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(54) **WRITING INSTRUMENTS**

(57) The present disclosure relates to a writing instrument (10) comprising:

- a barrel (12) having a longitudinal axis,
- a writing tip (22),
- a writing tip extension-retraction system (20) configured to slide axially inside the barrel between an extended position and a retracted position wherein the writing tip respectively extends outside the barrel and is retracted inside the barrel,
- a locking system (34) movable between a locked position wherein the locking system is engaged with the sys-

tem (20) in the extended position to lock the latter in this position and an unlocked position wherein the locking system is disengaged from the system (20).

The system (20) comprises a movable unlocking member (44) configured to be moved rearwardly when the instrument is moved from a writing to a rest position. This movement causes the locking system to move from the locked position to the unlocked position under magnetic attraction between the movable unlocking member (44) and a permanent magnet (42) associated with the locking system.

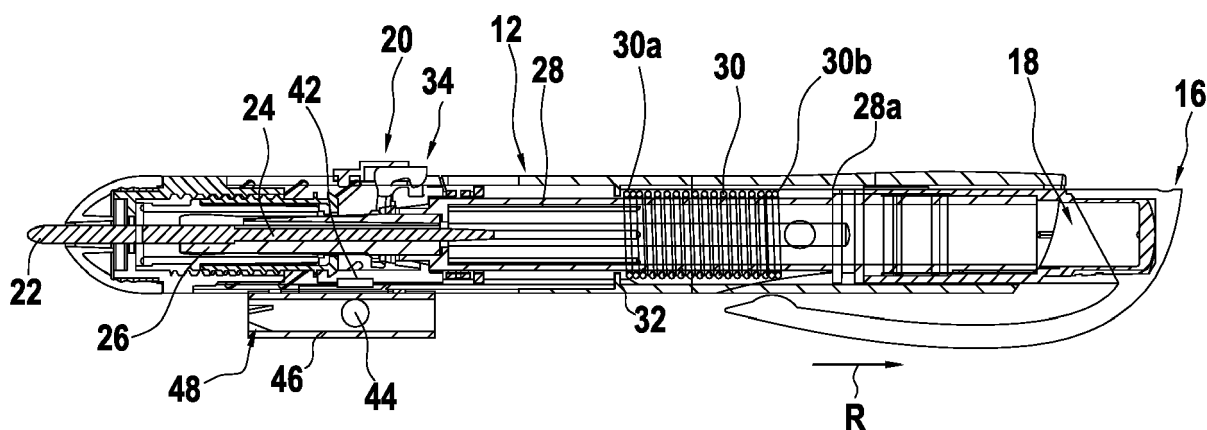


FIG. 1D

Description

Technical Field

[0001] The present disclosure relates to the field of writing devices. More specifically, the present disclosure relates to writing devices with a writing tip that can be extended and retracted.

Background

[0002] Writing instruments comprising a barrel and a writing tip that can be extended outside the barrel for writing purpose when a user actuates a writing tip extension-retraction system inside the barrel and retracted inside the barrel when the user does no longer need to use the writing instrument are largely known.

[0003] Further, prior art systems which automatically retract the writing tip of a writing instrument inside the barrel are also known, such as systems described in patent documents US 10,532,601 B2, US 2004/228671 A1 and US 8,100,598 B2.

[0004] However, these systems need actuation by the user which may forget to retract back the writing tip after using the writing instrument thereby e.g. drying writing tip for those writing implements using ink or keeping the writing tip more vulnerable e.g. in the writing implement falls down.

[0005] The present disclosure aims to address one or more problems in the prior art.

Summary

[0006] In a first aspect, the present disclosure relates to a writing instrument. The writing instrument comprises a barrel having a longitudinal axis, a writing tip, and a writing tip extension-retraction system configured to slide axially inside the barrel between a first extended forward position wherein the writing tip extends outside the barrel and a second retracted rearward position wherein the writing tip is retracted inside the barrel from the first extended forward position along an axial rearward direction. The writing instrument further comprises a locking system movable between a locked position wherein the locking system is engaged with the writing tip extension-retraction system in the first extended forward position to lock the latter in this position and an unlocked position wherein the locking system is disengaged from the writing tip extension-retraction system. The writing tip extension-retraction system comprises a movable unlocking member configured to be moved in the axial rearward direction when the writing instrument is moved from a writing position to a rest position, wherein the rest position is a horizontal position or a position with the writing tip oriented upwardly relative to the floor, the movement of the movable unlocking member in the axial rearward direction causing the locking system to move from the locked position to the unlocked position under magnetic

attraction between the movable unlocking member and at least one permanent magnet associated with the locking system.

[0007] According to the first aspect, the writing tip extension-retraction system may be easily and reliably caused to move to a second retracted rearward position by merely moving (through a user) the writing instrument to an horizontal position or a position with the writing tip oriented upwardly without carrying out any other action such as exerting an effort on an actuation member, e.g. pulling, pressing etc. An horizontal position or a position with the writing tip oriented upwardly or facing up may be considered as a rest position; i.e. a position in which the writing instrument is no longer configured for writing purpose. In the present disclosure, the horizontal orientation or upward orientation is defined relative to the floor or ground or a lying surface or support, e.g. a table, on which the writing instrument can be laid down in a rest position. The upward orientation of the writing tip more particularly defines an orientation that is opposed to the floor/ground (or a lying surface or support) where the writing tip faces up with respect to the floor/ground. The writing tip of the writing instrument would, in contrast, be oriented downwardly if it were facing the floor/ground or a lying surface or support. In the present disclosure the retraction movement may be automatically achieved through re-orienting the writing instrument as described above, in particular through lifting the writing tip upwardly. More particularly, the natural movement of the user after writing is to lift the writing tip from the writing surface and positioning the writing instrument either horizontally or even with the writing tip facing up. The gesture of the user may cause a metallic or magnetic member (movable unlocking member) to move relative to the writing instrument and, notably the locking system thereof, thereby causing unlocking of the latter thanks to the displacement of the metallic or magnetic member and magnetic coupling with the at least one permanent magnet associated with the locking system.

[0008] In some embodiments, the locking system comprises a first part configured to be engaged with the writing tip extension-retraction system and a second part that is:

- either a fixed inner part of the writing instrument configured to be engaged with the writing tip extension-retraction system,
- or a movable part configured to be subject to forwardly oriented pressure forces.

[0009] In some embodiments, the second movable part is moveable between a first forward position wherein it is subject to forwardly oriented pressure forces and at least one second rearward position wherein it is no longer subject to forwardly oriented pressure forces, the first part being kept engaged with the writing tip extension retraction system in the locked position as long as the second movable part is in the first forward position, the

movement of the movable unlocking member causing the second movable part to move from the first forward position to the at least one second rearward position.

[0010] In some embodiments, the locking system comprises a trigger member which comprises the first part configured to be engaged with the writing tip extension-retraction system.

[0011] In some embodiments, the trigger member has an head which is the first part of the locking system and a tail.

[0012] In some embodiments, the trigger member or at least the head thereof is able to pivot about an axis that is perpendicular to the longitudinal axis of the barrel..

[0013] In some embodiments, the tail is the second movable part.

[0014] In some embodiments, the writing instrument comprises an actuation mechanism movable between a first forward position wherein it is active and configured to exert forward pressure forces through a first biasing member on the tail in order to maintain the latter in the first forward position and a second rearward position wherein the actuation mechanism is no longer active and a second biasing member is configured to exert rearward pressure forces on the tail.

[0015] In some embodiments, the movable unlocking member is a metallic or magnetic member configured to be moved rearwardly when the writing instrument is moved to an horizontal position, thus creating magnetic attraction between the metallic or magnetic member and the actuation mechanism, which causes the latter to be inactive and the trigger head to pivot and disengage from the writing tip extension retraction system.

[0016] In some embodiments, the locking system further comprises a locking member that is part of the writing tip extension-retraction system and configured to engage with a fixed inner part of the writing instrument, thereby defining two different locking zones.

[0017] In some embodiments, the locking member has a permanent magnet.

[0018] In some embodiments, the movable unlocking member is metallic or magnetic .

[0019] In some embodiments, the writing instrument comprises a lateral housing fixed to the barrel and the movable unlocking member is configured to slide axially within the housing.

[0020] In some embodiments, the housing has an inner forward portion that is tapered toward a forward most end of the housing.

[0021] In some embodiments, when the writing instrument is moved to an horizontal position the movable unlocking member moves rearwardly and passes-by the permanent magnet, thereby creating magnetic attraction between the movable unlocking member and the permanent magnet, which drives the latter rearwardly together with the locking member, thus disengaging the locking member from the fixed inner part of the writing instrument and disengaging the trigger head from the writing tip extension retraction system.

[0022] In some embodiments, the writing instrument comprises a biasing member configured to bias the writing tip extension retraction system in the rearward direction.

[0023] In some embodiments, the biasing member is configured to exert biasing forces on the writing tip extension-retraction system which are compensated by counter forces generated at the two different locking zones where the writing tip extension retraction system is locked.

Brief Description of the Drawings

[0024]

Figures 1A to 1E show a first exemplary embodiment of a writing instrument of the present disclosure.

Figures 2A to 2E show a second exemplary embodiment of a writing instrument of the present disclosure.

Detailed Description

[0025] Hereinafter, a detailed description will be given of the present disclosure. The terms or words used in the description and the aspects of the present disclosure are not to be construed limiting as only having common-language or dictionary meanings and should, unless specifically defined otherwise in the following description, be interpreted as having their ordinary technical meaning as established in the relevant technical field. The detailed description will refer to specific embodiments to better illustrate the present disclosure, however, it should be understood that the presented disclosure is not limited to these specific embodiments.

[0026] In the present disclosure the term "gravity" naturally refers to the newtonian gravitational acceleration created by the earth and the term "gravity direction" refers to the direction of the acceleration which is oriented downwardly with respect to the location where the writing instrument is located.

[0027] In a first exemplary embodiment, the present disclosure relates to a writing instrument as shown in figures 1A to 1E of which the description follows. Figure 1A is a schematic overall view of a writing instrument oriented in a writing position, i.e. oriented obliquely when handled by a user for writing purpose.

[0028] The writing instrument may be a marker, a felt pen, a highlighter, a ball point pen, a permanent or non-permanent marker or any other type of writing instrument with an extension and retraction mechanism for extending and retracting a writing tip of the instrument when necessary.

[0029] The writing instrument 10 may comprise a barrel or tubular body 12 having a longitudinal axis X. The tubular body may be a unitary body, or may comprise multiple components. In Figure 1A, a portion of the length of the barrel has been withdrawn to show the internal mech-

anism involved in the present disclosure.

[0030] The writing instrument 10 may comprise at a first forward end of the instrument a tip component 14 comprising a writing orifice 14a which is located at the distal end of the tip component 14. The writing instrument 10 may comprise at a second opposed rearward end of the instrument a clip 16 for clipping the instrument onto a support, a piece of clothes etc. The clip may be actuated by a user, e.g. by pressing the latter with a finger (e.g. the thumb) forwardly along the axis X so as to cause extension of the writing tip of the instrument through the writing orifice 14a in a known manner. To be noted that other actuating members may alternatively be used for causing writing tip extension. The writing instrument 10 may further comprise in the tubular body a tank (not shown in Figure 1A) for storing a writing ink used by the writing tip. The writing instrument 10 may further comprise a filler cap 18 disposed between the barrel 12 and the clip 16 (figs. 1A and 1D). The clip 16 may be firmly engaged around the protruding end of the filler cap 18 so as to cover the latter as shown in figure 1D. The barrel 12 may extend longitudinally from the tip component 14 toward the rear part of the instrument where the clip 16 is located. As shown in figures 1D and 1E, the barrel 12 may extend longitudinally in a rearward direction so as to cover as a sheath the internal components of the writing instrument, including a forward end of the filler cap while leaving the clip 16 uncovered.

[0031] The writing instrument 10 may comprise, within the barrel 12, a writing tip extension-retraction system or mechanism 20 that is configured to slide axially (along axis X) inside the barrel between a first extended forward position wherein the writing tip 20 extends outside the distal writing orifice 14a (figures 1A and 1D) and a second retracted rearward position illustrated in figure 1E in which the writing tip 22 has been retracted inside the barrel along an axial rearward direction (arrow R on figures 1A and 1D) from the first extended forward position of figures 1A and 1D.

[0032] The writing tip extension-retraction system 20 may further comprise other internal components such as a nib 24 of which a first end forms the writing tip 22 and a nib holder 26 (e. g. a sleeve surrounding the nib) which may at least partly surround the nib 24 and firmly maintain the latter inside the nib holder 26 (figures 1D-E). The nib 24 is fixed inside the nib holder 26 and the latter is fixed to an inner tube 28 (containing the ink tank e.g. through tight engagement or insertion of the second opposed end of the nib 24 into an opened first end of the inner tube 28. The inner tube 28 extends rearwardly and is configured to move in accordance with the mechanism 20 between a position that is proximate the rear end of the barrel 12, in the first forward extended position of figure 1D, and a position beyond the rear end of the barrel 12 in the second rearward retracted position of figure 1E. The filler cap 18 may be tightly mounted inside a second opposed end of the inner tube 28, e.g. by press-fit, so as to ensure air tight and prevent ink from evaporating. To

be noted that the clip can be used as a filler cap: thus, instead of having a filler cap and a clip, one piece may serve for both elements.

[0033] The writing instrument 10 may further comprise a biasing member 30 (e.g. a spring) that is longitudinally disposed in the instrument and has two opposite ends along its longitudinal dimension: one end, 30a, may rest against at least one fixed stop 32 that is arranged on an inner surface of the barrel 12 (figs. 1D-E), e.g. under the form of a peripheral inner ridge, and the opposite end 30b of biasing member 30 may press against a rear part of the inner tube 28, here on an outside shoulder 28a thereof. Thus the biasing member 30 is positioned between a fixed part 32 of the barrel and the inner tube 28 so as to exert permanent rearward pulling forces on the latter (in rearward direction R) which tend to pull rearwardly the inner tube 28, and therefore the writing tip extension-retraction system 20 toward the second retracted position of figure 1E.

[0034] The writing instrument 10 may further comprise a locking system 34 that is movable between two positions:

- a first locked position wherein it engages with the writing tip extension retraction system 20 in the first extended forward position of figure 1A so as to lock the latter in this position and withstand the biasing forces exerted in the rearward direction by the biasing member 30;
- and a second unlocked position wherein it is disengaged from the writing tip extension-retraction system 20, and does therefore no longer counter the biasing forces, thereby enabling rearward sliding of the system 20 as shown in figure 1E which reaches the second retracted rearward position.

[0035] More particularly, as shown in the enlarged drawings of figures 1B and 1C, the locking system 34 may comprise both a first part which may be part of a trigger member 36 and configured to be engaged with a first portion of the writing tip extension-retraction system 20 and a second part which may be a fixed inner part 38 of the writing instrument configured to be engaged with a second portion of the writing tip extension-retraction system 20.

[0036] The trigger member 36 may have an head 36a which corresponds to the first part of the locking system 34 and a tail 36b. The trigger member may have an overall shape of an ax or a hammer.

[0037] As shown in figures 1B and 1C, the head 36a is configured to pivot about a pin axis a1 that is perpendicular to the longitudinal axis X of the barrel in the section planes of the figures. The remaining part (body) of the trigger member including the tail 36b may be fixed in embodiments whereas it may be movable, e.g. pivoting, in other exemplary embodiments. To be noted that the head 36a could pivot differently relative to the body of the trigger member. For instance, the pin could be a separate

component as a metallic pin that is assembled with the trigger member 36.

[0038] The head 36a may have a hooked shape at one end so as to engage with a first portion of system 20.

[0039] The writing tip extension-retraction system 20 may further comprise a member 40, called shock absorber, that is fixed, e.g. through snap-fit, to the first end of the inner tube 28 where the nib 24 is engaged. The shock absorber 40 has an overall shape of a ring or an annular component surrounding the inner tube first end with a longitudinally (here downwardly on figs. 1B-C when the writing instrument is in a writing position) extended tab 40a provided with an externally-oriented edge, groove or the like on which the hook shape of the trigger head 36a may engage in the locked position of figures 1A-D. The longitudinally extended tab 40a may extend beyond the inner tube first end so as to be able to elastically deform in a transverse or radial direction relative to the longitudinal axis X (e.g. inwardly).

[0040] The shock absorber 40 may further include a diametrically opposed beam member 40b which projects longitudinally (here downwardly) farther from tab 40a so as to be able to engage with the above-mentioned fixed inner part 38 of the writing instrument, in particular with an undercut 38a thereof, thereby forming a separate second locking zone. The inner part 38 may define a sealing chamber together with other internal parts of the writing instrument to prevent the ink evaporation. The beam member 40b which also possesses a radially-oriented elastic capacity of deformation may be equipped with a permanent magnet 42 fixed on its length, in examples on the outside of the beam member.

[0041] Thus, two different locking zones are provided inside the writing instrument of figures 1A-E for locking the writing tip extension-retraction system 20 in its first forward extended locked position of figures 1A-D. These two distinct zones compensate for the biasing forces exerted by the biasing member 30 on the system 20 in the rearward direction R.

[0042] The writing tip extension-retraction system 20 may further comprise a movable unlocking member that is configured to be moved in the axial rearward direction (R) when the writing instrument is moved from a writing position as shown in figures 1A-C to a rest position as an horizontal position as shown in figures 1D-E that is parallel to the floor or ground or to a lying surface (e.g. table etc.).

[0043] In embodiments, the movable unlocking member takes the form of a metallic member 44 such as a sphere or a ball which is in a material that is magnetizable, i.e. it can magnetically interact under the influence of a magnetic field, e.g. it can be magnetically attracted by a permanent magnet such as magnet 42. Alternatively, the movable unlocking member may take the form of a magnetic member. To be noted that the metallic member may take another form.

[0044] The writing instrument may further comprise a lateral housing 46 that is laterally fixed to the barrel 12

outside thereof as shown in figures 1D-E, here in an axial position that substantially corresponds to the location in the writing instrument of the trigger member 36 and the fixed inner part 38 where the beam member 40b engages in the locked position. The housing 46 has an overall elongate shape and is hollow so as to accommodate the movable unlocking member 44 therein and allow the latter to slide axially within the housing, depending on the inclination of the writing instrument as shown in figures 1D and 1E. The housing 46 may be mounted in the barrel by snap-fit, press-fit or by using glue.

[0045] The housing 46 may be further configured internally at its forward most end with an inner tapering portion that is tapered forwardly and flares out rearwardly. In examples, the tapered portion may take the shape of internal inclined ribs 48 (figs. 1C-E). Such an inner configuration makes it possible for the metallic movable unlocking member 44 to be aided in sliding rearwardly inside the housing when the writing instrument is placed in the horizontal position of figures 1D-E.

[0046] Thus, when the writing instrument 10 is placed in an inclined writing position as shown in figures 1A-C, the writing tip extension-retraction system 20 is locked through two distinct zones inside the barrel as explained above and the metallic movable unlocking member 44 is attracted downwardly by gravity, thereby reaching the position located at the forward most end of housing 46 (fig. 1C).

[0047] When the writing instrument 10 is moved from the above-described writing position to the horizontal position of figure 1D, the metallic movable unlocking member 44 (e.g. sphere) is caused to move rearwardly along direction R thanks to the tapered inner configuration of housing 46. When the movable unlocking member 44 passes near the magnet 42, the magnetic field generated by the latter attracts member 44. The further rearward movement of member 44 drives the magnet rearwardly due to the magnetic attraction, which therefore pulls the beam member 40b rearwardly and cause the latter to mechanically disengage from the undercut 38a. Thus, the second locking zone is unlocked. The first locking zone formed by the trigger member 36 engaged with the first portion 40a of the writing tip extension-retraction system 20 remains the only locking zone for system 20 and cannot withstand on its own the biasing forces exerted by biasing member 30. Therefore, the first locking zone is caused to be unlocked (released) under the action of the biasing member 30, thereby causing the locking system to move from the locked position to the unlocked position.

[0048] The writing tip extension-retraction system 20 is thus automatically released without any specific action from a user (except the change in position of the writing instrument from a writing position to a rest position, i.e. an horizontal position or even to a position where the writing tip is facing upwardly and the clip 16 downwardly) and can slide rearwardly inside the barrel under the action of biasing member to occupy the second retracted un-

locked position of figure 1E.

[0049] A second exemplary embodiment of a writing instrument 110 is illustrated in figures 2A-2E.

[0050] All the corresponding numeral references of figures 1A-1E are taken over here, preceded by "1" and will not be repeated unless necessary. As for the previous embodiment, the trigger member is pivotally mounted and engaged through its head 136a with the first portion 140a of the shock absorber 140.

[0051] In embodiments, the second movable part which is here the trigger member tail 136b is still moveable between a first forward position (figures 2A-2C) wherein it is subject to forwardly oriented pressure forces (arrow F) and at least one second rearward position wherein it is no longer subject to forwardly oriented pressure forces as shown in figure 2D (arrow R). The first part (here trigger member head 136a) is kept engaged with the writing tip extension retraction system 120 in the locked position as long as the second movable part 136b is in the first forward position.

[0052] As for the previous embodiment, the movement of a movable unlocking member caused by the writing instrument change in position will cause the second movable part 136b to move rearwardly (R) from the first forward position to the at least one second rearward position, which will unlock the writing tip extension retraction system 120.

[0053] More particularly, the writing instrument 110 comprises an assembly 150 (locking system) that may be located outside the barrel 112 a length portion thereof has been withdrawn on figure 1A for greater visibility of the inner mechanism and components. The assembly 150 may comprise an actuation mechanism 152 that is movable between both a first forward position wherein it is active (figures 2A-2C) and configured to exert forward pressure forces through a first biasing member 154 on the tail 136b, in order to maintain the latter in the first forward position, and a second rearward position (figure 2D) wherein the actuation mechanism 152 is no longer active and a second biasing member 156 is configured to exert rearward pressure forces (direction R) on the tail 136b.

[0054] As shown in figures 2B, 2C and 2E, the actuation mechanism 152 may comprise an actuator 152a of a known type (the actuator or cam member may be made of plastic or metallic material with a specific geometry as illustrated in these figures) that is pivotally mounted about an axis a2 (in the direction of arrow R1) that is both perpendicular to longitudinal axis X of the barrel and to the pivot axis of trigger member 136. The actuation mechanism further comprises a rod 152b connected to the actuator 152a and that can be actuated axially (see the double arrow F1 in figure 2E). The actuator 152a may be a cam member made of plastic or metallic material that can actuate axially a follower depending on its pivoting motion about axis a2, which follower is connected to the rod 152b to cause its axial movement. The actuator 152a may further comprise a laterally-extending portion 152a1

that bears a permanent magnet 152a2.

[0055] The assembly 150 comprises the first and second biasing members 154 and 156 (here helicoidal springs) which are disposed on either side of the trigger member tail 136b so that the latter is subject to biasing forces exerted by both biasing members. The biasing member 156 is fixed against a stop member 160 disposed in the alignment of actuator 152a, rod 152b, and piston 158. All these components may be mounted on a supporting member 162, e.g. a longitudinal curved plate, that may be fixed to the outside of the barrel 112.

[0056] The actuation mechanism 152 may further comprise an engagement body 158, e.g. a piston, which is laterally provided with an engagement member 158a, here inwardly radially oriented toward the barrel, that is configured to engage with a portion 140b of the shock absorber 140, diametrically opposed to the first portion 140a that is engaged with the trigger member head 136a. A double arrow F2 illustrated in figure 2E shows the direction of displacement of shock absorber 140 (i.e. writing tip extension-retraction system 120), that is parallel to F1 and to longitudinal axis X of the barrel. To be noted that the engagement member 158a is configured to exert forces on the shock absorber 140 that are rearwardly oriented, so as to push the latter rearwardly when no longer locked.

[0057] As shown in figure 2E, the trigger member 136 may comprise a transverse pivot axis a3 about which the trigger member is configured to pivot and a hollow central body 136d that is configured to surround the centrally-located nib holder 126 (fig. 2C). More particularly, the trigger member 136 may be accommodated in a hole in the barrel and maintained therein by a holder component 137 which may be laterally disposed relative to the longitudinal arrangement of the actuator 152a, rod 152b, piston 158 and biasing members 154, 156 in a diametrically opposite manner therewith. The latter can be mounted on the barrel by press-fit, snap-fit or by using glue.

[0058] The assembly 150 further comprises a housing 164 that is disposed sideways relative to the longitudinal arrangement of the actuator 152a, rod 152b, piston 158 and biasing members 154, 156.

[0059] A movable unlocking member 166 is located within the housing 164 and can axially freely move therein as in the embodiment of figures 1C-1E. Member 166 may be a metallic member (magnetizable material), e.g. a sphere or ball, as represented in figures 2C and 2D where the housing 164 has been omitted to show the sphere 166. Alternatively, the movable unlocking member may be a magnetic member.

[0060] In figures 2A-2C the writing tip extension-retraction system 120 is locked in its first extended forward position wherein the writing tip 122 extends outside the barrel 112 through the actuation mechanism 152 that is active in a first forward position wherein it is configured to exert forwardly-oriented axial pressure forces (see arrow F in figure 2A) with actuator 152a (in active position),

rod 152b, piston 158 and biasing member 154 which all exert forces against one side of the trigger tail 136b. The biasing member 156 exerts counter forces (rearwardly-oriented forces) against the opposite side of the trigger tail 136b but which are not sufficient to compensate the forward forces.

[0061] The locked position is obtained when the writing instrument 110 is in a writing position as shown in figure 2A.

[0062] To unlock the writing tip extension-retraction system 120 and retract the writing tip 122 inside the barrel 112, the writing instrument 110 is moved to an horizontal position (rest position) as shown in figures 2C-2D. Such an horizontal position is defined with respect to an horizontal lying surface or support or ground. Owing to this change in position, the movable unlocking member 166 (ex: sphere) is moved rearwardly (direction R) in its housing by virtue of its own weight and the inner configuration of the housing. The housing 164 of figure 2B has been omitted in figures 2C and 2D to show the movable unlocking member 166 that is accommodated within the housing. The housing 164 may have an inner cross section that tapers rearwardly so as to cause the member 166 to slide or roll on the tapered cross section rearwardly. When the movable member approaches the laterally-arranged extension 152a1 equipped with the permanent magnet 152a2, magnetic coupling occurs between the latter and metallic member 166 which attracts the magnet and the bearing structure 152a1. As the latter is integrally formed with the remaining part of the actuator 152a, this movement drives the actuator in a pivoting motion about axis a2 as indicated by arrow R1 in figure 2E, which therefore moves sideways the actuator (it therefore becomes inactive). Thus, the latter can no longer push axially on the rod 152b and piston 158 in order to press biasing member 154 against trigger tail 136b. It ensues that the biasing member 156 which is kept on pressing against the other side of trigger tail 136b, causes the latter to move rearwardly (arrow R in figure 2D) as it does no longer withstand biasing forces from biasing member 154. The rearward motion causes both the piston 158 to push rearwardly on the shock absorber 140 through engagement member 158a and pivoting of the trigger member 136, thereby disengaging the head 136a from the shock absorber 140 at the locking zone 140a-136a. Therefore the mere change in position of the writing instrument as described above makes it possible to automatically unlock the writing tip extension-retraction system 120 and cause the latter to move to a second retracted rearward position wherein the writing tip is retracted inside the barrel (figure 2D).

[0063] Although the embodiments of the present disclosure have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications and alterations are possible, without departing from the spirit of the present disclosure. It is also to be understood that such modifications and alterations are incorporated in the scope of the present disclosure and

the accompanying claims.

Claims

1. A writing instrument (10; 110) comprising:

- a barrel (12; 112) having a longitudinal axis,
- a writing tip (22; 122),
- a writing tip extension-retraction system (20; 120) configured to slide axially inside the barrel between a first extended forward position wherein the writing tip extends outside the barrel and a second retracted rearward position wherein the writing tip is retracted inside the barrel from the first extended forward position along an axial rearward direction,
- a locking system (34; 150) movable between a locked position wherein the locking system is engaged with the writing tip extension retraction system in the first extended forward position to lock the latter in this position and an unlocked position wherein the locking system is disengaged from the writing tip extension-retraction system,

the writing tip extension-retraction system comprising a movable unlocking member (44;166) configured to be moved in the axial rearward direction when the writing instrument is moved from a writing position to a rest position, wherein the rest position is a horizontal position or a position with the writing tip oriented upwardly relative to the floor, the movement of the movable unlocking member (44; 166) in the axial rearward direction causing the locking system to move from the locked position to the unlocked position under magnetic attraction between the movable unlocking member (44; 166) and at least one permanent magnet (42; 152a2) associated with the locking system.

2. The writing instrument of claim 1, wherein the locking system (34; 150) comprises a first part (36a; 136a) configured to be engaged with the writing tip extension-retraction system (20; 120) and a second part that is:

- either a fixed inner part (38) of the writing instrument configured to be engaged with the writing tip extension-retraction system, -or a movable part (136b) configured to be subject to forwardly oriented pressure forces.

3. The writing instrument of claim 2, wherein the second movable part (136b) is moveable between a first forward position wherein it is subject to forwardly oriented pressure forces and at least one second rearward position wherein it is no longer subject to forwardly oriented pressure forces.

- wardly oriented pressure forces, the first part (136a) being kept engaged with the writing tip extension retraction system (120) in the locked position as long as the second movable part (136b) is in the first forward position, the movement of the movable unlocking member (166) causing the second movable part to move from the first forward position to the at least one second rearward position.
4. The writing instrument of claim 1, wherein the locking system comprises a trigger member (36; 136) which comprises the first part configured to be engaged with the writing tip extension-retraction system.
 5. The writing instrument of the preceding claim, wherein the trigger member (36; 136) has an head (36a; 136a) which is the first part of the locking system and a tail (36b; 136b).
 6. The writing instrument according to the preceding claim, wherein the trigger member (36; 136) or at least the head thereof is configured to pivot about an axis (a1; a3) that is perpendicular to the longitudinal axis of the barrel.
 7. The writing instrument of claim 5 or 6 when they depend on claim 3, wherein the tail (36b; 136b) is the second movable part.
 8. The writing instrument of any one of claims 5 to 7 when they depend on claim 3, wherein the writing instrument comprises an actuation mechanism (252) movable between a first forward position wherein it is active and configured to exert forward pressure forces through a first biasing member (254) on the tail in order to maintain the latter in the first forward position and a second rearward position wherein the actuation mechanism is no longer active and a second biasing member (256) is configured to exert rearward pressure forces on the tail.
 9. The writing instrument of the preceding claim, wherein the movable unlocking member (166) is a metallic or magnetic member configured to be moved rearwardly when the writing instrument is moved to an horizontal position, thus creating magnetic attraction between the metallic or magnetic member and the actuation mechanism (252), which causes the latter to be inactive and the head (136a) of the trigger member to pivot and disengage from the writing tip extension retraction system.
 10. The writing instrument of any one of claims 1, 2, 4, 5 and 6, wherein the writing tip extension-retraction system comprises a locking member (40) that is configured to engage with the fixed inner part (38) of the writing instrument, thereby defining two different locking zones.
 11. The writing instrument of the preceding claim, wherein the locking member (40) has a permanent magnet (42).
 12. The writing instrument of the preceding claim, wherein the movable unlocking member (44) is metallic or magnetic.
 13. The writing instrument of the preceding claim, wherein the writing instrument comprises a lateral housing (46) fixed to the barrel (12) and the movable unlocking member (44) is configured to slide axially within the housing.
 14. The writing instrument of the preceding claim, wherein the housing (46) has an inner forward portion (48) that is tapered toward a forward most end of the housing.
 15. The writing instrument of any one of claims 12 to 14, wherein when the writing instrument is moved to an horizontal position, the movable unlocking member (44) moves rearwardly and passes by the permanent magnet (42), thereby creating magnetic attraction between the movable unlocking member and the permanent magnet, which drives the latter rearwardly together with the locking member (40), thereby disengaging the locking member (40) from the fixed inner part (38) of the writing instrument and disengaging the trigger head (36a) from the writing tip extension retraction system.
 16. The writing instrument of any one of the preceding claims, wherein the writing instrument comprises a biasing member (30) configured to bias the writing tip extension retraction system (20; 120) in the rearward direction.
 17. The writing instrument of claim 16 and any one of claims 10 to 15, wherein the biasing member (30) is configured to exert biasing forces on the writing tip extension-retraction system (20) which are compensated by counter forces generated at the two different locking zones where the writing tip extension retraction system is locked.

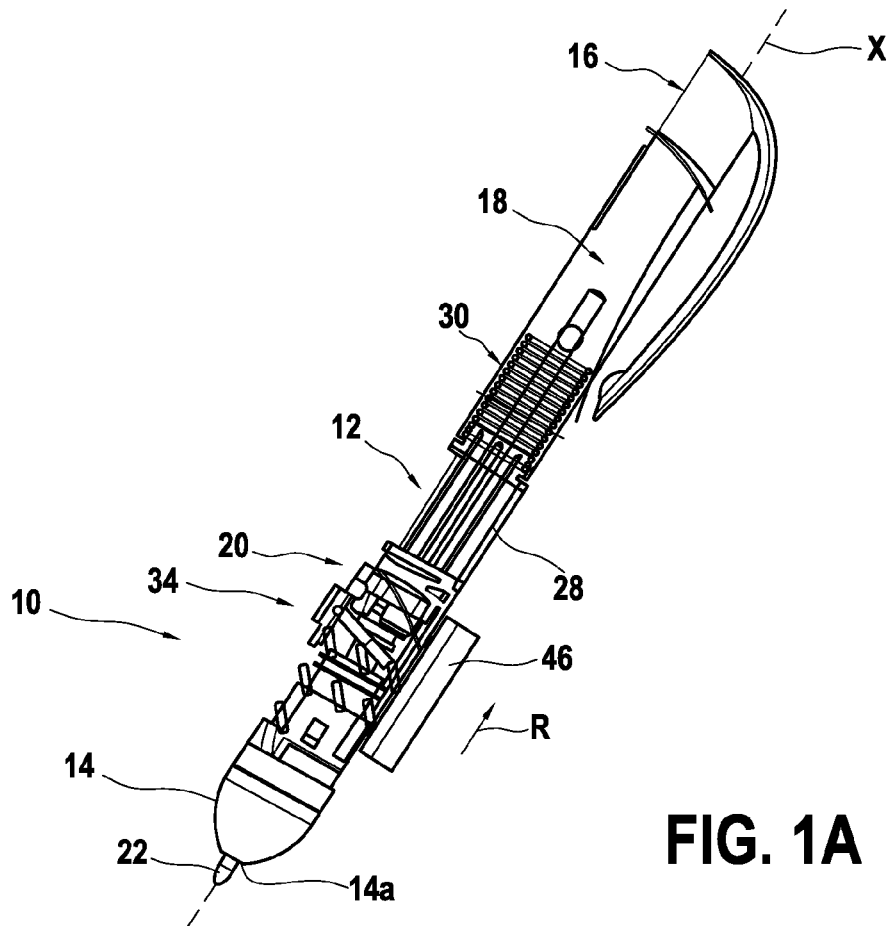


FIG. 1A

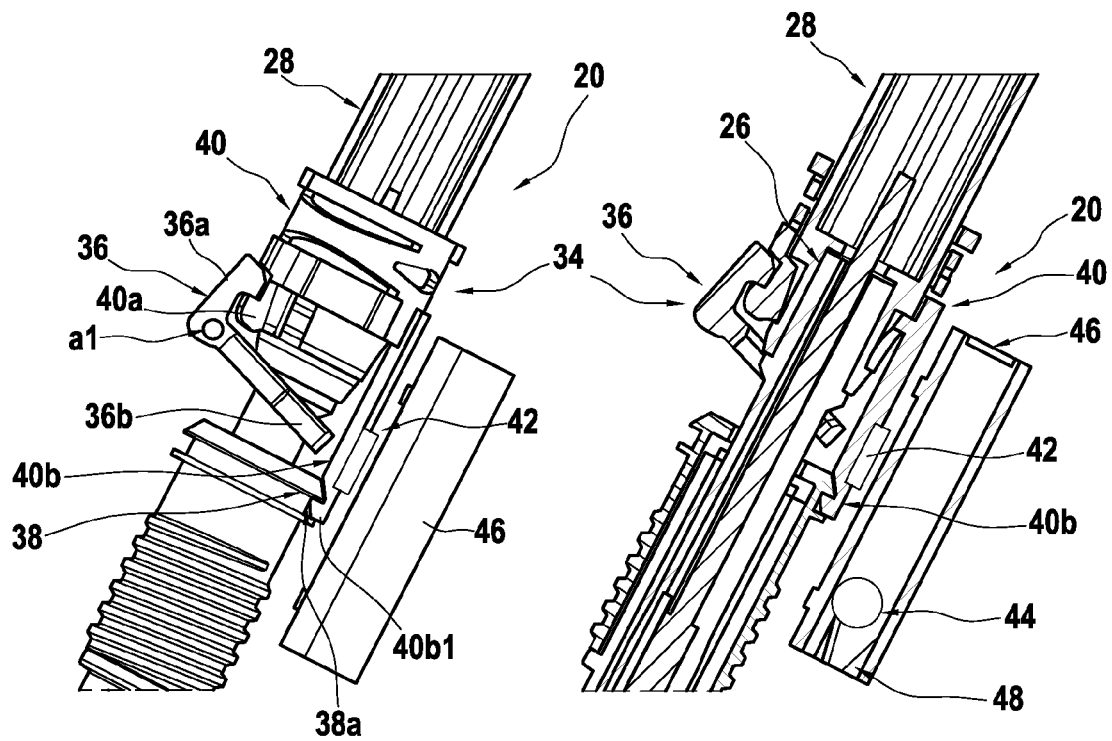


FIG. 1B

FIG. 1C

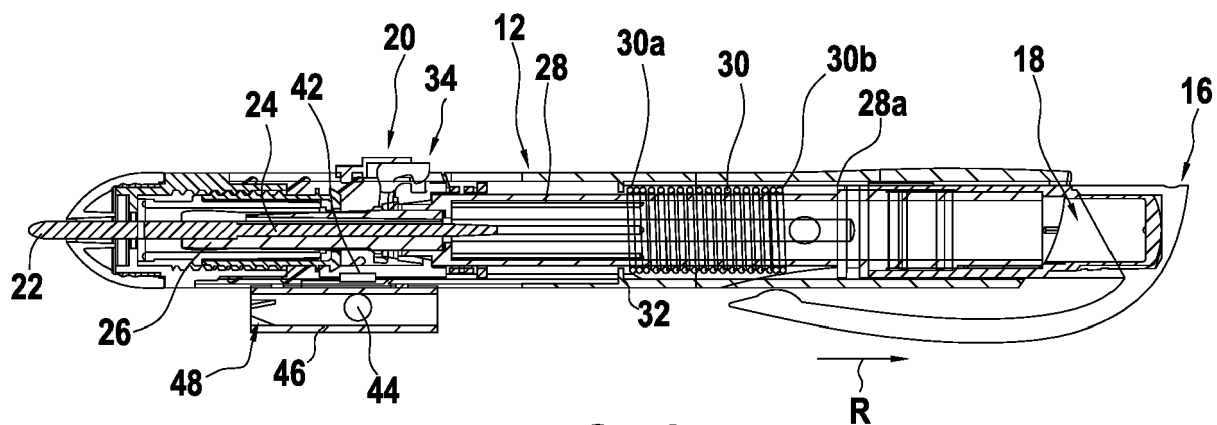


FIG. 1D

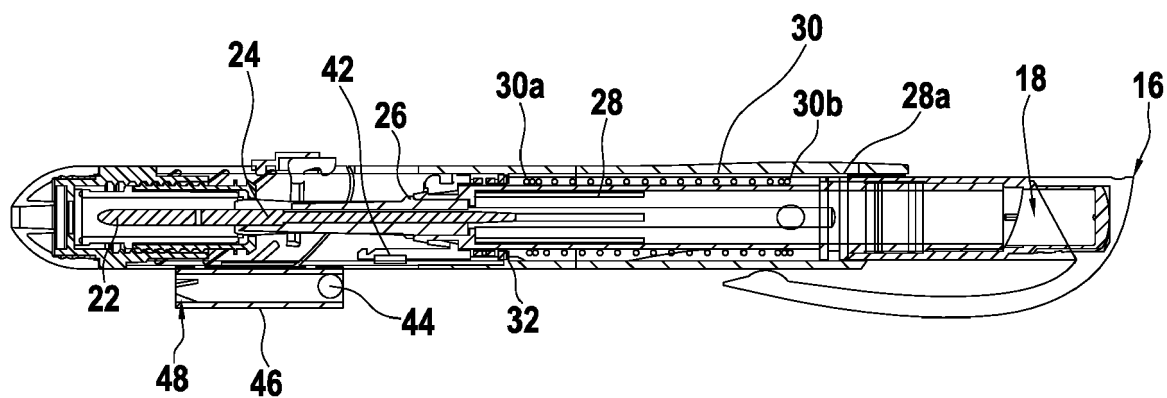
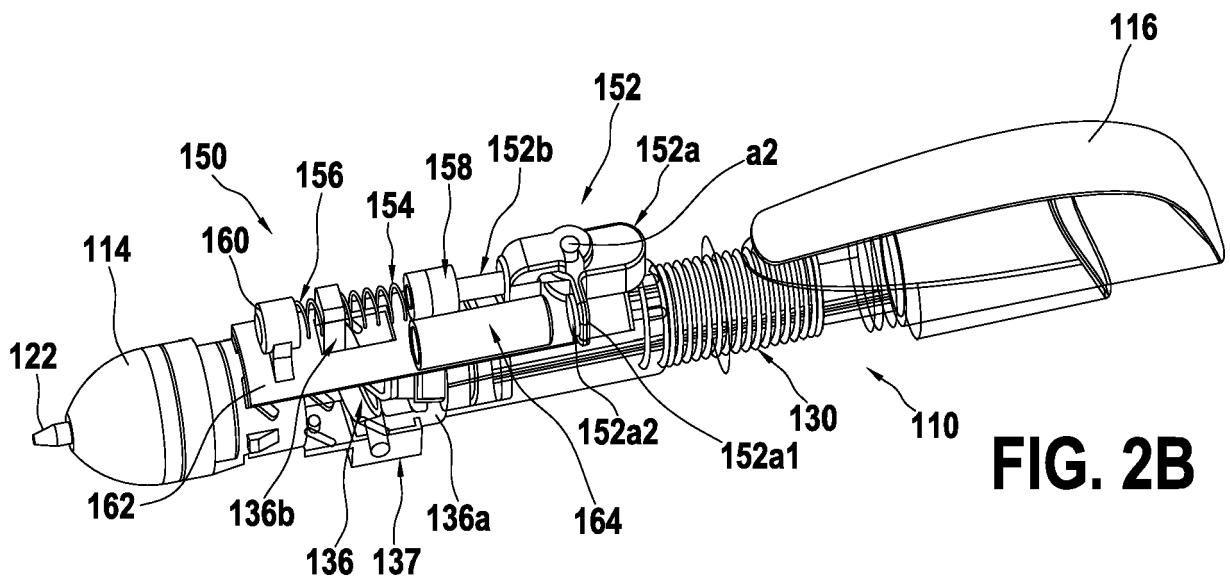
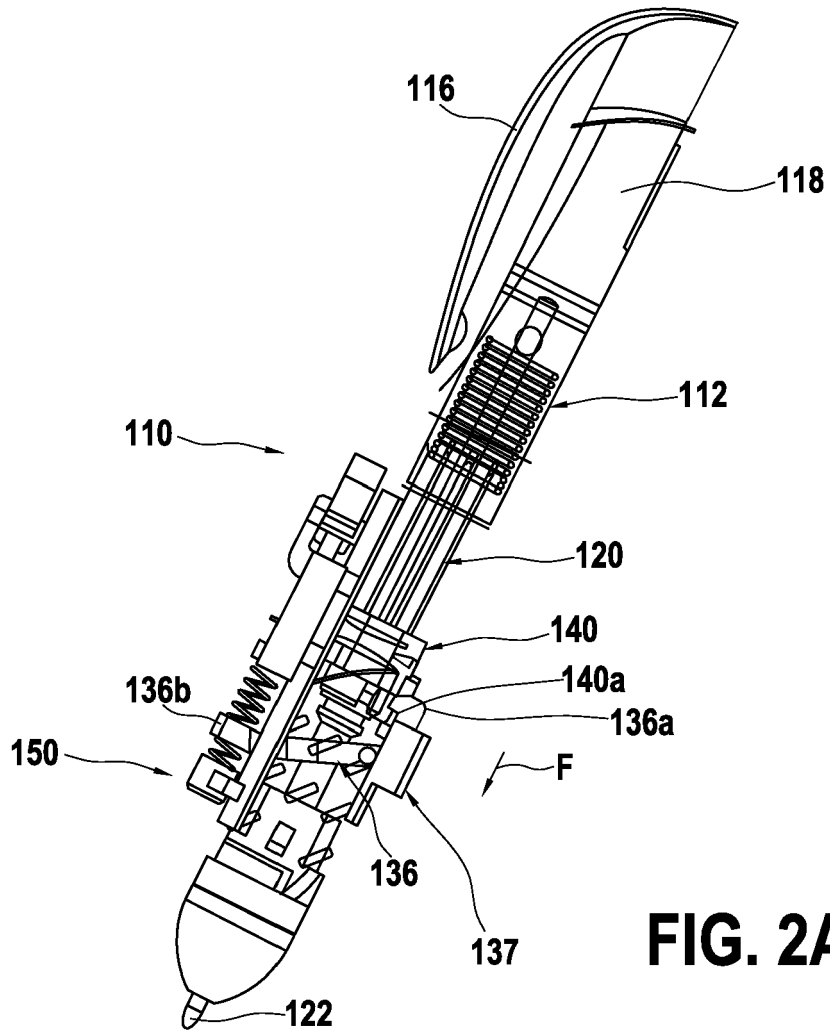
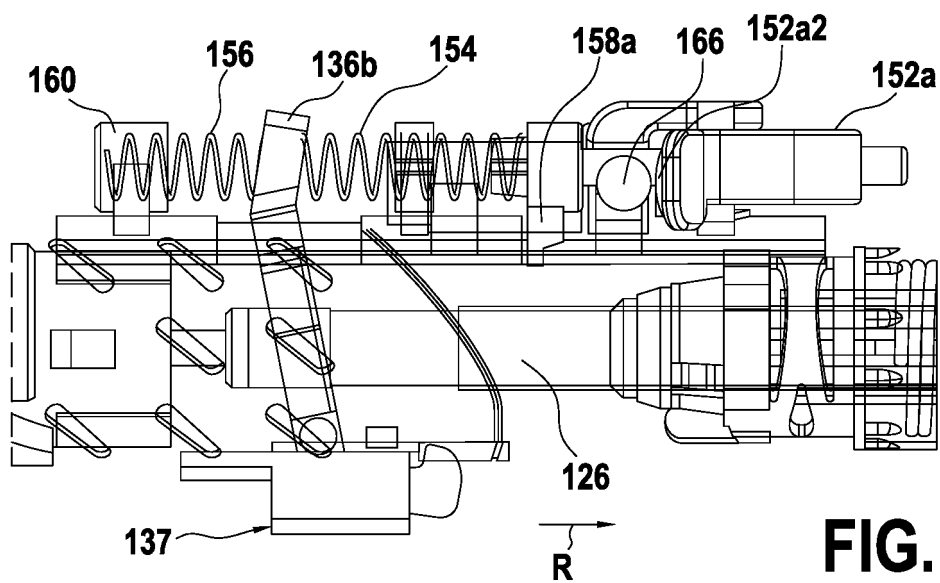
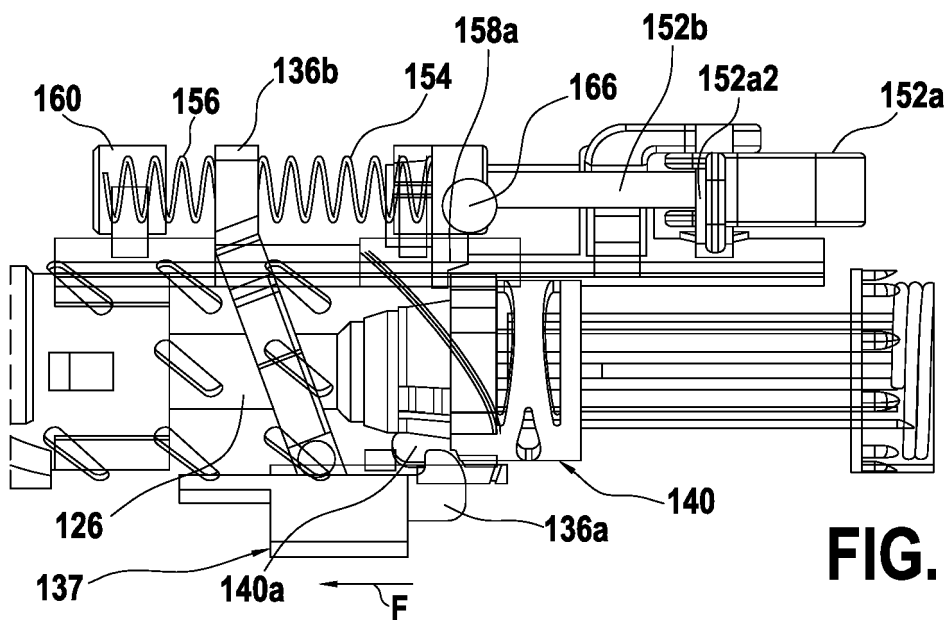


FIG. 1E





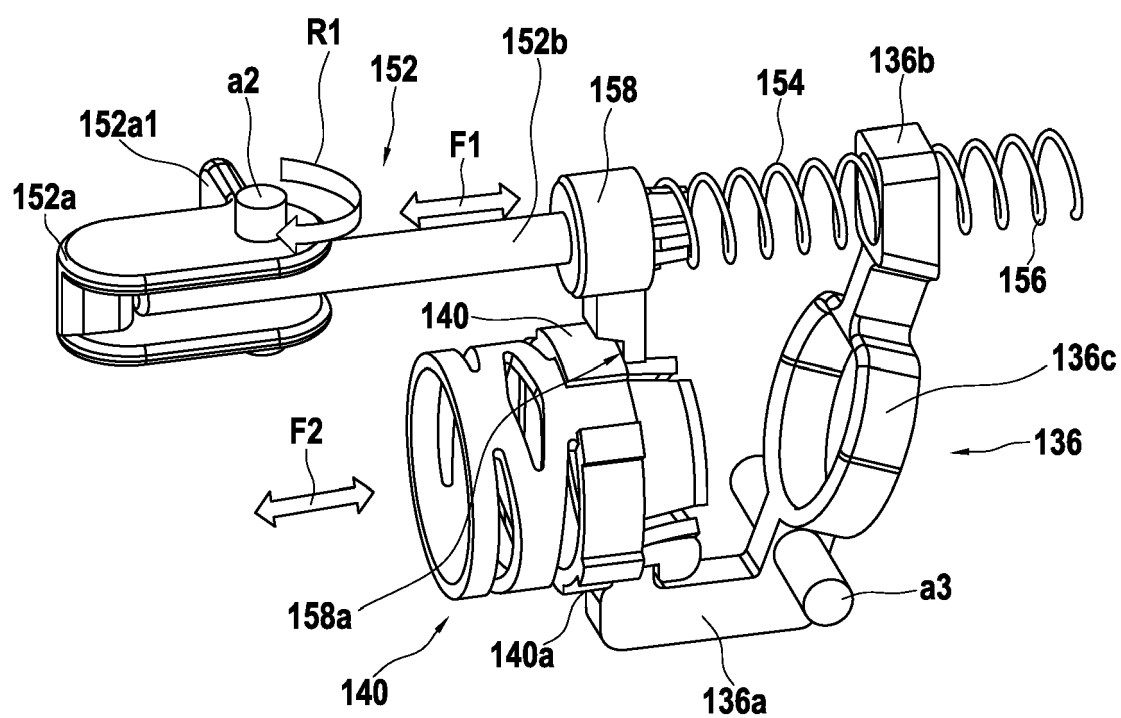


FIG. 2E



EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 March 2022	Examiner Kelliher, Cormac
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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