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-a clip member (16) attached to the body,
wherein the clip member (16) is attached to the body
through one or more biasing members (18,20) and the
clip member, the one or more biasing members and the
body are integrally formed.



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 clip.

Background

[0002] The present disclosure relates to writing instruments such as pen clips, 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 are handy when it is desirable to hold a pen in place in pockets of a garment, over sheets of paper and other thin medium.

[0004] Conventionally, in molded plastic pens, the clip is integrated with the pen body which is advantageous in terms of cost and strength. It, however, limits the flexibility of the clip.

[0005] When the support to which the pen clip is to be attached is thick, e.g. in the case of a thick luggage wallet or a plurality of paper sheets such as a notebook or a thick fabric of a piece of clothes, the limited capacity of deformation of the clip may cause a problem and result even in the breakage of the clip.

[0006] In some instances, it is not possible to attach the pen clip to a thick medium even when forcing.

[0007] In some other instances, the user nevertheless manages to attach the pen clip to a thick medium by deforming the clip forcibly with the consequence that the clip flexibility deteriorates over time due to repeated deformation.

[0008] In some instances, the clip is assembled to the barrel of the writing instrument through a multi-part mechanism that provides flexibility on it. However, this requires a lot of manufacturing time since all these parts need to be assembled together.

Summary

[0009] There is therefore a need for a writing instrument clip that can be attached to a thick medium without deteriorating its flexibility as in the prior art.

[0010] In one aspect, the present disclosure relates to a writing instrument. The writing instrument comprises:

- a body having a longitudinal axis and provided with a writing tip at a front end of the writing instrument,
- a clip member attached to the body,

wherein the clip member is attached to the body through one or more biasing members and the clip member, the one or more biasing members and the body are integrally formed.

[0011] According to the above aspect, the clip member,

the one or more biasing members and the body being integrally formed, it is thus possible for the writing instrument to be attached to a thick medium without deteriorating its flexibility as in the prior art.

[0012] In some embodiments, the one or more biasing members are spring members.

[0013] In some embodiments, the one or more biasing members are helical springs.

[0014] In some embodiments, the biasing members comprise at least two members.

[0015] In some embodiments, the one or more biasing members are arranged in line along the longitudinal axis of the body.

[0016] In some embodiments, the one or more biasing members are configured to support the clip member on the body.

[0017] In some embodiments, the clip member has a top surface that is flush mounted with respect to an outside surface of the barrel when the clip member is in a rest position.

[0018] In some embodiments, the body comprises a recess extending along the longitudinal axis X.

[0019] In some embodiments, the recess extends up to a rear end of the writing instrument that is opposite the front end in the longitudinal axis X.

[0020] In some embodiments, the recess extends transversally to the longitudinal axis X and across a portion of the width of the body.

[0021] In some embodiments, a depth of the recess corresponds to a thickness of the clip member and a width of the recess corresponds to a width of the clip member so that the clip member be fully or partially accommodated within the recess.

[0022] In some embodiments, the clip member comprises a protruding member on an inner surface that is facing a bottom of the recess.

[0023] In some embodiments, the clip member has a top surface that matches with the contours of the body.

[0024] In a further aspect, the present disclosure relates to a method of using the writing instrument comprising:

- pushing the clip member on its rear end toward the recess of the body such that the clip member front end is lifted at an angle, thereby defining an opening for receiving an object O,
- attaching the clip member on an upper surface S of an object O.

[0025] In a still further aspect, the present disclosure relates to a method for manufacturing the above-described writing instrument wherein the clip member, the biasing members and the body are integrally formed through additive manufacturing.

Brief Description of the Drawings

[0026]

Figure 1 shows an exemplary embodiment of a writing instrument of the present disclosure.

Figures 2A and 2B are partial views of the rear part of the writing instrument of Figure 1 with a clip member in a closed rest position, respectively in perspective and longitudinal cross section.

Figures 3A and 3B are partial views of the same rear part as in Figures 2A-B with the clip member in a first open position.

Figures 4A and 4B are partial views similar to those of Figures 2A-B with the clip member in a second open position.

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 10 as shown in Figure 1 of which the description follows. Figure 1 is a schematic overall longitudinal cross section view of a writing instrument oriented horizontally. The writing instrument may alternatively be oriented differently, e.g. vertically or in an oblique direction.

[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 integrating a clip member.

[0030] As shown in Figure 1, 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 front 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 a writing tip 14b that traverses axially the writing orifice 14a of the tip component 14 along its thickness to extend outside the latter.

[0032] The barrel 12 may extend longitudinally along longitudinal axis X from the distal end of the tip component 14, at the front end 10a toward the rear end 10b of the instrument.

[0033] The writing instrument 10 may further comprise a clip member 16 that is attached to the barrel 12 through one or more biasing members which are configured to support the clip member 16 through one of their ends. The biasing members are attached to the barrel through their opposite ends.

[0034] The one or more biasing members are more particularly shown in Figures 2A-4B where they take the form of spring members, e.g. two helical spring members 18 and 20, that are aligned with longitudinal axis X. Having several biasing members to connect the clip member 16 to the barrel 12 makes it possible to increase the thickness of the support to which the instrument can be attached through its clip member (by elastic deformation thereof). Several biasing members may also provide better stability to the clip member and prevent the latter from being rotated. To be noted that more than two biasing members may be provided in some configurations. For example, two rows of smaller springs may be provided in a parallel arrangement each row having two springs, thus resulting in a four-spring configuration. This may provide further stability to the clip member.

[0035] To be noted that each helical spring member may be either a compression or tension spring member. When the spring member is in its rest position it keeps the clip member 16 in a position aligned with the writing instrument barrel 12 as in the closed rest position of Figures 2A-B. However, it might be possible for the user to push the clip member 16 inside the recess in which the spring members are located (thus compressing the spring members to a low extent) in order to lift the front tip of clip member 16 and get it engaged to the desired surface.

[0036] The barrel or body 12 may include a recess 12a which may extend along longitudinal axis X on a portion of the barrel length starting from the rear end 10b. Here, the recess 12a extends up to the rear end 10b that is opposite the front end 10a along the longitudinal axis. Alternatively, the recess may be shifted further toward the front end 10a of the instrument depending on the desired configuration of the writing instrument clip member. The recess 12a may extend transversally relative to longitudinal axis X and across a portion of the width of the barrel 12. The recess 12a may further extend on a portion of the barrel thickness from a top surface 12b of the latter. The thickness is a dimension taken along vertical axis Z in Figure 2B. The depth of the recess 12a may correspond to the thickness of the clip member 16 and its width may correspond to the width of the clip member 16 so that the latter be fully or partially accommodated within the recess when not urged outwardly under the action of the biasing members. Under these conditions which correspond to a rest position of the clip member 16 (the spring members keep the clip member 16 in this position), the top surface 16c of the clip member 16 may thus be flush mounted to the outer surface (top surface 12b) of the barrel. The top surface 16c can be considered to be the surface that is facing on the opposite side of

the recess or facing away from the writing instrument's barrel. This means that the top surface shall be the surface which can be touched by the user. Both surfaces 16c and 12b are in alignment with each other as represented in Figures 2A-B.

[0037] As schematically illustrated in Figure 2A, the clip member 16 may further comprise a grip portion 16d (circle with dotted lines) which can be used by the user (the presence of grip portion 16d is optional and does not question the following method of using the instrument) when he pushes the clip member 16, e.g. by pushing or pressing on the rear end 16f of the clip member, toward the recess 12a (downwardly in Figure 2B) in order to lift up (upwardly) the front end or tip 16e of the clip member 16 at an angle with respect to the top surface 12b of the barrel, thereby defining an opening for receiving an object O. Thus the clip member 16 can be attached on an upper surface S of an object O as illustrated in Figure 3B. The grip portion 16d can behave as an indicator as well. When the spring members are thus compressed, the front end or tip 16e extends in order to fit to any desired surface.

[0038] The grip portion 16d may have a surface comprising rubber pins or a rubber layer or forming a recess (e.g. a semi spherical recess).

[0039] As shown in Figures 2B, 3B and 4B, the clip member 16 may comprise, on its inner surface 16a that is facing the bottom of the recess 12a, a protruding member 16b. The inner surface 16a is located on the opposite side of the top surface 16c. The protruding member 16b may be more particularly located proximate an end of the clip member 16 that is oriented away from the rear end 10b of the instrument 10, i.e. toward the front end 10a of the latter. This end corresponds to the front end or tip 16e.

[0040] The clip member 16 may be flexible per se, i.e. it can be deformed along its length as a beam by repeated flexing motion. The clip member may be flexible enough so as to hang on to thick notebooks, for example. This deformability comes out of its elongated shape and small thickness.

[0041] Figures 3A-4B show two extended positions of the clip member 16 where the latter is offset relative to the surface 2b of the barrel through the action of the spring members 18, 20 which urge or extend the clip member 16 outwardly (away from the rest position of Figures 2A-B), thereby freeing a space or gap between the clip member, in particular its front end 16e, and the top surface 12b of the barrel. An object O or O' can thus be partially engaged inside this free space or gap as shown in Figures 3B and 4B. This makes it possible for the clip member 16 to attach to an upper surface S or S' of object O or O', e.g. through the protruding member 16b. In Figure 3B, the spring members 18, 20 are extended differently from each other so as to lift up the front end 16e only, thus enabling attachment to a small thickness object O (ex: medium), e.g. on an edge thereof. In Figure 4B, the spring members 18, 20 are extended equally so as to move upwardly the whole clip member 16, thus freeing

a larger space where the whole thickness of object O' (ex: thicker medium) can be engaged for attachment with the clip member 16.

[0042] The top surface 16c of the clip member 16 may match with the contours of the body 12, i.e. if the body is flat, then the top surface 16c is flat. If the body is curved, then the top surface follows the curves of the body. If the body comprises for example a linear cavity, it extends also on the top surface 16c of the clip member 16. This can provide a smooth surface design that improves the ergonomics of the writing instrument and, in addition, may further protect the clip member from being broken in case of an accidental drop of the writing instrument or any other misuse of the latter.

[0043] According to the present disclosure, the part of the barrel with the recess 12a (e.g. the rear part of the barrel), the spring members 18, 20 and the clip member 16 form a single or unitary part. The spring members 18, 20 may be manufactured using known additive manufacturing techniques.

[0044] Additive manufacturing of the integrated part of the writing instrument (or of the whole instrument) of the present disclosure is based on the principle that, firstly a digital 3D model of the integrated part of the writing instrument is defined with a computer-aided design (CAD) package, via a 3D scanner, or by a plain digital camera and photogrammetry software. The principle is, for example, to create .stl files (stereolithography file format) that essentially "slice" the instrument into ultra-thin layers.

[0045] Based on the digitally defined 3D model 3D printing equipment may be software-controlled so that a nozzle or print head of the equipment is guided accordingly along a predetermined path in order to deposit melted or partially melted material layer by layer wherein each successive layer bonds to the preceding layer.

[0046] Other techniques are known such as those using a laser or electron beam selectively melting or partially melting in a bed of powdered material. As materials cool or are cured, they fuse together to form the desired 3D instrument.

[0047] Overall, different additive manufacturing processes may be used including the following: Vat photopolymerization, material jetting, binder jetting, bedding jetting, fused filament fabrication, stereolithography and/or selective laser sintering powder bed fusion, material extrusion, directed energy deposition and sheet lamination. The main differences between the above processes lie in the way the successive layers are deposited one after the other and in the materials used. For example the standard ISO/ASTM52900-15 defines the above categories.

[0048] As the part of the barrel with the recess 12a, the spring members 18, 20 and the clip member 16 are integrally formed using any of the above additive manufacturing techniques, the resulting writing instrument has thus a more flexible and extended clip member. This means that the barrel with the recess 12a, the spring

members 18, 20 and the clip member 16, constitute a single piece. This allows the writing instrument to be attached to a thicker support than in the prior art, without deteriorating flexibility too rapidly in spite of repeated deformation over the time. In addition the risk of breakage if the user attaches this on a thick surface is substantially limited.

[0049] By using additive manufacturing techniques it is possible to manufacture a writing instrument with an integrated part, or single part, incorporating the body, the biasing members and the clip member. This makes it possible to add complex biasing member geometry so as to increase the flexibility and extension of the clip member.

[0050] 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 body (12) having a longitudinal axis (X) and provided with a writing tip at a front end (10a) of the writing instrument,
- a clip member (16) attached to the body,

wherein the clip member (16) is attached to the body through one or more biasing members (18, 20) and the clip member, the one or more biasing members and the body are integrally formed.

2. The writing instrument of claim 1, wherein the one or more biasing members are spring members (18, 20).

3. The writing instrument of claim 2, wherein the one or more biasing members (18, 20) are helical springs.

4. The writing instrument of any of claims 1 to 3, wherein the biasing members comprise at least two members.

5. The writing instrument of any of claim 4, wherein the one or more biasing members are arranged in line along the longitudinal axis (X) of the body (12).

6. The writing instrument of any of claims 1 to 5, wherein the one or more biasing members are configured to support the clip member (16) on the body.

7. The writing instrument of any of claims 1 to 6, wherein the clip member (16) has a top surface (16c) that is flush mounted with respect to an outside surface (12b) of the barrel when the clip member (16) is in a rest position

8. The writing instrument of any of claims 1 to 7, wherein the body (12) comprises a recess (12a) extending along the longitudinal axis (X)

9. The writing instrument of claim 8, wherein the recess (12a) extends up to a rear end (10b) of the writing instrument that is opposite the front end (10a) in the longitudinal axis (X).

10. The writing instrument of claim 8 or 9, wherein the recess (12a) extends transversally to the longitudinal axis (X) and across a portion of the width of the body (12).

11. The writing instrument of any of claims 8 to 10, wherein a depth of the recess (12a) corresponds to a thickness of the clip member (16) and a width of the recess (12a) corresponds to a width of the clip member (16) so that the clip member be fully or partially accommodated within the recess (12a).

12. The writing instrument of any of claims 1 to 11, wherein the clip member (16) comprises on an inner surface (16a) that is facing a bottom of the recess (12a), a protruding member (16b).

13. The writing instrument of any of claims 1 to 12, wherein the clip member (16) has a top surface (16c) that matches with the contours of the body (12).

14. A method of using the writing instrument of any of the preceding claims comprising:

- pushing the clip member (16) on its rear end (16f) toward the recess (12a) of the body such that the clip member front end (16e) is lifted at an angle, thereby defining an opening for receiving an object (O),
- attaching the clip member (16) on an upper surface (S) of an object (O).

15. A method for manufacturing the writing instrument of any of claims 1 to 13, wherein the clip member (16), the one or more biasing members (18, 20) and the body (12) are integrally formed through additive manufacturing.

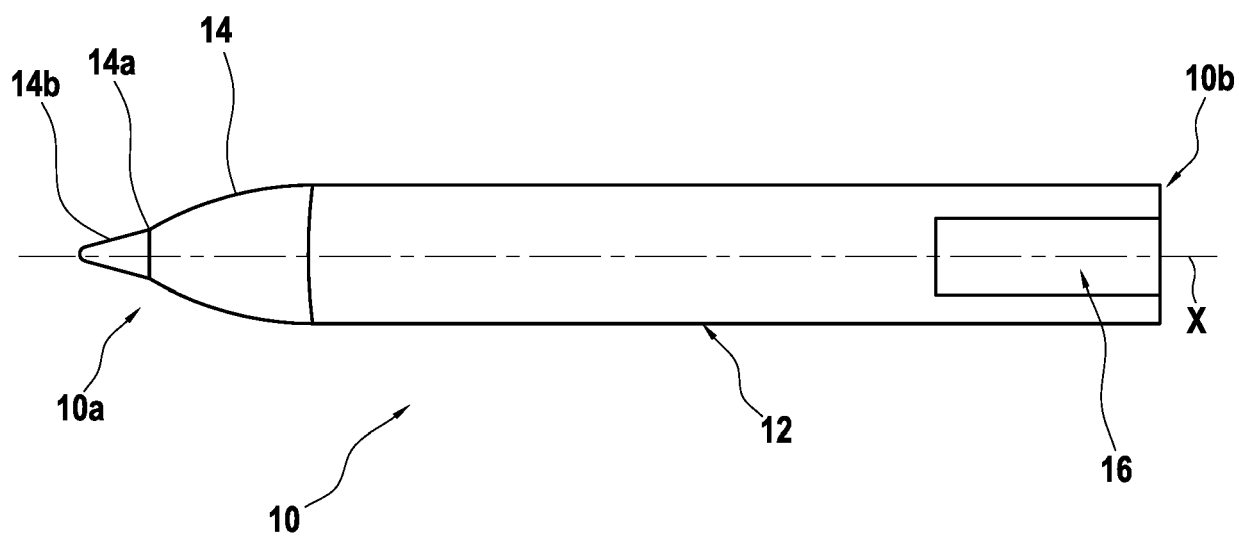


FIG. 1

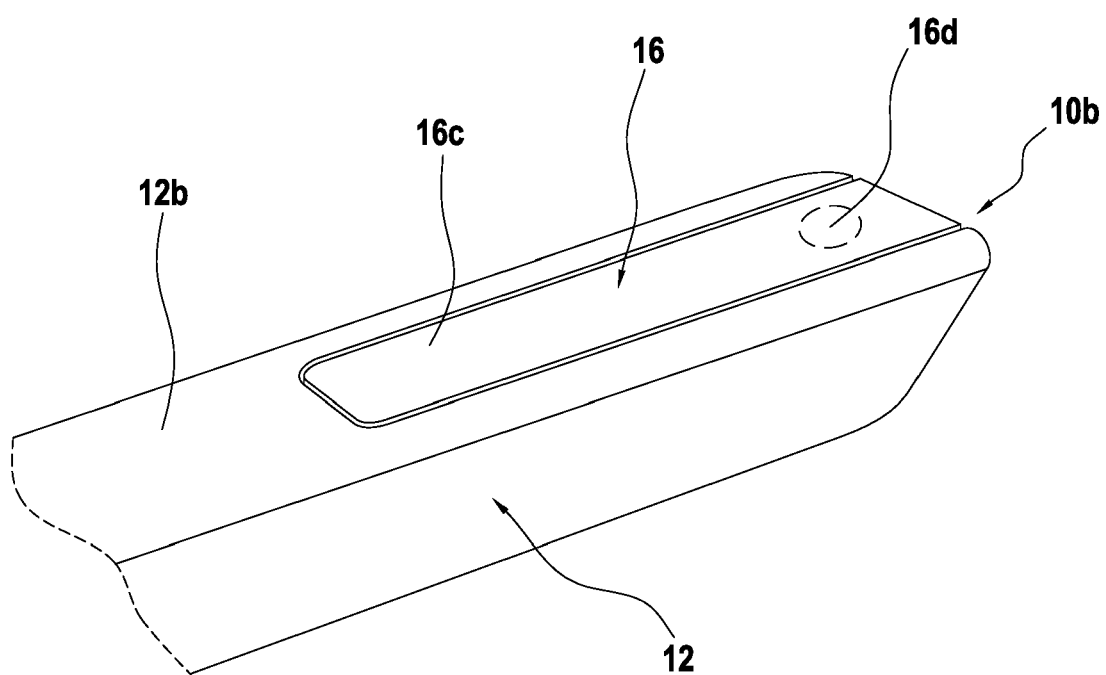


FIG. 2A

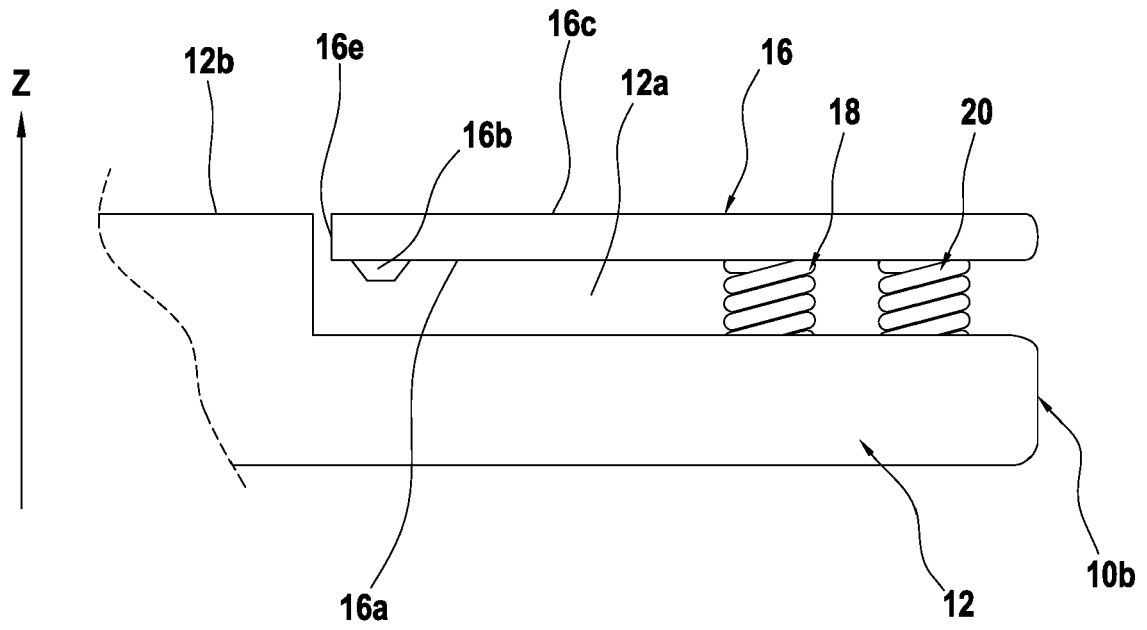


FIG. 2B

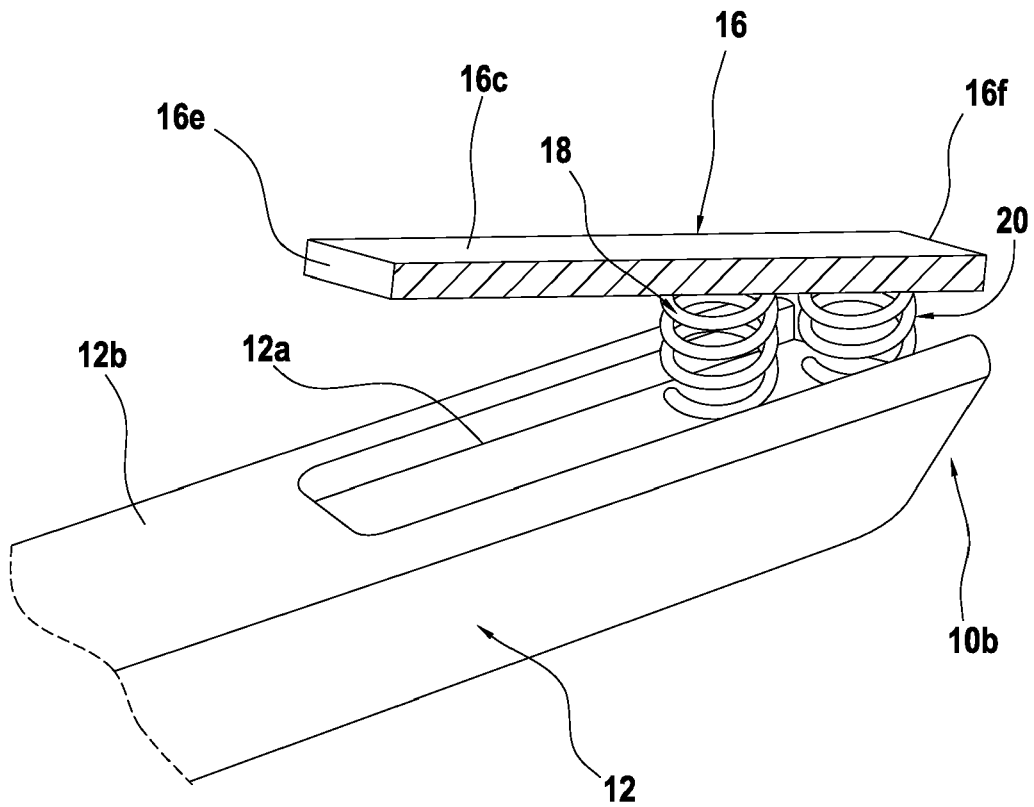


FIG. 3A

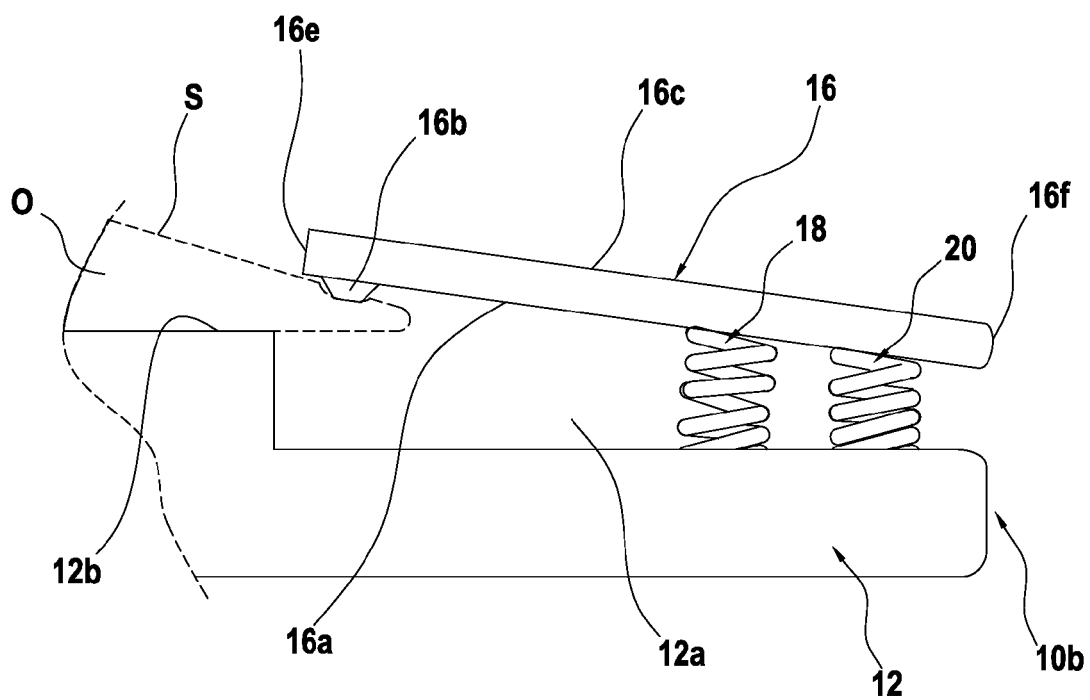


FIG. 3B

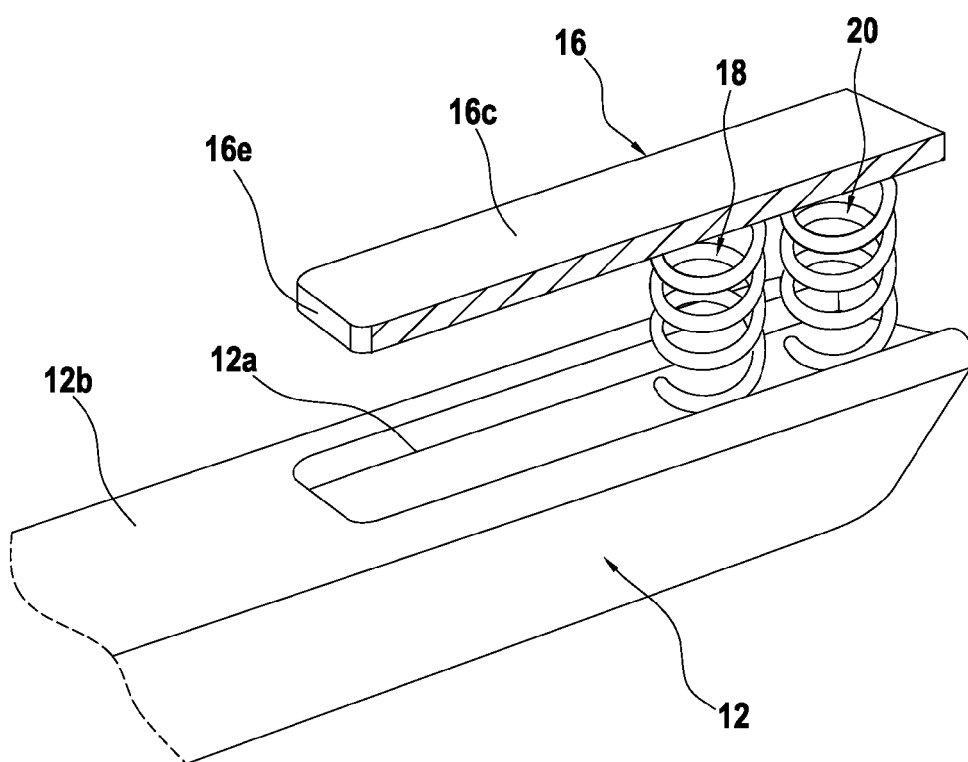


FIG. 4A

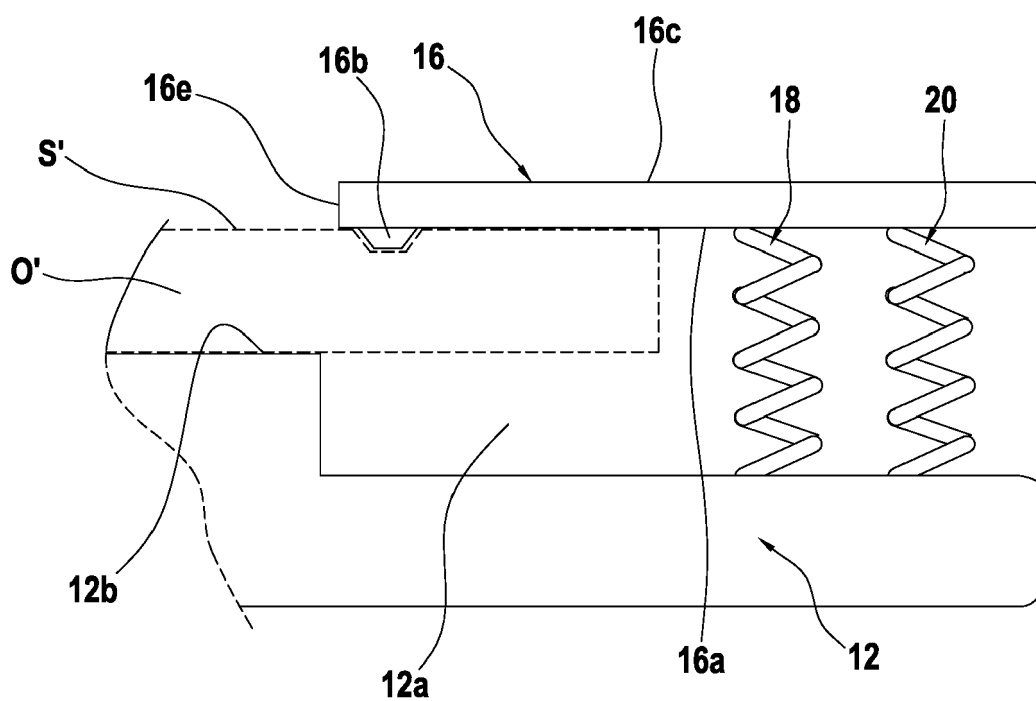


FIG. 4B



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