



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.05.2026 Bulletin 2026/20

(21) Application number: **25167715.9**

(22) Date of filing: **01.04.2025**

(51) International Patent Classification (IPC):
F41B 11/55 ^(2013.01) **F41B 11/56** ^(2013.01)
F41B 11/89 ^(2013.01) **F41A 9/02** ^(2006.01)
F41B 11/54 ^(2013.01)

(52) Cooperative Patent Classification (CPC):
F41B 11/55; F41B 11/56; F41B 11/89; F41A 9/02;
F41B 11/54

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
GE KH LA MA MD TN

(30) Priority: **06.11.2024 US 202463716963 P**

(71) Applicant: **ZURU IP Limited**
Tsim Sha Tsui, Kowloon (HK)

(72) Inventor: **MOWBRAY, Mathew Peter**
Mid-Levels West (HK)

(74) Representative: **Finnegan Europe LLP**
1 London Bridge
London SE1 9BG (GB)

(54)

IMPROVED TOY GUNS AND MAGAZINES

(57) A magazine for use in a toy gun is disclosed. The magazine comprises a storage cavity configured to store one or more gel balls, a channel configured to allow gel balls to pass through to feed a toy gun, a feeding assem-

bly configured to feed the gel balls into the channel, and a return assembly configured to return the gel balls from the channel to the storage cavity. The storage cavity includes an opening.



FIG. 1

Description

TECHNICAL FIELD

[0001] The present disclosure relates generally to the design of toy guns. More particularly, the invention pertains to systems for shooting soft gel pellets.

BACKGROUND

[0002] Toy guns that shoot jelly balls or gel balls, often referred to as gel blasters, have gained widespread popularity for recreational use due to their relatively lower risk of injury compared to traditional airsoft or paintball guns. These toy guns typically use synthetic polymer-based gel balls, which are designed to absorb water and swell, e.g., a hydrogel, helping to provide a non-lethal and possibly reusable projectile. The gel balls typically have a polymer matrix core designed to absorb and retain a relatively large amount of water with a relatively low friction outer layer. The outer layer may be made from various materials and may be designed to provide smoother movement for loading, movement within a magazine (e.g., a loading mechanism), or the toy gun (e.g., a barrel). The robust nature of these polymer gel balls helps ensure they can withstand the internal mechanisms of the toy gun, such as the magazine loading process and the high-pressure ejection system, with reduced deformation or lower premature breakage. Such polymer materials, however, may add to overall environmental concerns.

[0003] Alternatively, gel balls may be made from agar, a natural, biodegradable substance derived from seaweed, which may provide a more environmentally friendly material compared to synthetic materials. Agar is a polysaccharide derived from agarophyte algae cell walls, which presents certain mechanical challenges when used in toy guns. Traditional toy guns are designed for the robustness of synthetic polymer gel balls, which can endure the forces exerted by spring-driven or motor-driven magazine loading and toy gun firing. Agar-based gel balls may be more prone to deformation during loading, movement within the toy gun, and exposure to prolonged pressure when loaded but not fired. This may lead to jamming issues in the magazine or premature disintegration during the firing process.

[0004] The present invention is directed to overcoming one or more of the shortcomings above or other shortcomings in the art. For example, the present invention may release pressure asserted on the loaded gel balls as ammunition when a user has loaded but is not shooting the toy gun.

SUMMARY

[0005] One aspect of the present disclosure is directed to a magazine for use in a toy gun, comprising a storage cavity configured to store one or more gel balls, the

storage cavity including an opening; a channel configured to allow gel balls to pass through to feed a toy gun; a feeding assembly configured to feed the gel balls into the channel; and a return assembly configured to return one or more gel balls from the channel to the storage cavity.

[0006] The return assembly of the magazine may include a first blocker and a second blocker. The return assembly of the blocker may further comprise a linkage arm configured to link the first and/or second blocker.

[0007] The return assembly may be configured to have a first state and a second state, wherein when the return assembly is in the first state, the first blocker is configured to block the gel balls from being fed to the toy gun and the second blocker is configured to open a return gate for the gel balls to return to the storage cavity; and when the return assembly is in the second state, the first blocker may be configured to allow gel balls to be fed to the toy gun through the channel and the second blocker is configured to block the return gate.

[0008] The return assembly of the magazine may further comprise an activation means configured to move the return assembly from the first state to the second state and vice versa. The activation means may be a button.

[0009] The activation means may be configured to engage with the linkage arm, to change the state of the return assembly between the first or second state.

[0010] Both the feeding assembly and the return assembly of the magazine may be individually actuated by a trigger of the toy gun. The trigger may engage with the activation means to actuate the return assembly.

[0011] The feeding assembly of the magazine may comprise a feeding wheel and an agitator. The feeding wheel may be a gear with teeth accommodating the gel balls. The gel balls may be generally spherical in shape and have a diameter of at least 5 mm.

[0012] The agitator of the magazine may be configured to have a repetitive movement in the storage cavity when the feeding wheel is actuated.

[0013] When the feeding wheel of the magazine is actuated, teeth of feeding wheel may be configured to engage with the agitator to move the agitator against a biasing device. The feeding wheel may be actuated by a motor controlled by the trigger.

[0014] In another aspect, there is provided a toy gun shooting gel balls as ammunitions, comprising a trigger; and a magazine as described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is an illustrative view of a toy gun, consistent with the embodiments of this disclosure.

FIG. 2 is an illustrative view a magazine for a toy gun, consistent with the embodiments of this disclosure.

FIG. 3 is an illustrative view of the magazine of FIG. 2, consistent with the embodiments of this disclosure.

FIG. 4 is an illustrative view of a return assembly, consistent with the embodiments of this disclosure.

FIG. 5 is an illustrative view of a return assembly, consistent with the embodiments of this disclosure.

DETAILED DESCRIPTION

[0016] The following detailed description refers to the accompanying drawings for informational purposes only. The same reference numbers are used throughout the drawings and specification to refer to the same elements. While several illustrative embodiments are described herein, modifications, adaptations and other implementations are possible. For example, substitutions, additions, or modifications may be made to the components illustrated in the drawings, and the illustrative methods described herein may be modified by substituting, reordering, removing, or adding steps to the disclosed methods. Accordingly, the following detailed description is not limited to the disclosed embodiments and examples. Instead, the invention is defined by the appended claims.

[0017] Embodiments of the present disclosure relate to a magazine for toy guns for shooting gel balls as ammunition in general, and gel balls made from non-polymer materials in particular. The magazine comprises a storage cavity to store the gel balls, a feeding assembly to feed the gel balls to a channel that the gel balls pass through to feed the breech or other firing mechanism of the toy gun, and a return assembly to return the gel balls from the channel to the storage cavity.

[0018] FIG. 1 is an illustrative view of a toy gun 10 with a magazine 100 and a trigger 104. In some embodiments, toy gun 10 may shoot gel balls 102, i.e., cause gel balls 102 to be projected out through and away from a muzzle of toy gun 10. Magazine 100 may store and feed gel balls 102 to the breech or firing mechanism of toy gun 10.

[0019] FIG. 2 and FIG. 3 are illustrative views of a magazine 100 for toy gun 10 (not shown in FIG. 2 and FIG. 3) in two operating states, consistent with embodiments of this disclosure. In some embodiments, a user of toy gun 10 may install magazine 100 to toy gun 10 to provide gel balls 102 to toy gun 10 as ammunition.

[0020] In some embodiments, gel balls may comprise a core material comprised of about 5% agar and as high as 95% water and an outer layer, e.g., a gelatinous outer layer, which may offer lower friction for smoother handling. This outer layer may be configured to help withstand pressure such that gel balls maintain a desired shape while passing through the loading, firing, and/or return process.

[0021] In some embodiments, gel balls may have a spherical shape with at least 5 mm in diameter. In some embodiments, gel balls may be spheroid, faceted, or any other suitable shape.

[0022] In some embodiments, the core material of gel balls may lose water content in a dry environment and absorb less than 50% water by weight when in a wet environment.

[0023] A magazine 100 according to some embodiments of the disclosure includes a storage cavity 106 to store gel balls 102, a channel for conveying gel balls 102, a feeding assembly 116, that may include at least a feeding wheel 118 and an agitator 120, for loading or otherwise providing gel balls 102 to a breech or firing mechanism in toy gun 10, and a return assembly 128, that may include at least an actuation means, one example of which is a button 130, a first blocker 132, a second blocker 134, and a linkage arm 142, configured to return one or more unfired gel balls 102 back to the storage cavity 106.

[0024] In some embodiments, storage cavity 106 may form a majority of magazine 100. In some embodiments, storage cavity 106 may have an opening 108 through which gel balls 102 may be provided and a cover (not shown) configured to close opening 108 after filling. For example, a user may load magazine 100 containing one or more gel balls 102 into toy gun 10, shoot some or all of gel balls 102 using toy gun 10 thereby removing some of gel balls 102 or fully emptying magazine 100 of all gel balls 102. Magazine 100 may be removed from toy gun 10, and reloaded with one or more gel balls 102. In other words, magazine 100 is intended to be reusable.

[0025] In some embodiments, opening 108 may be positioned in proximity to one end of magazine 100. For example, opening 108 may be positioned adjacent to the breech or firing mechanism of toy gun 10 when magazine 100 is installed in toy gun 10.

[0026] In some embodiments, magazine 100 may have a maximum fill line (not shown) to give an indication of the maximum volume of gel balls 102 that may be loaded into magazine 100, i.e., indicate a position that gel balls 102 should not be above in magazine 100.

[0027] In some embodiments, magazine 100 may have a channel 110 configured to facilitate passage of gel balls 102 (i.e., in a single file configuration) to feed the breech or firing mechanism of toy gun 10. For example, where channel 110 is configured to pass gel balls 102 in a single file manner, a cross-sectional area of channel 110 may be slightly larger than that of one gel ball 102, for example, between about 1-10 percent larger.

[0028] In some embodiments, channel 110 may have an entrance 112 near a base of storage cavity 106, when loaded in toy gun 10. In some embodiments, having entrance 112 of channel 110 near the base of storage cavity 106 may help ensure gel balls 102 will move to entrance 112 by force of gravity, when magazine 100 is loaded in toy gun 10 and a user is handling toy gun 10 in a normal, firing position in which magazine 100 is in its upright position.

[0029] In some embodiments, storage cavity 106 may include a sloped boundary wall 114 to help guide gel balls 102 towards entrance 112 when a user positions toy gun

10 and magazine 100 in an orientation such that gel balls 102 fall or otherwise move towards the base of storage cavity 106. In other words, sloped boundary wall 114 may form an angle with a longitudinal axis of magazine 100. The angle between sloped boundary wall 114 and the longitudinal axis of magazine 100 may be between about 1 and 45 degrees, for example, between about 5 and 30 degrees. Additionally, by having entrance 112 near the base of storage cavity 106, channel 110 may extend along approximately an entire length of magazine 100 and may therefore enable a relatively continuous feeding of gel balls 102 to the breech or firing mechanism of toy gun 10.

[0030] In some embodiments, feeding assembly 116 may include a feeding wheel 118 and an agitator 120. In some embodiments, feeding wheel 118 may be driven by a motor (not shown) (e.g., an electric, battery-operated motor), which is controlled directly or indirectly by trigger 104, e.g., turned on when trigger 104 is actuated and turned off when trigger 104 is released. For example, a switch may be provided in operative communication with trigger 104, the motor (not shown), and a power source (not shown) such that upon actuation of trigger 104, the switch causes closing of the circuit and power to be supplied to the motor.

[0031] In some embodiments, feeding wheel 118 may include a gear, for example, with arcuate teeth forming and interposed between cavities having a shape accommodating gel balls 102, e.g., arcuate or other concave shaped cavities, such that rotational movement of feeding wheel 118 may capture successive gel balls 102 in respective cavities and move gel balls 102 towards entrance 112. The rotational axis of feeding wheel 118, its diameter, and its configuration of its teeth and cavities may be designed to capture and move gel balls 102 without damaging them. In some embodiments, feeding wheel 118 may apply enough pressure to gel balls 102 to push gel balls 102 into channel 110 successively, to form a column of gel balls 102 in channel 110, and e.g., if there are enough gel balls 102 loaded in magazine 100, move gel balls 102 to a top of channel 110 so as to feed gel balls 102 to toy gun 10 for firing.

[0032] In some embodiments, when trigger 104 is actuated, the motor drives feeding wheel 118 at a speed sufficient to feed toy gun 10 for continuous shooting. For example, depending on a firing rate of toy gun 10, the feed rate may vary between about 1 gel ball per second to about 10 gel balls per second. According to some embodiments, the feed rate may be user adjustable via an interface element (e.g., a knob, a switch, etc.) mounted on magazine 100 and/or toy gun 10.

[0033] In some embodiments, agitator 120 may have a shape that facilitates agitating gel balls 102 stored in storage cavity 106. For example, agitator 120 may comprise a cantilevered member (e.g., a pivot arm) configured to oscillate or move in a repetitive motion. For example, agitator 120 may have a relatively thin (e.g., between about 0.5 and 3.5 mm) bar or slab-like body with

a tab 122 and a boss 124 or other extension to loosen gel balls 102 around agitator 120, for example, based on a repetitive movement of agitator 120.

[0034] In some embodiments, agitator 120 may be pivotally mounted in magazine 100 at a first end thereof about pivot axis 138 and biased into engagement with feeding wheel 118 such that a second end thereof, generally opposite the first end, extends into storage cavity 106 and the plurality of gel balls 102 that may be stored therein. Tab 122 and boss 124 may be disposed on the second end of agitator 120.

[0035] Tab 122 may take any shape that facilitates agitating gel balls 102. For example, in some embodiments, tab 122 may include a finger or other flange like configuration that extends outward from the main body of agitator 120. Boss 124 may also extend outward from the main body of agitator 120 in a direction that is different from that of tab 122. For example, boss 124 may extend out of the plane in which feeding wheel 118 rotates and agitator 120 pivots, thereby providing a larger surface area to disturb gel balls 102 near the base of storage cavity 106. Because gel balls 102 may be randomly loaded in storage cavity 106 without particular order, such disturbances may result in gel balls 102 being more easily caught by feeding wheel 118 and subsequently fed to channel 110.

[0036] In some embodiments, agitator 120 may have additional features to improve structural stability and strength. For example, agitator 120 may have a cam 140 configured to engage feeding wheel 118 to drive agitator 120 and a rib 126 to reinforce the structural strength in a cam 140.

[0037] In the embodiments as shown in FIG. 2 and FIG. 3, agitator 120 includes a cam 140 reinforced by a rib 126, and is biased into engagement with the teeth of feeding wheel 118. When trigger 104 is actuated (as shown in FIG. 3,) feeding wheel 118 rotates (e.g., counter-clockwise), catching and feeding gel balls 102 to entrance 112 of channel 110. A tooth of feeding wheel 118 also catches cam 140 of agitator 120, enough to move agitator 120 (e.g., clockwise) about pivot axis 138 against its bias into feeding wheel 118.

[0038] As feeding wheel 118 continues rotating, the tooth that caught cam 140 disengages from cam 140, resulting in agitator 120 returning (e.g., counter-clockwise) about pivot axis 138 due to its bias, and cam 140 is repositioned to engage the next tooth of feeding wheel 118. This configuration may thus cause a repetitive movement of agitator 120.

[0039] In some embodiments, agitator 120 may move repetitively near feeding wheel 118 and boundary wall 114 to agitate gel balls 102 (e.g., with limited force) close to feeding wheel 118. Because agar-based gel balls may be relatively soft and compressible, they may tend to be squeezed together, leaving no gaps between them, due to gravity or other movement when loaded in storage cavity 106, for example where magazine 100 is loaded in toy gun 10. For example, when gel balls 102 are closely

packed together, the lack of space in between gel balls may cause gel balls 102 to adhere to each other and may be unable to move or be resistant to moving towards entrance 112 by way of feeding wheel 118. The repetitive movement of agitator 120 may help prevent gel balls 102 from compressing and packing together and help prevent jamming near feeding assembly 116 and entrance 112.

[0040] In some embodiments, the repetitive movement of agitator 120 may be substantially aligned with the direction of gravity when magazine 100 is loaded in toy gun 10 and a user orients toy gun 10 in the firing orientation (i.e., magazine 100 is in its upright position), so that the movement may move gel balls 102 in storage cavity 106 substantially aligns with gravity, effectively loosening at least one gel ball 102 from others. In some embodiments, agitator 120 may be driven through gears and other links or linkages by feeding wheel 118. In some embodiments, agitator 120 may be driven by a different source, e.g., independent of feeding wheel 118. In some embodiments, agitator 120 may be driven by feeding wheel 118 (and thus indirectly driven by the motor.)

[0041] In some embodiments, magazine 100 has a return assembly 128. In some embodiments, return assembly 128 may include a button 130, a first blocker 132, a second blocker 134, and a linkage arm 142. In some embodiments, return assembly 128 has two states: a first state and a second state. In some embodiments, the first state is a biased state and the second state is a transient state in which force must be applied to maintain its status against the bias. Accordingly, in the first state, button 130, first blocker 132, and second blocker 134 are all in their respective first position; in the second state, button 130, first blocker 132, and second blocker 134 are all in their respective second position.

[0042] In some embodiments, button 130, first blocker 132, and second blocker 134 are each biased into a first position and moved into a second position under force sufficient to overcome the bias.

[0043] In some embodiments, button 130, first blocker 132, and second blocker 134 each have a first position and a second position. A user may directly or indirectly apply an actuation force, e.g., via actuating trigger 104, to move button 130, first blocker 132, and second blocker 134 from their respective first positions to their respective second positions.

[0044] In some embodiments, button 130 serves as an interface between trigger 104 and first and second blockers 132 and 134. Thus, actuating or releasing trigger 104 may synchronize movements of first blocker 132 and second blocker 134. Button 130 may have, for example, tabs, linkages, and/or notches configured to transform movement of the button 130 to respective movements of first and second blockers 132 and 134.

[0045] For example, button 130 may be mounted in a wall of magazine 100, and may have a first end configured to engage trigger 104 or other linkage and a first cam surface 144 configured to engage a first end 146 of first blocker 132. The first end of button 130 may protrude

from the magazine wall. Movement of trigger 104 causes button 130 to move within a slot in the wall of magazine 100 such that the first cam surface 144 pushes on the first end 146 of first blocker 132. FIG 5 shows a detailed view of a return assembly 128 according to some embodiments in which linkage arm 142 is not shown. First blocker 132 may be mounted to magazine 100 about a pivot 148 such that movement of first end 146 thereof (due to movement of button 130) in a first direction, rotating about pivot 148, causes second end 150 of first blocker 132 to move in a second direction, rotating about pivot 148 and stopping second end 150 from obstructing channel 110, thus allowing for passage of gel balls 102. For example, first end 146 and second end 150 of first blocker 132 may both rotate in a clockwise direction and/or a counter-clockwise direction.

[0046] According to some embodiments, second blocker 134 may be mounted in another wall of magazine 100 different from that in which first blocker 132 is mounted and may move within a different slot in magazine 100. Second blocker 134 may have an inclined surface facing button 130 and be in contact with a second cam surface of button 130. Movement of button 130 and second blocker 134 may occur at an angle, for example, perpendicular to each other. Accordingly, movement of button 130 (e.g., due to movement of trigger 104) may cause a point of contact between the second cam surface of button 130 and the inclined surface of second blocker 134 to slide on the inclined surface, resulting in second blocker 134 moving within the slot in which second blocker is constrained. FIG. 4 shows a detailed view of return assembly 128 according to embodiments of the disclosure. Linkage arm 142 may functionally link one or more of button 130, first blocker 132, and second blocker 134. For example, linkage arm 142 may comprise a pivoting connecting point 154, configured to engage with the magazine housing, a first end 152, configured to engage with button 130, and a second end 156 configured to engage with second blocker 134. Actuating trigger 104 and thereby actuating, e.g., depressing, button 130 may cause first cam surface 144 of button 130 to interact with first end 152 of linkage arm 142. Depression of button 130 may be configured to correspond to rotational movement of linkage arm 142 about connecting point 154 proximal to first end 152 of linkage arm 142. Rotation of linkage arm 142 corresponding to movement of button 130 may be translated to linear movement of second blocker 134 via connection at second end 156 with second blocker 134. Movement of second blocker 134 may also, at least temporarily, block return gate 136. Release of trigger 104 reverses the movement of the components, obstructing channel 110 and thereby preventing return of any gel balls 102 present at or above the position of first blocker 132.

[0047] In some embodiments, when trigger 104 is actuated, return assembly 128 may change from being in the first state to being in the second state; button 130, first blocker 132, and second blocker 134 may all change from

their respective first position to their respective second position. When trigger 104 is released, return assembly 128 may change from being in the second state to being in the first state; button 130, first blocker 132, and second blocker 134 may all change from their respective second position to their respective first position.

[0048] In some embodiments, button 130, first blocker 132, and second blocker 134 are each biased into their respective first positions in the first state. Pulling trigger 104 may exert a force on button 130, an indirectly via button 130, first blocker 132, and second blocker 134, thereby moving them against their respective bias toward their respective second positions in the second state.

[0049] For example, as shown in FIG. 2, FIG. 4 and FIG. 5, magazine 100 is in its first state. Trigger 104 is not actuated. Button 130 is biased in its first position. First blocker 132 is biased in its first position blocking at least a portion of channel 110. Second blocker 134 is biased in its first position uncovering a return gate 136 in channel 110, to allow one or more gel balls 102 to exit channel 110 and return to storage cavity 106.

[0050] As shown in FIG. 3, magazine 100 is in its second state. Trigger 104 is actuated. Button 130 is moved against its bias to its second position. First blocker 132 is pivoted to its second position, opening channel 110. Second blocker 134 moved to its second position, blocking return gate 136 so that gel balls 102 in channel 110 are blocked from returning to storage cavity 106 and can move to feed the breech or the firing mechanism of toy gun 10. The positions and bias directions are merely illustrative and it is contemplated that the bias directions and component positions may be biased in different directions, configured to move in different directions, configured to pivot or translate in different ways to achieve similar effects. The biasing means may include one or more compression springs, extension springs, leaf springs or other suitable means for biasing the components.

[0051] In some embodiments, actuating trigger 104 (e.g., via a pulling motion) may also actuate feeding assembly 116. Therefore, feeding assembly 116 may be activated (actuated) when return assembly 128 is in its second state, and deactivated (stationary) when return assembly 128 is in its first state.

[0052] In the first state, first blocker 132 may partially block channel 110. In some embodiments, first blocker 132 may partially or fully extend within channel 110 to block gel balls 102 from moving to feed toy gun 10, as well as moving in the opposite direction. Additionally, first blocker 132 may provide support to gel balls 102 that have already moved past first blocker 132 (i.e., gel balls 102 already past first blocker 132 but not yet fired by toy gun 10). In some embodiments, keeping some gel balls 102 above first blocker 132 may render at least some gel balls 102 immediately available to the breech and/or firing mechanism of toy gun 10, so toy gun 10 may be readily loaded and ready to first gel balls 102.

[0053] In some embodiments, in the first state, second

blocker 134 may be in a position to open return gate 136, which provides a return path for gel balls 102 that are inside channel 110, below first blocker 132, but above return gate 136, to return back to storage cavity 106.

Thus, those gel balls 102 that remain inside channel 110 below first blocker 132 and below return gate 136 may be subject to limited compression causing force (e.g., only gravity.) In other words, gel balls 102 that would otherwise remain in channel 110 under compression because they were successively feed into channel 110 by the feeding wheel 118 but not released because trigger 104 was no longer actuated, may be released by allowing some gel balls 102 to exit channel 110 and re-enter storage cavity 106 through return gate 136.

[0054] In some embodiments, the location of return gate 136 may be higher than opening 108. In some embodiments, the location of return gate 136 may be higher than the maximum fill line. Having return gate 136 above opening 108 and/or maximum fill line may prevent storage cavity 106 from being overfilled and blocking return gate 136.

[0055] In the second state, trigger 104 is actuated and moves button 130 against its bias. In some embodiments, trigger 104 may directly or indirectly connect to and actuate button 130 located on magazine 100. In some embodiments, trigger 104 may indirectly actuate button 130 through one or more levers or linkages.

[0056] While illustrative embodiments have been described herein, the scope of any and all embodiments having equivalent elements, modifications, omissions, combinations (e.g., of aspects across various embodiments), adaptations and/or alterations as would be appreciated by those skilled in the art based on the present disclosure. The elements recited in the claims are to be interpreted based on the language employed in the claims and not limited to examples described in the present specification or during the prosecution of the application. The examples are to be construed as non-exclusive. Furthermore, the steps of the disclosed methods may be modified in any manner, including by reordering steps and/or inserting or deleting steps. It is intended, therefore, that the specification and examples be considered as illustrative only, with a true scope and spirit being indicated by the following claims and their full scope of equivalents.

Claims

1. A magazine for use in a toy gun, comprising:

a storage cavity configured to store one or more gel balls, the storage cavity including an opening;

a channel configured to allow gel balls to pass through to feed a toy gun;

a feeding assembly configured to feed the gel balls into the channel; and

- a return assembly configured to return one or more gel balls from the channel to the storage cavity.
2. The magazine of claim 1, wherein the return assembly includes a first blocker and a second blocker.
 3. The magazine of claim 2, wherein the return assembly further comprises a linkage arm configured to link the first and/or second blocker.
 4. The magazine of any of claims 2-3, wherein the return assembly is configured to have a first state and a second state, wherein:

when the return assembly is in the first state, the first blocker is configured to block the gel balls from being fed to the toy gun and the second blocker is configured to open a return gate for the gel balls to return to the storage cavity; and

when the return assembly is in the second state, the first blocker is configured to allow gel balls to be fed to the toy gun through the channel and the second blocker is configured to block the return gate.
 5. The magazine of any of claims 1-4 wherein the return assembly further comprises an activation means configured to move the return assembly from the first state to the second state and vice versa.
 6. The magazine of any of claims 2-5 wherein the activation means is configured to engage with the linkage arm, to change the state of the return assembly between the first or second state.
 7. The magazine of claim 5 wherein the activation means comprises a button.
 8. The magazine of any of claims 1-7, wherein both the feeding assembly and the return assembly are individually actuated by a trigger of the toy gun.
 9. The magazine of claim 8 wherein the trigger engages with the activation means to actuate the return assembly.
 10. The magazine of any of claims 1-9, wherein the feeding assembly comprises a feeding wheel and an agitator.
 11. The magazine of claim 10, wherein the feeding wheel comprises a gear with teeth accommodating the gel balls.
 12. The magazine of any of claims 1-11, wherein the gel balls are spherical in shape and have a diameter of at least 5 mm.
 13. The magazine of claim 10, wherein the agitator is configured to have a repetitive movement in the storage cavity when the feeding wheel is actuated.
 14. The magazine of any of claims 8 and 13, wherein when the feeding wheel is actuated, teeth of feeding wheel are configured to engage with the agitator to move the agitator against a biasing device.
 15. The magazine of any of claims 8 and 13-14, wherein the feeding wheel is actuated by a motor controlled by the trigger.
 16. A toy gun configured to shoot gel balls, comprising:

a trigger; and

a magazine of any one of claims 1-15.

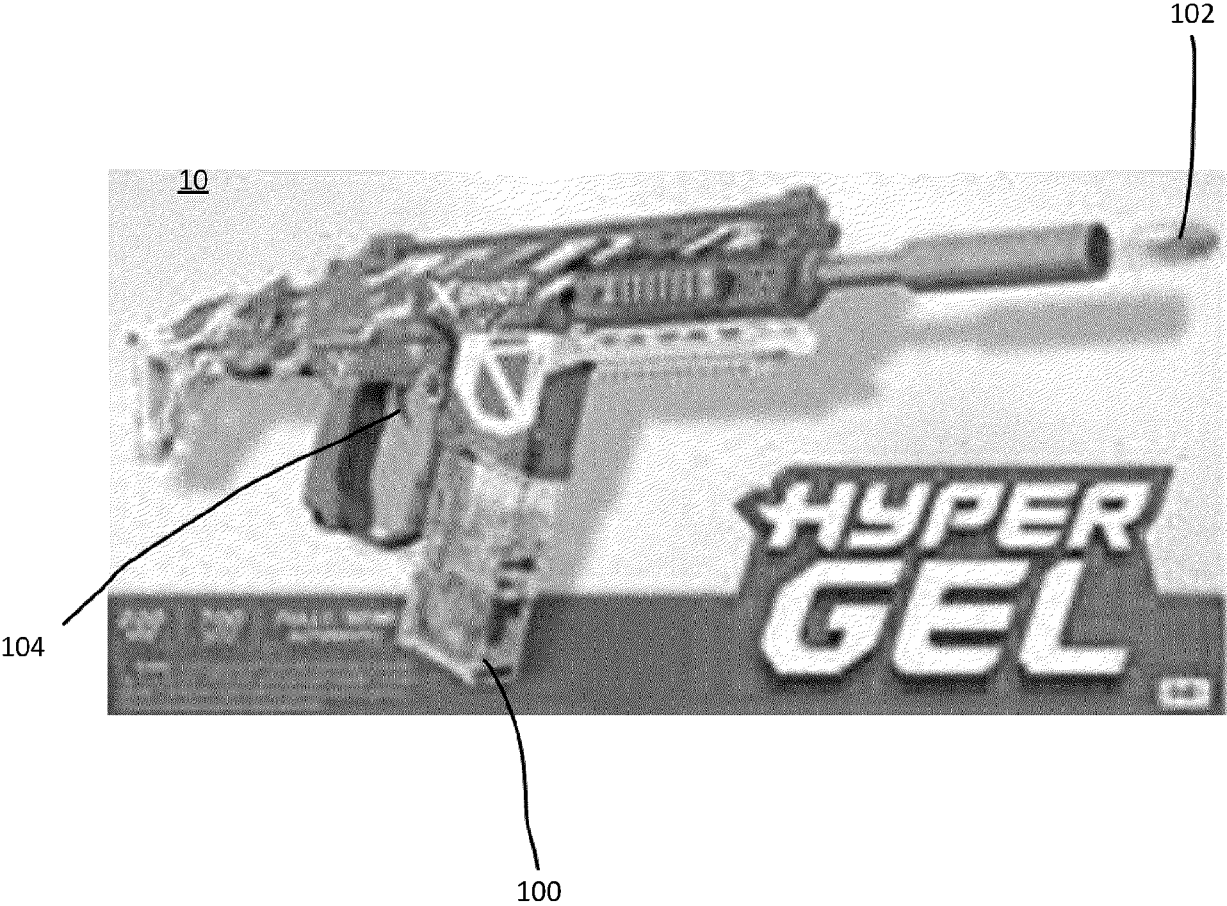


FIG. 1

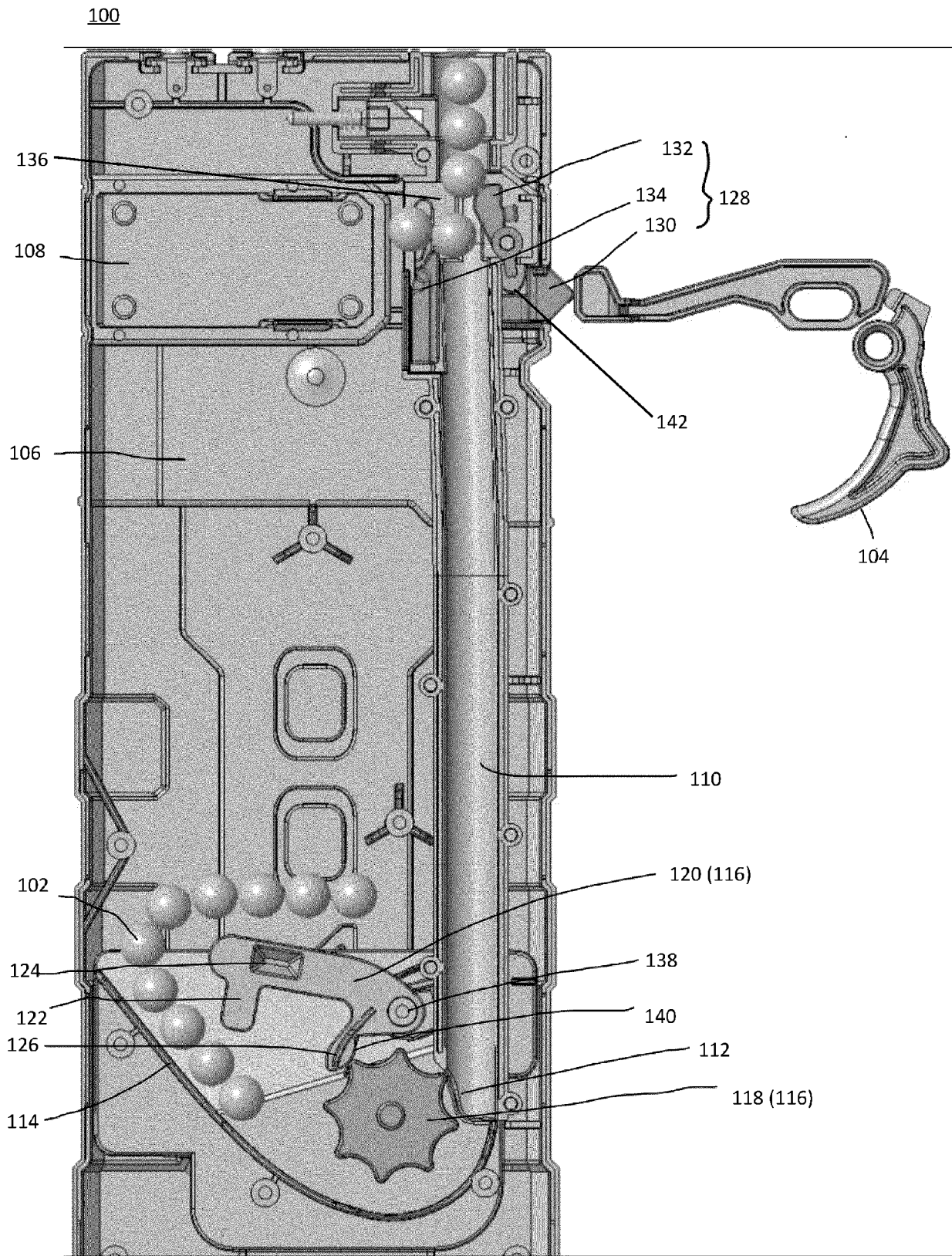


FIG. 2

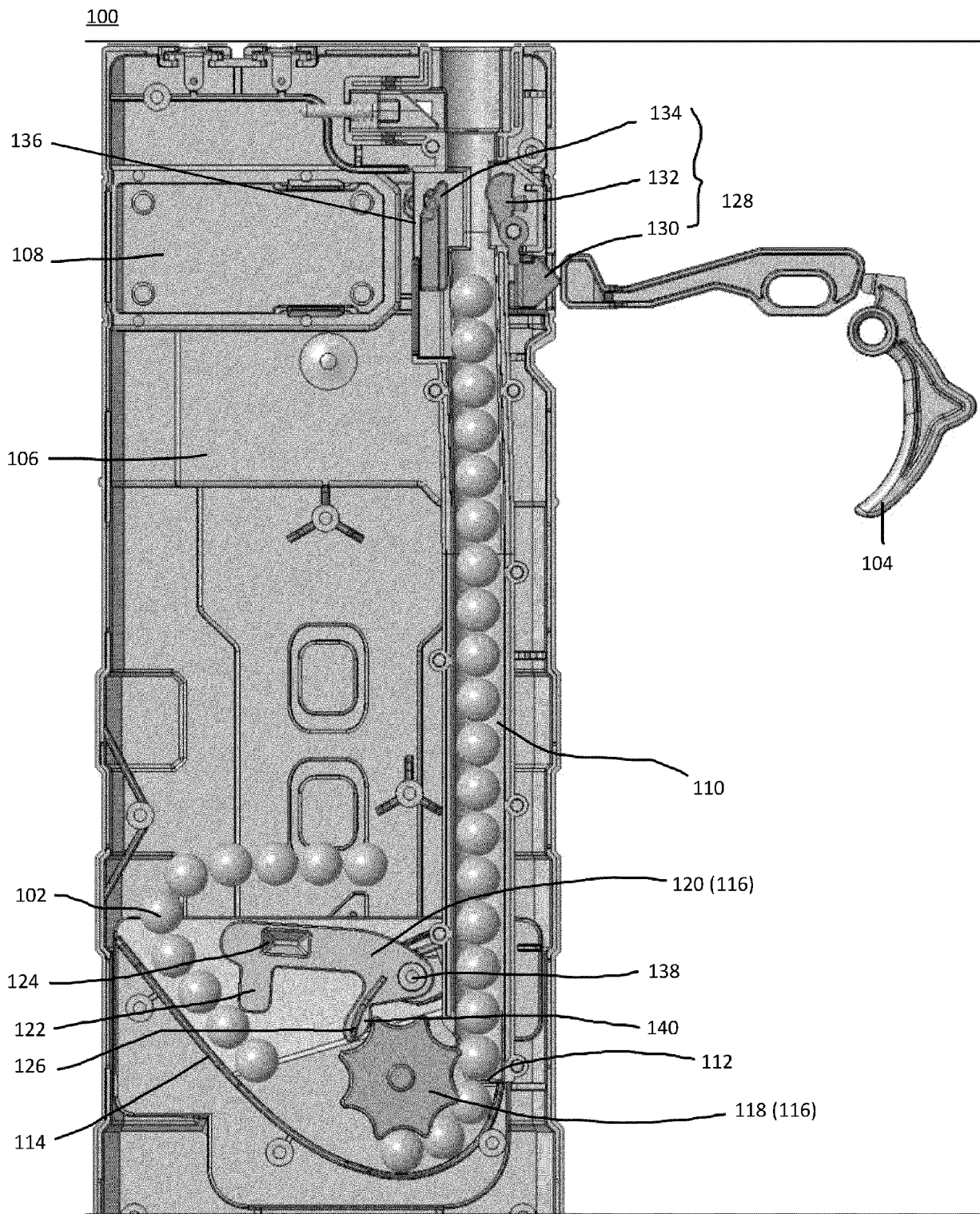


FIG. 3

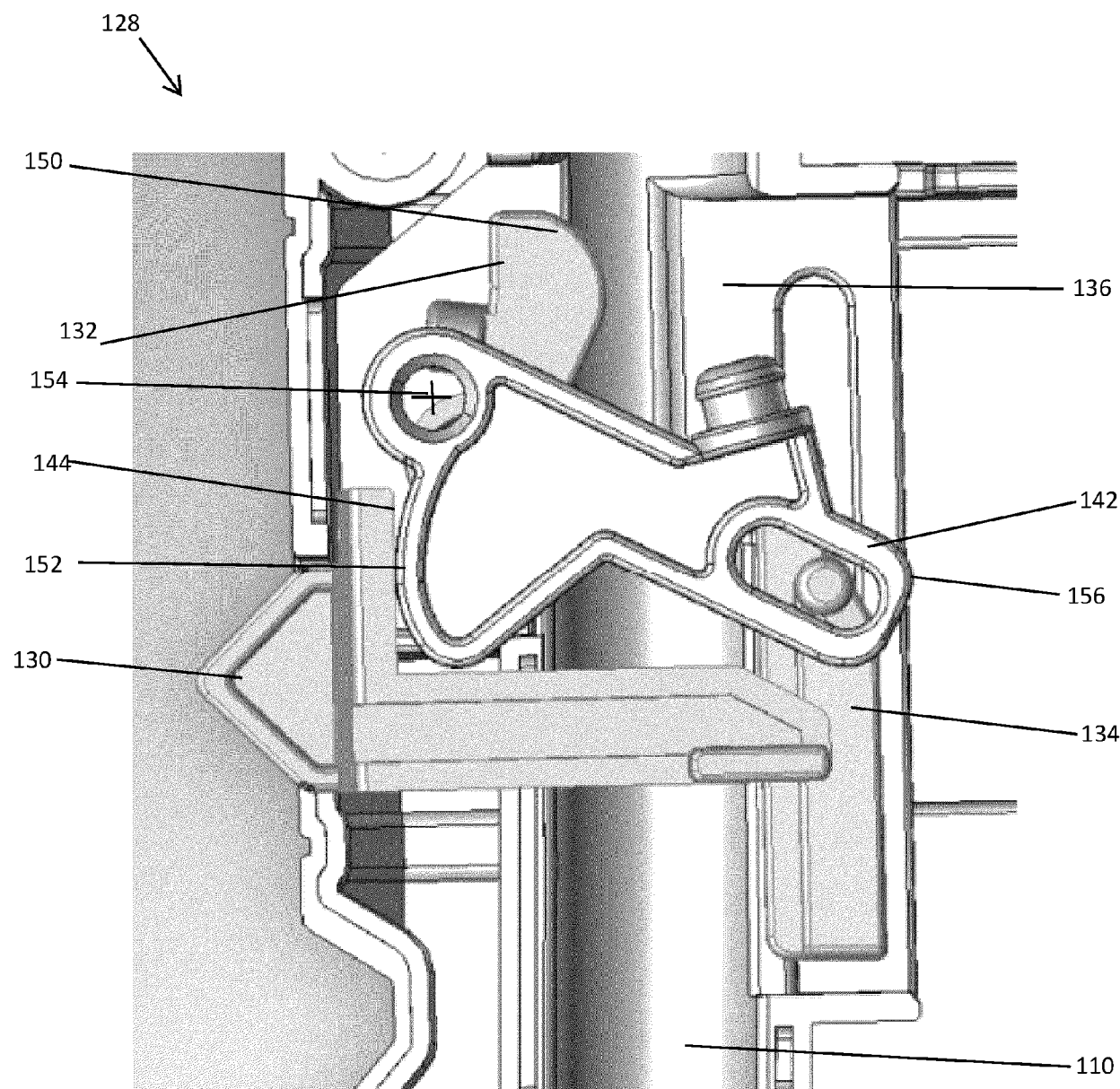


FIG. 4

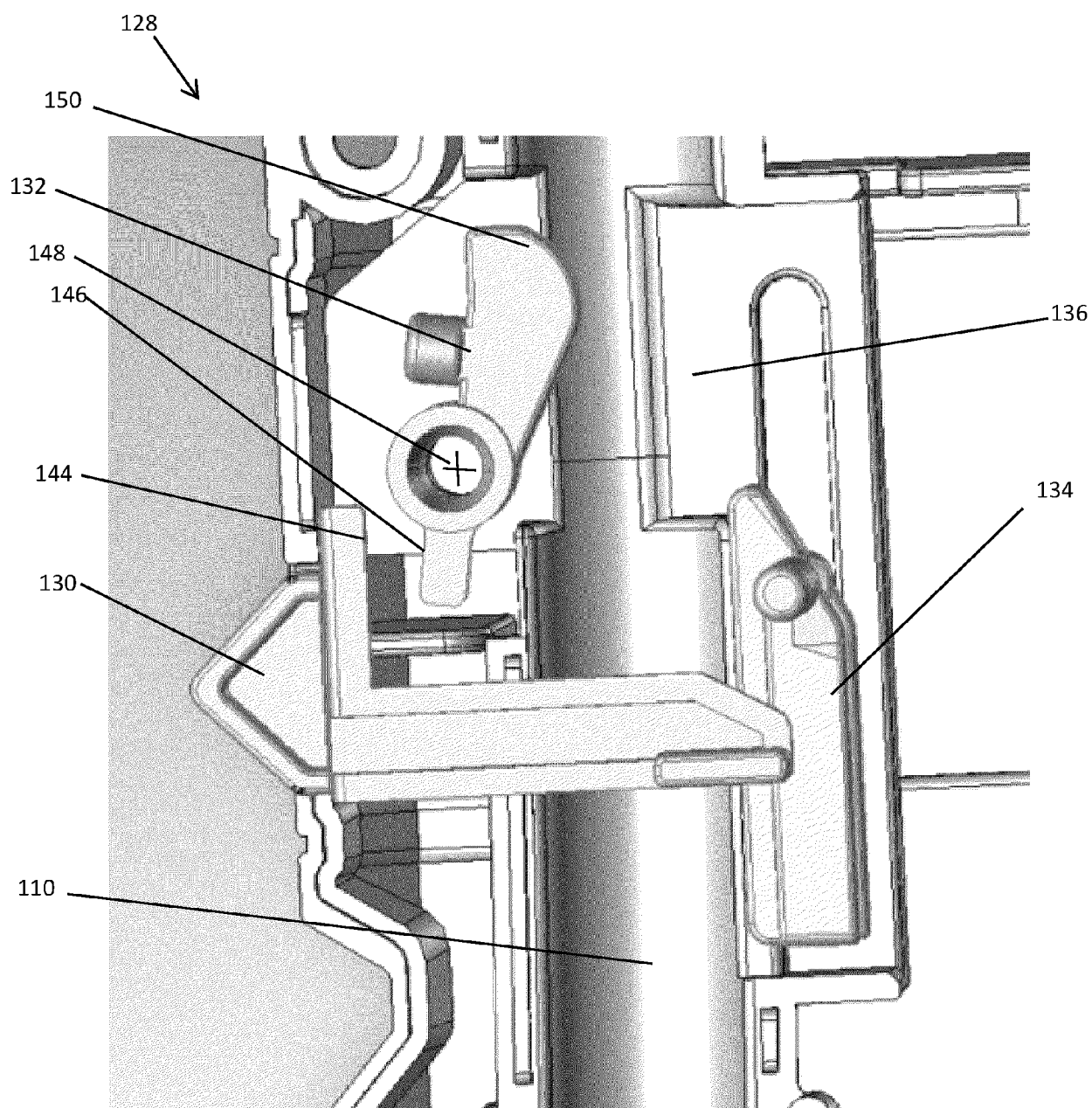


FIG. 5



EUROPEAN SEARCH REPORT

Application Number

EP 25 16 7715

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 10 139 192 B1 (BAGHADJIAN MARC [US] ET AL) 27 November 2018 (2018-11-27) * abstract * * column 3, line 6 - line 63 * * figures *	1-16	INV. F41B11/55 F41B11/56 F41B11/89 F41A9/02 F41B11/54
A	WO 2006/090864 A1 (NAGAYOSHI KATSUMI [JP]) 31 August 2006 (2006-08-31) * the whole document *	1-16	
A	CN 1 746 608 A (YIKAI ENTPR CO LTD [CN]) 15 March 2006 (2006-03-15) * abstract * * claim 1 * * figures *	1-16	
A	US 2011/030667 A1 (LIN NIEN-CHUN [TW]) 10 February 2011 (2011-02-10) * abstract * * paragraph [0017] * * figures *	1-16	
			TECHNICAL FIELDS SEARCHED (IPC)
			F41B F41A
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 September 2025	Vermander, Wim
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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