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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 (X),
-a cartridge (18) arranged inside the barrel and having a first end (18a) and a second opposed end (18b) that are aligned with each other along the longitudinal axis (X),
-a pusher (16) that is located facing the second opposed nd (18b) of the cartridge and that is actuable in a first forward direction (F1) along the longitudinal axis (X) under the action of a user,
-a rotation retardant component (24) that is in contact with the cartridge (18) and configured to bias, with a retardant effect, the cartridge towards its first retracted position in a second rearward direction (F2) along the longitudinal axis (X) ,
-a cartridge rotation stopper (28) configured to stop the second combined rotational and translational movement (H2) of the cartridge.

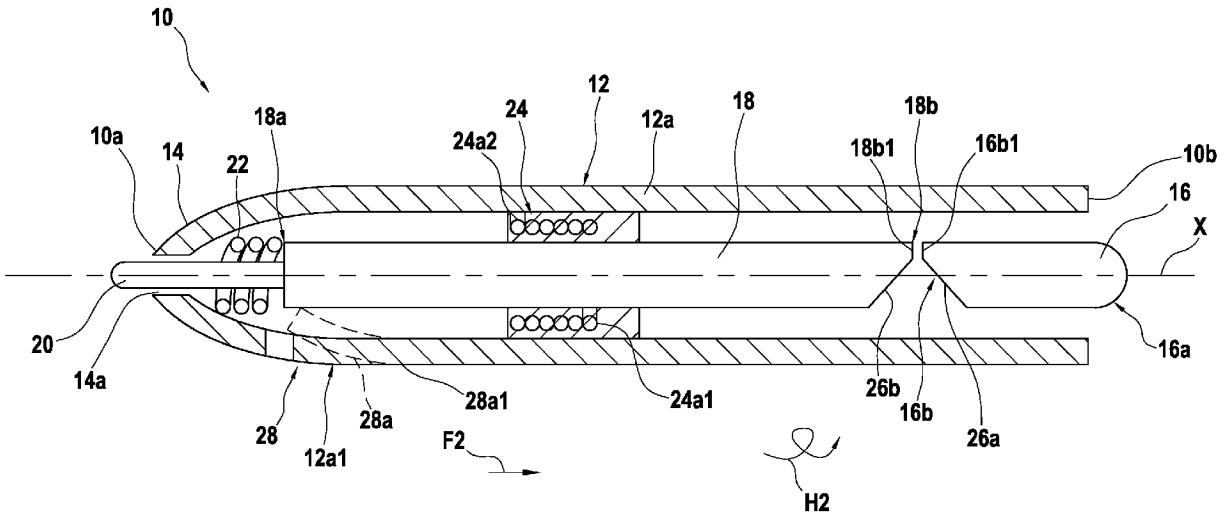

FIG. 2

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Description

Technical Field

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

Background

[0002] The present disclosure relates to writing instruments such as pens, for example ball-point pens markers in general, felt tip markers, highlighter, non-permanent and permanent markers, a stylus and/or the like.

[0003] In a known manner, such writing instruments comprise a writing tip which may be in the form of a nib and a cap to close off the nib. The nib is typically kept wet by the ink used for writing. Closing of the nib is necessary to prevent the solvents of the ink from evaporating and nib from drying out. A dried out nib may impair the writing quality of the nib or render the entire writing instrument irreversibly useless earlier than expected, thereby shortening the life of the latter. Further, an uncovered nib can lead to unintentional stains on surfaces, e.g. clothes or skin of the user. Also, it may be tedious for the user to recap a felt pen after every use, especially when drawing with multiple colors. When users are kids, they very often forget to put back the cap on the writing nib. Further, a cap may be displaced leading to the nib drying out.

[0004] The present disclosure aims to address one or more problems in the prior art.

Summary

[0005] In an aspect, the present disclosure relates to a writing instrument. The writing instrument comprises:

- a barrel having a longitudinal axis X,
- a cartridge arranged inside the barrel and having a first end and a second opposed end that are aligned with each other along the longitudinal axis X, the first end being provided with a writing tip, the cartridge being movable between a first retracted position in which the writing tip is inside the barrel and a second extended writing position in which the writing tip is outside the barrel,
- a pusher that is located facing the second opposed end of the cartridge and that is actuable in a first forward direction along the longitudinal axis X under the action of a user to cause the cartridge to move from the first retracted position toward the second extended writing position in a first combined rotational movement about the longitudinal axis X and translational movement along the longitudinal axis X,
- a rotation retardant component that is in contact with the cartridge and configured to bias, with a retardant effect, the cartridge towards the first retracted position in a second rearward direction along the longitudinal axis X by imparting the cartridge a second combined rotational and translational movement that is inverted with respect to the first combined rotational and translational movement,
- a cartridge rotation stopper configured to stop the second combined rotational and translational movement of the cartridge under the action of a user.

[0006] According to the above aspect, when a user handles the writing instrument for writing purpose he/she exerts an axial pressure on the pusher, which causes the cartridge to move from its first retracted position toward its second extended writing position.

[0007] If the user does not take any further action, then the rotation retardant component will automatically produce its effect and cause the cartridge to move back toward its first retracted position.

[0008] This will ensure that the writing tip will not dry out in case the user forgets to use the writing instrument after having actuated the pusher and, therefore, moved the writing tip outside the barrel. This situation may arise when children handle the writing instrument.

[0009] In case the user does want to write with the writing instrument he/she has nevertheless time to take another action since, by construction, the rotation retardant component produces its effect with some delay.

[0010] In this respect, the writing instrument is provided with a cartridge rotation stopper configured to stop the natural movement of the cartridge rearwardly as it would occur under the action of the rotation retardant component if no further human action were taken.

[0011] The cartridge rotation stopper has to be actuated by a user in a very simple manner, which stops the rearward motion of the cartridge. Thus, the user has to apply an external pressure on this stopper if he/she wants to maintain the writing tip outside the barrel for writing with this writing instrument. Depending on the kind of cartridge rotation stopper, the user may or not maintain a pressure thereon while writing at the same time.

[0012] In some embodiments, the cartridge rotation stopper is part of the barrel and comprises a deformable area on the barrel which can be deformed until coming into contact with the cartridge under a pressure exerted by a user on the deformable area of the barrel.

[0013] In some embodiments, the barrel comprises a substantially-cylindrical wall surrounding the cartridge and the deformable area on the barrel comprises a portion of the substantially-cylindrical wall that can be deformed inwardly towards the cartridge when submitted to a pressure exerted by a user on the substantially-cylindrical wall portion.

[0014] In some embodiments, the wall portion of the barrel comprises a tab that is attached by a proximal end on the portion wall and that is free at an opposed distal end so as to be displaced inside the barrel toward the

cartridge when submitted to a pressure exerted by a user on an outer surface of the tab.

[0015] In some embodiments, the tab is disposed along an axis that is parallel to the longitudinal axis X when no pressure is exerted by a user on an outer surface of the tab.

[0016] In some embodiments, the tab is provided on its outer surface with an outside projection intended for receiving a finger of a user.

[0017] In some embodiments, the rotation retardant component is arranged between the barrel and the cartridge.

[0018] In some embodiments, the rotation retardant component comprises a rotational spring or helical spring.

[0019] In some embodiments, the rotation retardant component is configured to cause a retardant effect through a fluid (ex: glue or grease) with a suitable viscosity, e.g. in the range from 800 to 4000centipoises, that is present between the cartridge and the rotation retardant component.

[0020] In some embodiments, when the cartridge is in its first retracted position the pusher and the second opposed end of the cartridge are in engagement with each other through a cam arrangement when the cartridge is in its first retracted position such that actuation of the pusher in the first forward direction along the longitudinal axis X under the action of a user causes the cartridge to move from its first retracted position toward its second extended writing position in the first combined rotational and translational movement about the longitudinal axis X.

[0021] In some embodiments, the cam arrangement comprises slanted surfaces on both the pusher and the second opposed end of the cartridge that are facing each other in the first retracted position of the cartridge.

[0022] In some embodiments, the slanted surface on the second opposed end of the cartridge comprises a substantially conical shape.

[0023] In some embodiments, the pusher and the second opposed end of the cartridge are in engagement with each other through flat surfaces perpendicular to the longitudinal axis X when the cartridge is in its second extended writing position.

[0024] In some embodiments, the pusher and the second opposed end of the cartridge are in engagement with each other through a ratchet mechanism that is configured to cause the cartridge to move from the first retracted position toward the second extended writing position in the first combined rotational and translational movement about the longitudinal axis (X) when the pusher is actuated in the first forward direction, and cause the cartridge to move backwards when not pushed by the pusher.

[0025] In some embodiments, a first sealing element is provided at the front end and a second sealing element is provided at the back or rear end of the component.

Brief Description of the Drawings

[0026]

Figures 1 to 3 show an exemplary embodiment of a writing instrument of the present disclosure wherein Figures 1 and 2 show a longitudinal cross section of the writing instrument respectively in a first retracted and a second extended position and Figure 3 is an enlarged view of a cartridge rotation stopper shown in Figure 2.

Figure 4 shows another exemplary embodiment of a writing instrument of the present disclosure.

Figure 5 shows a further exemplary embodiment of a writing instrument of the present disclosure.

Figures 6A-6D show a further exemplary embodiment of a writing instrument of the present disclosure involving a ratchet mechanism.

Detailed Description

[0027] 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 present disclosure is not limited to these specific embodiments.

[0028] In an exemplary embodiment, the present disclosure relates to a writing instrument as shown in Figures 1 to 3 of which the description follows. Figure 1 is a schematic overall longitudinal cross section view of a writing instrument oriented horizontally in a retracted or rest position, i.e. when it is not used by a user for writing purpose. The writing instrument at rest may, in examples, be oriented differently, e.g. vertically or in an oblique direction. Figure 2 is a schematic overall longitudinal cross section view of the Figure 1 writing instrument in an extended writing position. The writing instrument is also oriented horizontally for comparison with Figure 1's position but it is to be understood that the user may handle and orientate it differently when writing, e.g. generally in an oblique direction (at an angle) with respect to horizontal orientation.

[0029] The writing instrument may be a marker, a felt pen, a highlighter, a ball point pen, a permanent or non-permanent marker or stylus or any other type of writing instrument.

[0030] The writing instrument 10 may comprise a barrel or tubular body 12 having a longitudinal axis X and on which a user applies his/her fingers when handling the writing instrument. The tubular body may be a unitary body, or may comprise multiple components. In Figure

1, only the components of the writing instrument that are involved in the present disclosure have been represented. The other implicit or conventional components are not shown for the sake of clarity.

[0031] The writing instrument 10 may comprise, at a first forward end 10a of the instrument, a tip component 14 comprising a writing orifice 14a which is located at the distal end of the tip component 14 and traverses axially the tip component along its thickness.

[0032] The barrel 12 may extend longitudinally along longitudinal axis X through a substantially cylindrical wall 12a from the distal end of the tip component 14 toward the rear end 10b of the instrument where a pusher 16 is arranged. Pusher 16 protrudes axially outwardly with respect to the rear end 10b so that a user can handle it easily. Pusher 16 may have a first outer end 16a available to the user and a second opposed inner end 16b inside the barrel 12. Details concerning the closure of the rear end 10b around the pusher 16 have been omitted for the sake of clarity as such details are conventional for the skilled person.

[0033] The writing instrument 10 comprises, arranged within the barrel 12, a cartridge 18 filled with ink and known per se, that has a first end 18a and a second opposed end 18b both aligned with each other along the longitudinal axis X.

[0034] A writing tip 20 is connected to the first end 18a of cartridge 18.

[0035] The second end 18b of cartridge 18 is configured so as to cooperate with the facing second opposed end 16b of the pusher, as will be explained subsequently.

[0036] The cartridge 18 is movable along longitudinal axis X under the action of pusher 16 (as will be further explained below) between two positions:

- a first retracted position illustrated in Figure 1 (rest position) in which the writing tip 20 is retracted inside the barrel 12 where it is protected from outside by the barrel and can no longer be dried out by the surrounding air,
- and a second extended writing position illustrated in Figure 2 (writing position) in which the writing tip 20 protrudes axially outside the barrel 12 through the writing orifice 14a, in a position adapted for writing purpose.

[0037] As shown in Figures 1 and 2, a conventional bias member such as a helical spring 22 may be arranged within the tip component 14 around the writing tip 20 in a fixed axial position inside the barrel. When the cartridge 18 is moved forwardly in a first longitudinal direction indicated by arrow F1 in Figure 1, from its first retracted position toward its second extended writing position (Figure 2), the writing tip 20 slides axially inside the bias member 22 which compresses against the first end 18a as the latter moves forwardly.

[0038] Both the second end 16b of the pusher 16 located facing the second opposed end 18b of the cartridge 18 along the longitudinal axis X and the second opposed end 18b are mutually configured so as to mechanically cooperate with each other when the pusher is moved forward axially along direction F1 under the action of a user which presses thereon with one finger, e.g. a thumb (Fig 1).

[0039] Cooperation of these two elements under the axial pressure of the user causes the cartridge 18 to move from its first retracted position (Fig. 1) toward its second extended writing position (Fig. 2) in a first combined rotational and translational movement about the longitudinal axis X as schematically represented by the corresponding arrow HI illustrating a helical motion in Figure 1.

[0040] More particularly, the second end 16b of the pusher 16 and the second opposed end 18b of the cartridge 18 are in mechanical engagement with each other through a cam arrangement 26 when the cartridge is in its first retracted position (Fig. 1) and the user pushes axially the pusher 16 so as to obtain the mechanical engagement. Such a cam arrangement 26 comprises a cam arrangement portion 26a that is part of the second end 16b of the pusher and a cam arrangement portion 26b that is part of the second end 18b of the cartridge.

[0041] Actuation of the pusher 16 in the first forward direction F1 along the longitudinal axis X under the action of a user (pressure) on the protruding end 16a causes the cam arrangement portion 26a to further engage with cam arrangement portion 26b, thereby causing the cartridge 18 to move along the first combined rotational and translational movement HI about the longitudinal axis X.

[0042] In Figure 2, the cam arrangement portion 26b is no longer in contact with cam arrangement portion 26a which remains in the same angular position as in Figure 1.

[0043] However, the second end 16b of pusher 16 and the second end 18b of the cartridge 18 may further comprise respectively abutment portions 16b1 and 18b1 (ex: flat surfaces perpendicular to the longitudinal axis X) which are facing each other in the Figure 2 position. These facing abutment portions therefore cooperate with each other so as to constitute a mechanical stop and impede any further axial movement from the pusher when the cartridge is in its second extended writing position.

[0044] In the disclosed embodiment, the cam arrangement comprises slanted corresponding surfaces on both the end 16b of the pusher 16 and the second opposed end 18b of the cartridge 18 that are facing each other in the first retracted position of the cartridge (Figure 1) and come into contact with each other when the user pushes axially the pusher 16.

[0045] More particularly, the cam arrangement portion 26a comprises a first slanted surface as a beveled surface which is inclined with respect to axis X and can be obtained by cutting the end 16b of pusher 16 along a first plane that is inclined to axis X. Here the cutting plane leaves an uncut portion 16b1 which can appear as a flat abutment surface perpendicular to axis X (fig. 2).

[0046] The cam arrangement portion 26b of end 18b

is partially machined about axis X so as to obtain a 3D-shaped or conical surface (second slanted surface) centered about axis X, while leaving an uncut portion 18b1. Thanks to this mutually slanted configuration the pressure applied by the fixed oriented first slanted surface 26a against the slanted surface 26b will impart a twist or helical motion to the latter.

[0047] In examples (not represented), both facing contact portions of the pusher end and the cartridge end may be configured differently, for example each with a mere cylindrical shape, both coming into contact with each other when urged by the user pressing the pusher. The helical motion is here obtained by arranging a protruding member on an outside surface of the cartridge end 18b and that extends radially towards an helical groove provided in an inner surface of the barrel. When the user pushes axially the pusher 16, the contact between the two facing contact portions of the pusher end and the cartridge end will cause the protruding member to slide inside the helical groove, thereby causing both rotation and translation of the cartridge.

[0048] The writing instrument 10 may further comprise a component 24 located in a fixed axial position inside the barrel 12 and through which the cartridge 18 may slide axially during the first combined rotational and translational movement HI and also during the reverse movement along arrow F2.

[0049] This component 24 is here a rotation retardant component that is substantially cylindrical in shape and in contact with the cartridge 18 through its internal surface. The external surface of the cartridge 18 is adapted to slide against the internal surface of compoenent 24.

[0050] The rotation retardant component 24 is configured to bias, with a retardant effect or delay, the cartridge 18 towards its first retracted position of Figure 1 in a second rearward direction F2 (Fig. 2) along the longitudinal axis X. More particularly, rotation retardant component 24 is configured to impart the cartridge 18 a second combined rotational and translational movement, indicated by H2 on Figure 2, that is inverted with respect to the first combined rotational and translational movement HI.

[0051] In the absence of any further action from the user (after he/she pressed axially on the pusher 16 with an intent to have the writing tip 20 out of the orifice 14a), the rotation retardant component 24 causes automatically the cartridge 18 to move back toward its first position of Figure 1.

[0052] The writing instrument 10 may further comprise a cartridge rotation stopper 28 that is configured to stop the second combined rotational and translational movement H2 of the cartridge 18 under a further action of a user.

[0053] Thus, once the cartridge 18 has been moved to its extended writing position of Figure 2, the user further exerts an action on the cartridge rotation stopper 28 to prevent any rearward motion of the cartridge 18 back to its first position of Figure 1 under the action of the rotation retardant component 24. The action of the rotation retardant component 24 is therefore compensated by the user further action.

[0054] In some embodiments, the cartridge rotation stopper 28 is part of the barrel 12 and comprises a deformable area which can be deformed inwardly (toward the inner of the barrel) until coming into contact with the cartridge 18 under an external pressure exerted by a user finger on the deformable area of the barrel. More particularly, the actuation of the cartridge rotation stopper 28 takes place when the user holds with his fingers the writing instrument from the front part thereof in a way he will proceed when normally writing or drawing with the writing instrument. Therefore, at least one of his fingers will apply pressure on the cartridge rotation stopper 28 and deform the latter inwardly until it comes into contact with the cartrigdge 18 and blocks its rotation or translation or both of the two movements.

[0055] More particularly, the substantially-cylindrical wall 12a of the barrel that surrounds the cartridge 18 and the deformable area of the cartridge rotation stopper 28 comprises a wall portion 12a1 that can be deformed inwardly towards the cartridge (radially relative to axis X) when submitted to a pressure exerted by a user on the wall portion 12a1.

[0056] In some embodiments (Figure 3), the wall portion 12a1 may comprise a tab 28a that is attached by a proximal end 28a1 on the wall portion 12a1 and that is free at an opposed distal end 28a2 so as to be displaced inside the barrel toward the cartridge 18 when submitted to a pressure exerted by a user on an outer surface of the tab 28a. The tab 28a is surrounded on three sides (at its distal end 28a2 and on its both lateral sides) by a traversing aperture 28b which makes it possible for the tab to move perpendicularly to the plane of Figure 3 about its attached proximal end 28a1 as an attached beam. This flexing motion is illustrated in Figure 2 in dotted lines. When the inner surface of the tab 28a comes into contact with the outside surface of the cartridge 18 under the pressure of the user, then the cartridge is maintained in its position with the writing tip 20 outside, thereby allowing the user to write with the instrument 10. When the user withdraws his/her finger or does no longer apply any pressure on the tab 28a, then the action of the component 24 is no longer thwarted and the component 24 can therefore urge the cartridge 18 in its rotational motion H2.

[0057] As shown in Figure 3, the tab 28a may be disposed along an axis that is parallel to the longitudinal axis X and laterally offset with respect to the latter.

[0058] In some embodiments, the tab 28a may be provided on its outer surface with an outside projection 28a1 intended for receiving a finger of a user and making easier handling and deformation of the tab.

[0059] In some embodiments, the rotation retardant component 24 may comprise a rotational spring 24a that is in contact by one end 24a1 with an edge or abutment or shoulder on the outer surface of the cartridge 18 and attached thereto and is axially compressed as the cartridge is moving forwardly. The opposed end 24a2 of the

spring 24a remains in a fixed axial position within the rotation retardant component 24 and is attached thereto while the cartridge is sliding inside the component 24.

[0060] Thanks to this arrangement, the technical effect produced by the rotation retardant component 24 on the cartridge (action of a spring that has been compressed and tends to extend when no longer submitted to axial compression forces) takes place with some delay, instead of occurring immediately, which leaves a few seconds to the user to counterbalance this effect as explained above in relation with Figure 3 by actuating (e.g. pressing) the cartridge rotation stopper 28 so as to lock the cartridge in the extended position.

[0061] In some other embodiments, the rotation retardant component 24 may comprise a helical spring.

[0062] The component 24 may further comprise a retardant material (grease or glue or any fluid with high viscosity or sand and the like) in order to enhance the spring retardant effect. More generally, the fluid has a viscosity that is suitable for causing a retardant effect and may have a viscosity from 800 to 4000centipoises.

[0063] In another embodiment illustrated in Figure 4, the component 24' of the writing instrument 10' may comprise a retardant material (grease or glue or any fluid with high viscosity or sand and the like) that may be accommodated inside a casing. The appropriate viscosity may be in the range given above. No spring is present inside the component 24' but any of the other features of the Figures 1 to 3 embodiment may be taken over here.

[0064] The cartridge 18' may comprise at least one flap 18a', in examples two flaps 18a', 18b', extending inside the component 24'.

[0065] The component 24' may or may not have an inner wall. In the case that there is an inner wall 24a' facing the outer wall of the cartridge, the at least one flap 18a', 18b' extends through a helical groove provided on this inner wall. Thus, the cartridge 18' will be able to rotate and translate through the component 24'. During the helical motion the flap(s) are slowed down when progressing inside the casing of the component 24' by friction due to the presence of grease or glue or any liquid with high viscosity or sand and the like inside that fills in the casing.

[0066] Also, a first sealing element 24b' at the front end and a second sealing element 24c' at the back or rear end of the component 24' may be provided to keep the retardant material inside the component 24'. Each sealing element may be a flange, a rubber element or the like. It may be shaped as a ring (o-ring).

[0067] The other elements of the Figures 1-3 embodiment may be taken over here (except the spring) and their numeral references remain unchanged.

[0068] In a variant embodiment illustrated in Figure 5 and which takes over the features of Figure 4 embodiment (this variant embodiment may take over any feature of the Figures 1-3 embodiment), the tubular body 12" of the writing instrument 10" may comprise two protrusions to function as stoppers/shoulders for the component 24". The front stopper 25a" shall have a larger height with respect to the rear or back stopper 25b". This makes it possible for the cartridge 18" with component 24" to be inserted inside the tubular body 12", slides over the rear stopper 25b" and get stopped by the front stopper 25a", whereby it is then fixed between the front and the back stoppers 25a", 25b". The stoppers may have a triangular cross-section shape. The stoppers may be fixed on an inner suface of the barrel. The stoppers will block the component 24" and prevent it from being rotated and/or being translated along the longitudinal axis with respect to the tubular body 12". A further longitudinal protrusion (not represented) provided on the tubular body 12", may interact with a longitudinal groove (not represented) provided on the outer wall of component 24" (or the reverse arrangement) and prevent the latter from getting rotated with respect to the tubular body 12".

[0069] The other elements of the Figures 1-3 embodiment are taken over here (except the spring) and their numeral references remain unchanged.

[0070] Another embodiment of a part of a writing instrument is illustrated in Figures 6A-6D which can take over the features of any of the previous embodiments.

[0071] In the present embodiment, a ratchet mechanism is used as a mechanical engagement mechanism between the pusher and the second opposed end of the cartridge instead of the slanted surfaces as described above in relation with Figures 1-5.

[0072] More particularly, the ratchet mechanism takes over a conventional ratchet mechanism used for example in a clicky pen and modifies the latter as will be explained below.

[0073] Figures 6A-6B illustrate respectively enlarged perspective partial views of a pusher 40 and a cartridge 50 which are configured to engage with each other through respective engagement portions .

[0074] The modified ratchet mechanism comprises:

- for pusher 40, an engagement portion 42 that comprises, at a free end 40a of the pusher, a serrated edge with a plurality of serrations or teeth 42a regularly distributed around the circumference of the free edge (the opposed end of pusher 40 that is not represented may take the shape of that of Figures 1 and 2), the serations may take different shapes such as triangular as in Figure 6A, and at least one notch 42b, for example 2 notches or 3 notches, which serves as a guide sliding inside a corresponding longitudinal groove (not represented) arranged in the inner wall of the barrel during the axial movement of the pusher (here a plurality of notches being represented and regularly distributed about the outer surface of the pusher);
- for cartridge 50, an engagement portion 52 acting as a cam, comprising, at an end 50a of the cartridge, a plurality of teeth 52a regularly distributed about the outer surface of the end 50a, the teeth having beveled ends 52a1 pointing in a direction opposite the end 50a, i.e. towards then pusher 40 and the rear

end of the writing instrument.

[0075] It is to be noted that the cartridge is partially represented since it normally extends on the left side of Figure 6B through an elongated shape towards the retardant material and the writing tip as illustrated in Figures 1 and 2.

[0076] When the pusher 40 is pushed axially forwardly (along F1) against the beveled ends 52a1 of the cartridge as illustrated in Figure 6C the serrations 42a of the pusher cooperate with the beveled ends 52a1 so as to impart rotation and translation of the whole cartridge in a conventional manner.

[0077] In a conventional ratchet mechanism the teeth 52a of the cam portion are blocked in the extended position so as to hold the writing tip outside of the barrel and prevent any backward movement.

[0078] In the present embodiment, the ratchet mechanism is modified so that the teeth 52a cannot get blocked rearward. This is achieved, as shown in Figure 6D, by arranging parallel longitudinal channels C in the inner wall of the barrel 60 so that the cam teeth 52a1 can freely be guided and slide into these channels (the longitudinal arrows show the direction the cam teeth can take when moving axially inside these channels). Therefore, every time the user pushes axially the pusher 40 in the forward direction, this causes always translation and rotation of the cartridge 50 (and the part of the cartridge represented in Figures 1 and 2) so as to place the writing tip in the extended position. When the user releases the pusher 40, every time the cartridge 50 tends to naturally return to the retracted position (backward motion) since the cam portion is not blocked rearward as explained above. Then the user has to block the rotation through implementing/actuating the cartridge roation stopper 28 of Figures 1-3 in order to hold the cartridge 50 in the writing position.

[0079] 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) comprising:

- a barrel (12) having a longitudinal axis (X),
- a cartridge (18) arranged inside the barrel and having a first end (18a) and a second opposed end (18b) that are aligned with each other along the longitudinal axis (X), the first end being provided with a writing tip (22), the cartridge being movable between a first retracted position in which the writing tip is inside the barrel and a second extended writing position in which the writing tip is outside the barrel,
- a pusher (16) that is located facing the second opposed end (18b) of the cartridge and that is actuable in a first forward direction (F1) along the longitudinal axis (X) under the action of a user to cause the cartridge (18) to move from the first retracted position toward the second extended writing position in a first combined rotational movement about the longitudinal axis (X) and translational movement (HI) along the longitudinal axis (X),
- a rotation retardant component (24) that is in contact with the cartridge (18) and configured to bias, with a retardant effect, the cartridge towards the first retracted position in a second rearward direction (F2) along the longitudinal axis (X) by imparting the cartridge a second combined rotational and translational movement (H2) that is inverted with respect to the first combined rotational and translational movement (HI),
- a cartridge rotation stopper (28) configured to stop the second combined rotational and translational movement (H2) of the cartridge under the action of a user.

2. The writing instrument of claim 1, wherein the cartridge rotation stopper (28) is part of the barrel (12) and comprises a deformable area (12a1) on the barrel (12) which can be deformed until coming into contact with the cartridge under a pressure exerted by a user on the deformable area of the barrel.

3. The writing instrument of claim 2, wherein the barrel (12) comprises a substantially-cylindrical wall (12a) surrounding the cartridge and the deformable area (12a1) on the barrel comprises a portion of the substantially-cylindrical wall that can be deformed inwardly towards the cartridge when submitted to a pressure exerted by a user on the substantially cylindrical wall portion.

4. The writing instrument of claim 3, wherein the wall portion of the barrel comprises a tab (28a) that is attached by its proximal end (28a1) on the wall portion and that is free at an opposed distal end (28a2) so as to be displaced inside the barrel (12) toward the cartridge (18) when submitted to a pressure exerted by a user on an outer surface of the tab (28a).

5. The writing instrument of claim 4, wherein the tab (28a) is disposed along an axis that is parallel to the longitudinal axis (X), when no pressure is exerted by a user on an outer surface of the tab.

6. The writing instrument according to claim 4 or 5, wherein the tab (28a) is provided on its outer surface

with an outside projection (28a3) intended for receiving a finger of a user.

7. The writing instrument of any of claims 1 to 6, wherein the rotation retardant component (24) is arranged between the barrel (12) and the cartridge (18).

8. The writing instrument of any of claims 1-7, wherein the rotation retardant component (24) comprises a rotational spring or helical spring.

9. The writing instrument of claim 7 or 8, wherein the rotation retardant component (24) is configured to cause a retardant effect through a fluid with a suitable viscosity, e.g. in the range from 800 to 4000centipoises, that is present between the cartridge (18) and the rotation retardant component (24).

10. The writing instrument of any of claims 1 to 9, wherein when the cartridge is in the first retracted position the pusher (16) and the second opposed end (18b) of the cartridge are in engagement with each other through a cam arrangement (26) such that actuation of the pusher in the first forward direction (F1) along the longitudinal axis (X) under the action of a user causes the cartridge to move from its first retracted position toward its second extended writing position in the first combined rotational and translational movement (HI) about the longitudinal axis (X).

11. The writing instrument of claim 10, wherein the cam arrangement (26) comprises slanted surfaces (26a, 26b) on both the pusher (16) and the second opposed end (18b) of the cartridge that are facing each other in the first retracted position of the cartridge.

12. The writing instrument of claim 11, wherein the slanted surface on the second opposed end (18b) of the cartridge comprises a substantially conical shape.

13. The writing instrument of any of claims 10 to 12, wherein the pusher (16) and the second opposed end (18b) of the cartridge are in engagement with each other through flat surfaces (16b1, 18b1) perpendicular to the longitudinal axis (X) when the cartridge is in its second extended writing position.

14. The writing instrument of any of claims 1 to 9, wherein the pusher (40) and the second opposed end of the cartridge (50) are in engagement with each other through a ratchet mechanism that is configured to cause the cartridge (50) to move from the first retracted position toward the second extended writing position in the first combined rotational and translational movement (HI) about the longitudinal axis (X) when the pusher (40) is actuated in the first forward direction (F1), and cause the cartridge to move backwards when not pushed by the pusher.

15. The writing instrument of any of claims 1 to 14, wherein a first sealing element (24b') is provided at the front end and a second sealing element (24c') is provided at the back or rear end of the component (24').

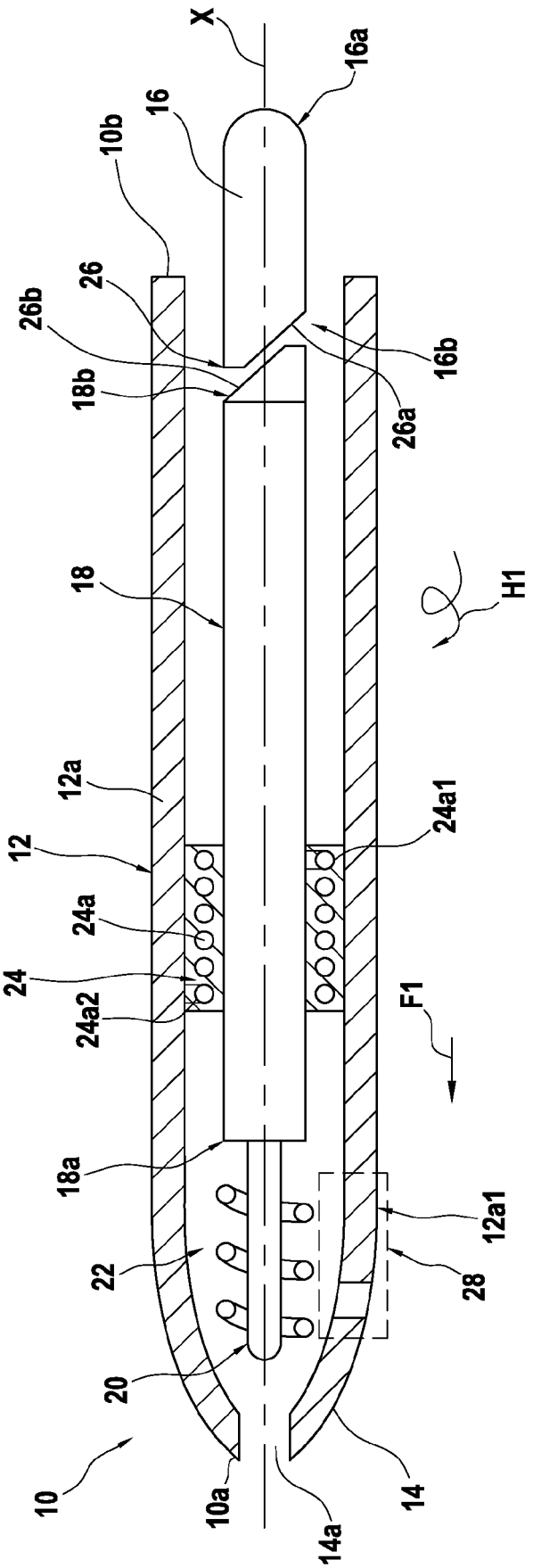
X
16a
16
10b
26
26b
16b
18b
26a
18
H1
12a
24a1
12
24a
24
24a2
F1
18a
12a1
22
28
20
10
10a
14a
14

FIG. 1

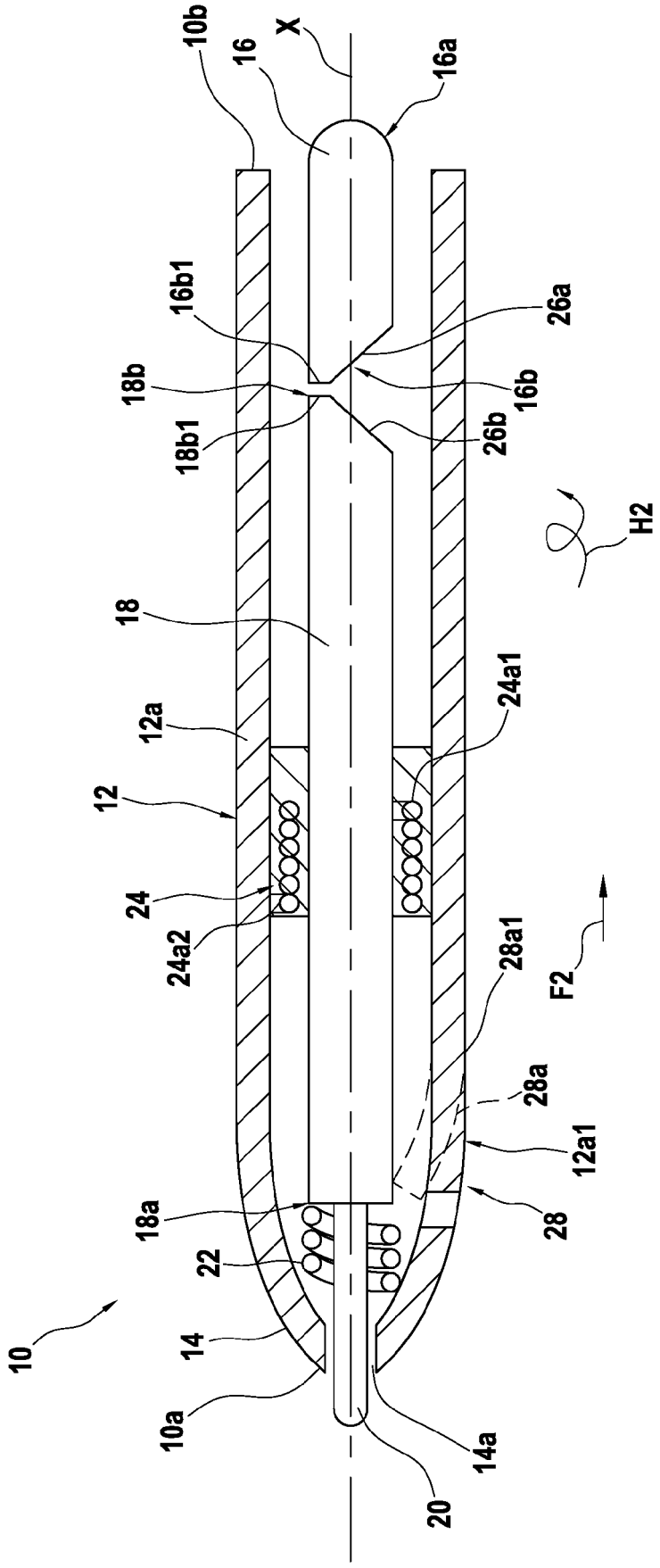
10b
16
X
16a
16b1
26a
18b
16b
18b1
26b
H2
18
24a1
12a
12
24
24a2
28a1
F2
28a
12a1
18a
28
22
10
14
10a
14a
20

FIG. 2

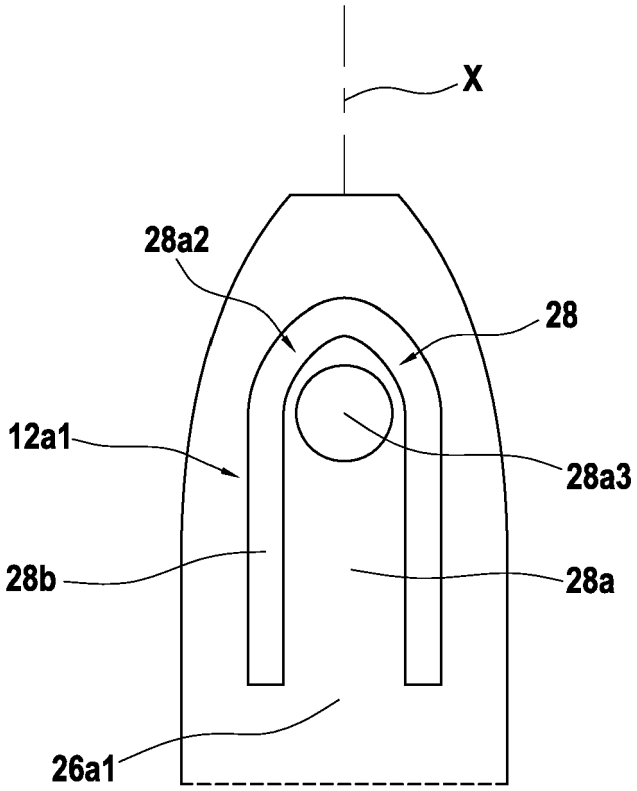

FIG. 3

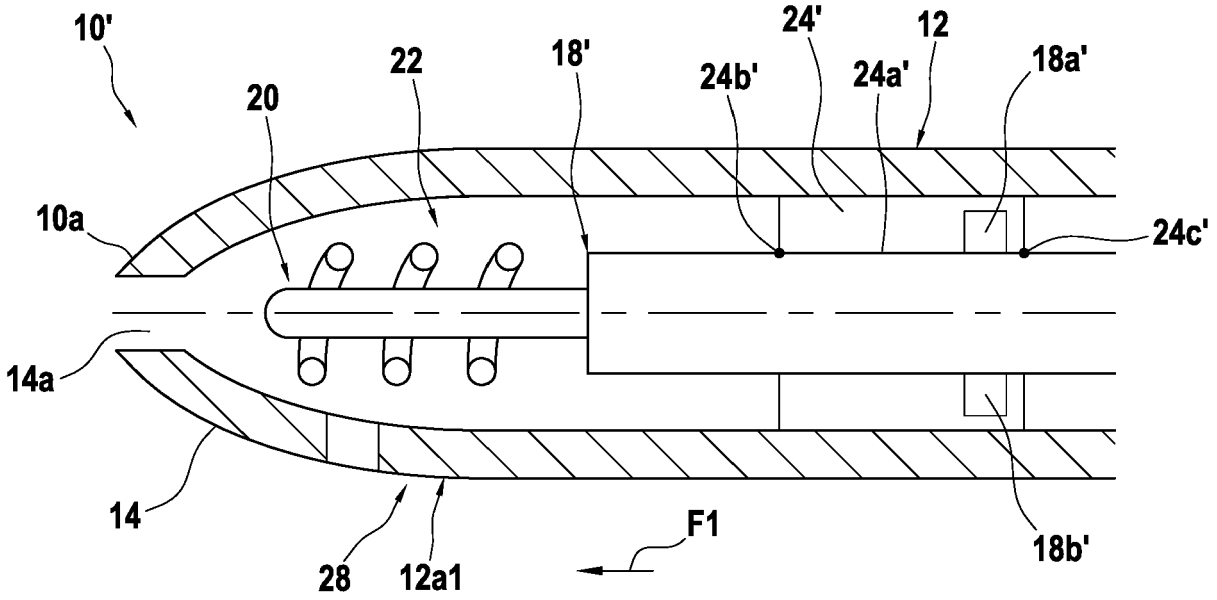
10'
20
22
18'
24'
12
24b'
24a'
18a'
10a
24c'
14a
14
28
12a1
F1
18b'

FIG. 4

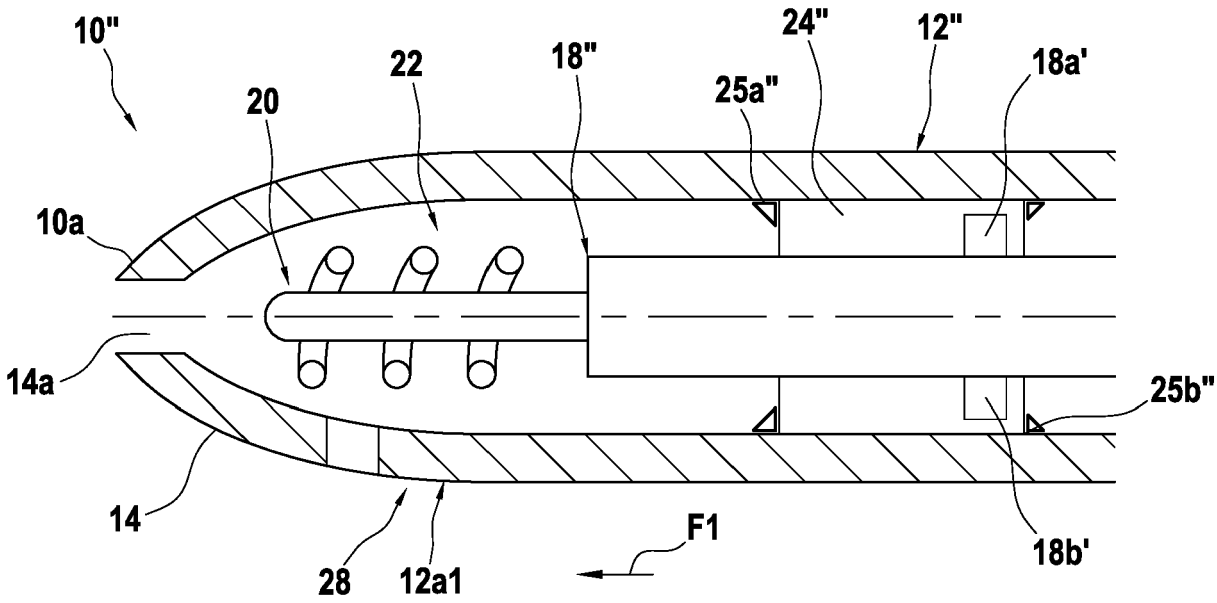
10"
20
22
18"
24"
12"
25a"
18a'
10a
14a
25b"
14
28
12a1
F1
18b'

FIG. 5

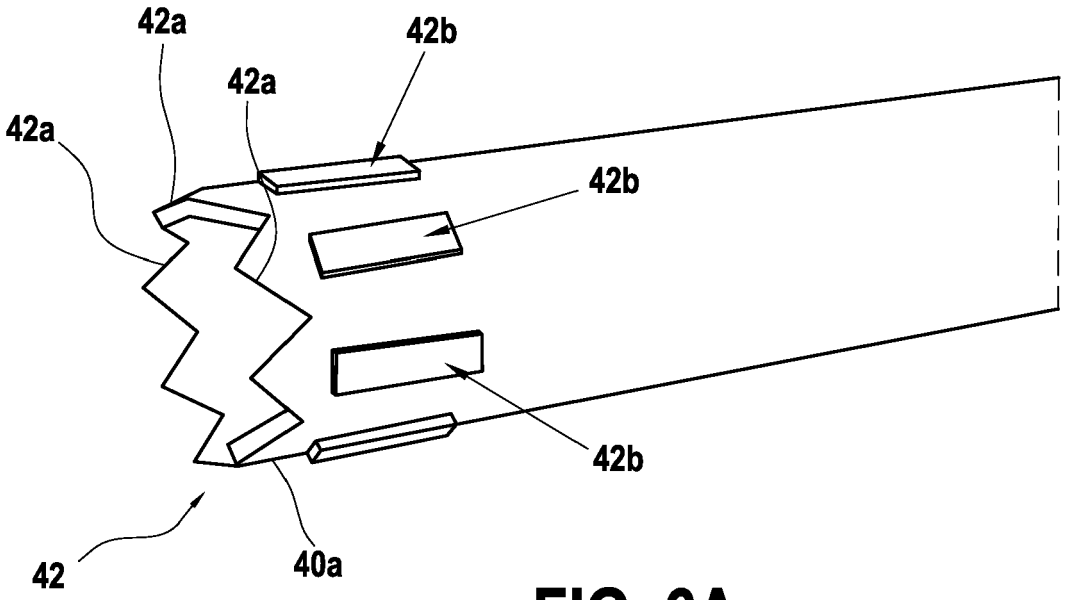

FIG. 6A

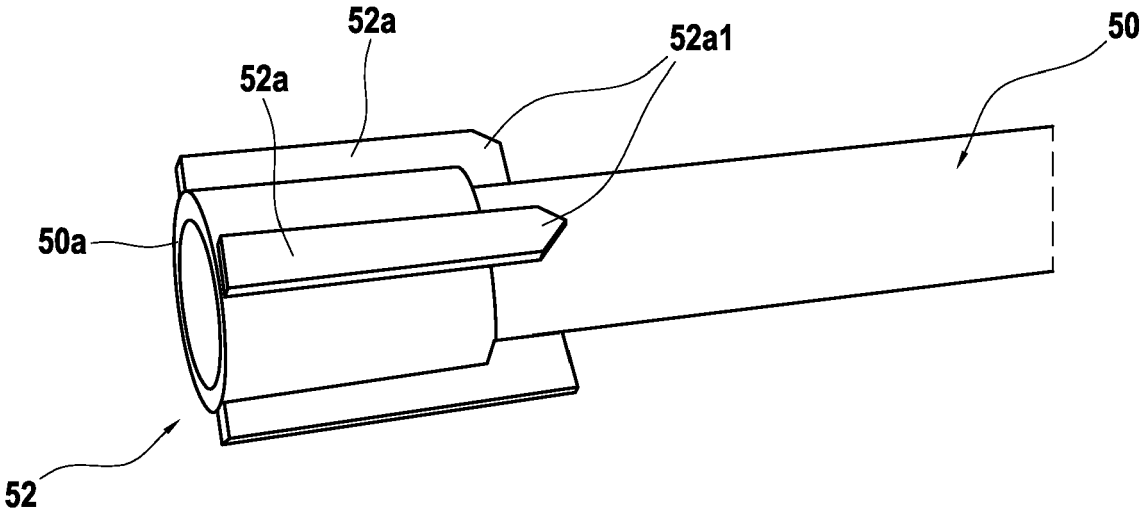

FIG. 6B

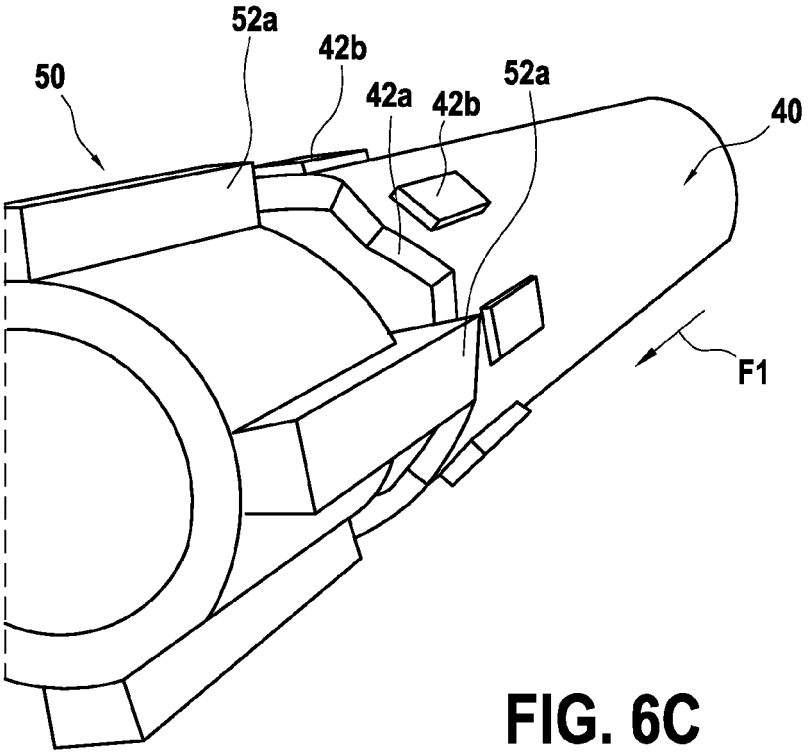

FIG. 6C

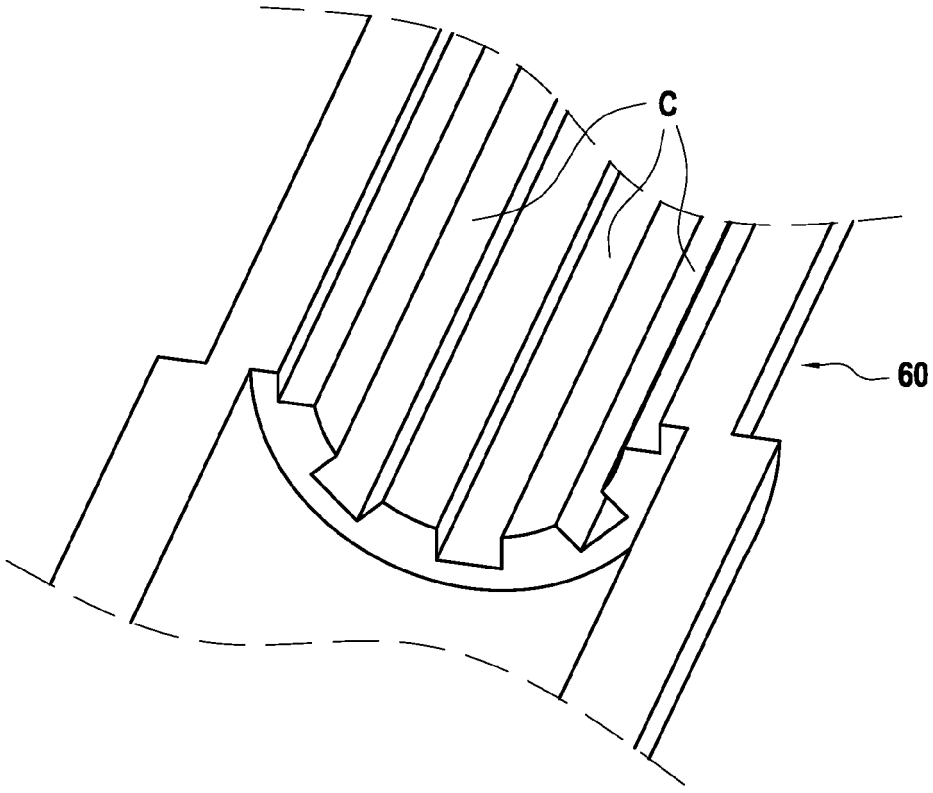

FIG. 6D

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EUROPEAN SEARCH REPORT

Application Number
EP 22 30 6113

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2002 307892 A (TAKAHASHI SUEMINE) 23 October 2002 (2002-10-23) * figures 1-4 *	1-15	INV. B43K24/06
X	WO 2012/013649 A1 (SCHMIDT FEINMECH [DE]; SCHMIDT OLIVER [DE]; MERKLE WERNER [DE]) 2 February 2012 (2012-02-02) * paragraph [0054] - paragraph [0080]; figures 1-8 *	1-9,15	

TECHNICAL FIELDS SEARCHED (IPC)

B43K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 December 2022	Kelliher, Cormac

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L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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16-12-2022

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WO 2012013649 A1	02-02-2012	DE 102010033695 A1	02-02-2012
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		WO 2012013649 A1	02-02-2012