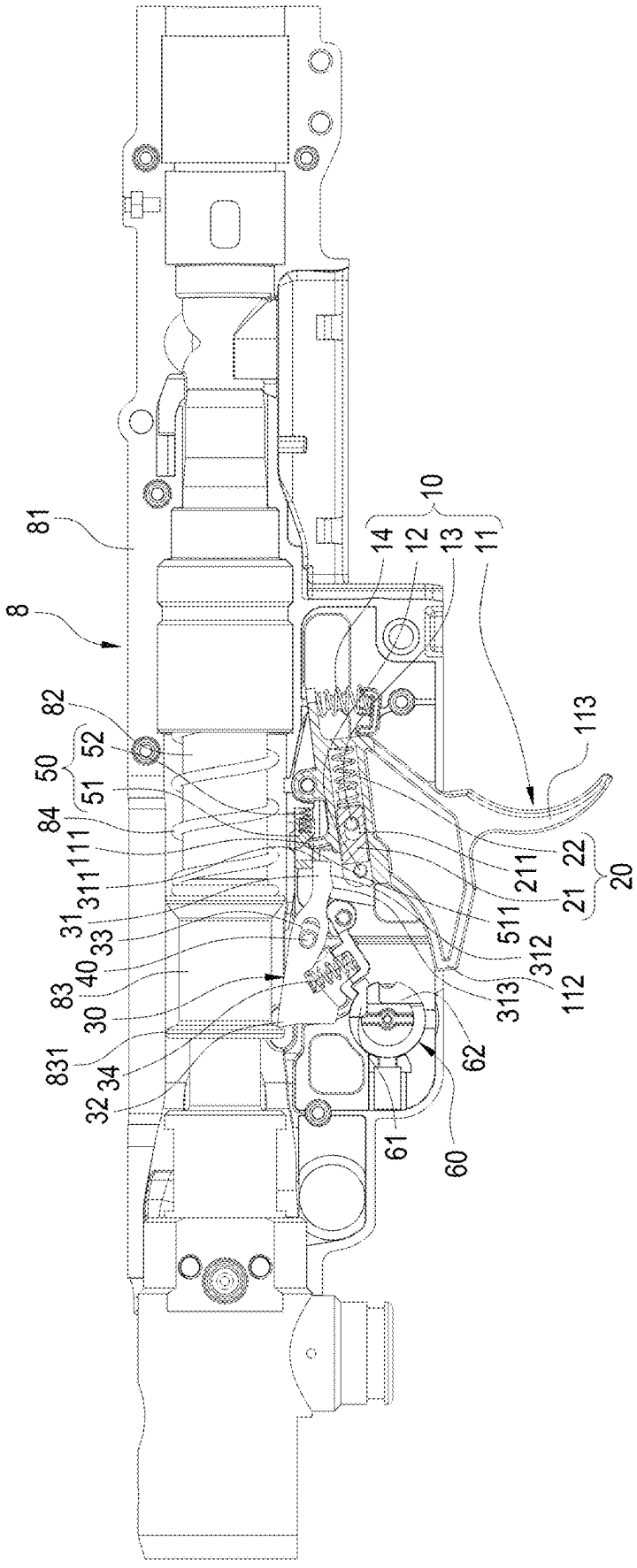
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FIG.9

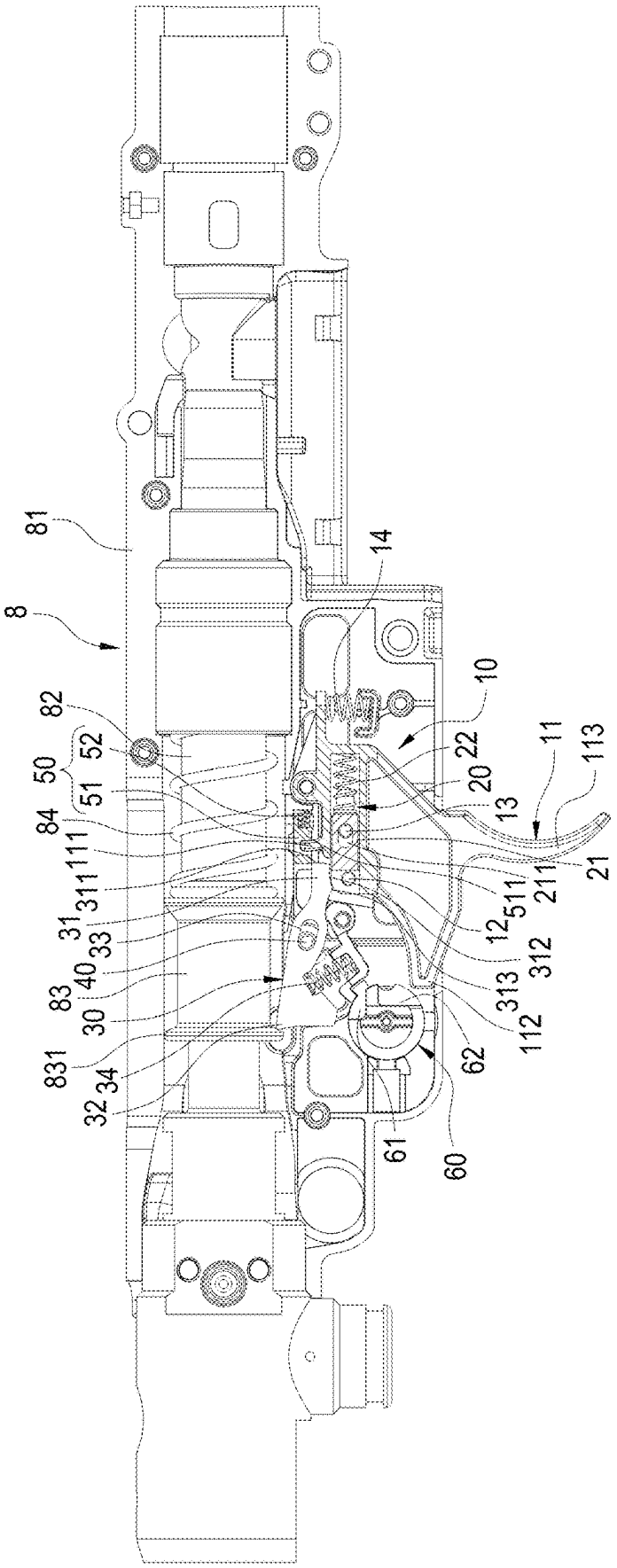
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FIG.10

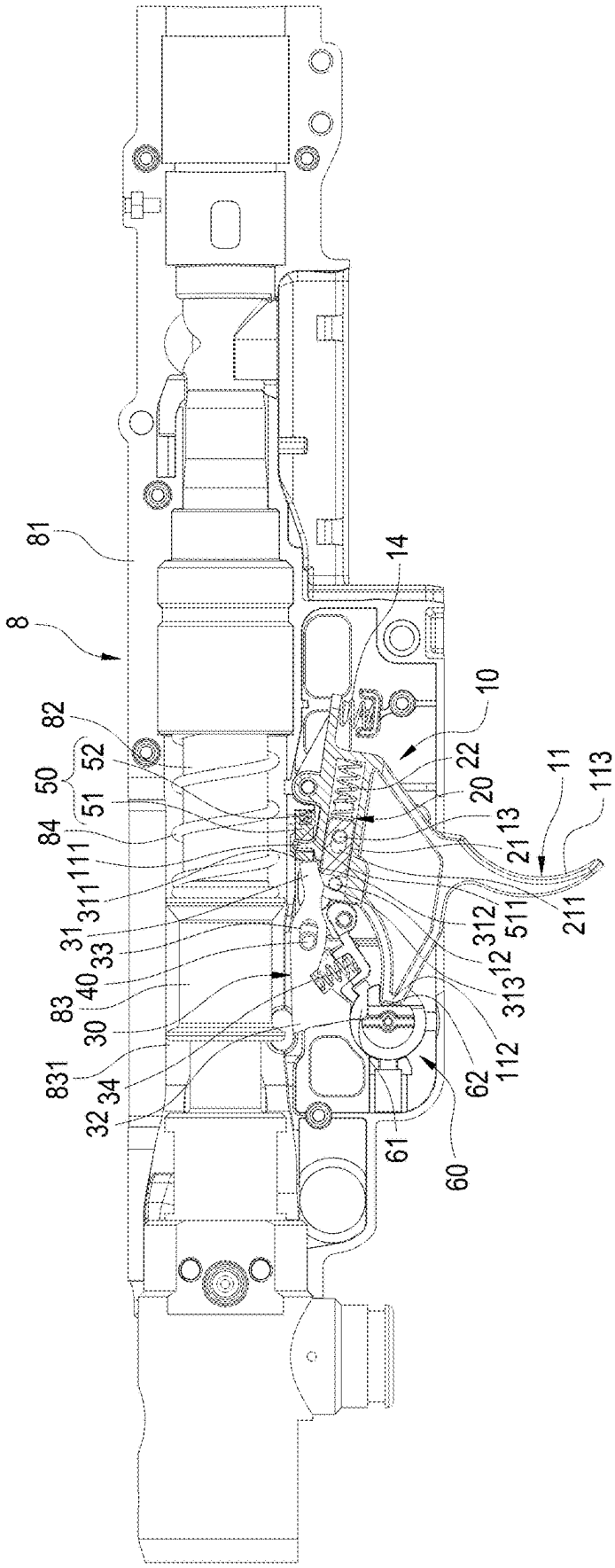
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FIG.11

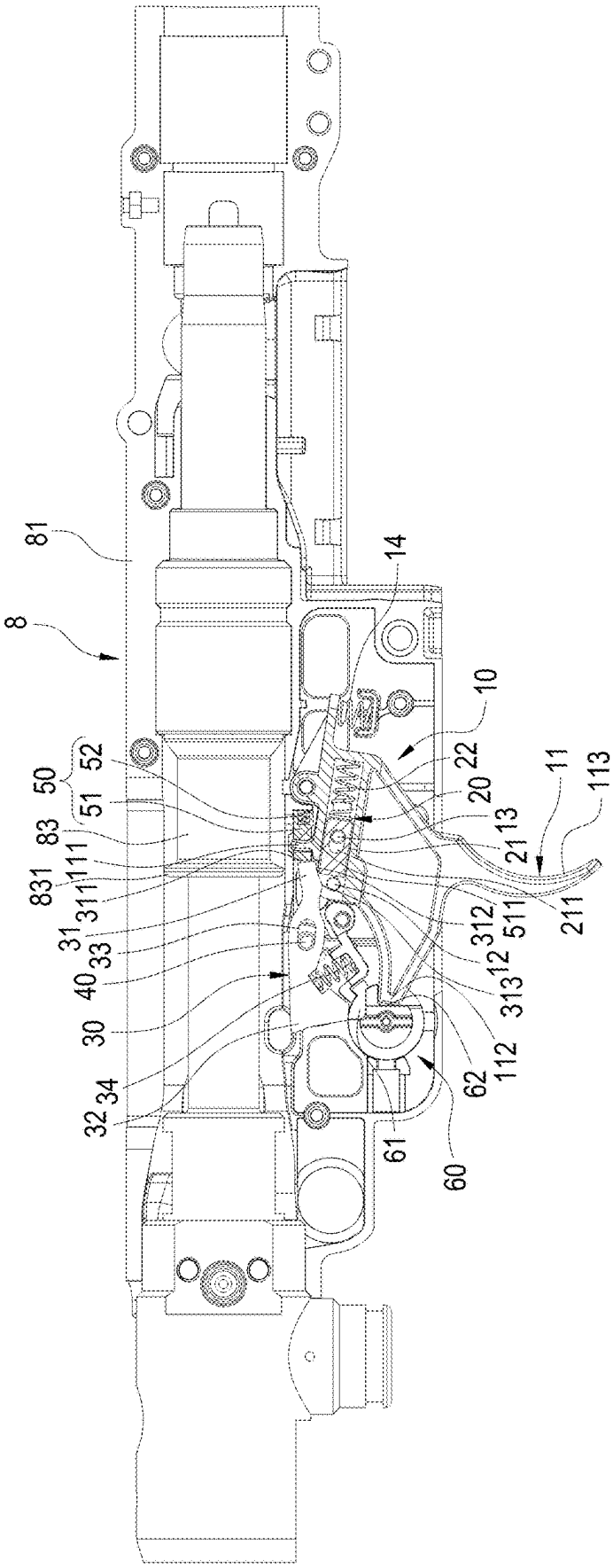
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FIG.12

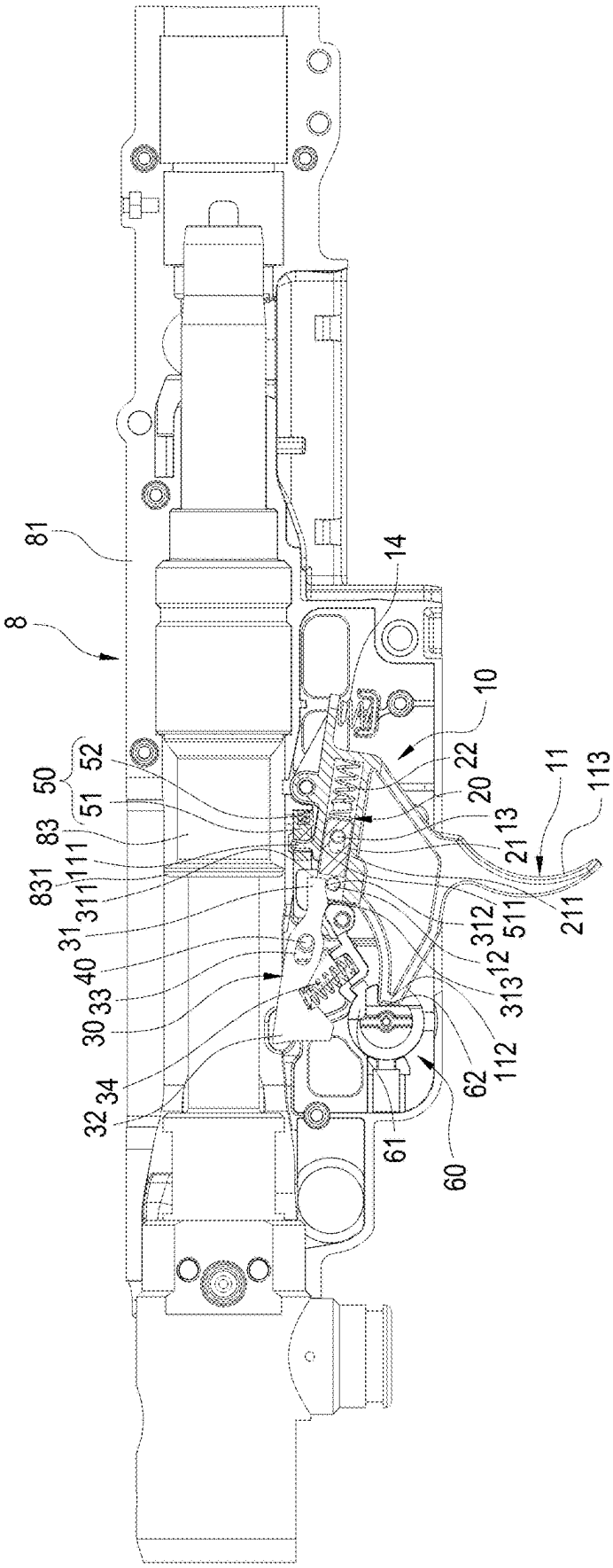
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FIG.13

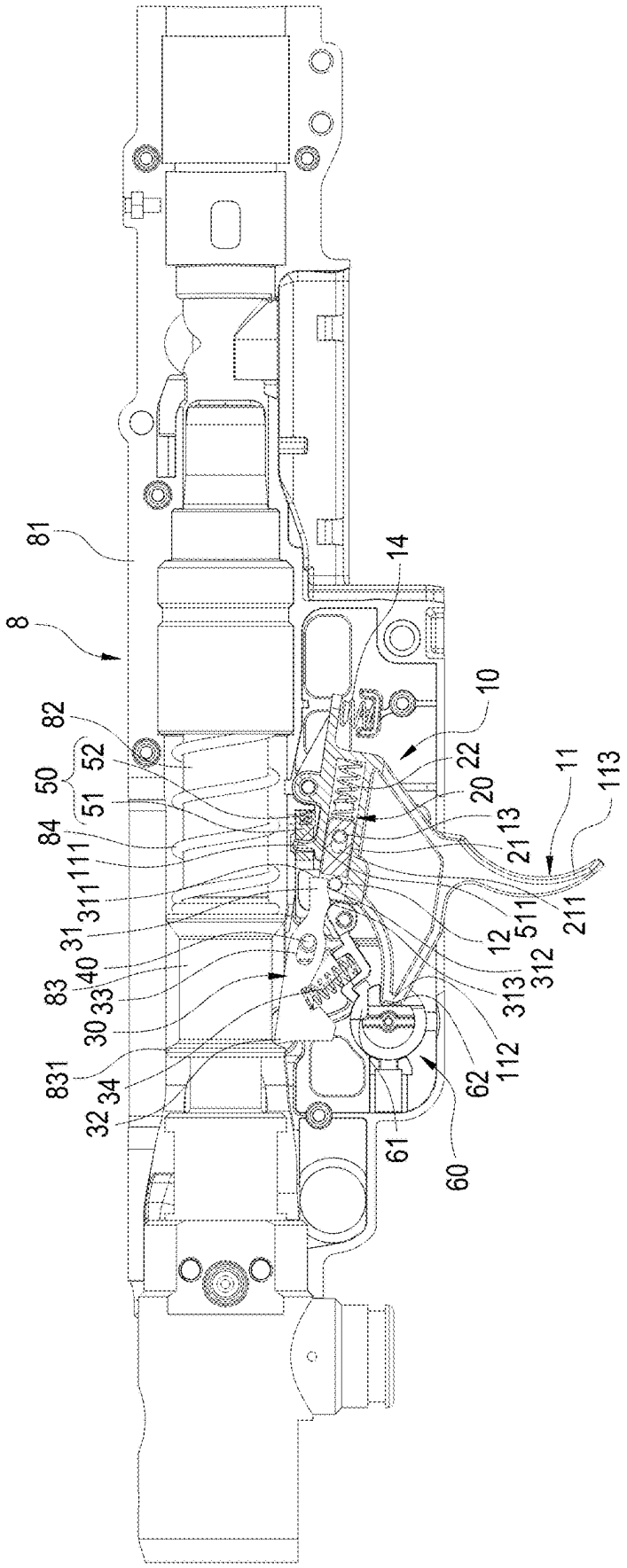
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FIG.14

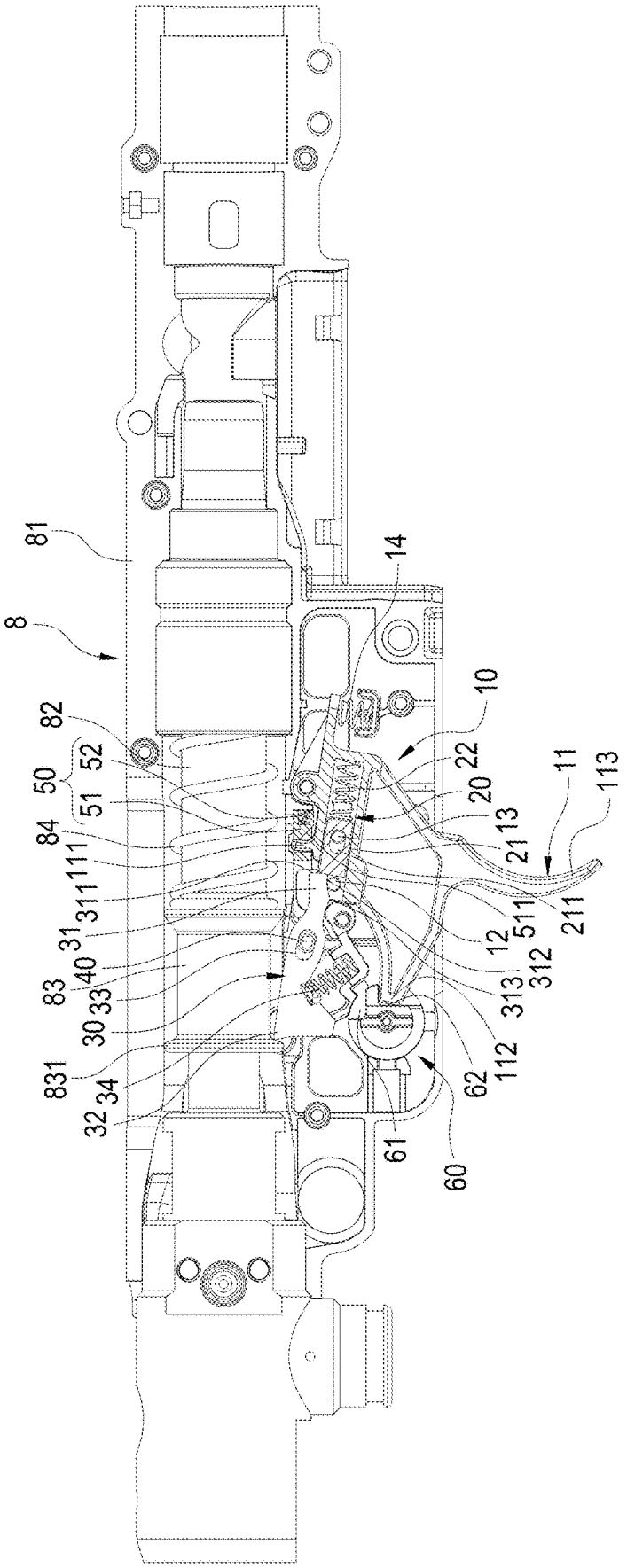
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FIG.15

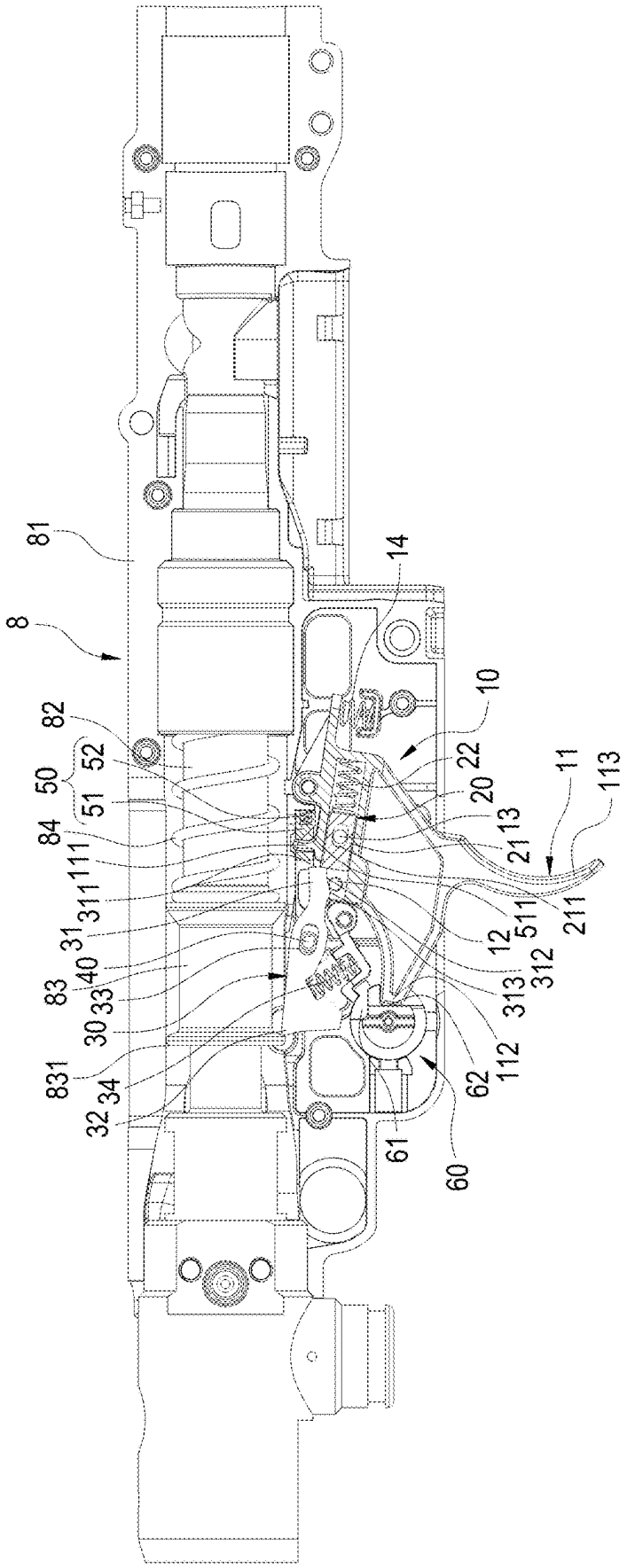
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FIG.16

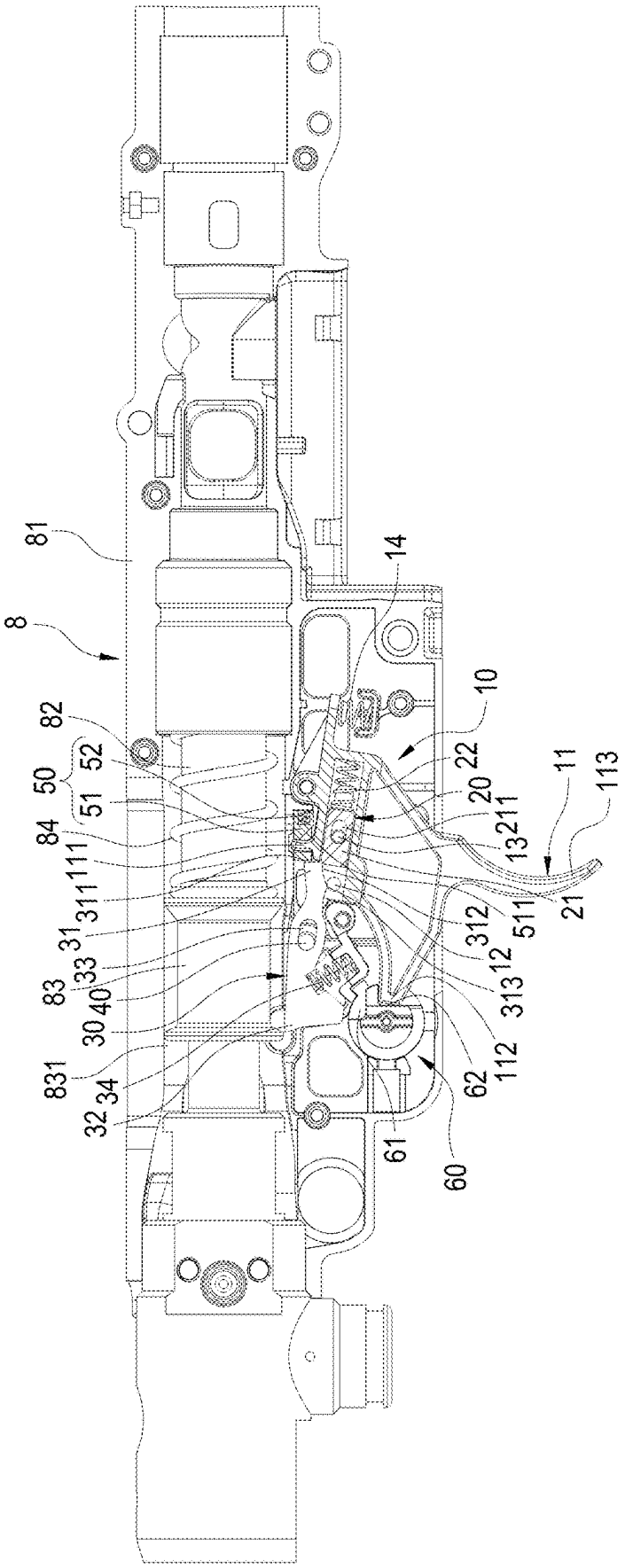
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FIG.17

SINGLE-SHOT/REPEATING SWITCHING DEVICE OF TOY GUN

BACKGROUND

Technical Field

The disclosure relates to a toy gun, particularly to a single-shot/repeating switching device of a toy gun.

Related Art

Related-art toy guns usually use air pressure to serve as a main power source, which has cheap manufacturing costs. Also, under the joint development of the industry, the simulated appearances and the simulation of working modes have been provided, for example, magazine loading and shooting modes of single-shot or repeating.

The operation of firing mode uses the pull of the trigger. In the single-shot mode, the trigger will make a single release to the action elements in the bore of the gun to make it generate a single firing. The repeating mechanism usually uses a battery circuit to operate an electro-mechanic valve system or a mechanic working mode to obtain the frequency action of repeating firing. Advantages of the mechanic working mode are that no electricity is required and that malfunction of electronic devices caused by damp or damage caused by oscillation needs not to be considered. Also, the fixed stress of the mechanic working mode may make the accumulated pressure of the firing cylinder before firing have a higher threshold pressure value. Air pressure purely formed by using air pressure elements performs purely mechanic interactions between elements to accomplish multiple shooting modes, which has been widely adopted by the industry.

However, the related-art mechanic firing in the repeating mode still has the problem of stable shooting to be improved. The applicant improves the above technical issue.

SUMMARY

An object of the disclosure is to provide a single-shot/repeating switching device of a toy gun, which can achieve stable shooting in the repeating process.

To accomplish the above object, the disclosure provides a single-shot/repeating switching device of a toy gun, the toy gun includes a gun body and a firing cylinder, and the single-shot/repeating switching device includes a trigger, a trigger buffer, a release connecting plate, a positioning bar, a safety blocker and a single-shot/repeating switching button. The trigger includes a trigger body. The trigger body is pivoted to the gun body and has a pushing block and an abutting end. The trigger buffer is disposed on the trigger body and includes a moving block and an elastic body pushing the moving block. The release connecting plate has an activating end, a fastened end and a sliding trough between the activating end and the fastened end. The positioning bar passes the gun body and the sliding trough to position the release connecting plate. The safety blocker corresponds to the pushing block to be disposed on the gun body. The single-shot/repeating switching button is rotatably connected to the gun body and has a repeating opening. In a repeating mode, the trigger body is moved to make the abutting end enter the repeating opening, the pushing block pushes the safety blocker to move, and the moving block pushes the activating end of the release connecting plate to move upward to make the fastened end escape from locking of the firing cylinder to generate a first firing. The firing cylinder touches the fastened end to make the release connecting plate rotate about the positioning bar during a return process of the firing cylinder. The activating end is pressed by the trigger buffer to slow down a subsequent repeating speed.

In an embodiment, the activating end of the release connecting plate has a front end face, a lower arcuate surface and a lower tip, the front end face is formed on a front position of the activating end, the lower arcuate surface and the lower tip are formed at a lower position of the activating end, and the lower arcuate surface is between the front end face and the lower tip.

An embodiment further includes a pushing spring, the pushing spring is disposed between the release connecting plate and the gun body and elastically pushes the release connecting plate to act.

In an embodiment, the sliding trough of the release connecting plate is between the activating end and the fastened end.

In an embodiment, the trigger body is disposed with a receiving trough, and the trigger buffer is disposed in the receiving trough.

In an embodiment, the trigger further includes a first shaft, the first shaft is connected to the trigger body and formed on an end of the moving block, which is away from the elastic body.

In an embodiment, the trigger further includes a second shaft, the moving block is disposed with a limiting trough, and the second shaft passes the trigger body and the limiting trough to make a travel of the moving block limited by the second shaft.

In an embodiment, the trigger further includes a returning spring, and the returning spring is clamped between the gun body and the trigger body which is away from the abutting end.

In an embodiment, the safety blocker includes a rod and a compression spring, the rod comprises a pushing slope pushed by the pushing block, and the compression spring is connected to the rod to provide a returning force.

In an embodiment, the single-shot/repeating switching button is further disposed with a single-shot opening, the repeating opening is parallel to a central line of the single-shot/repeating switching button, and the single-shot opening is perpendicular to the central line of the single-shot/repeating switching button.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an assembled cross-sectional view of the single-shot/repeating switching device of a toy gun of the disclosure;

FIG. **2** is a cross-sectional view of the using status of rotating the trigger body in the single-shot mode of the disclosure;

FIG. **3** is a cross-sectional view of the using status of the release connecting plate being upward pushed to the firing cylinder to be ready for escape in the single-shot mode of the disclosure;

FIG. **4** is a cross-sectional view of the using status of the firing cylinder after firing in the single-shot mode of the disclosure;

FIG. **5** is a cross-sectional view of the using status of the release connecting plate being upward rearward moved to be ready to be re-hooked by the firing cylinder in the single-shot mode of the disclosure;

FIG. **6** is a cross-sectional view of the using status of the firing cylinder withdrawing to re-hook the release connecting plate in the single-shot mode of the disclosure after gas ejecting;

FIG. **7** is a cross-sectional view of the using status of the firing cylinder pushing to the release connecting plate back to the initial position after being gas pressurized in the single-shot mode of the disclosure;

FIG. **8** is a cross-sectional view of the returning of the trigger body in the single-shot mode of the disclosure;

FIG. **9** is a cross-sectional view of the using status of rotating the single-shot/repeating switching button in the repeating mode of the disclosure;

FIG. **10** is a cross-sectional view of the using status of rotating the trigger body in the repeating mode of the disclosure;

FIG. **11** is a cross-sectional view of the using status of the release connecting plate being upward pushed to the firing cylinder to be ready for escape in the repeating mode of the disclosure;

FIG. **12** is a cross-sectional view of the using status of the firing cylinder after firing in the repeating mode of the disclosure;

FIG. **13** is a cross-sectional view of the using status of the release connecting plate being upward rearward moved to be ready to be re-hooked by the firing cylinder in the repeating mode of the disclosure;

FIG. **14** is a cross-sectional view of the using status of the firing cylinder withdrawing to re-hook the release connecting plate in the repeating mode of the disclosure after gas ejecting;

FIG. **15** is a cross-sectional view of the using status of the firing cylinder pushing to the release connecting plate back to the initial position after being gas pressurized in the repeating mode of the disclosure;

FIG. **16** is a cross-sectional view of the using status of the release connecting plate pushing the trigger buffer to generate a buffering action in the repeating mode of the disclosure; and

FIG. **17** is a cross-sectional view of the using status of the release connecting plate being forward pushed to touch the first shaft to rotate in the repeating mode of the disclosure.

DETAILED DESCRIPTION

The technical contents of this disclosure will become apparent with the detailed description of embodiments accompanied with the illustration of related drawings as follows. It is intended that the embodiments and drawings disclosed herein are to be considered illustrative rather than restrictive.

Please refer to FIG. **1**. The disclosure provides a single-shot/repeating switching device of a toy gun. The toy gun **8** mainly includes a gun body **81**, a barrel **82**, a firing cylinder **83**, a pressing spring **84** and other related devices and elements. An end of the firing cylinder **83** is formed with a fastening portion **831**. The connection and operation of each aforementioned element are related art, so they will not be described herein.

The single-shot/repeating switching device includes a trigger **10**, a trigger buffer **20**, a release connecting plate **30**, a positioning bar **40**, a safety blocker **50** and a single-shot/repeating switching button **60**.

The trigger **10** includes a trigger body **11**, a first shaft **12**, a second shaft **13** and a returning spring **14**. The trigger body **11** is pivoted to the gun body **81** and has a pushing block **111**, an abutting end **112** and a stem **113**. A receiving trough **114** is disposed under the pushing block **111** of the trigger body **11**. The first shaft **12** passes the trigger body **11** and is located behind the opening of the receiving trough **114**. The returning spring **14** is clamped between the gun body **81** and the trigger body **11** which is away from the abutting end **112** so as to make the trigger body **11** able to return the original position when not being continuously rotated.

The trigger buffer **20** is disposed in the receiving trough **114** and mainly includes a moving block **21** and an elastic body **22**. A limiting trough **211** is disposed at the middle position of the moving block **21**. The second shaft **13** passes the trigger body **11** and the limiting trough **211** and makes the moving block **21** limited in the receiving trough **114**. The elastic body **22** is connected to an end of the moving block **21** and elastically pushes the moving block **21**. The first shaft **12** is formed on an end of the moving block **21**, which is away from the elastic body **22**.

The release connecting plate **30** is a strip-shaped plate and has an activating end **31** and a fastened end **32**, which are separately located on two ends thereof. The activating end **31** has a front end face **311**, a lower arcuate surface **312** and a lower tip **313**. The front end face **311** is formed on a front position of the activating end **31**. The lower arcuate surface **312** is formed at a lower position of the activating end **31** and connected to the front end face **311**. The lower tip **313** is located behind the lower arcuate surface **312** and connected to the lower arcuate surface **312**. The lower arcuate surface **312** is between the front end face **311** and the lower tip **313**. A sliding trough **33** and a pushing spring **34** are disposed at the middle area of the release connecting plate **30**. The sliding trough **33** is between the activating end **31** and the fastened end **32**. The pushing spring **34** is disposed between the release connecting plate **30** and the gun body **81** and elastically pushes the release connecting plate **30** to act.

The positioning bar **40** passes the gun body **81** and the sliding trough **33** of the release connecting plate **30** to position the release connecting plate **30** on the gun body **81**. The release connecting plate **30** uses the positioning bar **40** to be able to move or sway up, down, left and right relative to the positioning bar **40**.

The safety blocker **50** corresponds to the pushing block **111** of the trigger body **11** to be disposed on the gun body **81** and mainly includes a rod **51** and a compression spring **52**. The rod **51** has a pushing slope **511**. The compression spring **52** is connected to the rod **51** to provide a returning force.

The single-shot/repeating switching button **60** is rotatably connected to the gun body **81** and corresponds to the abutting end **112** of the trigger body **11** to be arranged. The single-shot/repeating switching button **60** has a single-shot opening **61** and a repeating opening **62**. The repeating opening **62** is parallel to the central line of the single-shot/repeating switching button **60**. The single-shot opening **61** is perpendicular to the central line of the single-shot/repeating switching button **60**.

Please refer to FIGS. **2-8**. In a single-shot mode, please refer to FIG. **2** first, the single-shot/repeating switching button **60** is rotated to make the single-shot opening **61** directed to the trigger body **11** to be arranged, and the trigger body **11** is pulled to rotate about its pivoting position. At this time, the pushing block **111** of the trigger body **11** pushes along the pushing slope **511** of the rod **51** and makes both the activating end **31** of the release connecting plate **30** and the safety blocker **50** gradually separate.

Please refer to FIG. **3**. After the abutting end **112** of the trigger body **11** enters the single-shot opening **61**, the lower arcuate surface **312** of the activating end **31** of the release connecting plate **30** will be pushed by the moving block **21**

of the trigger buffer **20**. At this time, the release connecting plate **30** will rotate about the positioning bar **40** so as to make the fastening portion **831** of the firing cylinder **83** and the fastened end **32** of the release connecting plate **30** escape from locking. Please refer to FIG. **4**. At this time, the firing cylinder **83** will rapidly move along the axial direction of the barrel **82** and eject the inside bullet for firing.

Please refer to FIG. **5**. After the firing cylinder **83** separates from the release connecting plate **30**, the release connecting plate **30** will be elastically pushed by the pushing spring **34** to move rearward and upward to be ready to be re-hooked by the firing cylinder **83**. At this time, the positioning bar **40** is just located at the rightmost position of the sliding trough **33** of the release connecting plate **30**.

Please refer to FIG. **6**. After gas is ejected, the firing cylinder **83** is elastically pressed by the pressing spring **84** to be pushed back along the axial direction of the barrel **82**. When the firing cylinder **83** passes the fastened end **32** of the release connecting plate **30**, the fastening portion **831** of the firing cylinder **83** will re-hook the fastened end **32** of the release connecting plate **30**. At this time, the positioning bar **40** is still located at the rightmost position of the sliding trough **33** of the release connecting plate **30**.

Please refer to FIG. **7**. By way of the hooking of the fastening portion **831** of the firing cylinder **83** and the fastened end **32** of the release connecting plate **30**, when the firing cylinder **83** is pushed by gas pressure, it will push the release connecting plate **30** to the initial position. At this time, the positioning bar **40** is located at the leftmost position of the sliding trough **33** of the release connecting plate **30**.

Please refer to FIG. **8**. After the trigger body **11** is released, it will restore to the initial position with the pivoting position as a rotation center. At this time, the pushing block **111** of the trigger body **11** will withdraw from the pushing slope **511** of the rod **51**.

Please refer to FIGS. **9-17**. In a repeating mode, please refer to FIG. **9** first, the single-shot/repeating switching button **60** is rotated to make the repeating opening **62** directed to the trigger body **11** to be arranged. At this time, the rod **51** of the safety blocker **50** stops the activating end **31** of the release connecting plate **30** to present a still status.

Please refer to FIG. **10**. The trigger body **11** is pulled to rotate about its pivoting position as a rotation center. At this time, the pushing block **111** of the trigger body **11** will push along the pushing slope **511** of the rod **51** and make the activating end **31** of the release connecting plate **30** and the safety blocker **50** gradually separate.

Please refer to FIG. **11**. After the abutting end **112** of the trigger body **11** enters the repeating opening **62**, the lower arcuate surface **312** of the activating end **31** of the release connecting plate **30** will be pushed by the moving block **21** of the trigger buffer **20**. At this time, the release connecting plate **30** will rotate about the positioning bar **40** as a rotation center to make the fastened end **32** of the release connecting plate **30** and the fastening portion **831** of the firing cylinder **83** escape from locking. Please refer to FIG. **12**. At this time, the firing cylinder **83** will rapidly move along the axial direction of the barrel **82** and eject the inside bullet for the first firing.

Please refer to FIG. **13**. After the firing cylinder **83** separates from the release connecting plate **30**, the release connecting plate **30** will be elastically pushed by the pushing spring **34** to move rearward and upward to be ready to be re-hooked by the firing cylinder **83**. At this time, the positioning bar **40** is just located at the rightmost position of the sliding trough **33** of the release connecting plate **30**.

Please refer to FIG. **14**. After gas is ejected, the firing cylinder **83** is elastically pressed by the pressing spring **84** to be pushed back along the axial direction of the barrel **82**. When the firing cylinder **83** passes the fastened end **32** of the release connecting plate **30**, the fastening portion **831** of the firing cylinder **83** will re-hook the fastened end **32** of the release connecting plate **30**. At this time, the positioning bar **40** is still located at the rightmost position of the sliding trough **33** of the release connecting plate **30**.

Please refer to FIG. **15**. By way of the hooking of the fastening portion **831** of the firing cylinder **83** and the fastened end **32** of the release connecting plate **30**, when the firing cylinder **83** is pushed by gas pressure, it will push the release connecting plate **30** to move. At this time, the positioning bar **40** does not arrive at the leftmost position of the sliding trough **33** of the release connecting plate **30** yet. Also, because the trigger body **11** in the repeating mode has a larger rotational angle than the repeating mode, the position of the first shaft **12** will be higher so as to make the lower arcuate surface **312** of the activating end **31** of the release connecting plate **30** touch the first shaft **12** and the front end face **311** of the activating end **31** pushed by the moving block **21** of the trigger buffer **20**.

Please refer to FIG. **16**. When the pushing force exerted to the firing cylinder **83** by the gas pressure is greater than the elastic action force exerted to the firing cylinder **83** by the pressing spring **84**, the firing cylinder **83** will gradually move toward the front side of the barrel **82**. At this time, the lower arcuate surface **312** of the activating end **31** will rotate upward along the center of the first shaft **12** and the positioning bar **40** does not arrive at the leftmost position of the sliding trough **33** of the release connecting plate **30** yet. The front end face **311** of the activating end **31** is pushed by the moving block **21** of the trigger buffer **20** to generate a buffering action so as to reduce the subsequent repeating speed.

Please refer to FIG. **17**. When the firing cylinder **83** continuously pushes the release connecting plate **30** to move to make the positioning bar **40** arrive at the leftmost position of the sliding trough **33** of the release connecting plate **30**, at this time the lower top **313** of the activating end **31** of the release connecting plate **30** touches the first shaft **12**, and the front end face **311** of the activating end **31** will move upward to push the lower arcuate surface **312** of the release connecting plate **30** by way of the moving block **21** of the trigger buffer **20**. At this time, the firing cylinder **83** will rapidly move along the axial direction of the barrel **82** and eject the inside bullet for the second firing.

While this disclosure has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of this disclosure set forth in the claims.

What is claimed is:

1. A single-shot/repeating switching device of a toy gun, wherein the toy gun comprises a gun body and a firing cylinder, the single-shot/repeating switching device comprising:

a trigger, comprising a trigger body, and the trigger body being pivoted to the gun body and comprising a pushing block and an abutting end;

a trigger buffer, disposed on the trigger body, and comprising a moving block and an elastic body pushing the moving block;

a release connecting plate, comprising an activating end, a fastened end and a sliding trough between the activating end and the fastened end;

a positioning bar, passing the gun body and the sliding trough to position the release connecting plate;

a safety blocker, corresponding to the pushing block to be disposed on the gun body; and

a single-shot/repeating switching button, rotatably connected to the gun body, and comprising a repeating opening;

wherein in a repeating mode, the trigger body is moved to make the abutting end enter the repeating opening, the pushing block pushes the safety blocker to move, the moving block pushes the activating end of the release connecting plate to move upward to make the fastened end escape from locking of the firing cylinder to generate a first firing, the firing cylinder touches the fastened end to make the release connecting plate rotate about the positioning bar during a return process of the firing cylinder, and the activating end is pressed by the trigger buffer to slow down a subsequent repeating speed.

2. The single-shot/repeating switching device of the toy gun of claim **1**, wherein the activating end of the release connecting plate comprises a front end face, a lower arcuate surface and a lower tip, the front end face is formed on a front position of the activating end, the lower arcuate surface and the lower tip are formed at a lower position of the activating end, and the lower arcuate surface is between the front end face and the lower tip.

3. The single-shot/repeating switching device of the toy gun of claim **2**, further comprising a pushing spring, wherein the pushing spring is disposed between the release connecting plate and the gun body and elastically pushes the release connecting plate to act.

4. The single-shot/repeating switching device of the toy gun of claim **1**, wherein the sliding trough of the release connecting plate is between the activating end and the fastened end.

5. The single-shot/repeating switching device of the toy gun of claim **1**, wherein the trigger body is disposed with a receiving trough, and the trigger buffer is disposed in the receiving trough.

6. The single-shot/repeating switching device of the toy gun of claim **5**, wherein the trigger further comprises a first shaft, the first shaft is connected to the trigger body and formed on an end of the moving block, which is away from the elastic body.

7. The single-shot/repeating switching device of the toy gun of claim **6**, wherein the trigger further comprises a second shaft, the moving block is disposed with a limiting trough, and the second shaft passes the trigger body and the limiting trough to make a travel of the moving block limited by the second shaft.

8. The single-shot/repeating switching device of the toy gun of claim **1**, wherein the trigger further comprises a returning spring, and the returning spring is clamped between the gun body and the trigger body which is away from the abutting end.

9. The single-shot/repeating switching device of the toy gun of claim **1**, wherein the safety blocker comprises a rod and a compression spring, the rod comprises a pushing slope pushed by the pushing block, and the compression spring is connected to the rod to provide a returning force.

10. The single-shot/repeating switching device of the toy gun of claim **1**, wherein the single-shot/repeating switching button is further disposed with a single-shot opening, the repeating opening is parallel to a central line of the single-shot/repeating switching button, and the single-shot opening is perpendicular to the central line of the single-shot/repeating switching button.

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