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(54) Chamber-loaded indicator for firearms

(57) A chamber-loaded indicator for firearms comprises a contact element (22) slidably housed within a bolt (10) of the weapon at least between a forward position, wherein it has a first end (22a) ending in the breech face, and a backward position affected by the cartridge (14) being present within the chamber (16). The contact element (22) is arranged inclined relative to a firing pin. An indicator element (24) is further provided to be rotatably mounted about a rotation axis (40) within a seat (20) of the bolt (10) and comprising an active portion (42) on which a second end (22b) of the contact element (22) acts. The active portion (42) is movable about the rotation axis (40) at least between a retracted position in which it remains within the bulk of the bolt (10) and an extracted position in which it signals that a cartridge (14) is present within the chamber (16) following the thrust applied by the contact element (22).

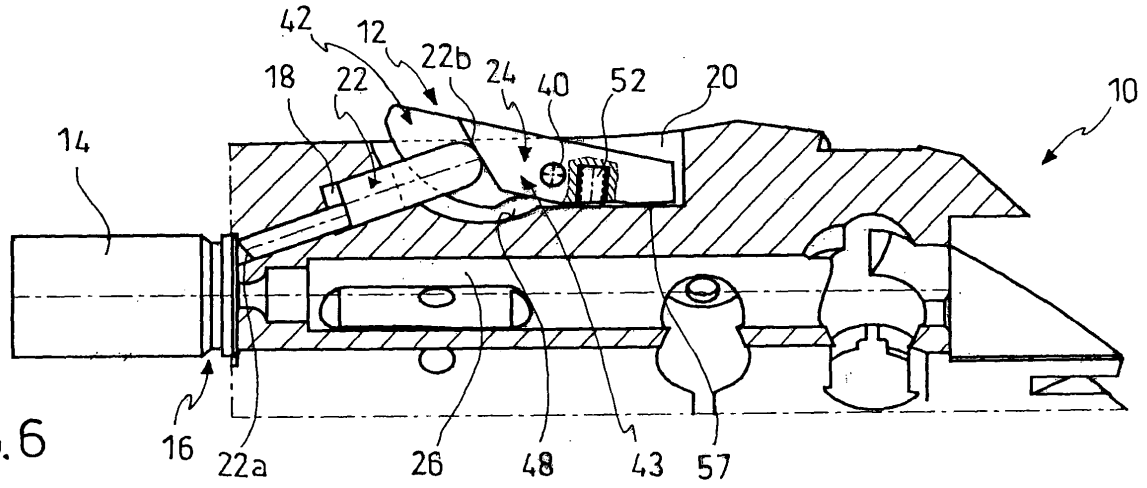


FIG. 6

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Description

[0001] The object of the present invention is a chamber-loaded indicator for firearms.

[0002] By "chamber-loaded indicator" is meant a safety device suitable to detect and signal the presence of a cartridge in the weapon chamber.

[0003] In order to meet the growing demand for improving firearm safety, these devices must be reliable and provide a clear and immediate indication on the weapon's current condition. This requirement, however, must be mediated with contrary requirements such as those of limiting the size and weight of the weapon, avoiding to weaken the bolt's load-bearing section or excessively interfere in the delicate operation of the loading mechanism.

[0004] A first known example of chamber-loaded indicator is the extractor being suitably coloured in vivid and bright colours in the portion projecting from the bulk of the bolt when there is a cartridge inserted within the chamber. While this device exploits elements that are already provided in the weapon, thus avoiding using additional devices, however, it does not offer the reliability and visibility required due to the small movement to which it is subjected when the cartridge is present within the chamber.

[0005] To improve the visibility of the device, it is known to amplify the movements by means of (for example, L-shaped) levers such as in US 4,100,691. The arrangement of the elements and the configuration thereof, however, generates an indicator that is quite complicated, large-sized and difficulty insertable in the small spaces available in a firearm, particularly a gun.

[0006] The problem at the heart of the present invention is to provide a chamber-loaded indicator having such structural and functional characteristics as to meet the above-said requirements, while overcoming the drawbacks mentioned with reference to the prior art.

[0007] This problem is solved by means of a chamber-loaded indicator in accordance with claim 1.

[0008] Further characteristics and advantages of the chamber-loaded indicator according to the invention will result from the description below of preferred exemplary embodiments, which are given as a non-limiting indication, with reference to the attached figures, wherein:

Fig. 1 illustrates a partial perspective view of a gun bolt;

Fig. 2 shows a front view of the bolt in Fig.1;

Fig. 3 shows a sectional view according to line III-III of the bolt in Fig. 2;

Fig. 4 shows a sectional view according to line IV-IV of the bolt in Fig. 3;

Fig. 5 illustrates a partial and sectional view of the bolt in Fig. 2 in a first operating condition;

Fig. 6 illustrates a partial and sectional view of the bolt in Fig. 2 in a second operating condition;

Fig. 7-9 illustrate side (left side), upper and side (right side) views of an indicator element of a chamber-loaded indicator according to the present invention, respectively;

Fig. 10-13 illustrate two perspective views, a side view and a sectional view according to line XIII-XIII in Fig. 10 of a contact element of a chamber -loaded indicator according to the present invention, respectively.

[0009] With reference to said figures, with 10 has been designated a firearm bolt, partially illustrated at the rear portion housing the weapon firing pin.

[0010] With 12 has been generally designated a chamber-loaded indicator suitable to detect the presence of a cartridge 14 within the weapon chamber 16. The above-said indicator is housed in the bolt 10 within a housing 18 and within a seat 20.

[0011] The housing 18 is developed between the breech face of the bolt and the seat 20 and is suitable to house a contact element 22 of the chamber-loaded indicator. More precisely, the housing 18 comprises a first tract 18a facing the seat 20 and a second tract 18b facing the breech face. The two tracts have different cross dimensions, and particularly, the first tract has greater cross dimensions than the second tract. Each of the two tracts develops along a respective axis, and as a whole, the housing 18 develops along a main direction.

[0012] The seat 20 opens outwardly of the bolt 10, preferably laterally thereto, and in a backward position, and is suitable to house an indicator element 24 of the chamber-loaded indicator.

[0013] The contact element 22 is inserted within the housing 18 such as to be capable of sliding therein in a direction that substantially coincides with the main development direction of the housing and contact element. Particularly, the contact element 22 is slidable between a forward position, in which it has a first end 22a ending in the breech face, and a backward position affected by the cartridge being present in the chamber.

[0014] With reference to a possible embodiment, the housing 18 and consequently the contact element 22 are arranged inclined, for example relative to the weapon firing pin (with 26 has been designated the firing pin housing hole). While different inclinations are feasible, in the embodiment illustrated herein by way of example, the housing 18 ends in the breech face at about 45° relative to a horizontal O or vertical V plane (with reference to the normal use condition of the weapon).

[0015] In other words, the housing 18 develops in an incident direction relative to the development of the firing pin, and ends outwardly of the weapon at a side and backward portion thereof.

[0016] The backward position of the seat 20 in which the housing 18 ends, allows maintaining a high mechanical resistance of the bolt, in that the seat 20 is thus made in a bolt area having a greater section and being subjected to less stress than that provided at the breech face arranged in the immediate vicinity of the chamber. Fur-

thermore, due to the provision of an indicator consisting of two elements, i.e. the indicator element and the contact element, and the arrangement of the same, a high level of safety can be obtained thus limiting the risk that the indicator may break (for example, in case of fortuitous failure of the case head).

[0017] In accordance with a possible embodiment, the contact element 22 is made such as to be capable of sliding within the housing 18, while restraining the possibility of rotating about a main development direction of the housing 18 substantially corresponding to a sliding or translational direction of the contact element 22 within the housing 18. Particularly, the contact element 22 is made by means of a first tract 28 and a second tract 30 having different cross dimensions. Preferably, the first tract has greater cross dimensions than the second tract. Each of the two tracts is inserted within a tract of the corresponding and counter-shaped housing 18 (the first tract 18a and second tract 18b), respectively.

[0018] Preferably, the first tract 28 develops along a first longitudinal axis 32 and the second tract 30 develops along a second longitudinal axis 34 eccentrically arranged relative to the first longitudinal axis 32 such that the contact element 22 can only translate along the housing 18.

[0019] The first tract 28 defines an abutment surface 35a suitable to abut against a stop surface 35b of the housing 18 such as to define an end-of-travel for the contact element 22. The length of second tract 30 is advantageously defined as a function of the position of the stop surface 35b, in order to prevent the second tract 30 from excessively projecting into the chamber thus being an obstacle to the loading of the cartridge.

[0020] The contact element 22 interacts with the indicator element 24 at a second end 22b, opposite the first end 22a. In accordance with a possible embodiment, the first tract 28 comprises a preferably arc-shaped thrust surface 36 at a second end 22b.

[0021] In accordance with a possible embodiment, the contact element 22, and particularly, the first tract 28, comprises a step 37 reducing the cross dimension at the second end 22b, thus defining a containment surface 37a.

[0022] Advantageously, the contact element 22, and particularly the second tract 30, comprises an inclined surface 38 suitable to define an inclined plane for contact with the case-head at the first end 22a. In this case, the provision of restraining the rotation of the contact element 22 within the housing 18 proves to be particularly advantageous, such as described above, such that the inclined surface 38 is in such a position as to avoid hindering the cartridge feeding.

[0023] When the incline surface 38 is provided, the length of the second tract 30 and the position of the stop 35a or abutment 35b surfaces is such as to prevent the inclined surface 38 from projecting completely beyond the breech face (in Fig. 5, the lower corner is slightly within the housing 18).

[0024] The indicator element 24 is rotatably mounted about a rotation axis 40 within the seat 20 of the bolt.

[0025] The indicator element 24 further comprises an active portion 42 on which advantageously acts the second end 22b of the contact element 22. By "active portion" is meant the portion movable about the rotation axis at least between a retracted position in which it remains within the bulk of the bolt, and an extracted position in which at least partially exits from the bulk of the bolt, and signals that the cartridge is present within the chamber following the thrust applied by the contact element 22. In accordance with the embodiment illustrated herein, the indicator element has such a shape as to be completely accommodated within the seat 20 when it is in the retracted position.

[0026] In accordance with a possible embodiment, the second end 22b of the contact element 22 is suitable to act on the indicator element by resting at an intermediate portion 43 of the active portion 42 of the indicator element, which is arranged between a free end of the indicator element and the rotation axis 40. Advantageously, the contact between the contact element and the indicator element is provided at an inclined plane 44 of the active portion such as to optimize the interaction between the contact element and the indicator element, thus limiting the friction and jamming risks as much as possible.

[0027] In accordance with a possible embodiment, the active portion 42 of the indicator element comprises a step provided at the intermediate portion 43 on which the contact element is rested or acts, thereby allowing a safer and more stable interaction between the contact element and the indicator element. When the inclined plane 44 is provided, said step is advantageously shaped such as to provide said inclined plane, such as illustrated in the figures, for example. Furthermore, by providing a stepped-shaped first tract 28 of the contact element, the containment surface 37a directly faces a corresponding counter-posed surface 44a being defined by the step/inclined plane of the indicator element.

[0028] Advantageously, the step of the active portion of the indicator element is suitable to cooperate with the second end 22b of the contact element 22, preferably with the corresponding thrust surface 36 of the first tract 28 of the contact element 22, when provided, thus defining a rest and thrust surface for the second end 22b of the contact element 22.

[0029] By providing the contact element 22 to act on the indicator element 24 at an intermediate portion 43 thereof, two arms of different lengths are obtained starting from the rotation axis 40, which are both arranged at the active portion 42 of the indicator element. The longer arm extends to the end of the active portion 42 intended to project from the seat 20 to signal that a cartridge is present within the chamber. The shorter arm corresponds to the distance between the rotation axis 40 and the point of contact between the contact element and the indicator element. The provision of two arms having different lengths allows obtaining an optimum degree of

multiplication of the movement of the contact element, thus allowing the active portion 42 of the indicator element to effectively project from the seat 20, thereby ensuring the visibility thereof.

[0030] In accordance with a possible embodiment, the seat 20 of the bolt is delimited by a delimitation surface 48 which defines a stop and rest surface for a rest surface 46 of the indicator element 24 and particularly of the active portion 42. Advantageously, the rest surface 46 is curvilinear and counter-shaped relative to the delimitation surface 48 of the seat 20 of the bolt, thereby simplifying the seat working step, which can be advantageously obtained by means of milling.

[0031] In accordance with a possible embodiment, the active portion has a free hand provided by means of a bevel 49 having such a size as to ensure the visibility of the indicator element while avoiding that the free end gets entangled or jammed when it is in the extracted position.

[0032] In accordance with a possible embodiment, the indicator element 24 comprises a reaction portion 50, arranged opposite the rotation axis 40 relative to the active portion 42. The reaction portion 50 is biased by elastic means 52 that are interposed between the indicator element and a plane 57 within the seat 20 of the bolt, to maintain the indicator element 24 in the retracted position. By way of example, the elastic means 52 can be partially housed within a hole 54 of the reaction portion 50.

[0033] In accordance with a possible embodiment, the shape of the indicator element and thus the mutual arrangement of the reaction portion and active portion are such as to ensure that the mutual arrangement of the reaction portion and active portion, are such as to ensure that the indicator element is completely housed within the seat 20 when it is in the retracted position. For example, the reaction portion 50 is in-line with the active portion 42.

[0034] In accordance with a possible embodiment, the indicator element defines a barycentre system relative to the rotation axis thereof, which is suitable to minimize the stress due to the firing cycle or shaking or vibrations on the weapon. To the purpose, the reaction portion extends beyond the axis of rotation to balance the counterposed active portion.

[0035] Still more advantageously, both the contact element 22 and the contact element/indicator element assembly are balanced such as to further minimize the effects of the inertia forces following the firing cycle or shaking or vibrations.

[0036] Advantageously, the reaction portion also extends to form an abutment 55 defining an end-of-travel for the indicator element against the plane 57 of seat 20. The configuration and position of the reaction portion 50 and particularly of the abutment 55 are such as to restrain the extra-travel of the indicator element beyond the maximum extracted position, and to minimize the inertial movements due to the firing cycle.

[0037] In other words, the contact element and the indicator element have separate and independent ends-of-travel to ensure that the contact element does not excessively project into the chamber, or that the indicator element remains within the seat 20 in the retracted position.

[0038] The present invention generally relates to a chamber-loaded indicator suitable to be mounted to the bolt of a firearm, particularly a gun.

[0039] The present invention further relates to a firearm, particularly a gun, comprising a barrel defining a chamber 16 and a bolt 10 that can be associated to the chamber when closed, in which the bolt comprises a chamber-loaded indicator 12 suitable to detect the presence of a cartridge 14 within the chamber 16 such as described above.

[0040] The operation of the chamber-loaded indicator as described above will be described herein below.

[0041] Fig. 5 illustrates a sectioned portion of the bolt, in which the cartridge chamber is empty. The chamber-loaded indicator is in a rest position in which the contact element 22 is in the forward position with the first end 22a ending within the chamber 16. The indicator element 24 is in the retracted position within the seat 20, biased by the elastic means 52. It should be noted that the interaction between the abutment surface 35a and the stop surface 35b prevents the lower corner of the inclined surface 38 to end beyond the breech face to prevent jamming during the loading of the cartridge.

[0042] Fig. 6 illustrates the portion of the bolt illustrated in Fig. 5, in which the chamber-loaded indicator is in the active position, i.e. it signal that a cartridge 14 is present within the chamber 16. In fact, the cartridge is pushed in a loading direction 56 (shown in Fig. 2) until when it interacts with the first end 22a of the contact element 22. In the case where it is provided that the first end of the contact element is made by means of an inclined surface 38, the inclined surface facilitates the interaction between the contact element 22 and the cartridge 14, particularly the head thereof, thus limiting the risk of jamming. Following the thrust applied by the cartridge, the contact element 22 slides along the respective housing 18. During the translation of the contact element 22 within the housing 18, the rotation of the same is prevented by the eccentric configuration of the first tract relative to the second tract.

[0043] The second end 22b of the contact element 22 interacts with the indicator element 24, particularly with the inclined plane 44 or step, by pushing the latter at the active portion 42 thereof, i.e. the same portion that, by exiting the seat 20 signals to the outside that a cartridge 14 is present within the chamber 16. Following the thrust of the contact element 22, the elastic means 52 are compressed and the indicator element 24 can rotate about the rotation axis 40. By providing the contact element 22 to push the indicator element 24 at an intermediate portion 43 thereof, i.e. closer to the rotation axis 40 than the free end of the active portion, the translational movement

of the contact element is suitably multiplied to ensure the visibility of the active portion of the indicator element, while maintaining a small size and high mechanical resistance (since a limited extension can be, in fact, maintained for the seat 20).

[0044] At least the active portion 42 of the indicator element 24 can be optionally coloured in bright colours to improve the visibility thereof.

[0045] Due to the action of the elastic means 52, the indicator element 24 and the contact element 22 return to the rest position, i.e. in the retracted position of the indicator element, and in the forward position of the contact element, when the case is removed from the chamber 16.

[0046] It should be noted that said operation corresponds to an active operation, i.e. in which the signalling operated by means of the rotation of the indicator element is generated by the cartridge being present within the respective chamber. The elastic elements 52 operate only with a function of recall or return in the retracted position, such that any breakage of the same will not affect the weapon's safety.

[0047] From what has been stated above, it may be appreciated how providing a chamber-loaded indicator according to the present invention allows meeting said requirement of facilitating and reducing the dimensions, while maintaining a good level of movement amplification which allows obtaining an optimum visibility of the signal. To this purpose, the inclined arrangement of the contact element and the interaction between the contact element and the indicator element is particularly advantageous and synergic directly at the active portion of the indicator, i.e. at the portion projecting from the seat to signal that a cartridge is present within the chamber.

[0048] There may be provided only one of said characteristics, which however will yield a simplified structure and greater compactness. Particularly, a chamber-loaded indicator can be provided, in which the housing and contact element are arranged inclined relative to the development of the weapon firing pin, independently on how the interaction between the contact element and the indicator element takes place. Alternatively, a chamber-loaded indicator can be provided, in which the interaction between the contact element and the indicator element takes place at the active portion of the indicator element, i.e. the portion which results to be visible outside the seat when a cartridge is present within the chamber, independently of the arrangement of the housing and contact element.

[0049] The inclined arrangement of the contact element allows moving back the seat 20 in a position of greater section of the bolt, thereby ensuring the necessary mechanical resistance of the bolt.

[0050] By providing the contact between the contact element and indicator element at the active portion thereof, the size of the indicator element can be reduced, while ensuring a high multiplication effect, and thus an optimum visibility. The size of the seat 20 can be thus restrained, without excessively reducing the resistant section of the bolt.

[0051] It is thus understood that both above-said advantages can be found either individually or synergically within a structure having an inclined arrangement of the contact element and an interaction between the two elements provided at the active portion of the indicator element as described above.

[0052] A further advantage of the indicator according to the invention is the unusual structural simplicity of the latter, which allows the latter to be manufactured at a very low cost.

[0053] In addition to the above, the arrangement and configuration of the indicator according to the present invention reduces the risk of jamming and does not affect the delicate and precise movement of the cartridge while being loaded within the chamber. Particularly, the presence of inclined planes, for example at the interaction between the cartridge and the contact element and/or at the interaction between the contact element and the indicator element, contributes to reduce the friction and make the presence of the indicator irrelevant for the cartridge loading movement.

[0054] In addition to the above, the balanced structure of the indicator element and/or contact element allows an optimum operation, which is theoretically independent from the presence of the elastic means, and not subjected to involuntary movement or extra-travels due to inertia forces developed while firing, for example.

[0055] Finally, the provision of separate ends-of-travel for the indicator element and contact element results to be further advantageous, such as to ensure the proper positioning of the same in an independent manner.

[0056] It should be understood that variations and/or additions to what has been described and illustrated above may be provided.

[0057] For example, the contact element may have other shapes, such as suitable to prevent the latter from rotating within the respective housing.

[0058] As stated above, the indicator according to the present invention can provide only the inclined arrangement of the housing and contact element. Alternatively, the indicator according to the present invention can provide only the characteristic of causing the contact element and the indicator element to interact at the active portion of the indicator element.

[0059] To the preferred embodiment of the chamber-loaded indicator described herein, those skilled in the art, aiming at satisfying contingent and specific requirements, may carry out a number of modifications, adaptations and replacements of elements with functionally equivalent ones, without however departing form the scope of the claims below.

Claims

1. A chamber-loaded indicator (12) for firearms suitable

to detect and signal that a cartridge (14) is present within the chamber (16), comprising:

a contact element (22) suitable to be slidably housed within a bolt (10) of the weapon at least between a forward position, in which it has a first end (22a) ending in the breech face, and a backward position affected by the presence of the cartridge (14) within the chamber (16), said contact element (22) being suitable to be arranged inclined relative to a firing pin of said weapon,
an indicator element (24) suitable to be rotatably mounted about a rotation axis (40) within a seat (20) of said bolt (10), wherein said indicator element (24) comprises an active portion (42) on which a second end (22b) of said contact element (22) rests or acts, said active portion (42) being movable about said rotation axis (40) at least between a retracted position in which it remains within the bulk of the bolt (10) and an extracted position in which it signals that a cartridge (14) is present within the chamber (16) following the thrust applied by said contact element (22).

2. The chamber-loaded indicator according to claim 1, wherein the second end (22b) of said contact element (22) is suitable to rest or act at an intermediate portion (43) of said active portion (42) of the indicator element (24), which is arranged between a free end of the indicator element and said rotation axis (40).

3. The chamber-loaded indicator according to claim 2, wherein a step is formed at said intermediate portion (43) of the active portion (42) of the indicator element (24), said second end (22b) of said contact element (22) being suitable to rest on said step.

4. The chamber-loaded indicator according to claim 2 or 3, wherein an inclined plane (44) is formed at said intermediate portion of the active portion (42) of the indicator element (24), said second end (22b) of said contact element (22) being suitable to rest or act on said inclined plane.

5. The chamber-loaded indicator according to claim 3 and 4, wherein said step defines said inclined plane (44) formed at the intermediate portion (43) of the active portion of the indicator element.

6. The chamber-loaded indicator according to one of the preceding claims, wherein said active portion (42) defines, starting from the rotation axis (40), two arms of different length, the longer arm extending to the end of the active portion (42) that is intended to project from the seat (20) to signal that a cartridge is present within the chamber, the shorter arm corresponding to the distance from the rotation axis (40) of the point of contact or interaction between the contact element (22) and the indicator element (24).

7. The chamber-loaded indicator according to one of the preceding claims, wherein said active portion (42) comprises a rest surface (46) on a delimitation surface (48) delimiting said seat (20) of the bolt.

8. The chamber-loaded indicator according to claim 7, wherein said rest surface (46) is curvilinear and counter-shaped relative to said delimitation surface (48) delimiting said seat (20) of the bolt (10).

9. The chamber-loaded indicator according to one of the preceding claims, wherein the active portion (42) has a free end made by means of a bevel (49) having such a size as to ensure the visibility of the indicator element while preventing the free end from getting entangled or jammed when it is arranged in the extracted position.

10. The chamber-loaded indicator according to one of the preceding claims, wherein said indicator element (24) comprises a reaction portion (50), arranged on the opposite side of said rotation axis (40) relative to the active portion (42).

11. The chamber-loaded indicator according to claim 10, wherein said reaction portion (50) is biased by elastic means (52) interposed between the reaction portion and a plane (57) defining said seat (20) of the bolt (10) to maintain the indicator element (24) in the retracted position.

12. The chamber-loaded indicator according to claim 11, wherein said elastic means (52) are partially housed within a hole (54) of said reaction portion (50).

13. The chamber-loaded indicator according to one of claims 10 to 12, wherein the reaction portion (50) extends to form an abutment (55) defining an end-of-travel for the indicator element (24) against a plane (57) of the seat (20).

14. The chamber-loaded indicator according to claim 13, wherein the shape and position of the reaction portion (50) and abutment (55) are such as to restrain the extra-travel of the indicator element (24) beyond the maximum extracted position and to minimize the inertial movements due to the firing cycle.

15. The chamber-loaded indicator according to one of the preceding claims, wherein the indicator element (24) defines a barycentre system relative to the rotation axis (40) thereof, which is suitable to minimize the stress due to shaking or vibrations on the weapon.

16. The chamber-loaded indicator according to one of the preceding claims, wherein both the contact element (22) and the contact element/indicator element assembly are balanced such as to further balance the effects of the inertia forces following shaking or vibrations.

17. The chamber-loaded indicator, according to one of the preceding claims, wherein the contact element (22) and the indicator element (24) have separate and independent ends-of-travel to ensure that the contact element (22) does not excessively project into the chamber, or that the indicator element (24) remains within the seat (20) in the retracted position.

18. The chamber-loaded indicator according to one of the preceding claims, wherein said contact element (22) is rotatably constrained about a sliding direction of the indicator element in a housing (18) within the bolt (10).

19. The chamber-loaded indicator according to claim 18, wherein said contact element (22) comprises two tracts (28, 30) having different cross dimensions.

20. The chamber-loaded indicator according to claim 18 or 19, wherein said contact element (22) comprises a first tract (28) developing along a first longitudinal axis (32) and a second tract (30) developing along a second longitudinal axis (34) arranged eccentrically relative to the first longitudinal axis (32).

21. The chamber-loaded indicator according to one of the preceding claims, wherein said contact element (22) comprises an arched thrust surface (36) suitable to come in contact with the active portion (42) of said indicator element (24).

22. The chamber-loaded indicator according to one of the preceding claims, wherein said active portion (42) of the indicator element (24) comprises a step or an inclined plane (44) that is formed at an intermediate portion (43) between the free end of the indicator element and the rotation axis (40), said step or inclined plane (44) being suitable to co-operate with the contact element (22), preferably with the arched thrust surface (36).

23. The chamber-loaded indicator according to one of the preceding claims, wherein said contact element (22) comprises an inclined surface (38) suitable to define an inclined plane for contact with the cartridge (14).

24. The chamber-loaded indicator according to one of the preceding claims, wherein said contact element (22) comprises a first tract (28) having larger cross dimensions than a second tract (30), each of the two tracts being inserted within a first tract (18a) and second tract (18b) of the corresponding and countershaped housing (18), respectively.

25. The chamber-loaded indicator according to one of the preceding claims, wherein the contact element comprises a first tract (28) defining an abutment surface (35a) suitable to abut against a stop surface (35b) of the housing (18) such as to define an end-of-travel for the contact element (22).

26. The chamber-loaded indicator according to claim 25, wherein the length of the second tract (30) is defined as a function of the position of the stop surface (35b), in order to prevent the second tract (30) from projecting in the chamber thus hindering the cartridge loading.

27. A firearm comprising a barrel defining a chamber (16) and a bolt (10) that can be associated to said chamber (16) when closed, wherein said bolt (10) comprises a chamber-loaded indicator suitable to detect that a cartridge (14) is present within the chamber (16), said chamber-loaded indicator comprising:

a contact element (22) that is slidably housed within said bolt (10) at least between a forward position, wherein it has a first end (22a) ending in the breech face, and a backward position affected by the cartridge (14) being present within the chamber (16), said contact element (22) being arranged inclined relative to a firing pin of said weapon,

an indicator element (24) which is rotatably mounted about a rotation axis (40) within a seat (20) of said bolt (10), wherein said indicator element (24) comprises an active portion (42) on which a second end (22b) of said contact element (22) rests or acts, said active portion (42) being movable about said rotation axis (40) at least between a retracted position in which it remains within the bulk of the bolt (10) and an extracted position in which it signals that a cartridge (14) is present within the chamber (16) following the thrust applied by said contact element (22).

28. The firearm according to claim 27, wherein the second end (22b) of said contact element (22) is suitable to rest or act at an intermediate portion (43) of said active portion (42) of the indicator element (24), which is arranged between the free end of the indicator element and said rotation axis (40).

29. The firearm according to claim 28, wherein said active portion (42) of the indicator element (24) comprises a step formed at an intermediate portion (43)

arranged between the free end of the contact element and said rotation axis (40).

30. The firearm according to one of claims 27 to 29, wherein said active portion (42) comprises a rest surface (46) on a delimitation surface (48) delimiting said seat (20) of the bolt (10).

31. The firearm according to claim 30, wherein said rest surface (46) is curvilinear and counter-shaped relative to said delimitation surface (48) delimiting said seat (20) of the bolt (10).

32. The firearm according to one of claims 27 to 31, wherein said indicator element (24) comprises a reaction portion (50), arranged on the opposite side of said rotation axis (40) relative to the active portion (42).

33. The firearm according to claim 32, wherein said reaction portion (50) is biased by elastic means (52) interposed between the reaction portion and a plane (57) defining said seat (20) of the bolt (10) to maintain the indicator element (24) in the retracted position.

34. The firearm according to claim 33, wherein said elastic means (52) are partially housed within a hole (54) of said reaction portion (50).

35. The firearm according to one of claims 27 to 34, wherein said contact element (22) is rotatably constrained about a sliding direction within a housing (18) of the bolt (10).

36. The firearm according to claim 35, wherein said contact element (22) comprises two tracts (28, 30) having different cross dimensions.

37. The firearm according to claim 35 or 36, wherein said contact element (22) comprises a first tract (28) developing along a first longitudinal axis (32) and a second tract (30) developing along a second longitudinal axis (34) eccentrically arranged relative to the first longitudinal axis (32).

38. The firearm according to one of claims 27 to 37, wherein said contact element (22) comprises an arched thrust surface (36) suitable to come in contact with the active portion (42) of said indicator element (24).

39. The firearm according to one of claims 37 to 38, wherein said active portion (42) of the indicator element (24) comprises a step formed at an intermediate portion (43) between the free end of the contact element and said rotation axis (40), said step being suitable to co-operate with the contact element (22).

40. The firearm according to one of claims 27 to 39, wherein said contact element (22) comprises an inclined surface (38) suitable to define an inclined plane for contact with the cartridge (14).

41. A chamber-loaded indicator (12) for firearms suitable to detect and signal that a cartridge (14) is present within the chamber (16), comprising:

a contact element (22) suitable to be slidably housed within a bolt (10) of the weapon at least between a forward position, in which it has a first end (22a) ending in the breech face, and a backward position affected by the presence of the cartridge (14) within the chamber (16), said contact element (22) being suitable to be arranged inclined relative to a firing pin of said weapon,
an indicator element (24) suitable to be rotatably mounted about a rotation axis (40) within a seat (20) of said bolt (10), said indicator element (24) being movable about said rotation axis (40) at least between a retracted position in which it remains within the bulk of the bolt (10) and an extracted position in which it signals that a cartridge (14) is present within the chamber (16) following the thrust applied by said contact element (22).

42. A chamber-loaded indicator (12) for firearms suitable to detect and signal that a cartridge (14) is present within the chamber (16), comprising:

a contact element (22) suitable to be slidably housed within a bolt (10) of the weapon at least between a forward position, wherein it has a first end (22a) ending in the breech face, and a backward position affected by the cartridge (14) being present within the chamber (16),
an indicator element (24) suitable to be rotatably mounted about a rotation axis (40) within a seat (20) of said bolt (10), wherein said indicator element (24) comprises an active portion (42) on which a second end (22b) of said contact element (22) rests or acts, said active portion (42) being movable about said rotation axis (40) at least between a retracted position in which it remains within the bulk of the bolt (10) and an extracted position in which it signals that a cartridge (14) is present within the chamber (16) following the thrust applied by said contact element (22).

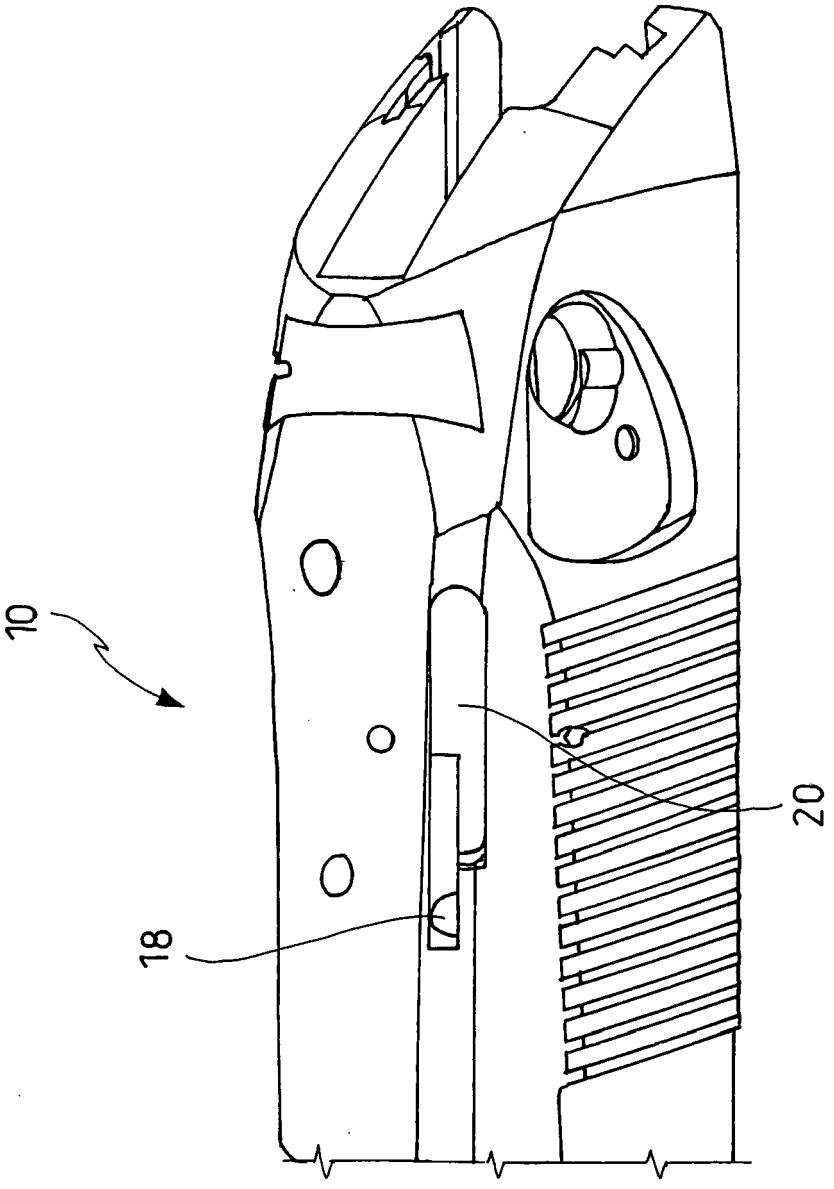


FIG.1

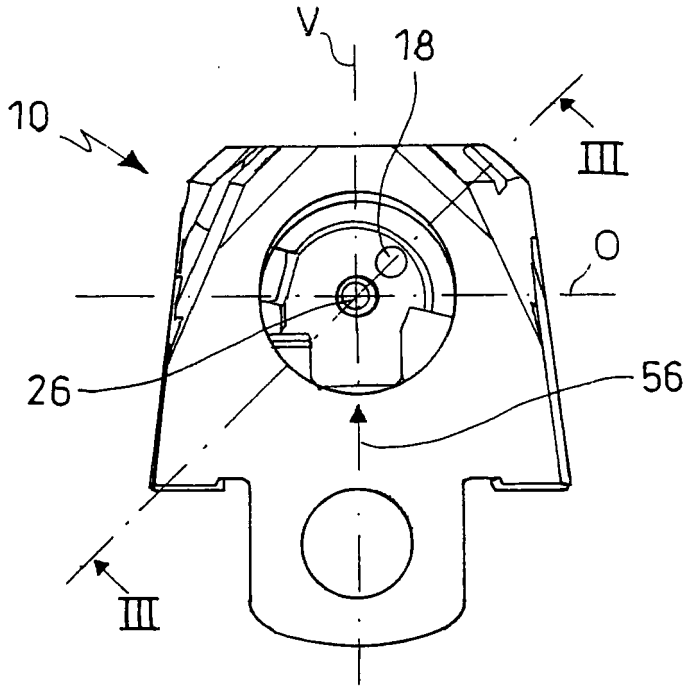


FIG.2

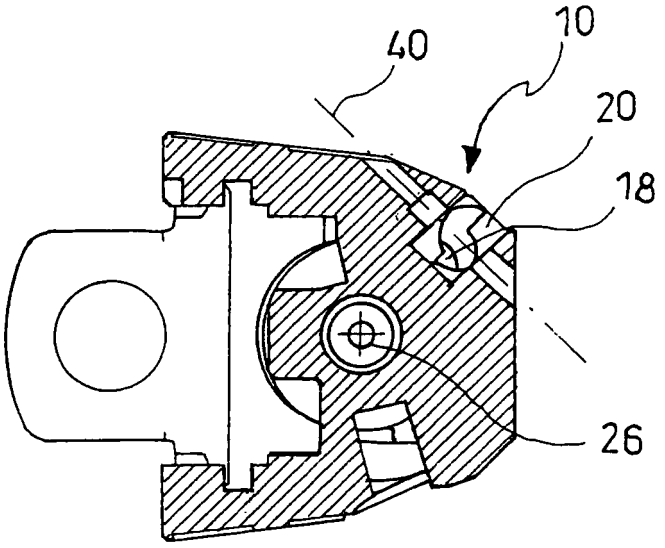


FIG.4

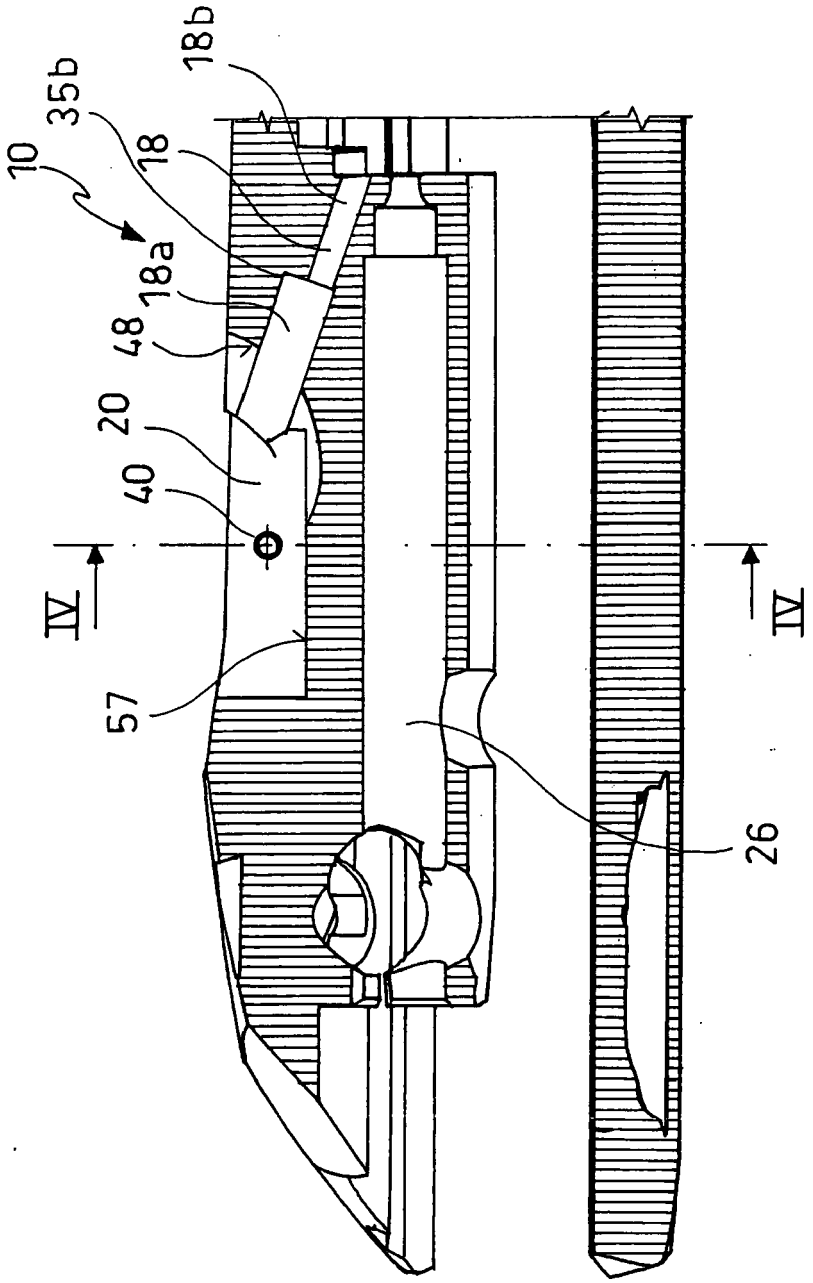


FIG.3

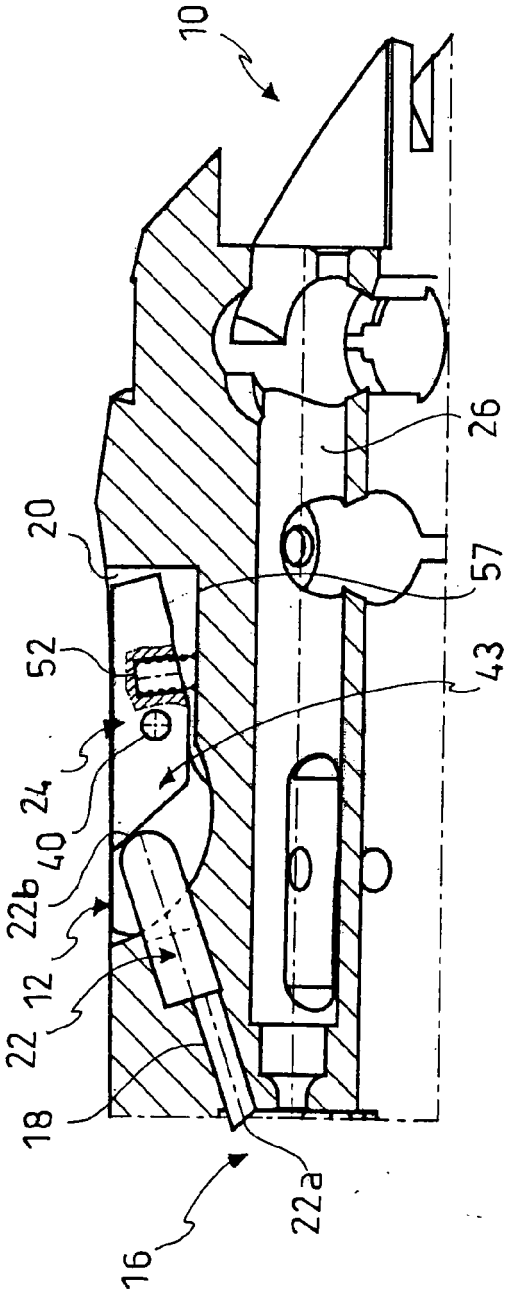

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22b
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16
22a
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FIG. 5

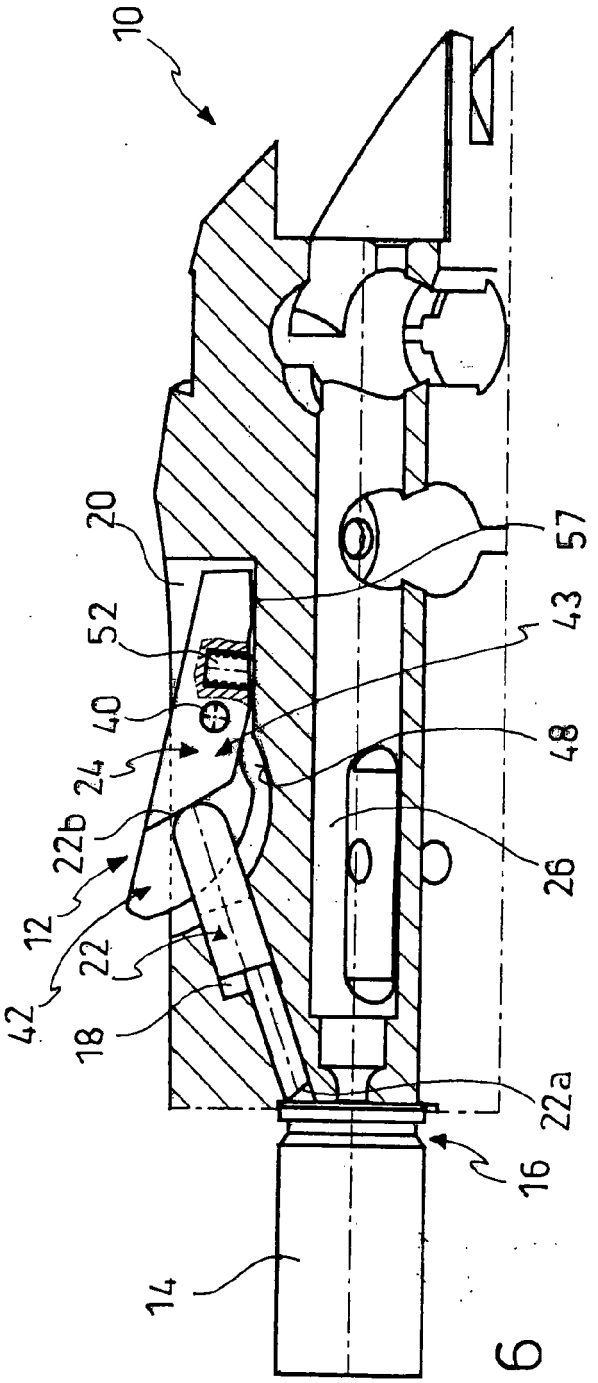

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22b
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22a
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FIG. 6

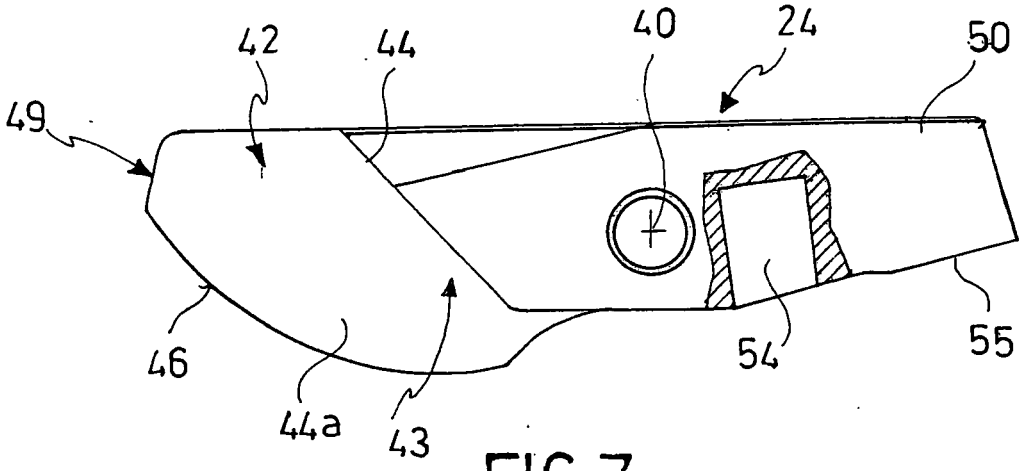


FIG. 7

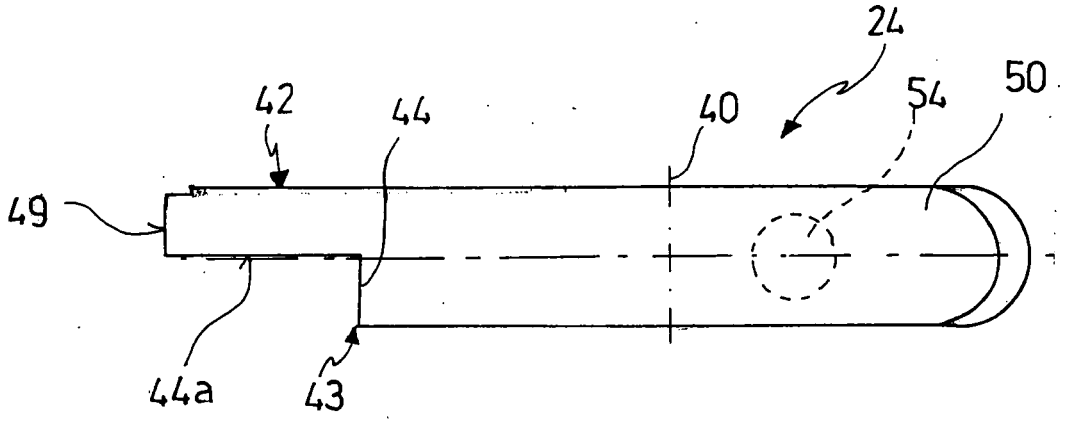


FIG. 8

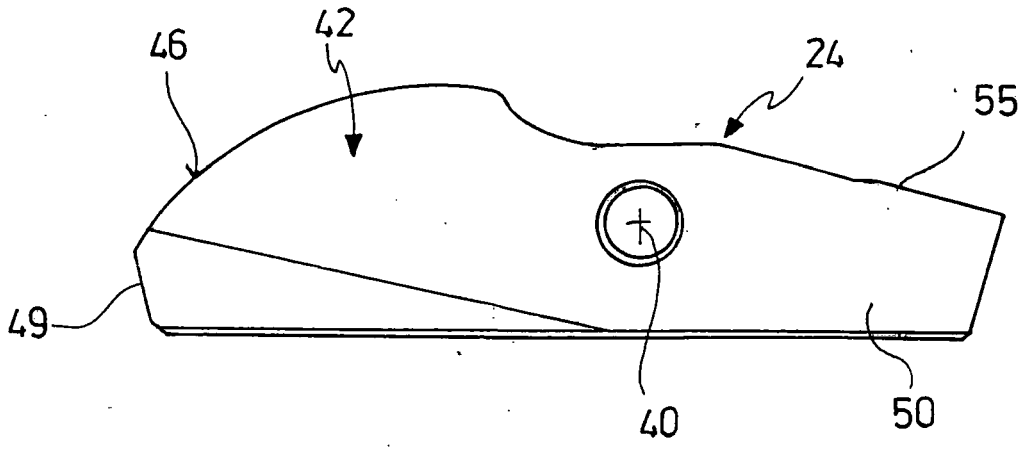


FIG. 9

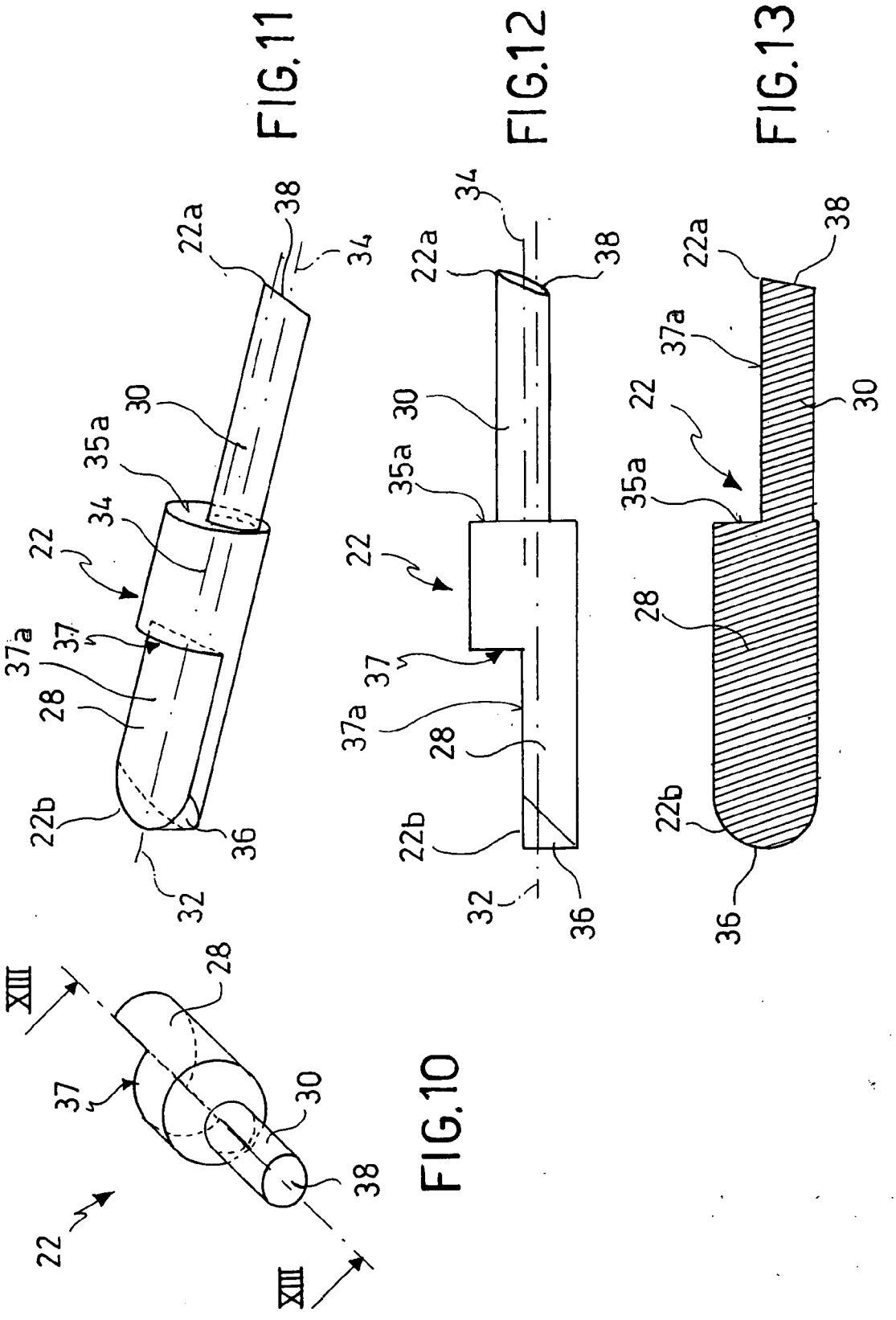


FIG.10

FIG.11

FIG.12

FIG.13

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EUROPEAN SEARCH REPORT

Application Number
EP 07 00 9380

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	US 4 100 691 A (WICKLUND) 18 July 1978 (1978-07-18) * abstract * * column 2, line 50 - column 4, line 19; figures 1-7 *	42 1-7, 27-30,41 10-14, 17,18, 23,25	INV. F41A9/53
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 June 2007	Giesen, Maarten

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