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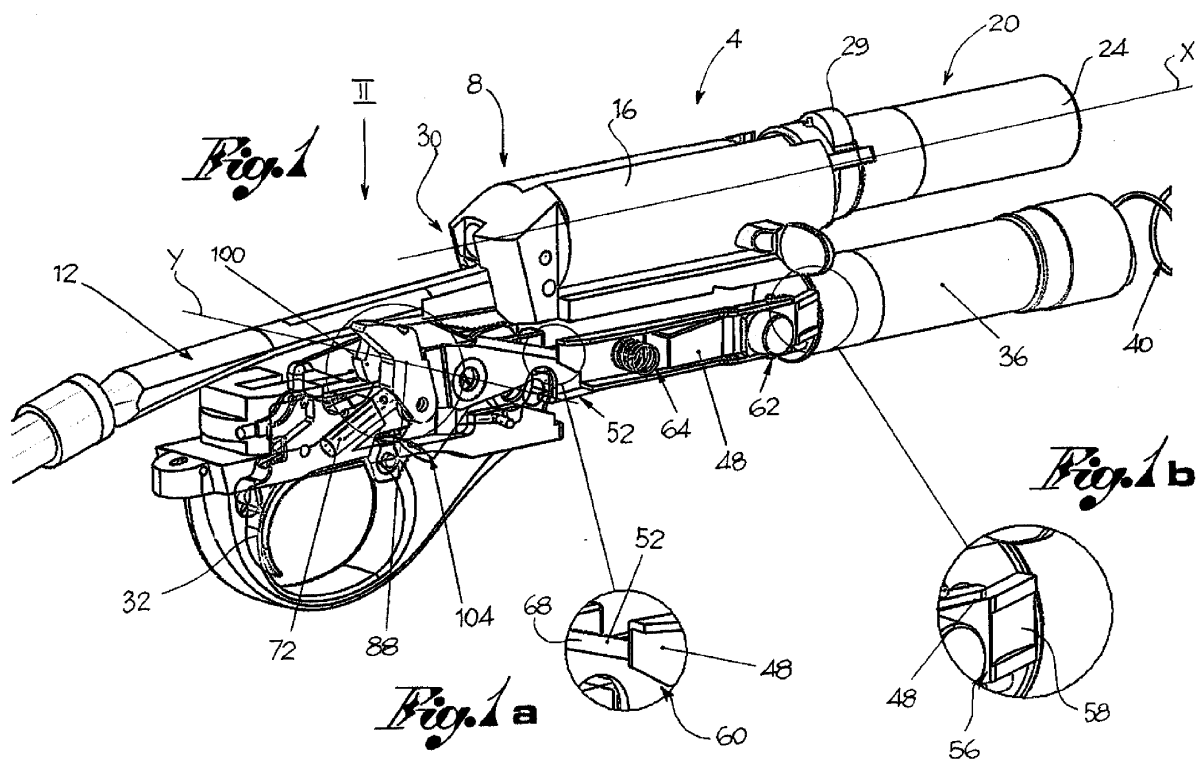
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(54) **Recoil operated rifle with improved trigger group**

(57) An inertia rifle (4) comprising a slide (16), a trigger (32) and a cartridge magazine containing at least one second cartridge (36) to load in the cartridge chamber (20) after expelling the first cartridge (24). The rifle (4) comprises a stop lever (48) and an elevator (52) wherein the stop lever (48) is joined to the elevator (52) so as to receive and block the second cartridge (36) on an insert of the magazine, the elevator (52) being elastically

pushed away from the stop lever (48) and being blocked in position against the stop lever (48) by means of a catch (76). The trigger (32) is operatively connected to the elevator (52) so as to release the catch (76) and thereby enable loading of the second cartridge (36) on the elevator (52) which interferes with the forward stroke of the slide (16) consequent to firing, so as to rotate the elevator (52) and load the second cartridge (36) into the cartridge chamber (20).



Description

[0001] The present invention relates to an inertia rifle fitted with an improved trigger group.

[0002] As is known, in the art inertia rifles and gas recovery rifles exist.

[0003] In rifles functioning by means of inertia the recoil generated following firing is used directly to move the slide or obturator backwards; such backward stroke permits makes it possible both to rearm the hammer of the rifle and to place a new cartridge in the cartridge chamber according to a semi-automatic or automatic type functioning depending on the type of weapon.

[0004] Such rifles functioning by means of inertia are quite simple as regards construction but do not always ensure precise, jam-free functioning. In fact, the use of cartridges having for example of relatively small calibres and therefore masses may cause the weapon to jam: in other words the inertial mass of the cartridge may not be sufficient to activate the inertial arming mechanism of the hammer and loading of a new cartridge connected with the backward stroke of the slide. Such rifles are therefore often constrained to use cartridges of a relatively high calibre.

[0005] Alternatively it is known of to use gas recovery rifles in which part of the gas produced by firing is directly used to drive mechanisms, comprising levers and pistons, which cause the backward stroke of the slide so as to arm the hammer and load a new cartridge in the cartridge chamber. Such mechanisms can also function with smaller calibres having smaller firing forces: in fact the thrust exerted by the gas is amplified by the mechanisms connected to the recovery of gas and acting on the slide.

[0006] Such gas recovery rifles are however more complicated to produce in that they require gas recovery mechanisms. An increase in the weight of the weapon results

[0007] Consequently, the need is felt in the art for a rifle which is as simple and lightweight as possible and, at the same time, which does not jam even when using small calibre cartridges.

[0008] The purpose of the present invention is to make a rifle which resolves the drawbacks mentioned with reference to the prior art.

[0009] Such drawbacks are resolved by a rifle according to claim 1.

[0010] Other embodiments of the rifle according to the invention are described in the subsequent claims.

[0011] Further characteristics and advantages of the present invention will be clearer from the description given below of a preferred embodiment, made by way of a non-limiting example, wherein:

[0012] figure 1 shows a perspective view of a rifle according to one embodiment of the present invention;

[0013] figures 1a and 1b show enlarged details of figure 1;

[0014] figure 2 shows a perspective view of the rifle in figure 1, from the side of the arrow II in figure 1;

[0015] figure 3 shows a perspective view of the rifle in figure 1, in a condition of movement of the trigger group;

[0016] figures 3a and 3b show enlarged details of figure 3;

5 **[0017]** figure 4 shows a perspective view of the rifle in figure 1, from the side of the arrow IV in figure 3;

[0018] figures 4a and 4b show enlarged details of figure 4;

10 **[0019]** figures 5-7 show perspective views of the rifle in figure 1, in subsequent phases of firing a cartridge;

[0020] figures 6a and 6b show enlarged details of figure 6.

[0021] With reference to the aforesaid drawings, reference numeral 4 globally denotes a rifle comprising a slide group 8 and a trigger group 12.

[0022] The slide group 8 comprises a slide 16 moving axially in a longitudinal direction X-X, parallel to a firing direction of the rifle 4.

20 **[0023]** The slide 16 has a backward stroke in relation to a closed position, in which the slide 16 closes and delimits rearwards a cartridge chamber 20 able to house a first cartridge 24 for firing. The slide 16 also has a forward stroke wherein it returns to the closed position of the cartridge chamber 20. The slide 16 is subject to the action of a spring which pushes it towards the closed position; such spring opposes the recoil effect impressed on the slide 16 by the first cartridge 24, as described further below.

25 **[0024]** The slide 16 directly faces a base 28 of the first cartridge 24 so as to be subject to the direct recoil effect of the cartridge following firing of the same, to perform the backward stroke. In other words, the rifle is of the inertial type wherein the inertia of the bullet fired is used directly on the slide to impose the backward movement and subsequent loading of the weapon, as described further below.

30 **[0025]** The slide 16 comprises a front portion 29 which interfaces directly with the cartridge to be fired and in particular which comes into contact with the base 28 of the first cartridge 24. Said front portion 29 thus forms a wall or end of the cartridge chamber 20. The slide 16 comprises, in addition, a rear portion 30, opposite the front portion 29 and suitable to interact with the trigger mechanism and in particular with the hammer of the rifle, as further described below. The slide 16 comprises a firing pin (not shown) inside it, for example of the known type which, subjected to the action of the hammer, strikes the base 28 of the first cartridge 24 generating the explosion of the blast of the latter.

35 **[0026]** The rifle 4 further comprises the trigger group 12 comprising a trigger 32 and means of activating the firing mechanism of the rifle 4, listed below.

40 **[0027]** The rifle 4 further comprises a cartridge magazine (not shown) containing at least one second cartridge 36 to load in the cartridge chamber 20 after expelling the first cartridge 24.

45 **[0028]** The cartridge magazine comprises a push spring 40 which pre-loads the second cartridge 36 lon-

gitudinally, said second cartridge 36 being housed inside the magazine substantially parallel to the first cartridge 24.

[0029] The trigger group 12 comprises a stop lever 48 and an elevator 52 suitable to interface with said second cartridge 36 so as to block the second cartridge 36 at the insert of the magazine while the first cartridge 24 occupies the cartridge chamber 20 and so as to push the second cartridge 36 into the cartridge chamber 20 after the expulsion of the first cartridge 24.

[0030] The stop lever 48 is joined to the elevator 52 so as to receive and block the second cartridge 36 on an insert of said cartridge magazine, and the second cartridge 36 is elastically pushed against a locking end 56 of the stop lever 48 in a direction substantially parallel to said longitudinal direction X-X. Such thrust is exerted by means of the push spring 40 positioned inside the magazine (figures 1-2).

[0031] For example, the locking end 56 of the stop lever 48 comprises a claw 58 suitable to block on a perimetral rim of the base 28 of the first cartridge 24 (figure 1b).

[0032] The stop lever 48 comprises the locking end 56 which abuts directly against the base of the second cartridge 36 and an interface end 60, opposite the locking end 56, at which it interfaces with the elevator 52.

[0033] The stop lever 48 is fixed to the body of the rifle by means of a pin 62, positioned between said stop 56 and interface 60 ends. The stop lever 48 is moreover influenced by elastic means 64 in rotation in relation to the pin 62. The elastic means 64 are positioned on the opposite side to the locking end 56, in relation to the pin 62; this way the elastic means 64 tend to rotate the stop lever 48 so as to release the locking end 56 from the base 28 of the second cartridge 36 to permit loading of the second cartridge 36 on the elevator 52.

[0034] The elastic action on the stop lever 48 is contrasted by the elevator 52, on one side 68 of the latter. In other words, the interface end 60 of the stop lever 48, stops against a corresponding side 68 of the elevator 52, in a transversal blocking direction Y-Y (figure 1a). The stop lever 48 is elastically pre-sprung against the side 68 of the elevator 52, in said transversal direction Y-Y, by means of the elastic means 64. Transversal direction is taken to mean a direction perpendicular to the longitudinal direction X-X.

[0035] The elevator 52 is elastically pressed away from the stop lever 48 by a push spring 72 and is blocked in position against the stop lever 48 by a catch 76 (figure 2b).

[0036] The elevator 52 is hinged to the body by a transversal pin 80 so as to be swivel mounted on a rotation axis parallel to said transversal direction Y-Y.

[0037] The push spring 72 pushes the elevator 52 to rotate around the transversal pin 80 away from the body, that is downwards.

[0038] The elevator 52 is hinged in relation to the transversal pin 80 so that following rotation of the elevator 52, the side of the elevator 52 is released from the interface end 60 of the stop lever 48 (figures 3a, 4a).

[0039] Such movement of the elevator 52 is prevented by the catch 76 situated, according to one embodiment, on the side opposite the associable stop lever 48.

[0040] The elevator 52 comprises a loading end 84 directly facing the second cartridge 36 and shaped so as to facilitate loading of the cartridge; for example said loading end 84 comprises a downwardly inclined ramp so as to facilitate loading of the second cartridge 36.

[0041] According to one embodiment the elevator 52 is joined in rotation with a tooth 88 suitable to interface with the slide during its backward and forward stroke.

[0042] In particular, the elevator 52 is joined in rotation to the tooth 88 which interferes with the rear portion 30 of the slide 16 so that, in the backward stroke of the slide 16, the tooth 88 is pushed and the elevator is rotated, in a transversal direction towards the cartridge chamber 20, so as to insert the second cartridge 36 next to the cartridge chamber 20 (figure 6).

[0043] In particular, the tooth, in turn comprises a protuberance 92 able to engage in a corresponding recess 94 made on the underside 96 of the slide 16 (figure 6b). So that during the forward stroke the protuberance 92 of the tooth 88 engages in the recess 94 and drags the tooth 88 with it causing the elevator 52 to rotate towards the cartridge chamber 20. This way the base 28 of the second cartridge 32 is moved to the forward stroke of the slide 16 so as to interfere at least partially with the front portion 29 of it. Such interference enables the slide 16 to push the second cartridge 36 fully inside the cartridge chamber 20.

[0044] The trigger group 12 comprises the trigger 32 operatively connected to a hammer 100 which acts by striking the firing pin, in the known manner. The movement of the trigger 32 releases the hammer 100, previously cocked, so as to permit its lowering onto the firing pin.

[0045] Advantageously, the trigger 32 is operatively connected to the elevator 52 so that, during the stroke of the trigger 32 to perform firing, the trigger 32 releases the catch 76 of the elevator 52 and consequently the stop lever 48, so as to allow loading of the second cartridge 36 on the elevator 52 as described above.

[0046] According to one embodiment the catch 76 of the elevator 52 is positioned on the opposite side to the associable stop lever 48 and is operatively connected to the movement of the hammer 100 of the rifle 4, so as to be released following lowering of the hammer 100.

[0047] The hammer 100 is for example pushed by a spring 104 which lowers it against the rear portion 30 of the slide 16; the hammer 100 is mechanically connected to a first lever 108 hinged to a transmission 112 in turn connected to the catch 76. As a result the movement of the first lever 108 permits the rotation of the catch 76 which releases the elevator 52 as well as the stop lever 48 allowing loading of the second cartridge 36 on the elevator, as already described.

[0048] As may be appreciated from the description, the rifle according to the present invention makes it pos-

sible to overcome the drawbacks presented in the rifles of the prior art.

[0049] In particular, the rifle is relatively simple and economical to make.

[0050] The trigger mechanism is particularly efficient and may be efficaciously activated by the slide even using relatively small calibre cartridges, therefore having reduced inertia.

[0051] In other words, the integration of the trigger group and the slide group according to the present invention makes the semi-automatic functioning of the rifle possible without incurring in jamming even when using small calibre cartridges.

[0052] The rifle according to the present invention is reliable and substantially free of jamming.

[0053] In addition, the rifle according to the present invention has a reduced mass in that it does not envisage complex gas recovery activating mechanisms.

[0054] A person skilled in the art may make numerous modifications and variations to the rifles described above so as to satisfy contingent and specific requirements, all contained within the sphere of protection as defined by the appended claims.

Claims

1. Rifle (4) comprising:

- a slide group (8) having a slide (16) moving axially in a longitudinal direction (X-X), parallel to a firing direction of the rifle, and a trigger group (12) comprising a trigger (32) and means of activating the firing mechanism of the rifle (4),
- the slide (16) having a backward stroke in relation to a closed position, in the closed position the slide (16) closing and delimiting rearwards a cartridge chamber (20) able to house a first cartridge (24) for firing, and a forward stroke wherein the slide (16) returns to the closed position of the cartridge chamber (20),
- the slide (16) facing directly onto the base (28) of the first cartridge (24) so as to be subject to the direct recoil effect of the first cartridge (24) following firing of the same, to perform the backward stroke,
- the rifle (4) comprising, in addition, a cartridge magazine containing at least one second cartridge (36) to load in the cartridge chamber (20) after expelling the first cartridge (24),

characterised by the fact that

- the trigger group (12) comprises a stop lever (48) and an elevator (52) able to interface with said second cartridge (36), wherein the stop lever (48) is joined to the elevator (52) so as to receive and block the second cartridge (36) on

an insert of said cartridge magazine, the second cartridge (36) being elastically pushed against a locking end (56) of the stop lever (48) in a direction substantially parallel to said longitudinal direction (X-X),

- the elevator (52) is elastically pressed away from the stop lever (48) and is blocked in position against the stop lever (48) by a catch (76),

- the trigger (32) is operatively connected to the elevator (52) so that, during the stroke of the trigger to perform firing, it releases the catch (76) of the elevator (52) and consequently the stop lever (48), so as to allow loading of the second cartridge (36) on the elevator (52) and movement of the elevator (52) which interferes with the subsequent forward stroke of the slide (16) consequent to firing, so as to rotate the elevator (52) and load the second cartridge (36) into the cartridge chamber (20).

2. Rifle (4) according to claim 1, wherein the stop lever (48), on the side opposite the locking end (56), comprises an interface end (60) which stops against a corresponding side (68) of the elevator (52), in a transversal blocking direction (Y-Y), the stop lever (48) being elastically pre-sprung against the side (68) of the elevator (52), in said transversal direction (Y-Y).

3. Rifle (4) according to claim 2, wherein the elevator (52) is hinged in relation to a transversal pin (80) so that following rotation of the elevator (52) the side (68) is released from the elevator (52) by the interface end (60) of the stop lever (48).

4. Rifle (4) according to any of the previous claims, wherein the catch (76) of the elevator (52) is positioned on the opposite side to the associable stop lever (48) and is operatively connected to the movement of a hammer (100) of the rifle (4), so as to be released following lowering of the hammer (100).

5. Rifle (4) according to any of the previous claims, wherein the locking end (56) of the stop lever (48) comprises a claw (58) able to block the first cartridge (24) on a perimetral rim of the base (28).

6. Rifle (4) according to any of the previous claims, wherein the cartridge magazine comprises a push spring (72) which pre-loads the second cartridge (36) longitudinally against the elevator (52), said second cartridge (36) being housed inside the magazine longitudinally and parallel to the first cartridge (24).

7. Rifle (4) according to any of the previous claims, wherein the elevator (52) is joined in rotation to a tooth (88) which interferes with a rear portion (30) of the slide (16) so that, in the backward stroke of the

slide (16), the tooth (88) is pushed and the elevator (52) is rotated, in a transversal direction (Y-Y), towards the cartridge chamber (20), so as to insert the second cartridge (36) next to the cartridge chamber (20).

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8. Rifle (4) according to any of the previous claims, wherein the tooth (88) comprises a protuberance (92) able to engage in a corresponding recess (94) made on the underside (96) of the slide (16), so that during advancement of the slide (16) the protuberance (92) of the tooth (88) engages in the recess (94) dragging the tooth (88) with it and causing the elevator (52) to rotate towards the cartridge chamber (20).
9. Rifle (4) according to claim 8, wherein the base (28) of the second cartridge (32) is moved to the forward stroke of the slide (16) so as to interfere at least partially with a front portion (29) of it so that at the end of the forward stroke the slide (16) pushes the second cartridge (36) fully inside the cartridge chamber (20).

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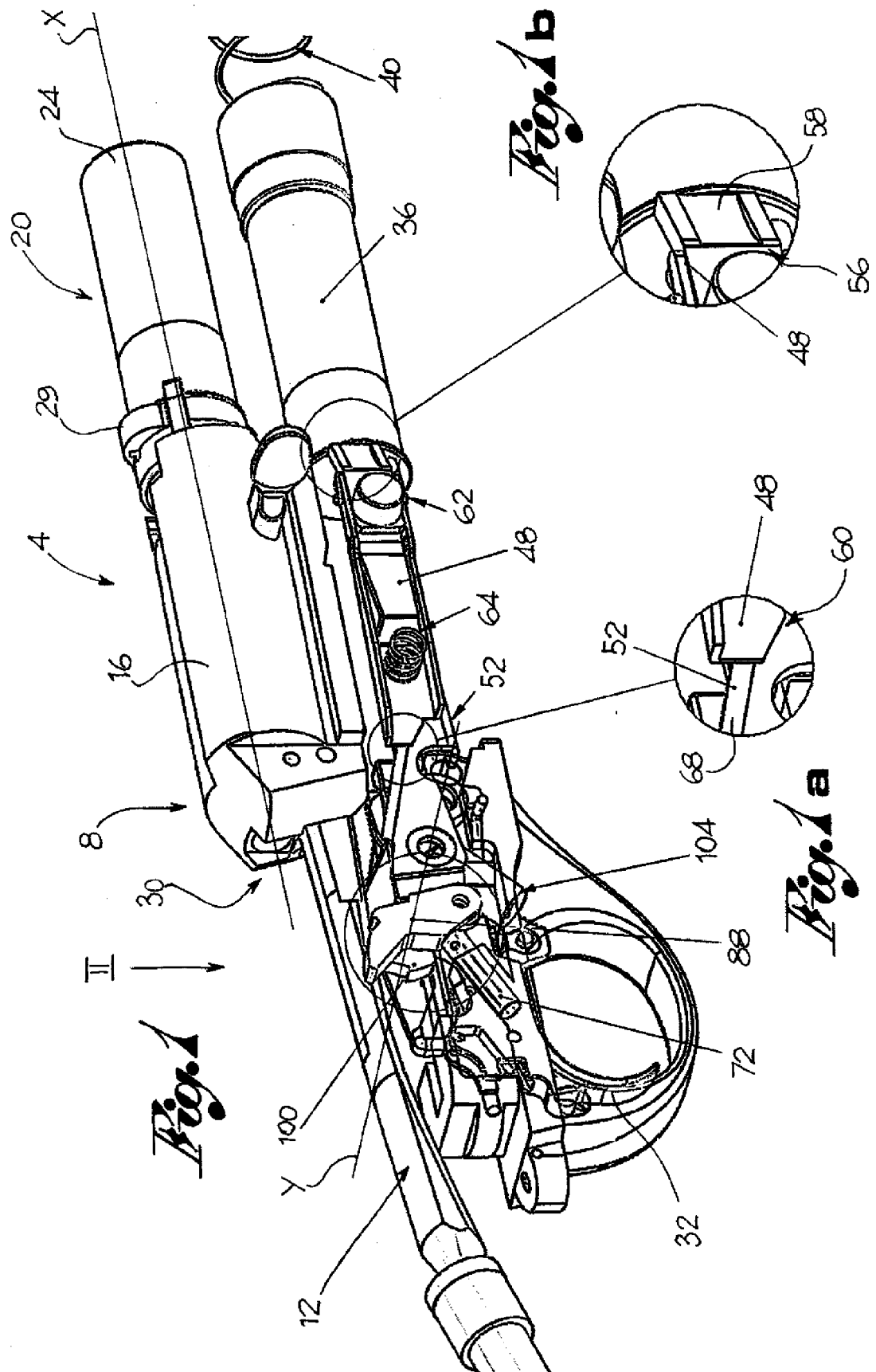
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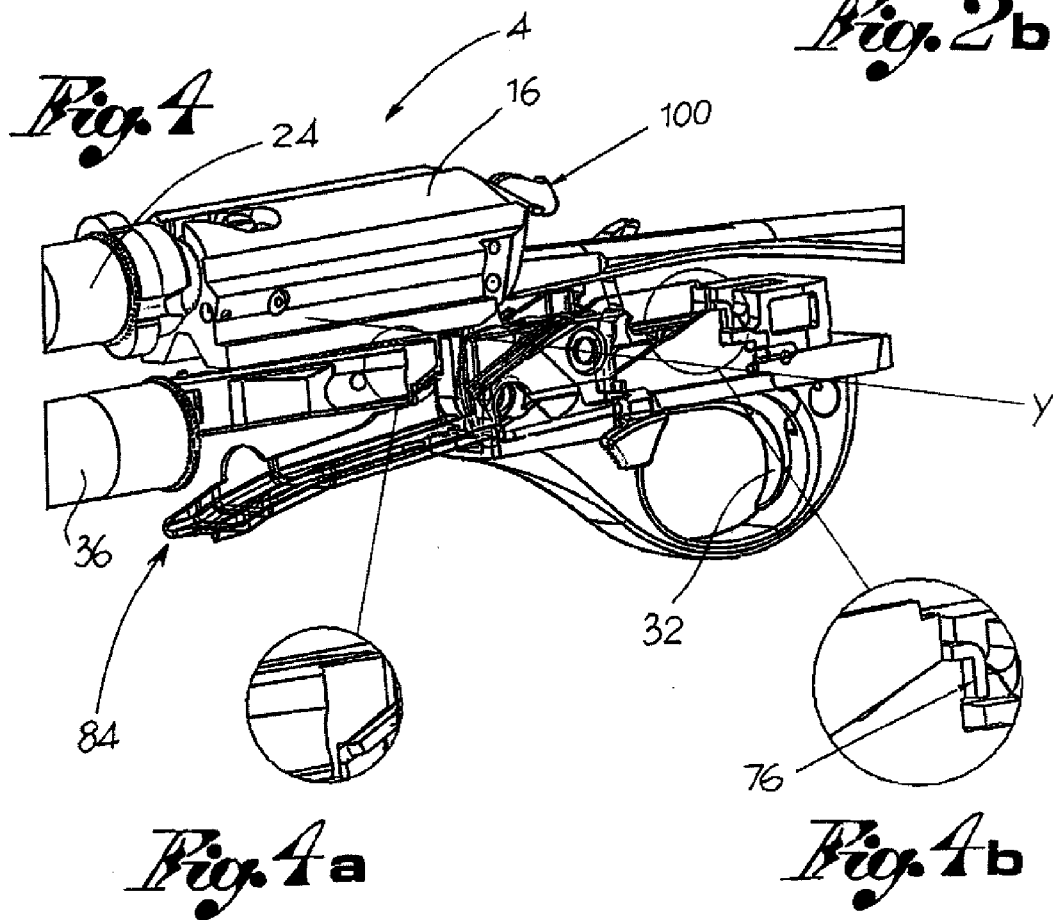
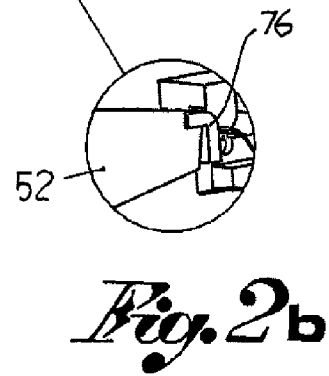
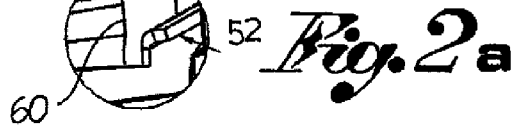
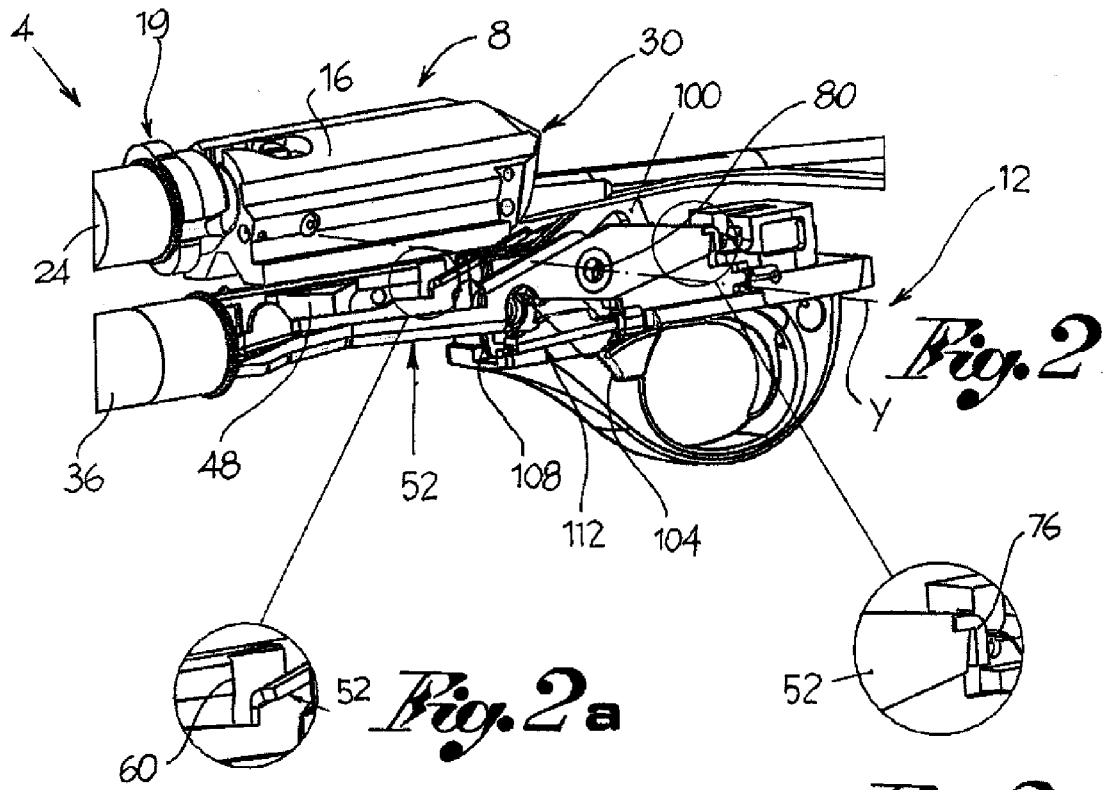
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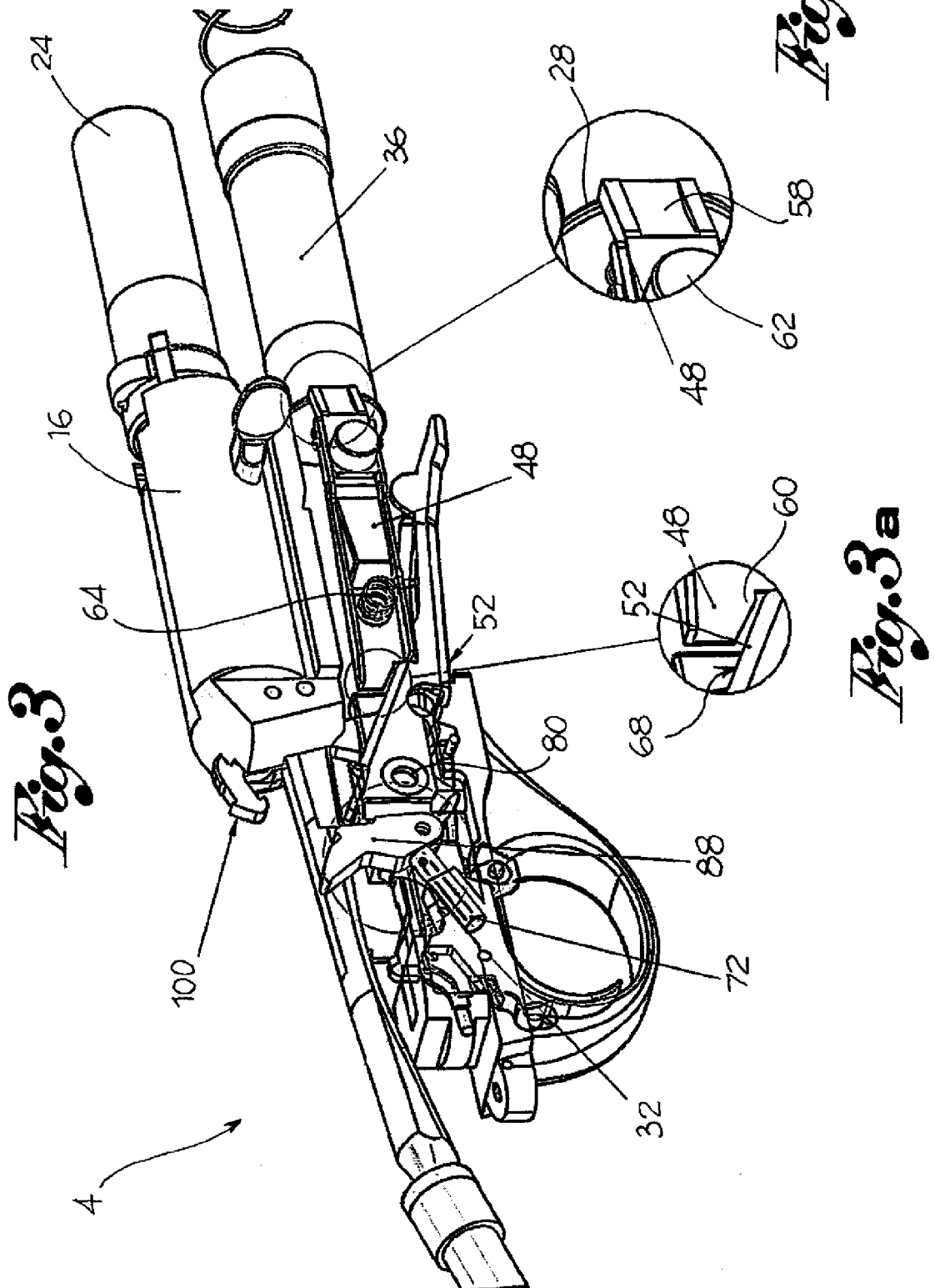
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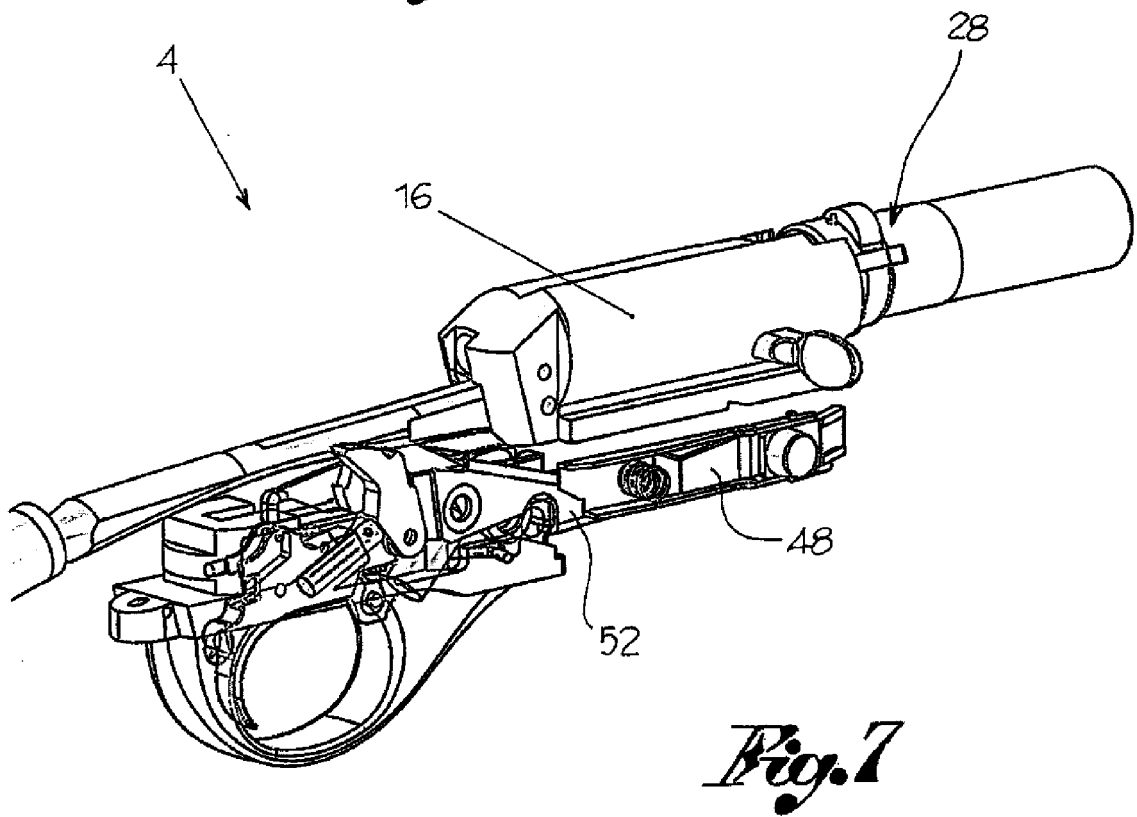
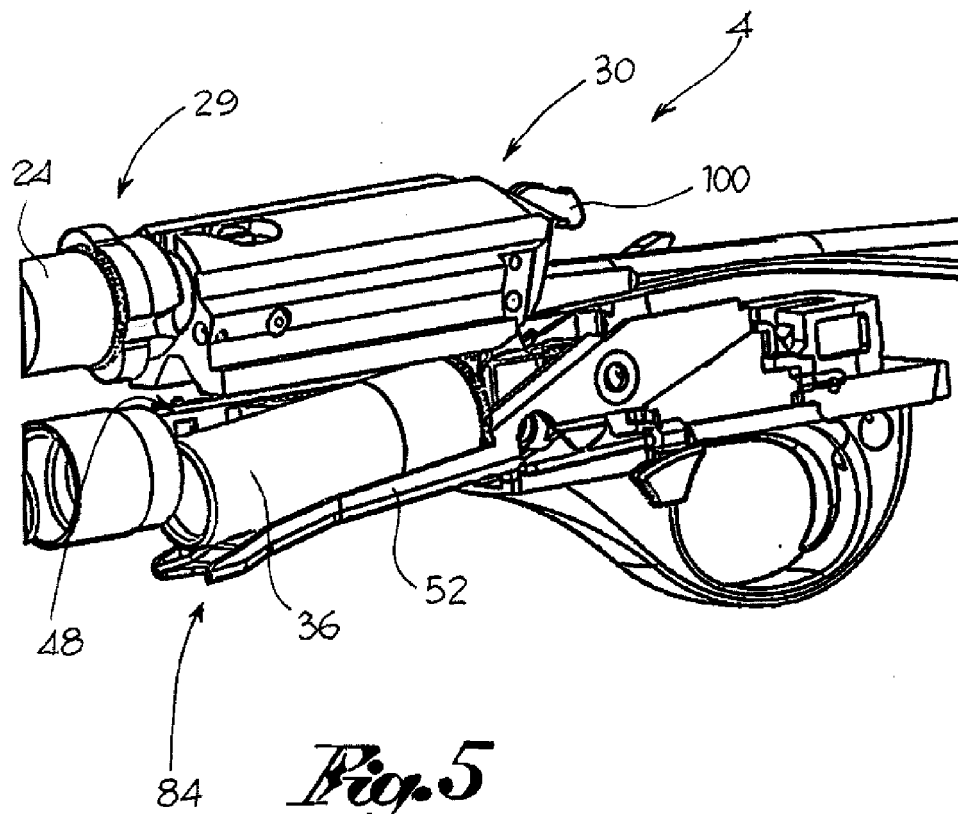
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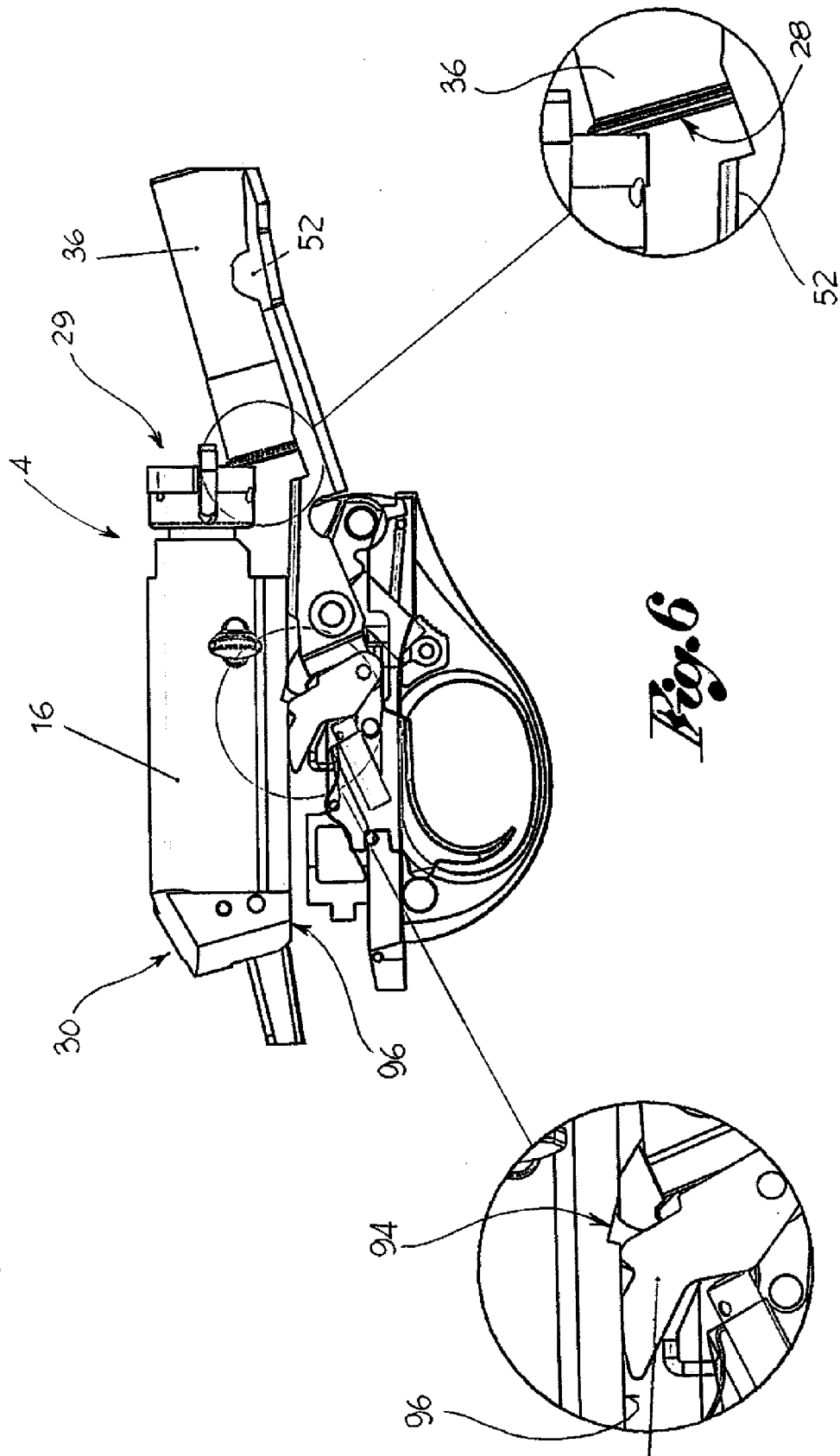


Fig. 6a

Fig. 6

Fig. 6b



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 6668

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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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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