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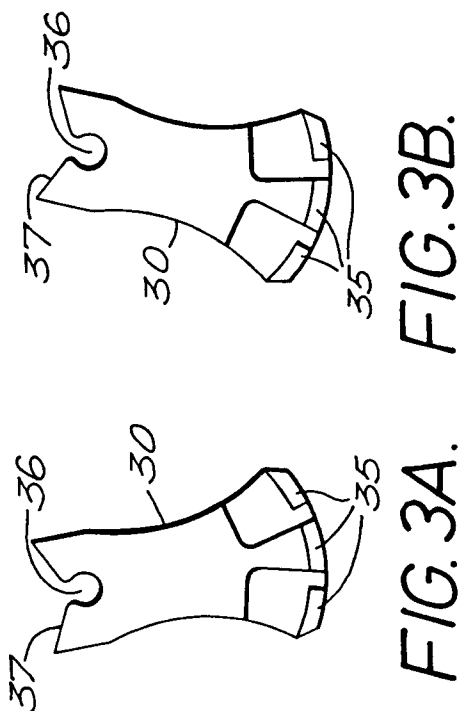
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(54) **Firearm action.**

(57) An action (1) for an over-and-under double-barrelled shotgun is provided in which the firing mechanism (3) is releasably received with the action body (2). The action body (2) has a strap portion (8) and juxtaposed firing trains for each barrel including a hammer (19), a main spring (20) for driving the hammer (19) against a firing pin, a sear (21) and a sear spring (22). A thumb-operated safety catch (11) is provided on the strap portion (8) and includes a selector plate (47) depending from its underside which cooperates with a forked selector (30) pivotally mounted on a recoil inertia block (28) on the firing mechanism whereby by movement of the safety catch (11) co-operable selector parts (30,47) on the underside of the safety catch (11) and on the firing mechanism (3) are operable together on inter-engagement of the firing mechanism (3) with the action body (2).



This invention relates to an action for a firearm, particularly a double-barrelled shotgun.

Shotguns are used for game and clay pigeon shooting and clay pigeon shooting in particular is becoming increasingly popular. The sport of clay pigeon shooting may be divided into two types, namely:

- (i) "Target", where the shooter shoots from a fixed position at clay pigeons hurled from one or more traps in a regulated manner; and,
- (ii) Game, known as "Sporting", where the trajectory of the clays is designed to replicate the differences in the flight of game.

Sporting clay pigeon shooting is now the most popular form of clay pigeon shooting and the favoured firearm is a shotgun of over-and-under configuration. Although the shotgun can include two triggers, it normally has a single trigger and invariably includes a selector mechanism which enables the shooter to select the order in which the barrels are discharged.

Competition sporting clay pigeon shooting has become very popular and because of the many shots that are fired the guns used have become quite specialized for the purpose.

In existing guns the barrel selector is usually located in one of two positions on a gun, either:

- (i) on the top strap where it is incorporated with the safety catch; or,
- (ii) a button, slide, catch or similar actuator located on the underside of the gun, mounted directly on or adjacent to the trigger mechanism.

The firing mechanism is either a fixed mechanism which is assembled and located within the action body of the gun or is a detachable mechanism which may be removed from the action body as an assembly which facilitates cleaning, service and repair as well as providing the possibility of interchangeability of a spare mechanism. A detachable mechanism for a double-barrelled shotgun is disclosed, for example, in U.S. Patent No. 4,805,332. That patent specification disclosed a firing mechanism for use in a double-barrelled shotgun having two hammers and a single trigger and the mechanism is snap-engageable within the body of the shotgun. The removable mechanism carries a selector for selectively releasing the firing hammers in turn, depending on which of the two barrels is to be used first.

The most convenient and aesthetic arrangement for the selector is to have the selector incorporated with the safety catch. However, this has only been possible where the firing mechanism has been fixed because, as the selector has a critical interrelationship with the firing mechanism, it has been necessary to couple the selector mechanism directly to the firing mechanism where the firing mechanism is detachable.

An object of the present invention is to provide an improved action for a double-barrelled shotgun.

According to the present invention, an action for a double-barrelled shotgun comprises a body, a firing mechanism removably received within the body, a safety means on the body for immobilizing the firing mechanism, and selector means for selecting the firing sequence of the two barrels operable from a position on the body.

Preferably the selector means is combined with the safety means. Suitably the selector means is operable such that selection may only be made with the safety means immobilizing the firing mechanism. The action is preferably for a double-barrelled shotgun of over-and-under superimposed barrel arrangement.

In a preferred arrangement the selector means comprises a selector plate depending from a movable safety catch and a forked selector pivotally mounted on the firing mechanism receiving the plate within the fork and including a plurality of sear selector points. The forked selector may include leading surfaces at the opening of the fork to guide the selector plate into location on insertion of the removable firing mechanism. The forked selector is suitably pivotally mounted on a recoil inertia block which is itself pivoted so as to move the selector into and out of engagement with sears of the firing mechanism. Preferably, the selector plate includes at least one lateral extension which engages behind the forked selector whereby, when the safety catch is moved to its safety, immobilizing position, the lateral extension pushes against the forked selector and moves it and the recoil block about the pivot of the recoil block away from the sears to immobilize the firing mechanism.

The firing mechanism is releasably received within the body of the action by means of a spring-loaded detachment bolt operable by means of a detachment lever. Preferably the detachment lever comprises a movable part of a trigger guard.

The invention also includes an over-and-under double-barrelled shotgun with an action as aforesaid.

Therefore, in a preferred arrangement there is provided a double-barrelled shotgun of over-and-under superimposed barrel arrangement comprising an action body having a strap portion, a firing mechanism releasably received within the action body and comprising juxtaposed firing trains for each barrel including a hammer, a main spring for driving the hammer against a firing pin, a sear and a sear spring, a thumb-operated safety catch on the strap portion and selector means operable by movement of the safety catch for selecting the firing sequence of the barrels, the selector means comprising co-operable parts on the underside of the safety catch and on the firing mechanism which are operable together on inter-engagement of the firing mechanism with the action body.

Preferably the selector means comprises a selector plate depending from the underside of the safety catch which co-operates with a forked selector pivo-

tally mounted on a recoil inertia block on the firing mechanism.

In accordance with a further aspect of the invention there is provided a firearm comprising an action body, a firing mechanism detachably received by the action body and including a trigger and trigger guard, and a detachment lever for releasing the firing mechanism from the action body, the detachment lever comprising a movable part of the trigger guard and lying substantially flush therewith in its closed position.

The firearm may comprise a single or double-barrelled shotgun and is preferably a double-barrelled shotgun of over-and-under superimposed barrel configuration. The firearm may include an action as aforesaid.

The invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the action of the present invention;

Figure 2 is a side elevation of the releasable firing mechanism with the detachment lever open enabling release of the firing mechanism from the rest of the action;

Figures 3a and 3b show the view in the direction of arrow A in Figure 2 of the alternative positions of a selector carousel;

Figure 4 is a side elevation of the detachable firing mechanism locked in position with the detachment lever closed;

Figure 5 is a general view of the selector carousel connection with the safety catch; and,

Figures 6a, 6b, 6c and 6d show the different positions of the safety catch and selector.

In the drawings, referring particularly to Figures 1 and 2, an action (1) for a double-barrelled shotgun includes a body (2) and a detachable firing mechanism (3). The body (2) includes a forward portion (4) adapted to receive two barrels (not shown) in a drop-down over-and-under superimposed barrel arrangement. The barrels are pivoted to the forward portion of the body at (5) in conventional manner to allow opening of the barrels for cartridge replacement. The barrels are supported on a fore end iron (6) which carries a rearward cocking anvil (7) for re-cocking the firing mechanism on opening the barrels.

Extending rearwardly from the body (2) is a top strap (8) carrying a cross-head (9) by means of which a stock (not shown) is attached to the action (1). The stock is attached by means of a stock bolt which passes through the centre of the stock and engages within an opening (10) in the cross-head (9). The top strap (8) includes a movable safety catch (11) as will be explained in more detail below.

The firing mechanism (3) is supported on the body (2) and is detachable by means of a retractable detachment bolt (12). The firing mechanism (3) comprises a trigger plate chassis (13) including an integral

trigger guard (14). A single trigger (15) is positioned within the trigger guard and is pivoted to the trigger plate chassis at (16). The trigger (15) includes a rearwardly extending actuating plate (17) and is spring-loaded by means of trigger spring (18) which, on squeezing the trigger (15) is compressed by a fixed dowel (54) on the trigger plate chassis (13). Also mounted to the trigger plate chassis (13) in juxtaposed relationship are the firing trains for each of the two barrels, only one train being shown in Figures 2 and 4. The firing train comprises a hammer (19) for striking the firing pin (not shown), a main spring (20), a sear (21) and a sear spring (22). A cocking toggle (23) is co-operable with a cocking slide (not shown) which is movable upon a slide (24) surface to re-cock the hammer (19) after re-loading. The hammer (19), sear (21) and cocking toggle (23) are pivotable upon the trigger plate chassis (13) at respective pivots (25,26,27).

Positioned on a rearward portion of the trigger plate chassis (13) is an inertia recoil block (28) which is pivoted to the trigger (15) at (29). The recoil block (28) carries a forked selector carousel (30) which is pivoted to the recoil block (28) by means of pivot pin (31). The free movement of the selector carousel (30) is checked by means of a detent ball and spring arrangement (32) which acts against the carousel (30). Slidably mounted within the recoil block (28) is a recoil plunger (33) biased outwardly by a spring (34). As seen from Figures 3a and 3b, the bottom portion of the selector carousel (30) has three sear points (35) which co-operate with the sears (21) depending upon the selected firing sequence as will be explained. The upper portion of the selector carousel is forked providing an opening (36) with inclined lead surfaces (37). Projecting downwardly from the recoil block (28) below the pivot point (29) is a camming extension (38).

The camming extension (38) of the recoil block (28) co-operates both with the actuating plate (17) of the trigger and with a plate extension (39) of the detachment bolt (12). The plate extension (39) includes an opening (40) which receives an actuating extension (41) on a detachment lever (42) pivoted to the trigger guard (14) at (43). The bolt (12) is biased by means of a bolt plunger (44) acting against a cross-plate (45) and biased by means of spring (46).

As seen from Figures 1, 2 and 4, the detachment lever (42) is designed so as to lie flush with the trigger guard (14) in its closed position.

Referring now particularly to the safety catch (11) shown in Figures 5 and 6a to 6d, the catch has a depending selector plate (47) which extends through a gate (48) in the strap (8). As can be seen from Figure 5, the gate (48) comprises two parallel tracks with a crossover position in the rear, safety position, of the safety catch (11). The safety catch is movable to four positions and is given a positive ac-

tion by means of a detent and detent spring arrangement (49). The four positions are shown in Figures 6a to 6d and comprise:

position 1 (Figure 6a) - safety catch (11) in forward position with the selector carousel (30) selecting the top barrel first and bottom barrel second;

position 2 (Figure 6b) - safety catch (11) in rearward, safe position;

position 3 (Figure 6c) - safety catch (11) moved across the gate (8) but still in the safety position; and,

position 4 (Figure 6d) - safety catch (11) in forward position with the selector carousel (30) arranged to fire the bottom barrel first and the top barrel second.

The depending selector plate (47) co-operates with the opening (40) in the selector carousel (30) and includes lateral pins (50) providing positive positioning of the selector carousel (30) upon manipulation of the firing mechanism (3) following re-engagement after detachment.

In use, with the firing mechanism (3) in position, the safety catch/selector (11) is aligned with the track of the gate (48) determining which barrel fires first and then the safety catch (11) is moved to its forward position so that the safety catch is off. If the top barrel has been selected first, then the selector carousel will be moved by the depending selector plate (47) into the position shown in Figure 3a. Alternatively, if the bottom barrel is to be fired first, then the depending selector plate (47) will have moved the selector carousel into the position shown in Figure 3b. In this position with the safety catch off, the respective side sear point (26) will be engaging under the respective sear (21) as shown in Figure 4. The first barrel is then fired by squeezing the trigger (15) which pivots about its pivot point (16) and the movement of the actuating plate (17) co-operating with the camming extension (38) causes the recoil block (28), carrying the carousel selector (30) to pivot clockwise about the recoil pivot (29). This movement lifts the sear (21) releasing the hammer (19) which is driven against the firing pin of the respective barrel by the associated main spring (20).

The recoil action of the double-barrelled shotgun causes the recoil block (28) to pivot rearwardly about its pivot (29). Simultaneously the selector carousel (30) carried by the recoil block (28) moves about its pivot pin (31) back to its natural position of rest where the middle sear point is aligned with the sear (21) of the second barrel to be fired. The recoil block (28) serves as an inertia member which then returns the selector carousel (30) back into the position shown in Figure 4 but with the centre sear point (35) engaging under the second sear (21). The second barrel is fired in exactly the same way as the first barrel.

Once both barrels have been discharged, the firearm is broken allowing ejection of the spent cartridges and the barrels are then re-loaded. On open-

ing the firearm, the cocking anvil (7) engages the cocking levers (not shown) which move against the cocking toggles (23) re-cocking the respective hammers (19). The firearm is then ready to fire again. The re-cocking arrangement is conventional but can be seen from comparison of Figure 4 which shows the firing train in the cocked position with Figure 2 which shows the train in the position after firing.

If it is desired to engage the safety catch (11) the safety catch (11) is moved to the safety position shown in either Figure 6b or 6c depending upon which barrel has been fired. Movement of the safety catch (11) causes the lateral pins (50) to engage the forward surface of the selector carousel (30) and to move the carousel and the recoil block (28) to which it is mounted about the recoil block pivot pin (29). This takes the sear point (35) on the selector carousel (30) away from the underside of the respective sear (21) so that squeezing the trigger (15) will not cause the carousel selector to move the respective sear (21) releasing the associated hammer (19).

If it is desired to remove the firing mechanism from the action body (2), the detachment lever (42) is moved into the position shown in Figure 2. The movement of the detachment lever (42) through the co-operation between the extension (41) and the opening (40) retracts the detachment bolt (12). Simultaneously the plate extension (39) engages over the actuating plate (17) of the trigger which prevents movement of the trigger (15) about its pivot point (16). Also, the end of the plate extension (39) engages the camming extension (38) moving the recoil block (28) about its pivot point (29) moving the selector carousel (30) away from the sears (21). With the detachment lever (42) open, a plunger and spring (51) acts on a jumping jack (52) and the plunger (51) then holds the detachment bolt in its retracted position. The firing mechanism then falls away from engagement with the action body (2) and the other end is released simply by disengaging a projecting lip (53).

In order to re-insert the firing mechanism into the firearm, the lip (53) is engaged on the action body (2) and the firearm mechanism (3) pushed upwardly. The leading surfaces (37) on the selector carousel (30) ensure that the selector carousel straddles the depending selector plate (47) and, because the recoil block (28) and selector carousel (30) are held in a pivoted position, the selector carousel (30) is ensured of engagement behind the lateral pins (50). The firing mechanism (3) is then pushed home into the action body (2) which has the effect of pushing down the jumping jack (52) releasing the detachment bolt. Simultaneously the detachment lever (42) is moved back into its closed position which pushes the bolt rearwardly urged by the bolt plunger (44). Also, once clear of the actuating plate (17) and the camming extension (38), the recoil plunger (33) is able to act on the action body (2) in order to move the recoil block

and selector carousel (30) back to the position shown in Figure 4.

The provision of lead surfaces (37) on the selector carousel (30) mean that the firing mechanism (3) can be re-assembled even if the safety catch/selector (11) has been switched in position. Moreover, the releasable linkage arrangement provided by the selector carousel (30) allows the selector to be operated from the safety catch (11) whilst also allowing a detachable firing mechanism (3).

As shown in the drawings, it is preferred that the detachment lever (42), which actuates or disengages the detachment bolt (12), forms part of and is machined flush with the trigger guard (14) so as to provide an aesthetic and uncluttered arrangement at the trigger position. Preferably the trigger guard (14) and the trigger plate chassis (13) comprise a one-piece component although it may be made of two parts if desired.

Claims

1. An action (1) for a double-barrelled shotgun comprising a body (2), a firing mechanism (3) removably received within the body (2), a safety means (11) on the body (2) for immobilizing the firing mechanism (3), and selector means (30,47) for selecting the firing sequence of the two barrels characterized in that the selector means (30,47) is operable from a position on the body (2).
2. An action according to claim 1, wherein the selector means (30,47) is combined with the safety means (11).
3. An action according to claim 2, wherein the selector means (30,47) is operable such that selection may only be made with the safety means (11) immobilizing the firing mechanism (3).
4. An action according to any one of claim 1 to 3, wherein the safety means (11) on the body (2) comprises a thumb-operated safety catch (11) and the selector means (30,47) comprises co-operable parts on the underside of the safety catch (11) and on the firing mechanism (3) which are operable together on inter-engagement of the firing mechanism with the action body, movement of the safety catch (11) being effective to select the firing sequence of the two barrels.
5. An action according to claim 4, wherein the selector means (30,47) comprises a selector plate (47) depending from a movable safety catch (11) and a forked selector (30) pivotally mounted on the firing mechanism (3) receiving the plate (47) within the fork and including a plurality of sear se-

lector points (35).

6. An action according to claim 4, wherein the forked selector (30) includes leading surfaces (37) at the opening of the fork to guide the selector plate (47) into location on insertion of the removable firing mechanism (3).
7. An action according to claim 5 or 6, wherein the forked selector (30) is pivotally mounted on a recoil inertia block (28) which is itself pivoted so as to move the selector (30) into and out of engagement with sears (21) of the firing mechanism (3).
8. An action according to claim 7, wherein the selector plate (47) includes at least one lateral extension (50) which engages behind the forked selector (30) whereby, when the safety catch (11) is moved to a safety, immobilizing position, the or each lateral extension (50) pushes against the forked selector (30) and moves it and the recoil block (28) about the pivot of the recoil block away from sears (21) of the firing mechanism (3) to immobilize the firing mechanism (3).
9. An action according to any one of the preceding claims, wherein the firing mechanism (3) is releasably received within the body (2) of the action by means of a spring-loaded detachment bolt (12) operable by means of a detachment lever (42).
10. An action according to claim 9, wherein the detachment lever (42) comprises a movable part of a trigger guard (14).
11. An over-and-under double-barrelled shotgun including an action in accordance with any one of claims 1 to 10.
12. A double-barrelled shotgun of over-and-under superimposed barrel arrangement comprising an action body (2) having a strap portion (8), a firing mechanism (3) releasably received within the action body (2) and comprising juxtaposed firing trains for each barrel including a hammer (19), a main spring (20) for driving the hammer (19) against a firing pin, a sear (21) and a sear spring (22), a thumb-operated safety catch (11) on the strap portion (8) and selector means (30,47) operable by movement of the safety catch (11) for selecting the firing sequence of the barrels, the selector means (30,47) comprising co-operable parts on the underside of the safety catch (11) and on the firing mechanism (3) which are operable together on inter-engagement of the firing mechanism (3) with the action body (12).
13. A double-barrelled shotgun according to claim

12, wherein the selector means (39,47) comprises a selector plate (47) depending from the underside of the safety catch (11) which cooperates with a forked selector (30) pivotally mounted on a recoil inertia block (28) on the firing mechanism (3). 5

14. A firearm comprising an action body (2), a firing mechanism (3) detachably received by the action body (2) and including a trigger (15) and trigger guard (14), and a detachment lever (42) for releasing the firing mechanism (3) from the action body (2), the detachment lever (42) comprising a movable part of the trigger guard (14) and lying substantially flush therewith in its closed position. 10 15

15. A firearm according to claim 14, including an action in accordance with any one of claims 1 to 10. 20

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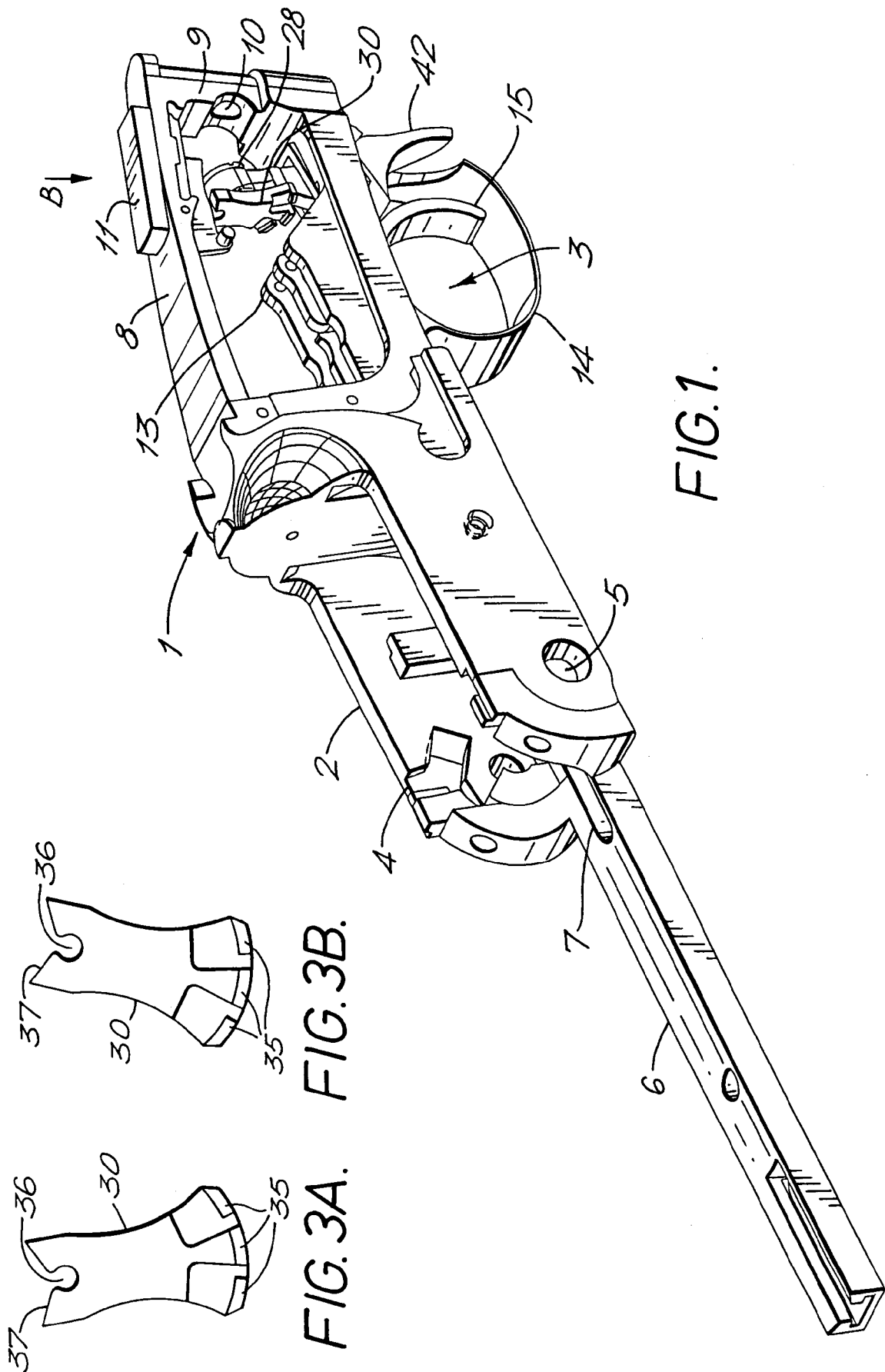
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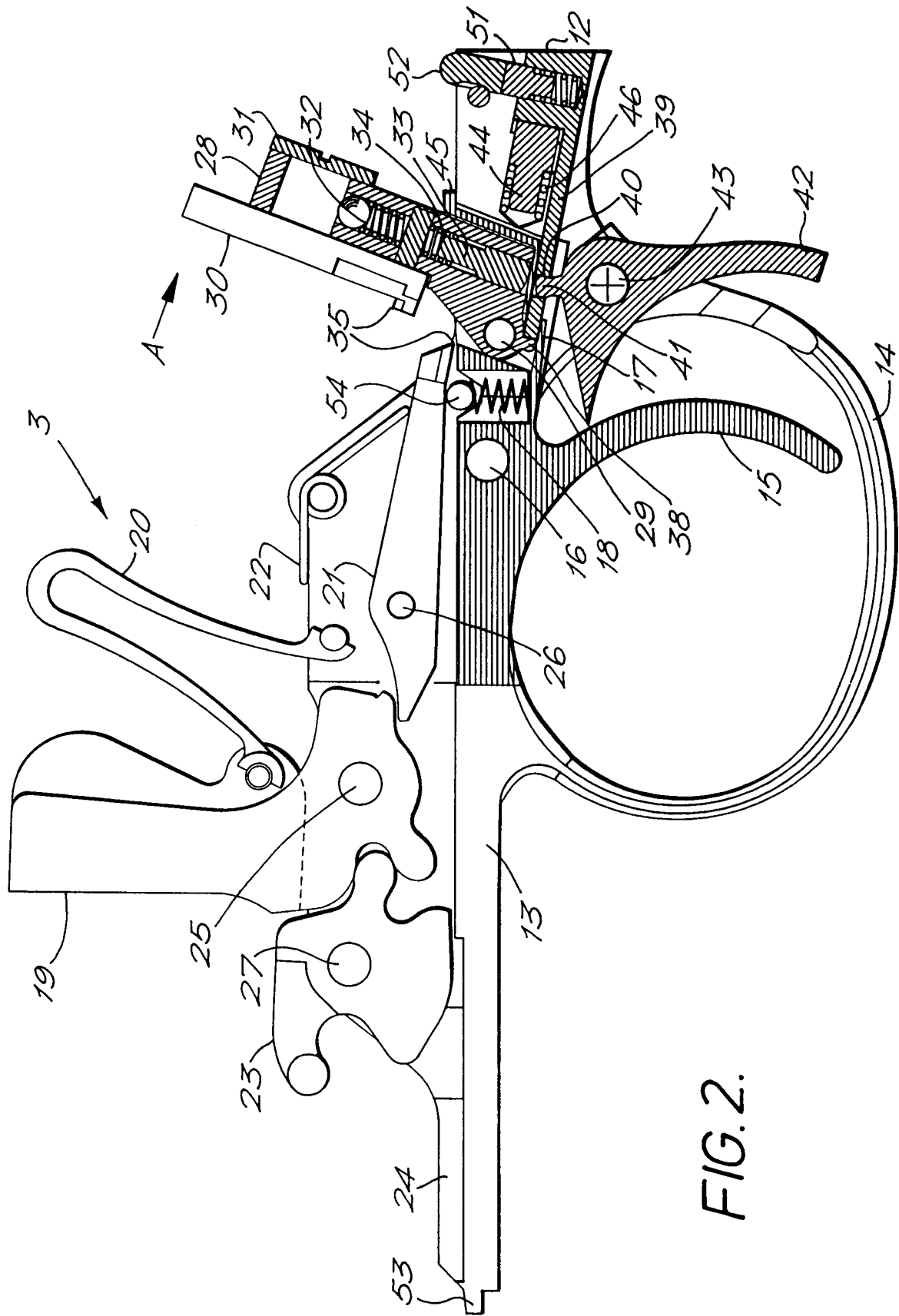


FIG. 2.

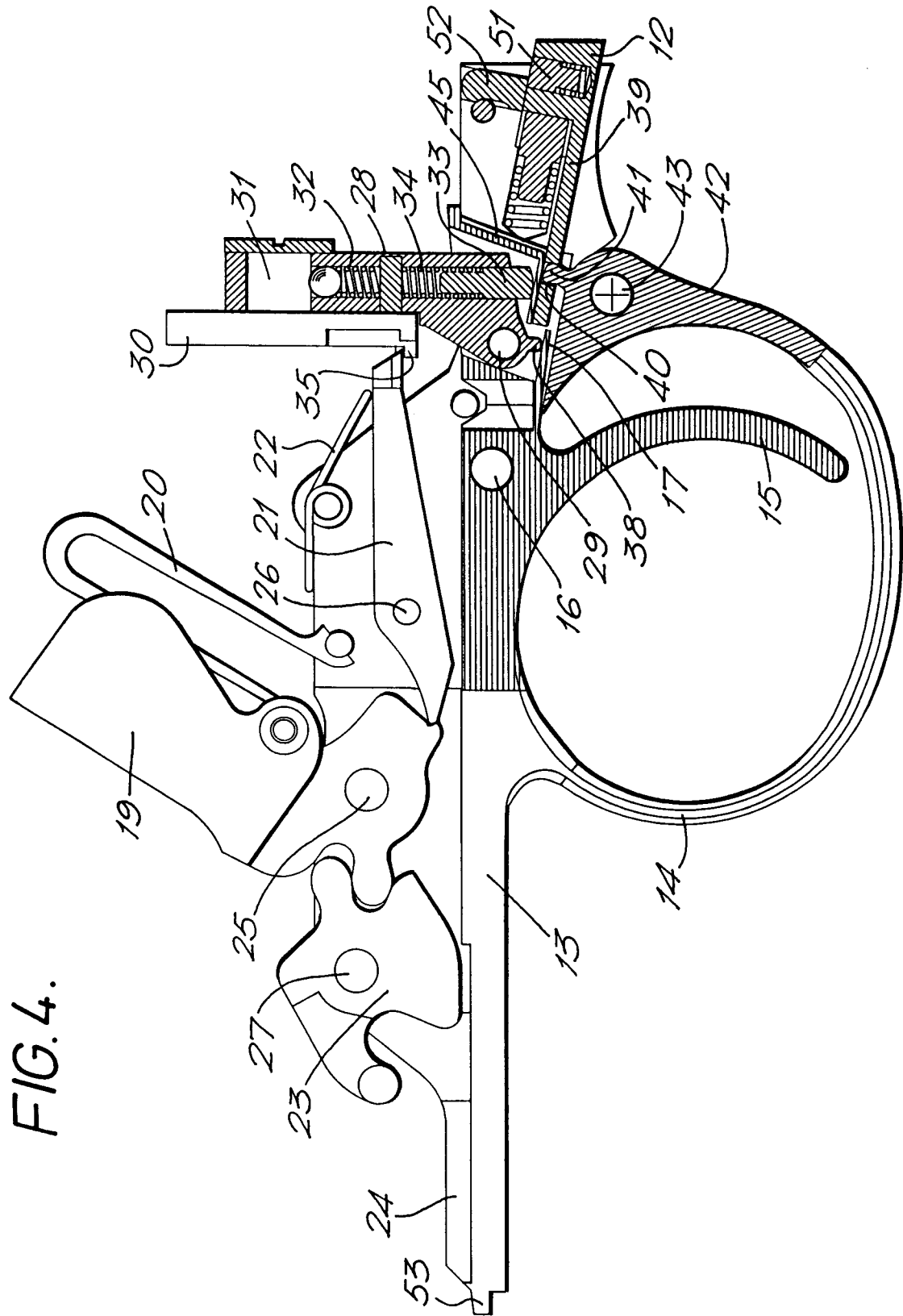


FIG. 4.

FIG. 5.

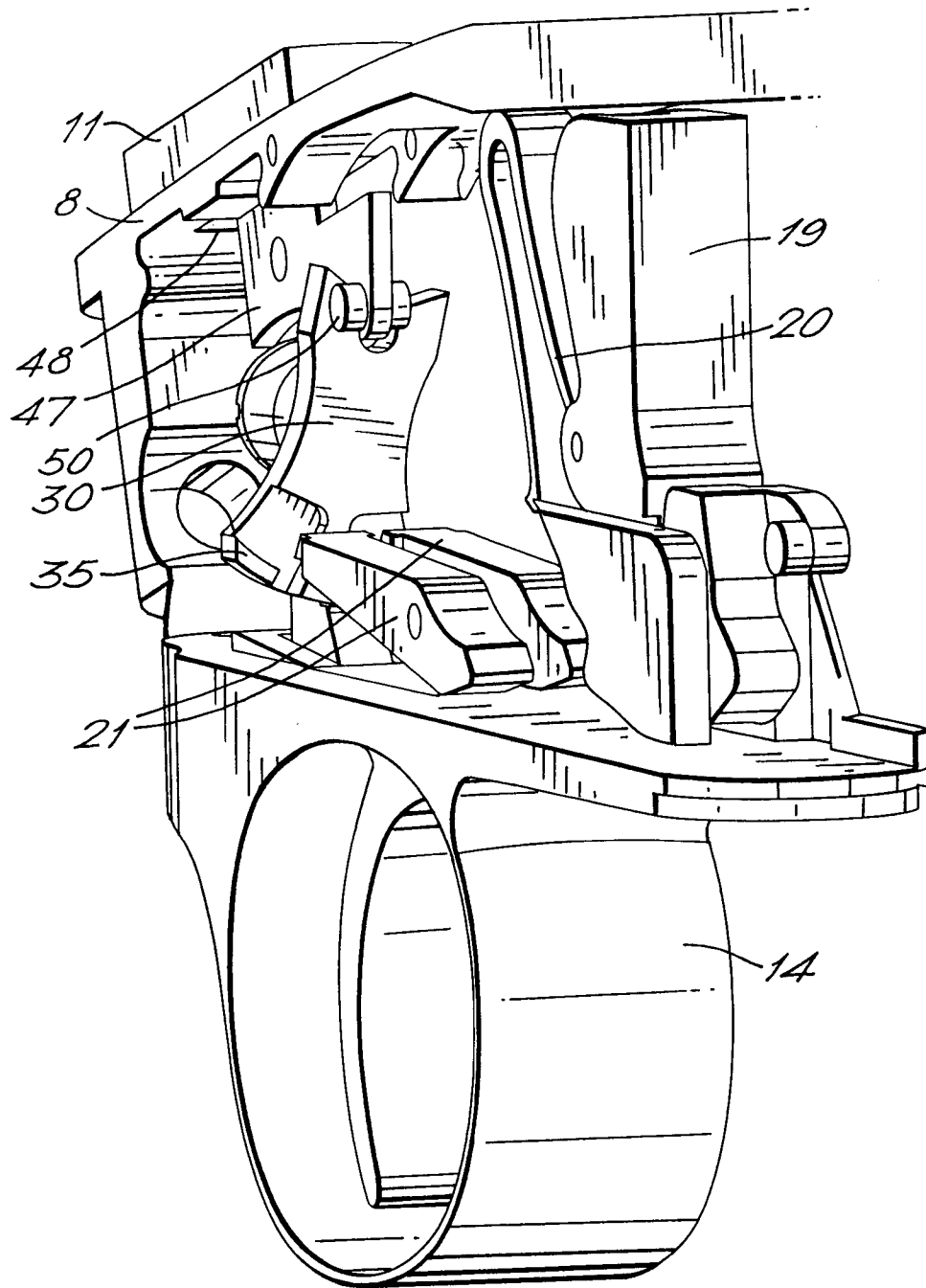


FIG. 6A.

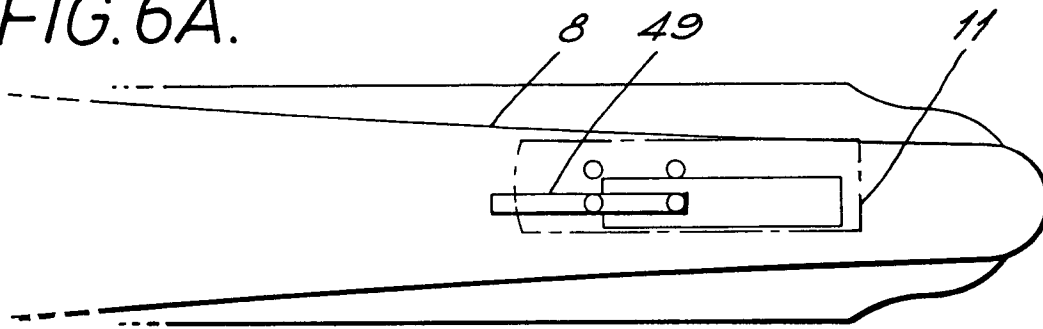


FIG. 6B.

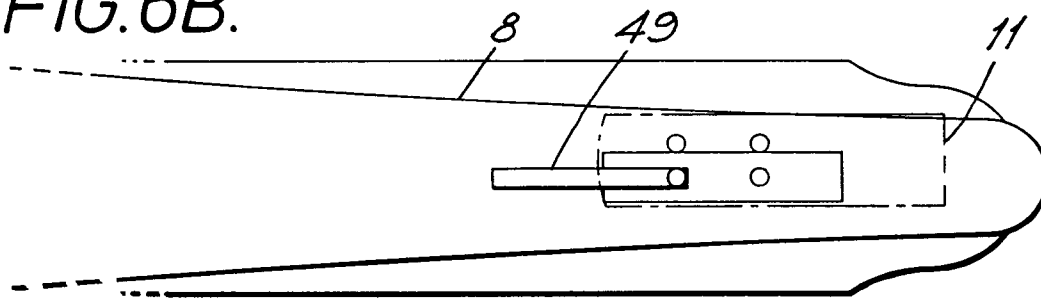


FIG. 6C.

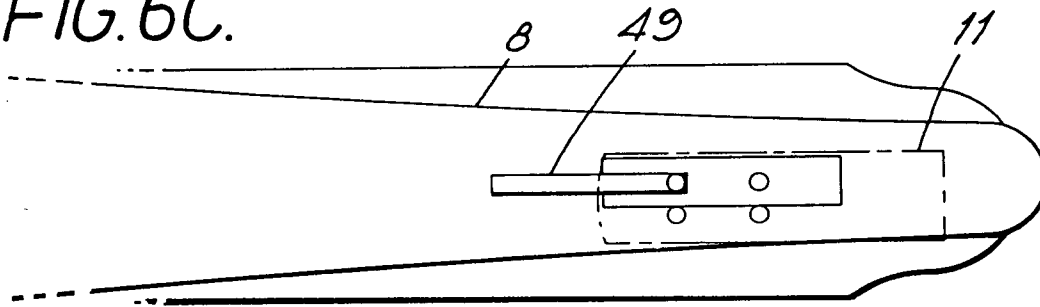
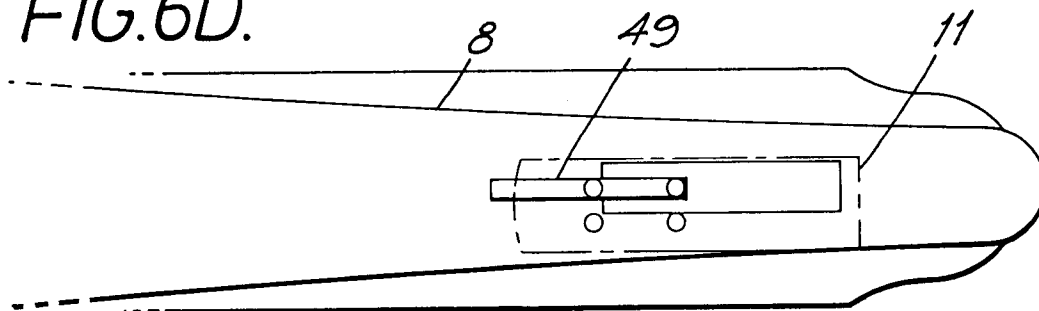


FIG. 6D.





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 93 30 6975

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	FR-A-2 070 572 (MANUFACTURE D'ARMES DE SAINT-ETIENNE) * Page 1, lines 1-11; page 2, line 7 - page 5, line 10; figures 1-10 *	1-4,12	F 41 A 19/21
A	---	5-8,13,14	
Y,D	US-A-4 805 332 (PERAZZI) * Whole document *	1-4,12	
A	US-A-4 399 628 (FRANCHI) * Column 2, line 58 - column 3, line 61; figures *	1,12	
A	US-A-3 131 499 (ARSENAULT) * Column 3, lines 5-24; figures *	1,12	
A	US-A-3 304 643 (NITTLER) * Column 2, lines 38-42; figures *	1,12	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F 41 A
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14-12-1993	Examiner RODOLAUSSE P E C
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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