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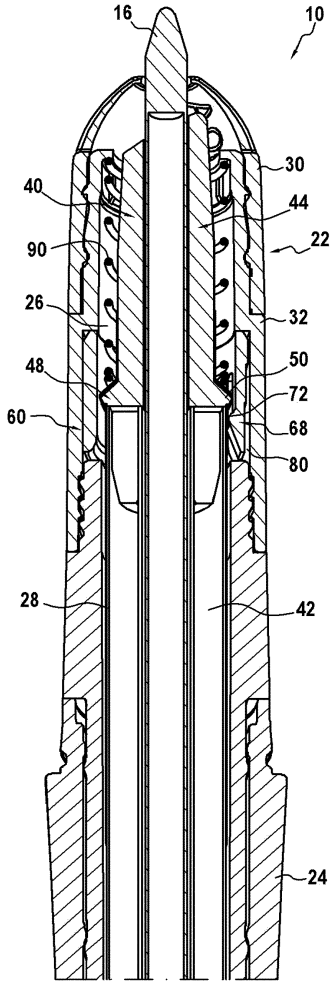
(54) WRITING INSTRUMENTS AND METHODS THEREOF

(57) A writing instrument (10) comprising a first housing member (22) configured to surround at least a portion of a writing element (40), a second housing member (24) configured to surround at least a portion of the writing element (40), a retainer (60) configured to be received by the first housing member (22), and the retainer (60) configured to engage the writing element (40), and wherein, engagement of the writing element (40) by the retainer (60) allows the writing element (40) to be withdrawn from the second housing member (24) when the retainer (60) is moved axially away from the second housing member (24).

[Fig. 3]



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Description

FIELD

[0001] The present disclosure relates generally to the field of writing instruments. More specifically, the present disclosure relates to a writing instrument configured to improve removal of one or more component which may be disposed within the writing instrument.

BACKGROUND

[0002] A typical writing instrument may include one or more writing element disposed within a housing. Examples of a writing element may include a ballpoint pen, a highlighter, a marker, a pencil, and/or the like. The writing element may be removable, so as to allow the writing element and/or a cartridge thereof to be replaceable. Additionally, the writing element may be mechanically displaceable, so that the writing element and/or a writing tip thereof may be moved to a position outside of the housing.

[0003] In currently available writing instruments which include a highlighter as the writing element, removing the writing element may require that a user directly grasp a cartridge of a highlighter in order to remove the writing element from the housing. Directly grasping the cartridge of the highlighter may result in a hand of the user coming into direct contact with ink of the highlighter, which may create a messy situation. Additionally, removing the writing element may also include removal of a mechanical component which allows for mechanical displacement of the writing element, such as a spring and/or the like. Removal of the mechanical component may increase a risk of losing the mechanical component, which may result in the writing instrument no longer functioning properly.

[0004] It is desirable to provide a writing instrument which includes structures and/or relationships configured to improve removal of a writing element from the writing instrument in a hassle-free and convenient manner.

SUMMARY

[0005] According to aspects of the disclosure, a writing instrument is provided. The writing instrument extends along an axis between a first end and a second end, and comprises a first housing member configured to surround at least a portion of a writing element, a second housing member configured to surround at least a portion of the writing element, a retainer configured to be received by the first housing member, and the retainer configured to engage the writing element, and wherein, engagement of the writing element by the retainer allows the writing element to be withdrawn from the second housing member when the retainer is moved axially away from the second housing member.

[0006] According to aspects of the disclosure, the retainer is configured to be received between the first housing member and the writing element.

[0007] According to aspects of the disclosure, a gap is formed between the retainer and the first housing member when the retainer is received by the first housing member.

[0008] According to aspects of the disclosure, the retainer includes a first engagement member, the writing element includes a second engagement member, and the first engagement member is configured to engage the second engagement member.

[0009] According to aspects of the disclosure, the first engagement member includes a recess configured to form the gap between the retainer and the first housing member.

[0010] According to aspects of the disclosure, the first engagement member is capable of movement within the gap formed between the retainer and the first housing member.

[0011] According to aspects of the disclosure, the first engagement member includes a hook projecting radially inwardly, the second engagement member includes a shoulder projecting radially outwardly, and the hook is configured to abut the shoulder.

[0012] According to aspects of the disclosure, one or more of the hook and the shoulder includes a ramped surface.

[0013] According to aspects of the disclosure, the hook projects from an axially extending arm, and the axially extending arm is elastically deformable.

[0014] According to aspects of the disclosure, the retainer includes a plurality of engagement members, an opening having a first diameter is formed between the plurality of engagement members, and the second engagement member of the writing element includes a second diameter greater than the first diameter of the opening.

[0015] According to aspects of the disclosure, the retainer includes a connection member configured to form a connection with the first housing member.

[0016] According to aspects of the disclosure, the first engagement member of the retainer and the connection member of the retainer are configured to be radially offset from each other about the axis of the writing instrument.

[0017] According to aspects of the disclosure, the connection member is a radially-projecting rib.

[0018] According to aspects of the disclosure, the first housing member is configured to engage a bias member.

[0019] According to aspects of the disclosure, the writing instrument includes a second writing element.

[0020] According to aspects of the disclosure, a method for removing a writing element from a writing instrument is provided. The method comprises providing the writing instrument according to any aspect disclosed herein, and moving the retainer axially away from the second housing member to withdraw the writing element from the writing instrument.

[0021] In the manner described and according to aspects illustrated herein, the writing instrument and the

method are configured to improve removal of a writing element from the writing instrument in a hassle-free and convenient manner.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Aspects of an embodiment will be described in reference to the drawings, where like numerals reflect like elements:

Figure 1A is a cross-sectional view of a writing instrument according to aspects of the disclosure, taken along an axis A-A, and shown without a second housing member of a housing of the writing instrument;

Figure 1B is a cross-sectional view of the second housing member of the housing of the writing instrument according to Figure 1A, taken along the axis A-A;

Figure 2 is a partial exploded view of the writing instrument according to Figures 1A-1B;

Figure 3 is a partial cross-sectional view of the writing instrument according to Figures 1A-1B, taken along the axis A-A;

Figure 4 is a partial cross-sectional view of the writing instrument according to Figures 1A-1B, taken along the axis A-A, with emphasis on a retainer, a writing element, and a first housing member of the writing instrument according to Figures 1A-1B;

Figure 5 is a partial cross-sectional view of the writing instrument according to Figures 1A-1B, taken along the axis A-A, with emphasis on the retainer and the writing element of the writing instrument according to Figures 1A-1B;

Figure 6A is a perspective view of the first housing member of the housing of the writing instrument according to Figures 1A-1B;

Figure 6B is a cross-sectional view of the first housing member according to Figure 6A, taken along the line VIB;

Figure 6C is an exploded cross-sectional view of the first housing member according to Figure 6A, taken along the line VIB;

Figure 7A is a perspective view of the retainer of the writing instrument according to Figures 1A-1B;

Figure 7B is a cross-sectional view of the retainer of the writing instrument according to Figure 7A; and

Figure 8 is a perspective view of a writing tip of the writing element of the writing instrument according to Figures 1A-1B.

DETAILED DESCRIPTION

[0023] An embodiment of a writing instrument and a method of removing a writing element from a writing instrument according to aspects of the disclosure will now be described with reference to Figures 1A-8. Like numerals represent like parts, and the writing instrument will generally be referred to by the reference numeral 10. Although the writing instrument 10 is described with reference to specific examples, it should be understood that modifications and changes may be made to these examples without going beyond the general scope as defined by the claims. In particular, individual characteristics of the various embodiments shown and/or mentioned herein may be combined in additional embodiments. Consequently, the description and the drawings should be considered in a sense that is illustrative rather than restrictive. The Figures, which are not necessarily to scale, depict illustrative aspects and are not intended to limit the scope of the disclosure. The illustrative aspects depicted are intended only as exemplary.

[0024] The term "exemplary" is used in the sense of "example," rather than "ideal." While aspects of the disclosure are amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit aspects of the disclosure to the particular embodiment(s) described. On the contrary, the intention of this disclosure is to cover all modifications, equivalents, and alternatives falling within the scope of the disclosure.

[0025] Various materials, methods of construction and methods of fastening will be discussed in the context of the disclosed embodiment(s). Those skilled in the art will recognize known substitutes for the materials, construction methods, and fastening methods, all of which are contemplated as compatible with the disclosed embodiment(s) and are intended to be encompassed by the appended claims.

[0026] As used in this disclosure and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the content clearly dictates otherwise. As used in this disclosure and the appended claims, the term "or" is generally employed in its sense including "and/or" unless the content clearly dictates otherwise.

[0027] Throughout the description, including the claims, the terms "comprising a," "including a," and "having a" should be understood as being synonymous with "comprising one or more," "including one or more," and "having one or more" unless otherwise stated. In addition, any range set forth in the description, including the claims should be understood as including its end value(s) unless otherwise stated. Specific values for described elements should be understood to be within accepted manufacturing or industry tolerances known to one of skill in the art, and any use of the terms "substantially," "approximately," and "generally" should be understood to mean falling within such accepted tolerances.

[0028] When an element or feature is referred to herein as being "on," "engaged to," "connected to," or "coupled to" another element or feature, it may be directly on, engaged, connected, or coupled to the other element or feature, or intervening elements or features may be present. In contrast, when an element or feature is referred to as being "directly on," "directly engaged to," "di-

rectly connected to," or "directly coupled to" another element or feature, there may be no intervening elements or features present. Other words used to describe the relationship between elements or features should be interpreted in a like fashion (e.g., "between" versus "directly between," "adjacent" versus "directly adjacent," etc.).

[0029] Spatially relative terms, such as "top," "bottom," "middle," "inner," "outer," "beneath," "below," "lower," "above," "upper," and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the drawings. Spatially relative terms may be intended to encompass different orientations of a device in use or operation in addition to the orientation depicted in the drawings. For example, if the device in the drawings is turned over, elements described as "below" or "beneath" other elements or features would then be oriented "above" the other elements or features. Thus, the example term "below" can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

[0030] Although the terms "first," "second," etc. may be used herein to describe various elements, components, regions, layers, sections, and/or parameters, these elements, components, regions, layers, sections, and/or parameters should not be limited by these terms. These terms are only used to distinguish one element, component, region, layer, or section from another region, layer, or section. Thus, a first element, component, region, layer, or section discussed herein could be termed a second element, component, region, layer, or section without departing from the teachings of the present disclosure.

[0031] As shown in Figures 1A-3, a writing instrument 10 configured to improve removal of one or more component of the writing instrument 10 is provided. The term "writing instrument" as used herein may be understood to be a tool used to produce writing and/or drawing (e.g. figures, characters, lines, forms, and/or the like). In the disclosed embodiment, the writing instrument 10 extends from a first end 12 to a second end 14 along an axis A-A. The writing instrument 10 includes a tubular housing 20 having a first housing member 22 configured to extend from the first end 12 of the writing instrument 10 toward the second end 14 of the writing instrument 10 and a second housing member 24 configured to extend from the second end 14 of the writing instrument 10 toward the first end 12 of the writing instrument 10. The writing instrument 10 also includes a writing element 40, a retainer 60 configured to facilitate removal of the writing element 40 from the housing 20 of the writing instrument 10, and a bias member 90 (see Figures 2-3) configured to mechanically displace the writing element 40 by providing a return force on the writing element 40 when the writing element 40 is retracted within the housing 20. In the disclosed embodiment, the bias member 90 is a coil spring; however, it is contemplated that other bias members may be compatible with the writing instrument 10. The writing instrument 10 may also include a driving mechanism 95 configured for retraction and extraction of the writing element 40 to and from the writing instrument 10, respectively. In the disclosed embodiment, the driving mechanism 95 is positioned within the housing 20, adjacent the second end 14 of the housing 20, and may be actuated by twisting a portion of the writing instrument 10 and/or a component connected thereto. To this end, the driving mechanism 95 may include a cam and a cam follower. It is contemplated that alternative driving mechanisms may be compatible with the writing instrument 10, such as a driving mechanism including a push-button actuator. The housing 20, the writing element 40, the retainer 60, and the bias member 90 are all configured to extend along the axis A-A of the writing instrument 10. As such, it is contemplated that the housing 20, the writing element 40, the retainer 60, and the bias member 90 of the writing instrument 10 are each configured to include an axis which is common to and/or the same as the axis A-A of the writing instrument 10. As such, the axis of each of the housing 20, the writing element 40, the retainer 60, and the bias member 90 of the writing instrument 10 will also be referred to herein as "the axis A-A."

[0032] In the disclosed embodiment, the term "writing element" may be understood to be a component of the writing instrument 10 configured to hold and transfer a fluid-based writing medium (not shown), such as ink, to a writing surface (not shown) (e.g. a highlighter, ballpoint pen, rollerball pen, fountain pen, marker, felt-tipped pen, and/or the like. Additionally or alternatively, the term "writing element" may be understood to be a component of the writing instrument 10 configured to hold and transfer a solid-type writing medium (not shown) to a writing surface (e.g. a pencil, stylus, chalk, charcoal, lead, and/or the like.

[0033] In the disclosed embodiment, the writing element 40 is a highlighter. It is contemplated that the term "highlighter" as used herein may be understood to be a writing element 40 configured to overlay brightly colored transparent ink to mark select text on a writing surface. Additionally or alternatively, the writing instrument 10 may include a second writing element 16, which includes an additional writing medium (not shown). Referring to Figures 1A-1B of the disclosed embodiment, the second writing element 16 may be a ballpoint pen including a ballpoint tip and an ink cartridge. The second writing element 16 is configured to be received within an opening of the writing element 40. To this end, the second writing element 16 has a diameter that is less than an internal diameter of the writing element 40. Additionally, to this end, the writing element 40 is formed as a hollow cylinder. It is contemplated that the second writing element 16 may not be retractable, as the writing element 40 is. Additionally, the second writing element 16 may be replaceable and may be removed by a user when the user removes

the first housing member 22, the writing element 40, and the retainer 60 from the second housing member 24, as illustrated by Figures 1A-1B and as will be discussed further herein. As a highlighter, the writing element 40 includes a filler-type writing medium cartridge (also referred to herein as a "reservoir") 42 (see Figures 1A, 4, and 8), which is a writing medium cartridge 42 that is constructed of a porous material (not shown) for holding a writing medium, such as within the pores of the writing medium cartridge 42, without allowing the writing medium to flow freely, yet allowing the writing medium to be extracted, such as by a wick using capillary forces, for application to a writing surface. The writing element 40 may also include a writing tip 44 (also referred to herein as a "nib") configured to transfer the writing medium from the writing medium cartridge 42 to a writing surface. The writing tip 44 may be constructed of the same or substantially similar porous material as the writing medium cartridge 42. The writing medium cartridge 42 and the writing tip 44 are exposed to an interior of the housing 20 and/or the surrounding environment when removed from the housing 20.

[0034] The one or more component contemplated for removal from the writing instrument 10 is the writing element 40 of the writing instrument 10. The porosity of the writing element 40, in combination with exposure of the porous material of the writing element 40 to a user removing the writing element 40 from the writing instrument 10, creates a potential for the writing medium to come in direct contact with a hand of a user and/or other unintended surfaces. Accordingly, interaction between the retainer 60 and the writing element 40, and between the retainer 60 and the first housing member 22 of the housing 20, are configured to allow for proper handling and/or removal of the writing element 40 from the writing instrument 10 to reduce and/or eliminate direct contact between a user and the writing medium cartridge 42.

[0035] As shown in Figures 1A-3, the housing 20 of the writing instrument 10 includes the first housing member 22 and the second housing member 24. The first housing member 22 is configured to mate with the second housing member 24 to form the housing 20 of the writing instrument 10. In the disclosed embodiment, the first housing member 22 and the second housing member 24 are configured to mate via a threaded connection. As such, the first housing member 22 and the second housing member 24 are configured to be unscrewed from each other in order to remove and/or replace the writing element 40. The first housing member 22 is configured to define a first cavity 26 and the second housing member 24 is configured to define a second cavity 28. In this manner, the first housing member 22 is configured to receive and/or surround at least a portion of the writing element 40. The second housing member 24 is also configured to surround at least a portion of the writing element 40. Additionally, the first housing member 22 is configured to receive and/or surround the retainer 60 and the bias member 90. In the disclosed embodiment, the bias member 90 is coupled to the first housing member 22. Particularly, the bias member 90 is press-fit within the first housing member 22. Coupling the bias member 90 to the first housing member 22 reduces a risk of losing the bias member 90 during removal and/or replacement of the writing element 40 from and/or into the second housing member 24. Referring to Figures 6A-6C, in the disclosed embodiment, the first housing member 22 includes a cover 30 configured to mate with a support 32. However, it is contemplated that the cover 30 and the support 32 may be constructed integrally as one component.

[0036] As shown in Figures 1A-4, the retainer 60 of the writing instrument 10 is configured to be received in the housing 20. Particularly, the retainer 60 of the writing instrument 10 is configured to be received within the first housing member 22. In the disclosed embodiment, the retainer 60 is configured to form a press-fit connection with the first housing member 22. To this end, as shown in Figures 7A-7B, the retainer 60 includes a body 62 and one or more connection member 64 extending along the body 62, which is configured to form the press-fit connection between the retainer 60 and the first housing member 22. In the disclosed embodiment, the retainer 60 includes a plurality of the connection members 64. Additionally, in the disclosed embodiment, the connection member 64 is in the form of a radially-projecting rib. Additionally or alternatively, the retainer 60 may be configured to couple with the first housing member 22. To this end, connection member 64 may be configured to couple with a second connection member 34, which may be included by the first housing member 22 (see Figures 6B-6C). Additionally or alternatively, the first housing member 22 may include a plurality of second connection members 34 complimentary to the plurality of connection members 64 of the retainer 60; however, the plurality of second connection members 34 will be referred to herein as "the second connection member 34" unless reference to the plurality of second connection members 34 is otherwise necessary. Additionally or alternatively, the second connection member 34 of the first housing member 22 may be in the form of a groove configured to receive and/or couple with the connection member 64. Additionally or alternatively, it is contemplated that the connection member 64 of the retainer 60 may be in the form of the groove and the second connection member 34 of the first housing member 22 may be in the form of a radially-projecting rib. After the first housing member 22 is unscrewed from the second housing member 24, the press-fit connection or the coupling between the retainer 60 and the first housing member 22 allows for a user to move the retainer 60 axially away from the second housing member 24 by grasping and pulling the first housing member 22 axially away from the second housing member 24 during removal and/or replacement of the writing element 40.

[0037] As illustrated by Figures 1A-5, the retainer 60 is configured to engage the writing element 40. To this end, as shown in Figures 7A-7B, the retainer 60 includes

a first engagement member 68 extending from the body 62. Additionally or alternatively, the retainer 60 may include a plurality of first engagement members 68 extending from the body 62; however, the plurality of first engagement members 68 will be referred to herein as "the first engagement member 68" unless reference to the plurality of first engagement members 68 is otherwise necessary. The first engagement member 68 of the retainer 60 is configured to engage a second engagement member 48 (see Figures 3-5 and 8) included by the writing element 40. The first engagement member includes an arm 70 extending axially from the body 62. Additionally, the first engagement 68 member includes a hook 72 projecting radially inwardly from the arm 70, which is configured to engage the second engagement member 48 of the writing element 40. It is contemplated that the terms "inwardly" and "outwardly" as used herein may be understood with reference to the axis A-A. As such, "inwardly" may be understood as a direction extending transversely with respect to the axis A-A, toward the axis A-A, and "outwardly" may be understood as a direction extending transversely with respect to the axis A-A, away from the axis A-A. The hook 72 may include a ramped surface 74 to provide clearance for the second engagement member 48 of the writing element 40 when the writing element 40 is inserted within the retainer 60 and/or when the writing element 40 is removed from the retainer 60.

[0038] As shown in Figures 4-5 and 7A-7B, an opening 78 is formed between the plurality of first engagement members 68 of the retainer 60. Particularly, the opening 78 is formed between the hooks 72 of the plurality of first engagement members 68 of the retainer 60. The second engagement member 48 of the writing element 40 is configured to be inserted through the opening 78 and/or to be withdrawn through the opening 78 so that the writing element 40 may be engaged with the retainer 60 and/or so that the writing element 40 may be disengaged with the retainer 60, respectively. In the disclosed embodiment, the opening 78 includes a first diameter D_1 which is smaller than a second diameter D_2 of the second engagement member 48. The difference in diameters allows the writing element 40 to be engaged and/or secured within the retainer 60. As such, the second engagement member 48 of the writing element 40 must exert a force and/or apply pressure upon the first engagement member 68 in order to be inserted through the opening 78 and/or to be withdrawn through the opening 78. Particularly, the second engagement member 48 of the writing element 40 must exert a force and/or apply pressure upon the hook 72 of the first engagement member 68 in order to be inserted through the opening 78 and/or to be withdrawn through the opening 78. To this end, the first engagement member 68 is elastically deformable. Particularly, the arm 70 of the first engagement member 68 is elastically deformable. As such, the first engagement member 68 is capable of movement. In the disclosed embodiment, the first engagement member 68 is capable of movement in a direction away from the axis A-A of the retainer 60. In the same manner, the first engagement member 68 is capable of movement in a direction toward the axis A-A of the retainer 60. Deformation and/or movement of the first engagement member 68 allows for the second engagement member 48 of the writing element 40 to be inserted through the opening 78 and received within the retainer 60, such that the second engagement member 48 of the writing element 40 may be engaged by the first engagement member 68 of the retainer 60. Additionally, deformation and/or movement of first engagement member 68 allows for the second engagement member 48 of the writing element 40 to be withdrawn through the opening 78 and from the retainer 60, such that the second engagement member 48 of the writing element 40 may be disengaged from the first engagement member 68 of the retainer 60.

[0039] As shown in Figures 4-5, the first engagement member 68 includes a recess 76 configured to allow for the deformation and/or movement of the first engagement member 68 when the retainer 60 is positioned within and/or coupled to the first housing member 22. The recess 76 is formed at an exterior surface of the first engagement member 68. In the disclosed embodiment, the exterior surface of the first engagement member 68 may be stepped in order to form the recess 76. Alternatively, the exterior surface of the first engagement member 68 may include a single surface and/or a slope which forms the recess 76. In the disclosed embodiment, the recess 76 of the first engagement member 68 is configured to form a gap 80 between the retainer 60 and the first housing member 22 when the retainer 60 is positioned within and/or coupled to the first housing member 22. Particularly, the recess 76 of the first engagement member 68 is configured to form the gap 80 between the first engagement member 68 of the retainer 60 and the first housing member 22 when the retainer 60 is positioned within and/or coupled to the first housing member 22. The gap 80 formed between the retainer 60 and the first housing member 22 creates space for the movement and/or deformation of the first engagement member 68. As such, the gap 80 formed between the retainer 60 and the first housing member 22 creates space for the movement and/or deformation of the first engagement member 68 in the direction away from the axis A-A of the retainer 60. In the disclosed embodiment, the first engagement member 68 and the connection member 64 of the retainer are radially offset from each other about the axis A-A, so that the gap 80 is formed for movement and/or deformation of the first engagement member 68, while the retainer 60 is also capable surface-to-surface interaction with the first housing member 22 to directly connect and/or couple to the first housing member 22. In this manner, the first engagement member 68 may move within the gap 80 in order to allow the second engagement member 48 of the writing element 40 to pass through the opening 78 of the retainer 60 and engage with the first engagement member 68 the retainer 60. Additionally, in this manner, the first engagement member 68 may move within the gap

80 in order to allow the second engagement member 48 of the writing element 40 to be disengaged with the first engagement member 68 of the retainer and withdrawn from the retainer 60.

[0040] As shown by Figures 1A-1B and 3-4, the writing element 40 is configured to be received in and extend throughout the housing 20. In the disclosed embodiment, the writing tip 44 is configured to be received in and extend within the first cavity 26 of the first housing member 22 and the writing medium cartridge 42 is configured to be received in and extend within the second cavity 28 of the second housing. Additionally, the writing element 40 is configured to be engaged by the retainer 60. As such, referring to Figures 4-5 and 8, the writing element 40 includes the second engagement member 48 which is configured to be engaged by the first engagement member 68 of the retainer 60. Additionally, the second engagement member 48 of the writing element 40 is configured to apply a force and/or pressure upon the first engagement member 68 of the retainer 60 in order to move the first engagement member 68 away from the axis A-A of the retainer 60 and into the gap 80 between the retainer 60 and the first housing member 22.

[0041] In the disclosed embodiment, the second engagement member 48 is positioned on the writing tip 44 of the writing element 40. The second engagement member 48 includes a shoulder 50 projecting radially outwardly from the writing tip 44. In the disclosed embodiment, the second engagement member 48 includes an annular shoulder 50; however, it is contemplated that other geometries may be compatible for engagement with the first engagement member 68 of the retainer 60. The shoulder 50 of the second engagement member 48 may include a ramped surface 52 to provide clearance for the second engagement member 48 of the writing element 40 when the writing element 40 is inserted within the retainer 60 and/or when the writing element 40 is removed from the retainer 60. The hook 72 of the first engagement member 68 of the retainer 60 is configured to abut the shoulder 50 of the second engagement member 48 of the writing element 40 in order to form the engagement between the first engagement member 68 and the second engagement member 48, when the second engagement member 48 is inserted past the first engagement member 68. In this manner, as shown in Figure 1A, the writing element 40 remains engaged by the retainer 60 and/or the first housing member 22 when the first housing member 22 is unscrewed and moved axially away from the second housing member 24. As such, a user may handle the writing element 40 during removal from and/or replacement into the second housing member 24 by grasping the first housing member 22. It is contemplated that the writing medium cartridge 42 may include a grip 54 constructed of a non-porous material and/or configured to avoid contact with the writing medium. Additionally or alternatively, the writing medium cartridge 42 may include a membrane 46 configured to provide an impermeable barrier to the writing medium, such as a plastic membrane 46, at an outer surface of the writing medium cartridge 42. As such, the membrane 46 is configured to prevent leakage of the writing medium from the writing medium cartridge 42. The grip 54 may be configured to be grasped by a user once the writing element 40 is removed from the second housing member 24, in order for the user to pull the writing element 40 out of engagement with the retainer 60. Additionally or alternatively, the membrane 46 may be configured to be grasped by a user once the writing element 40 is removed from the second housing member 24, in order for the user to pull the writing element 40 out of engagement with the retainer 60. Accordingly, direct contact between a hand of a user and/or other unintended surfaces and the writing medium of the writing element 40 is reduced and/or avoided to allow for hassle-free and convenient handling of the writing element 40.

[0042] Although the present disclosure herein has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the principles and applications of the present disclosure.

[0043] It is intended that the specification and examples be considered as exemplary only, with a true scope of the disclosure being indicated by the following claims.

[0044] Additionally, all of the disclosed features of an apparatus may be transposed, alone or in combination, to a method and vice versa.

Claims

1. A writing instrument (10) extending along an axis (A-A) between a first end (12) and a second end (14), the writing instrument (10) comprising:

   a first housing member (22) configured to surround at least a portion of a writing element (40);
   a second housing member (24) configured to surround at least a portion of the writing element (40);
   a retainer (60) configured to be received by the first housing member (22), and the retainer (60) configured to engage the writing element (40); and
   wherein, engagement of the writing element (40) by the retainer (60) allows the writing element (40) to be withdrawn from the second housing member (24) when the retainer (60) is moved axially away from the second housing member (24).

2. The writing instrument (10) according to claim 1, wherein the retainer (60) is configured to be received between the first housing member (22) and the writing element (40).

3. The writing instrument (10) according to any of

claims 1-2, wherein a gap (80) is formed between the retainer (60) and the first housing member (22) when the retainer (60) is received by the first housing member (22).

4. The writing instrument (10) according to any of claims 1-3, wherein the retainer (60) includes a first engagement member (68), the writing element (40) includes a second engagement member (48), and the first engagement member (68) is configured to engage the second engagement member (48).

5. The writing instrument (10) according to claim 4, wherein the first engagement member (68) includes a recess (76) configured to form a gap (80) between the retainer (60) and the first housing member (22).

6. The writing instrument (10) according to claim 4 taken in combination with claim 3 or 5, wherein the first engagement member (68) is capable of movement within the gap (80) formed between the retainer (60) and the first housing member (22).

7. The writing instrument (10) according to any of claims 4-6, wherein the first engagement member (68) includes a hook (72) projecting radially inwardly, the second engagement member (48) includes a shoulder (50) projecting radially outwardly, and the hook (72) is configured to abut the shoulder (50).

8. The writing instrument (10) according to claim 7, wherein one or more of the hook (72) and the shoulder (50) includes a ramped surface (52, 74).

9. The writing instrument (10) according to any of claims 7-8, wherein the hook (72) projects from an axially extending arm (70), and the axially extending arm (70) is elastically deformable.

10. The writing instrument (10) according to any of claims 4-9, wherein the retainer (60) includes a plurality of engagement members (68), an opening (78) having a first diameter (D_1) is formed between the plurality of engagement members (68), and the second engagement member (48) of the writing element (40) includes a second diameter (D_2) greater than the first diameter (D_1) of the opening (78).

11. The writing instrument (10) according to any of claims 1-10, wherein the retainer (60) includes a connection member (64) configured to form a connection with the first housing member (22).

12. The writing instrument (10) according to claim 11 taken in combination with claim 4, wherein the first engagement member (68) of the retainer (60) and the connection member (64) of the retainer (60) are configured to be radially offset from each other about the axis (A-A) of the writing instrument (10).

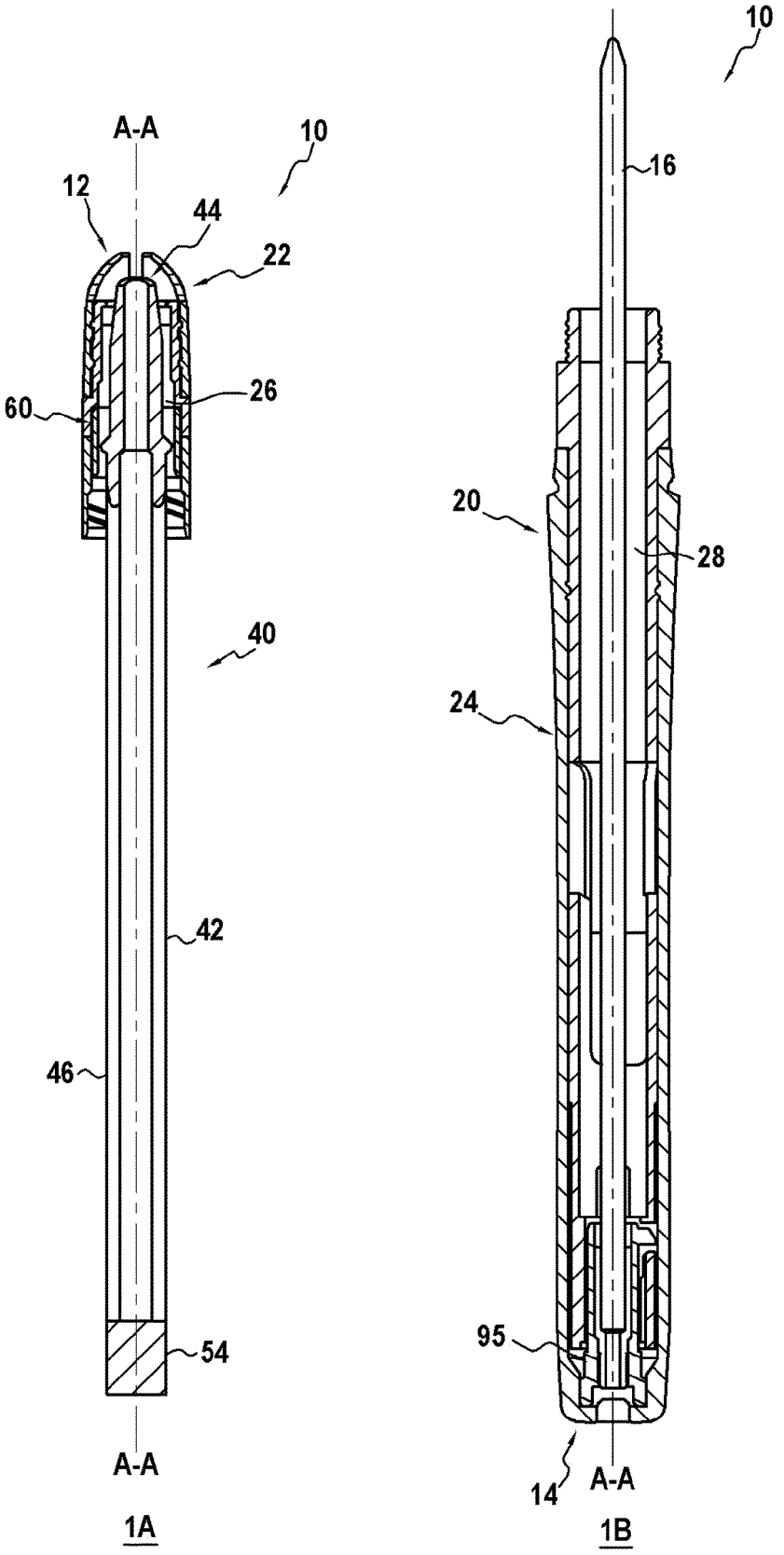
13. The writing instrument (10) according to any of claims 11-12, wherein the connection member (64) is a radially-projecting rib.

14. The writing instrument (10) according to any of claims 1-13, comprising a second writing element (16).

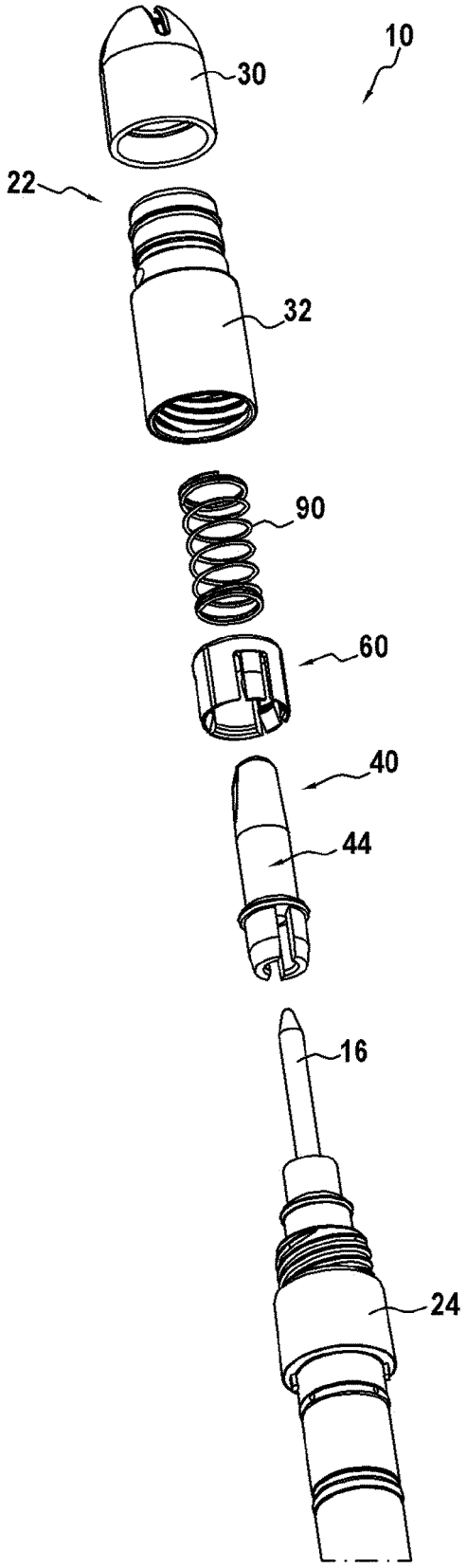
15. A method for removing a writing element (40) from a writing instrument (10), the method comprising:

providing the writing instrument (10) according to any of claims 1-14; and
moving the retainer (60) axially away from the second housing member (24) to withdraw the writing element (40) from the writing instrument (10).

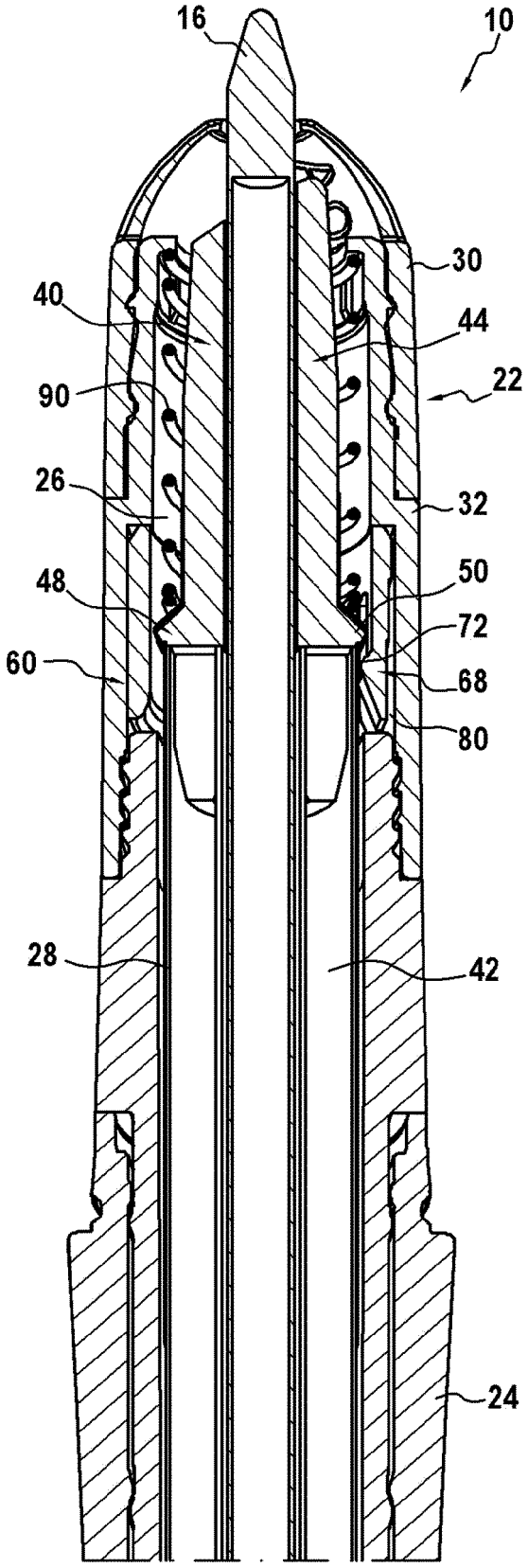
[Fig. 1A-1B]



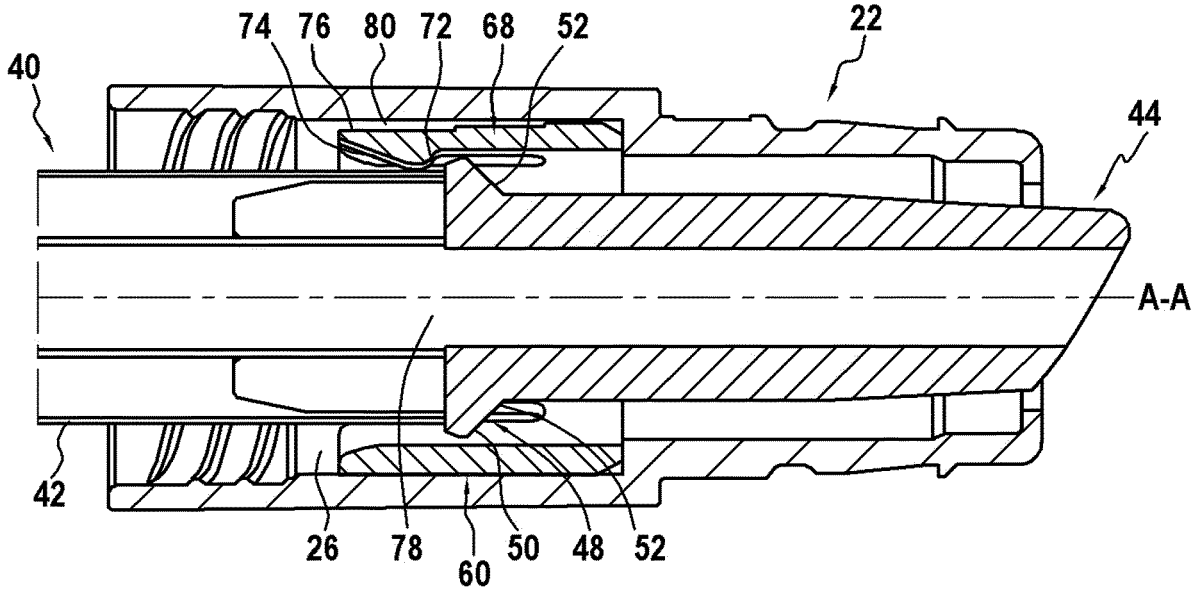
[Fig. 2]



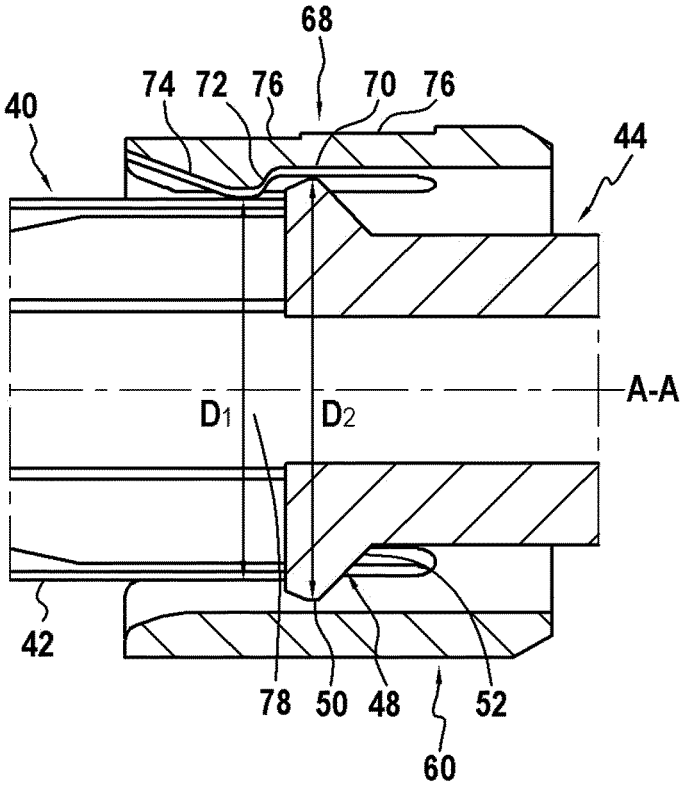
[Fig. 3]



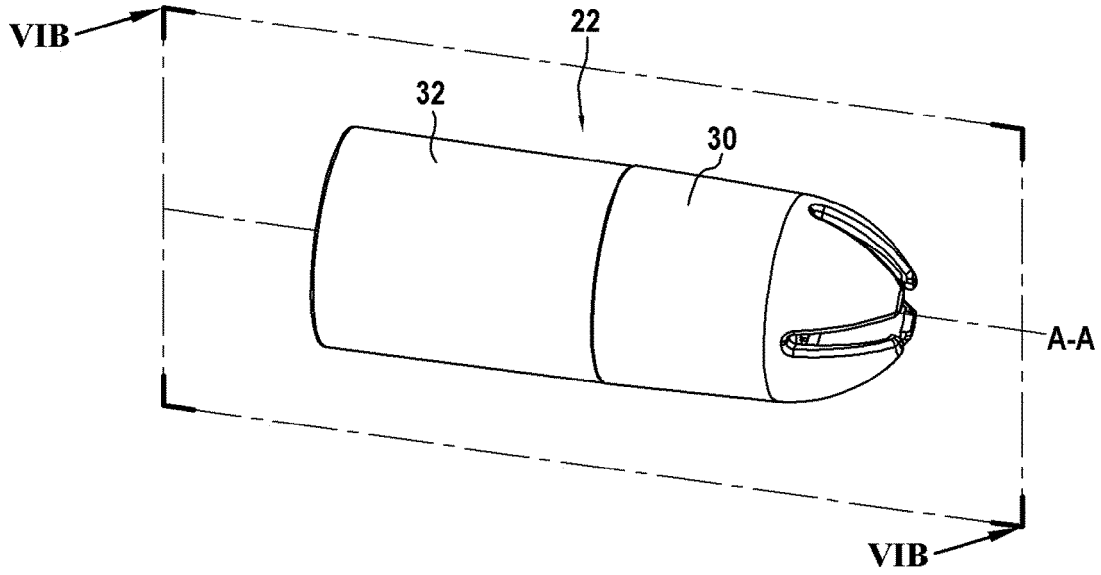
[Fig. 4]


74
76
80
72
68
52
22
40
44
A-A
42
26
78
60
50
48
52

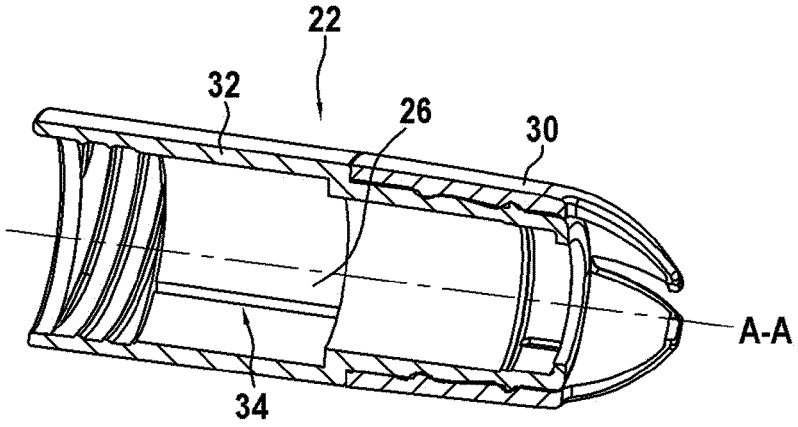
[Fig. 5]


68
74
72
76
70
76
40
44
A-A
D1
D2
42
78
50
48
52
60

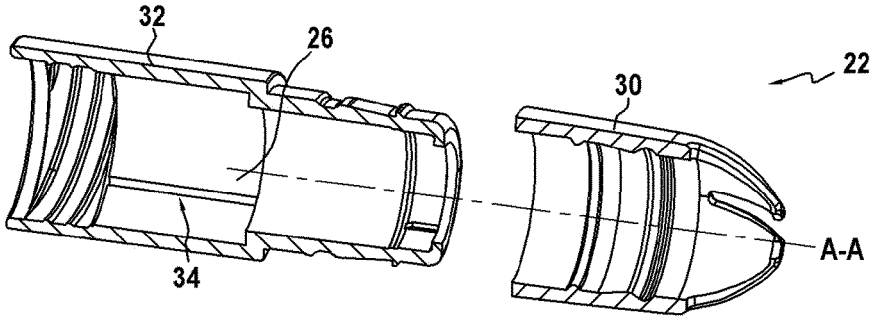
[Fig. 6A]



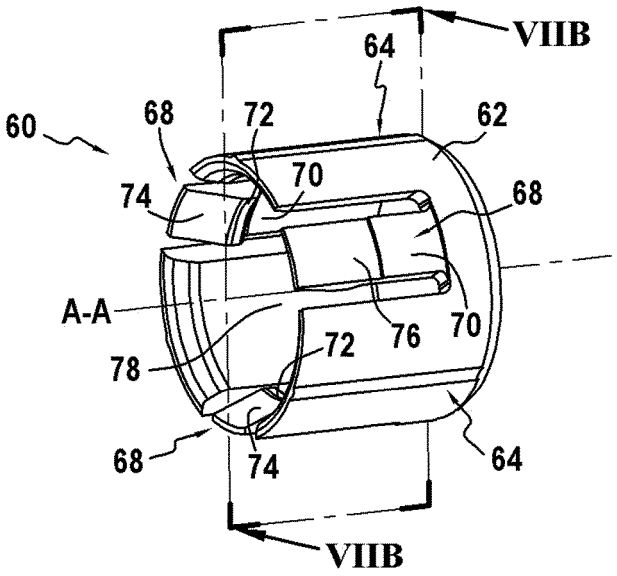
[Fig. 6B]



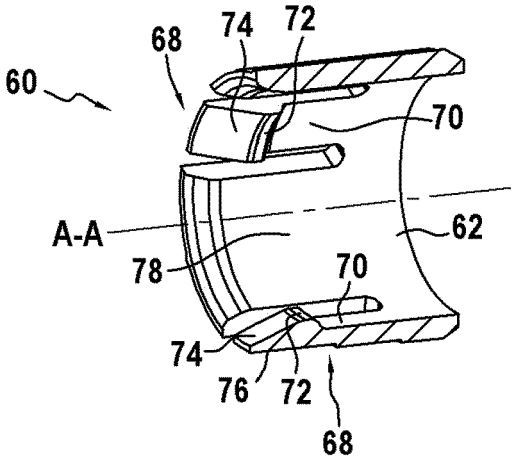
[Fig. 6C]



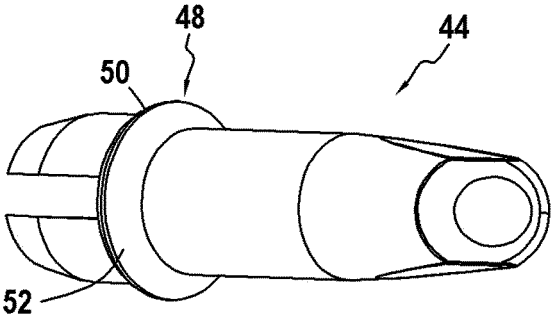
[Fig. 7A]



[Fig. 7B]



[Fig. 8]



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EUROPEAN SEARCH REPORT

Application Number
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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
Munich	15 June 2021	Kelliher, Cormac

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