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(54) **RECEIVER EXTENSION AND A METHOD OF MANUFACTURING IT**

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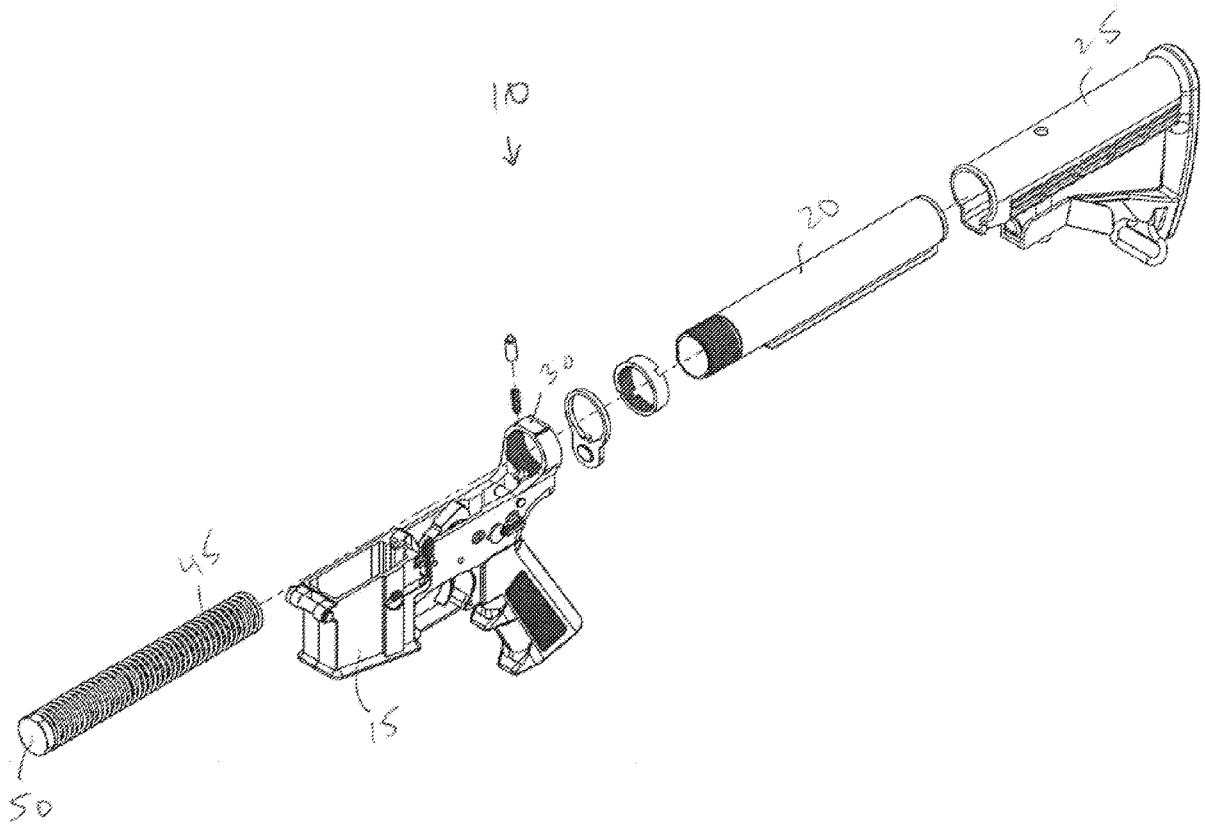
CPC ***B21D 51/16*** (2013.01); ***F41A 3/66*** (2013.01); ***B21C 23/08*** (2013.01)

(57) **ABSTRACT**

A method for manufacturing is disclosed. The method forms a hollow pipe using an extrusion process, the hollow pipe contains a main body, a through aperture, and a protrusions running along the entire length of the main body, forms internal threads inside the through aperture, forms an elongated bottom member from the protrusion, wherein the elongated bottom member contains a recessed channel and one or more recesses, wherein the elongated bottom member runs along a portion of the main body, forms external threads along the main body.



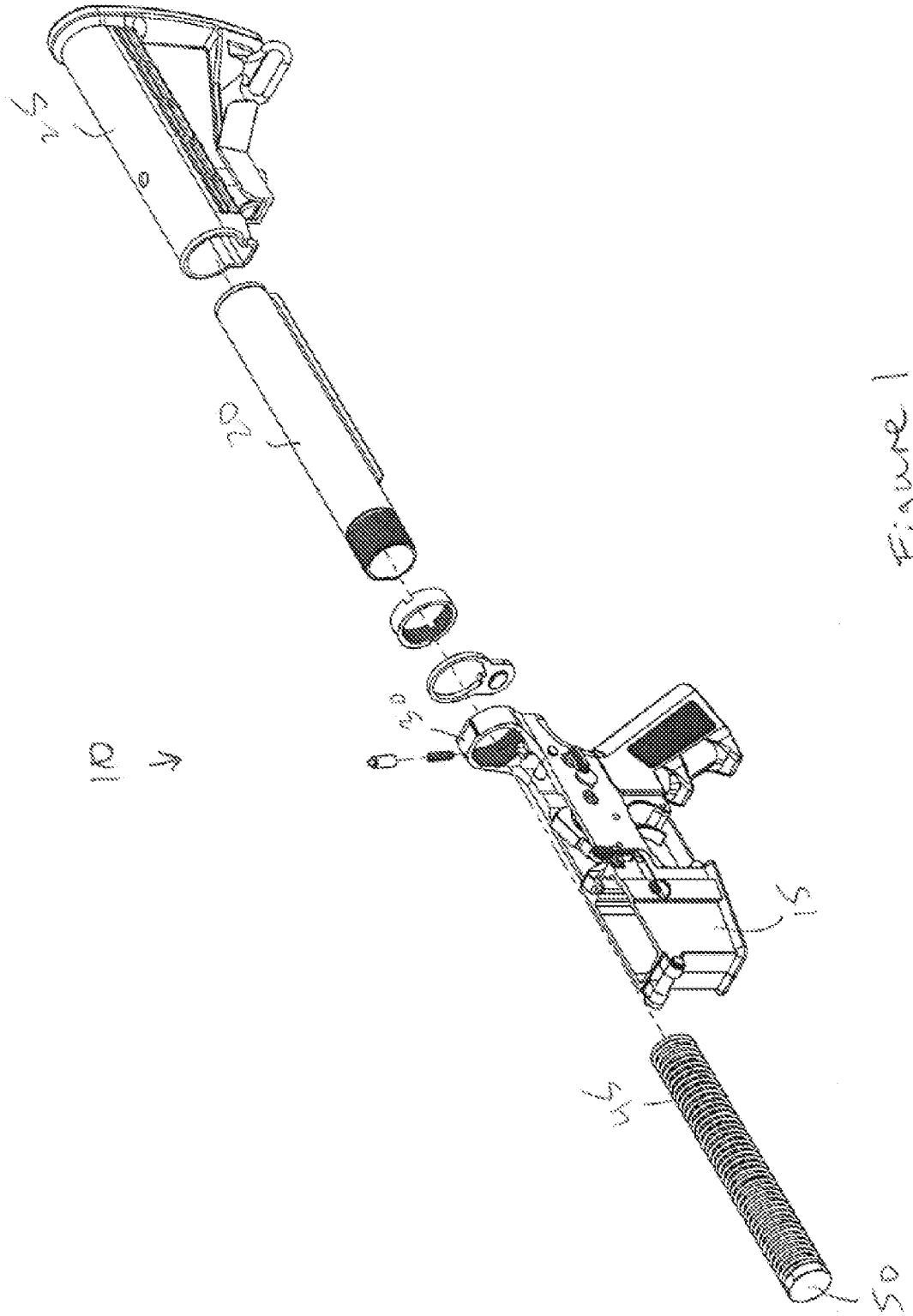


Figure 1

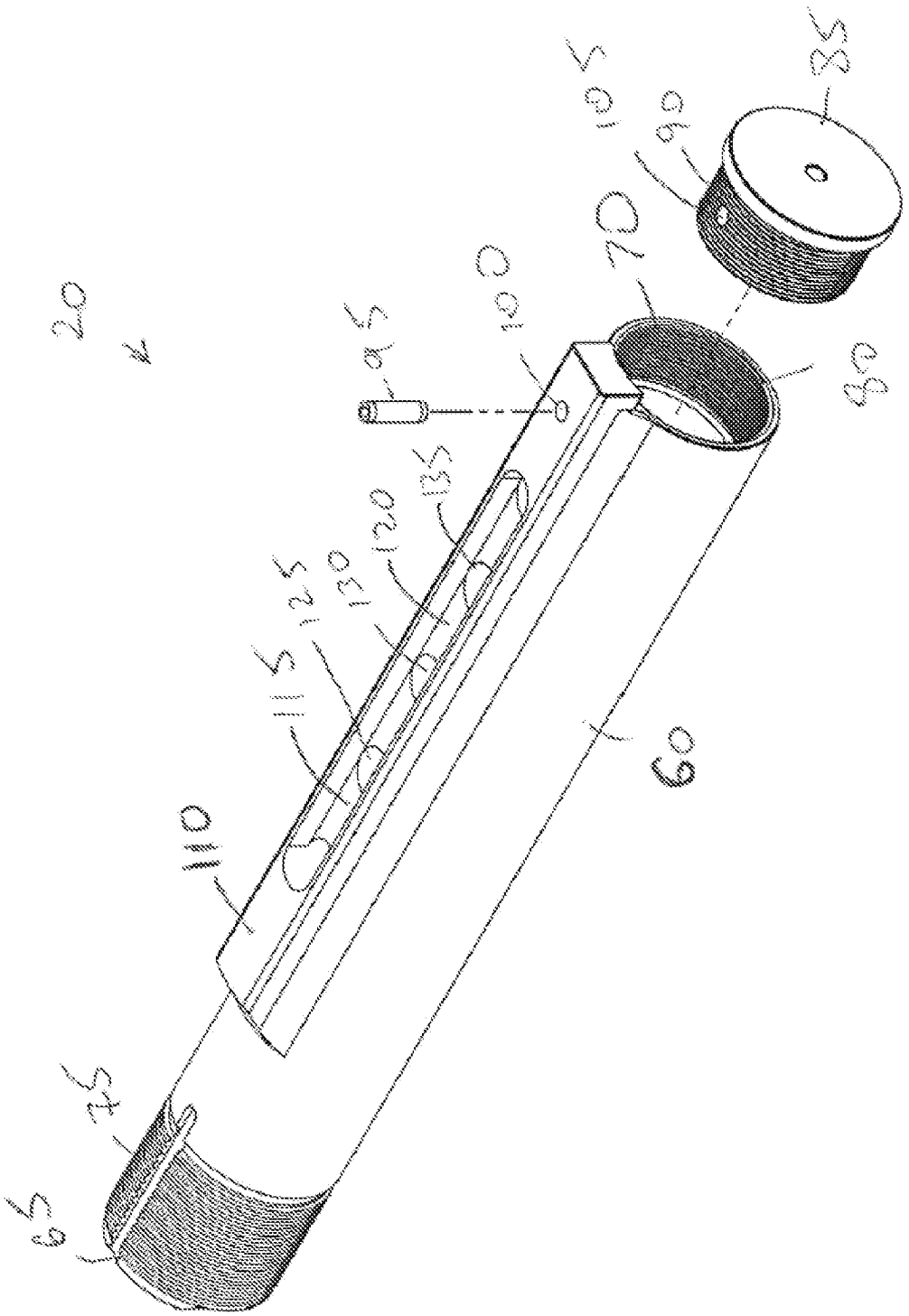


Figure 2

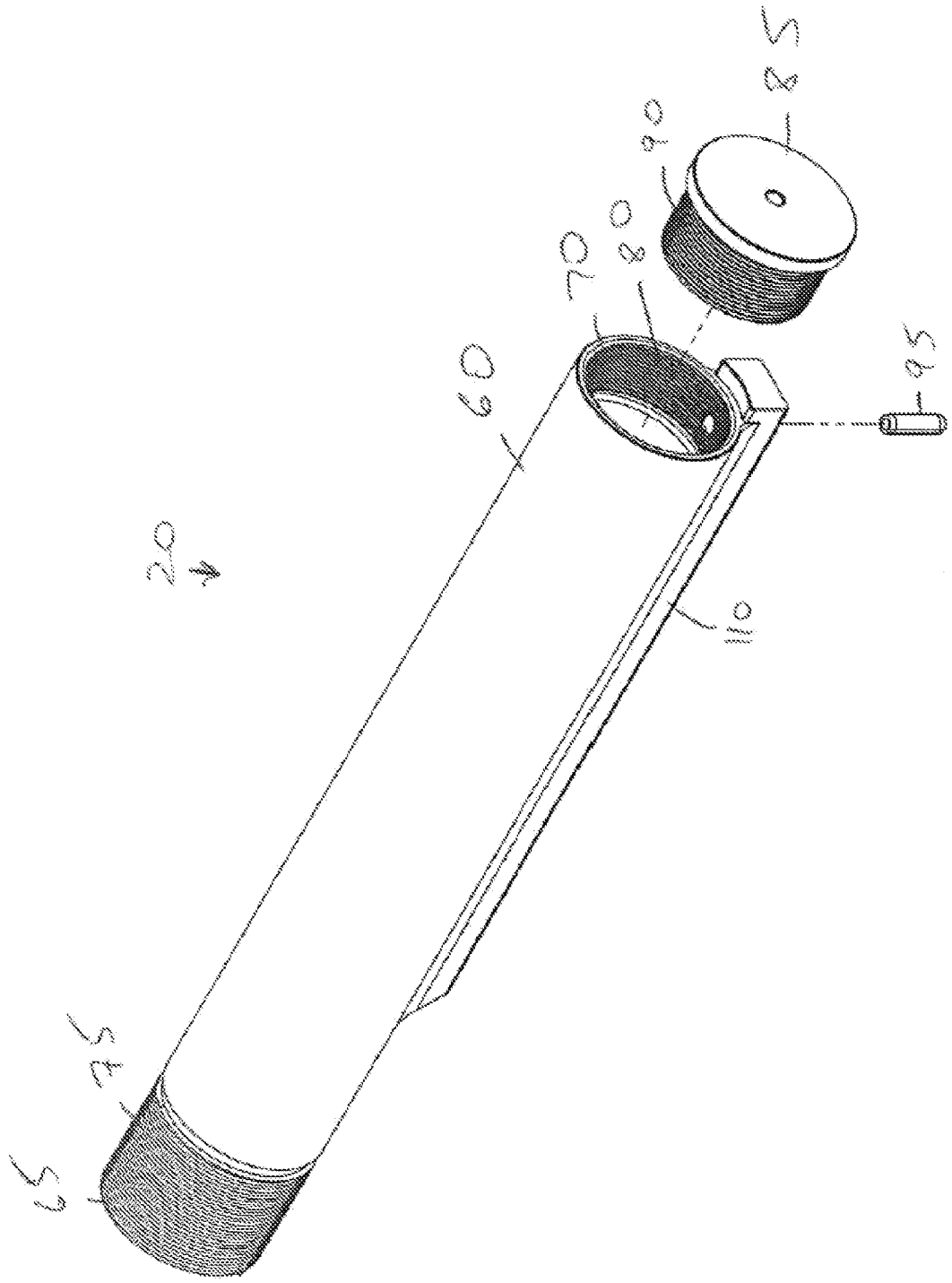


FIGURE 3

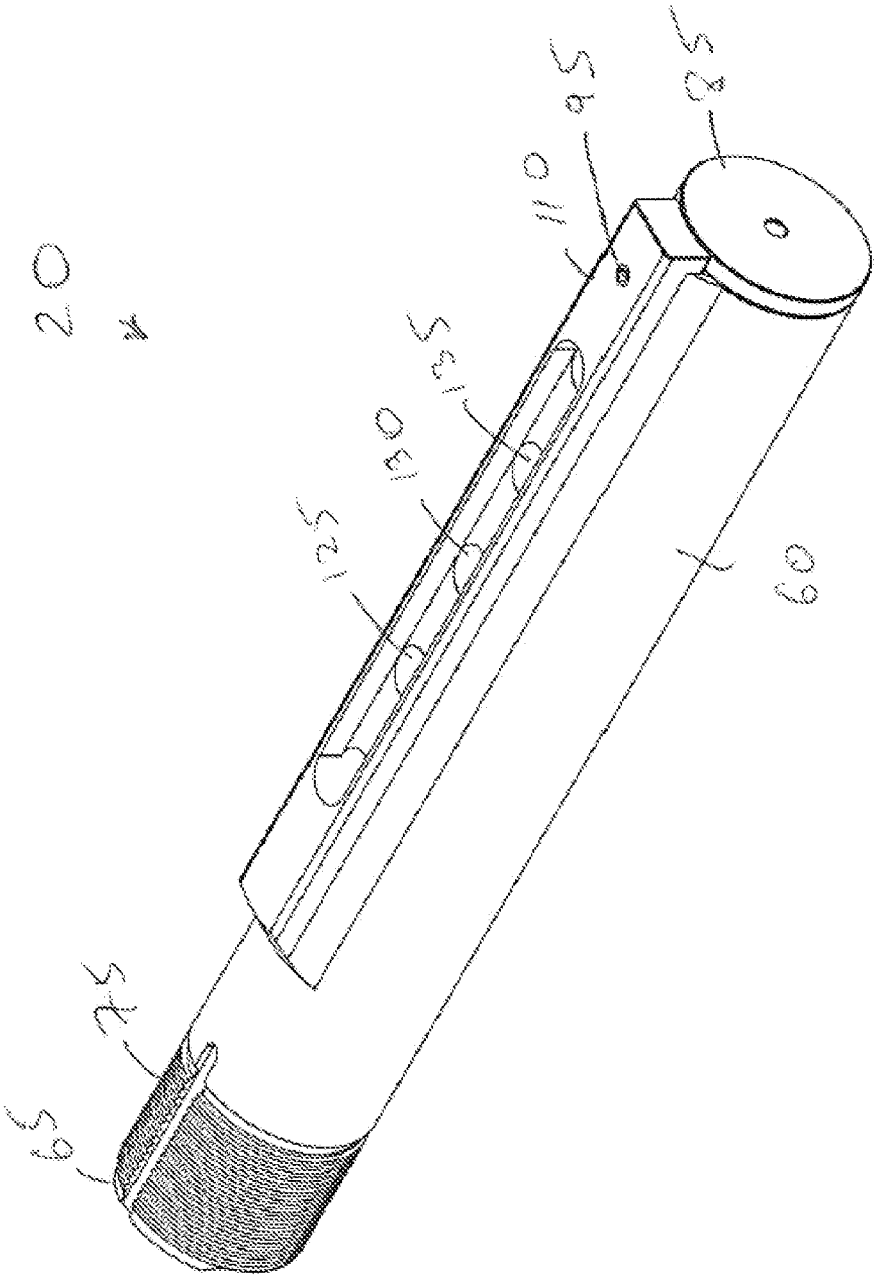


Figure 4

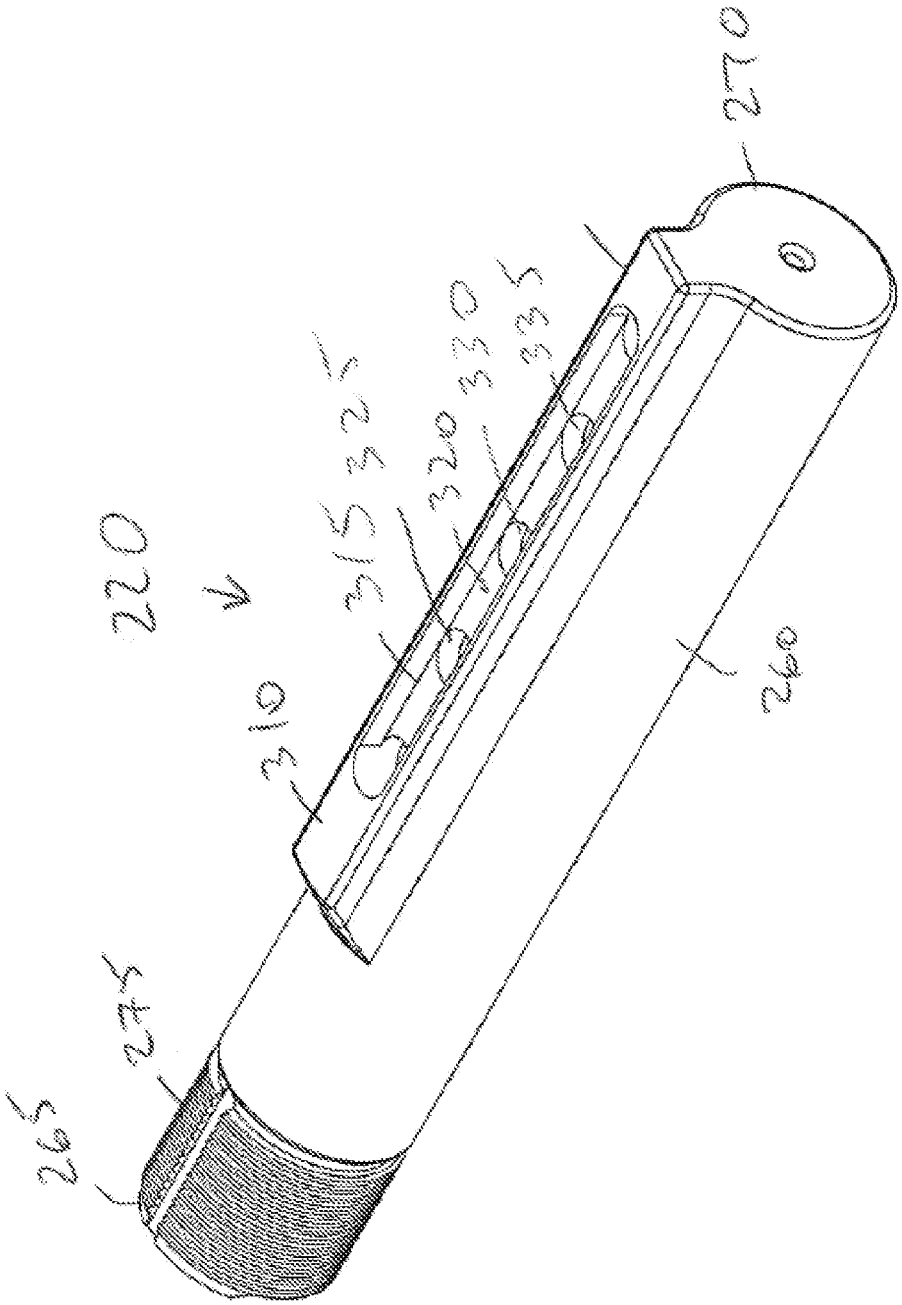


Figure 5

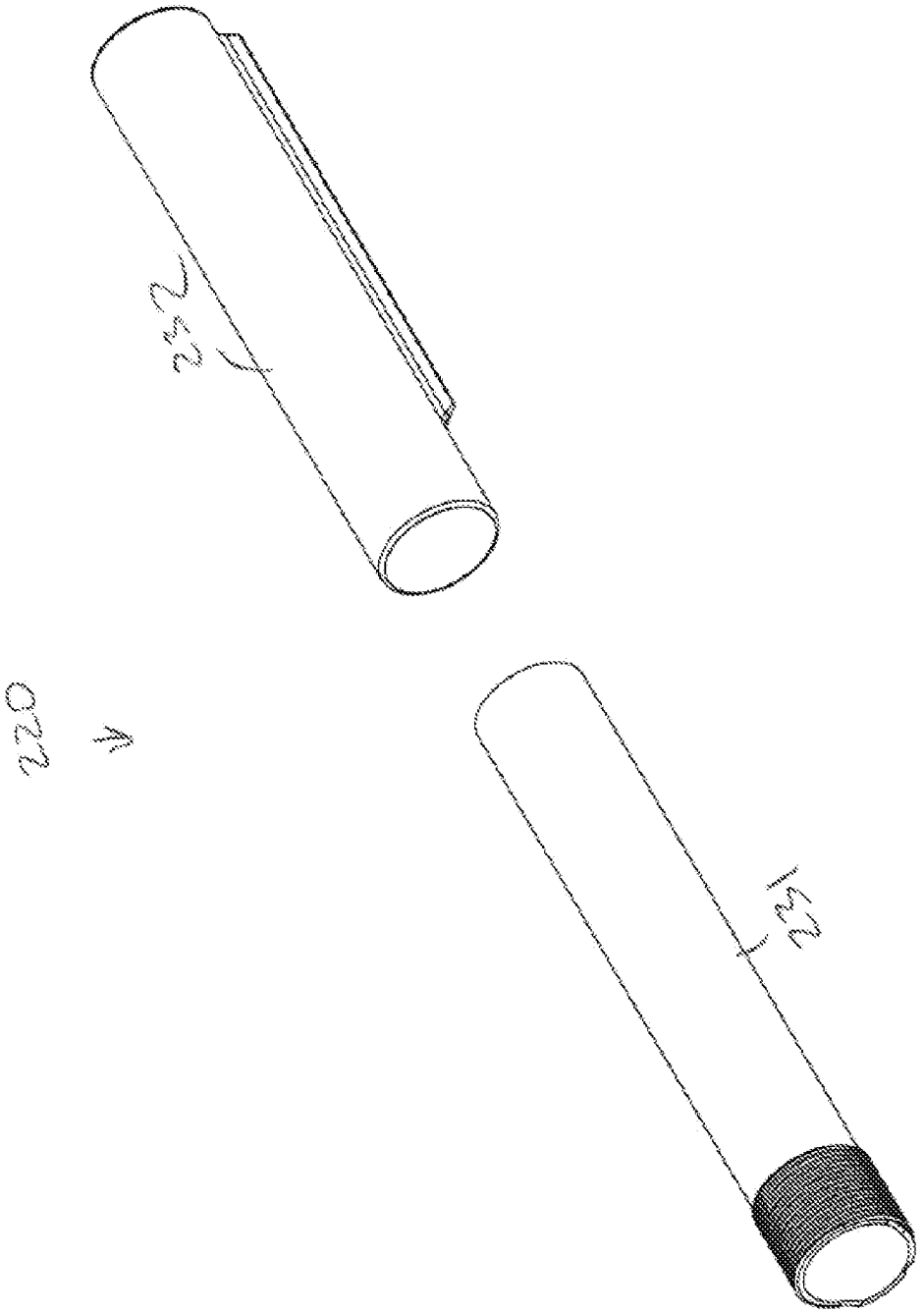


Figure 6

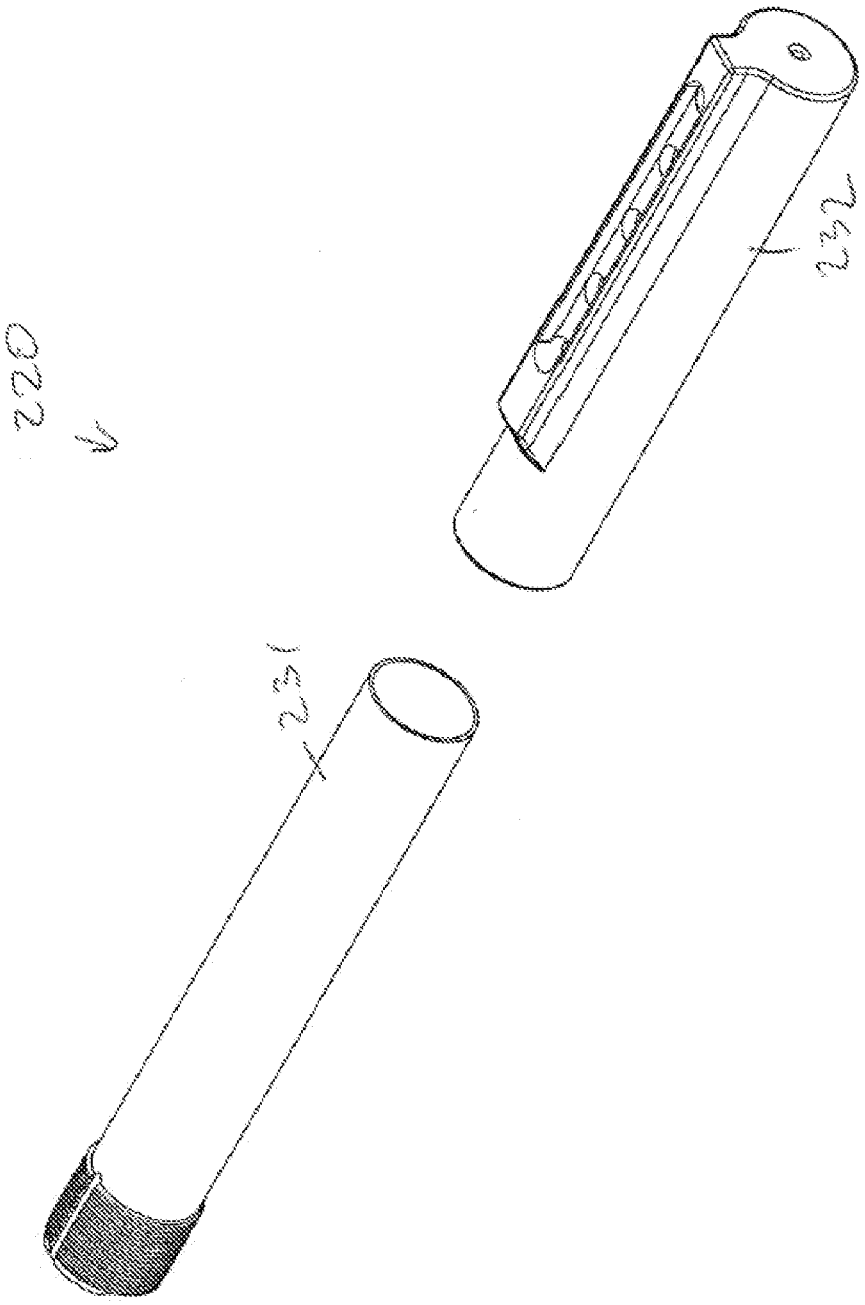


Figure 7

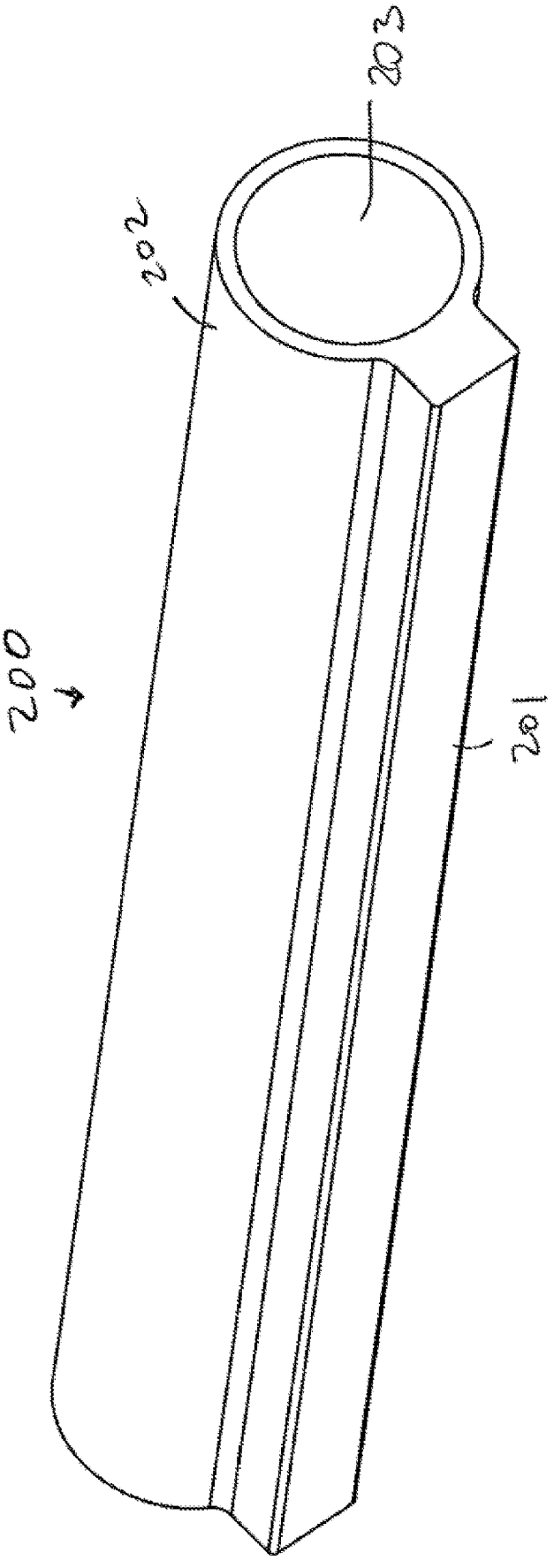


Figure 8

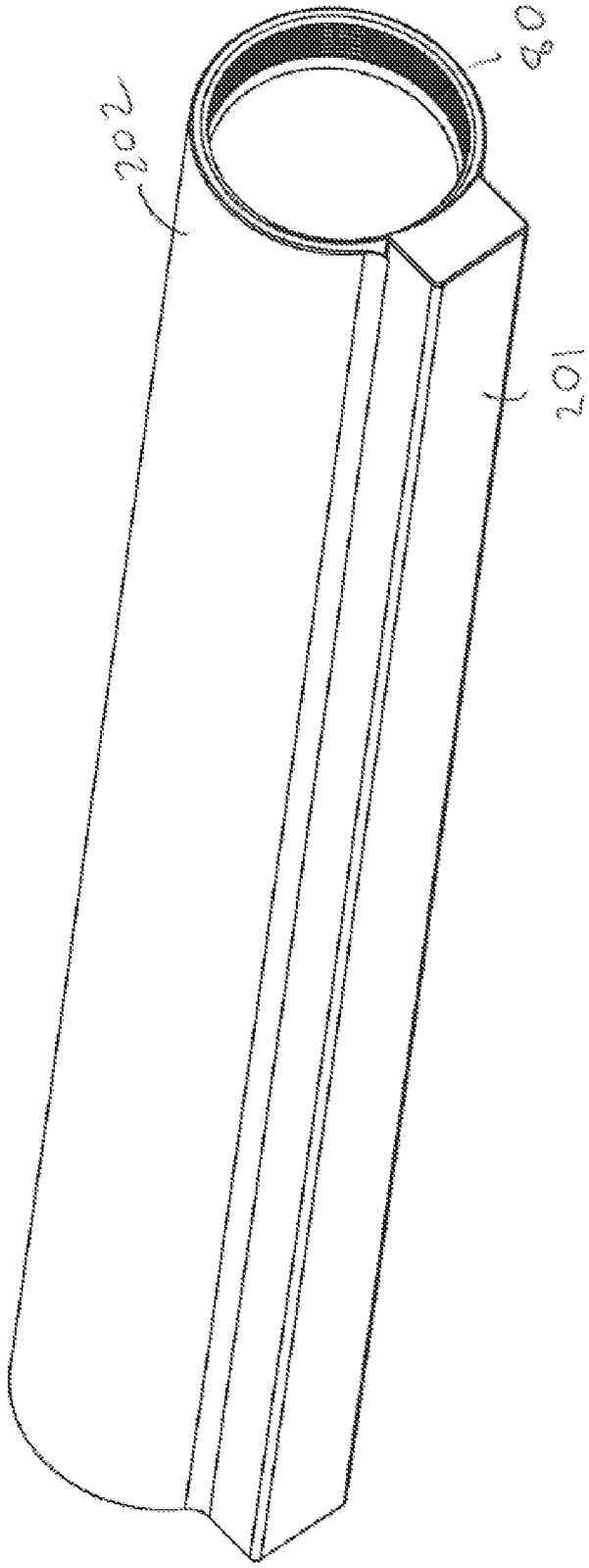


Figure 9

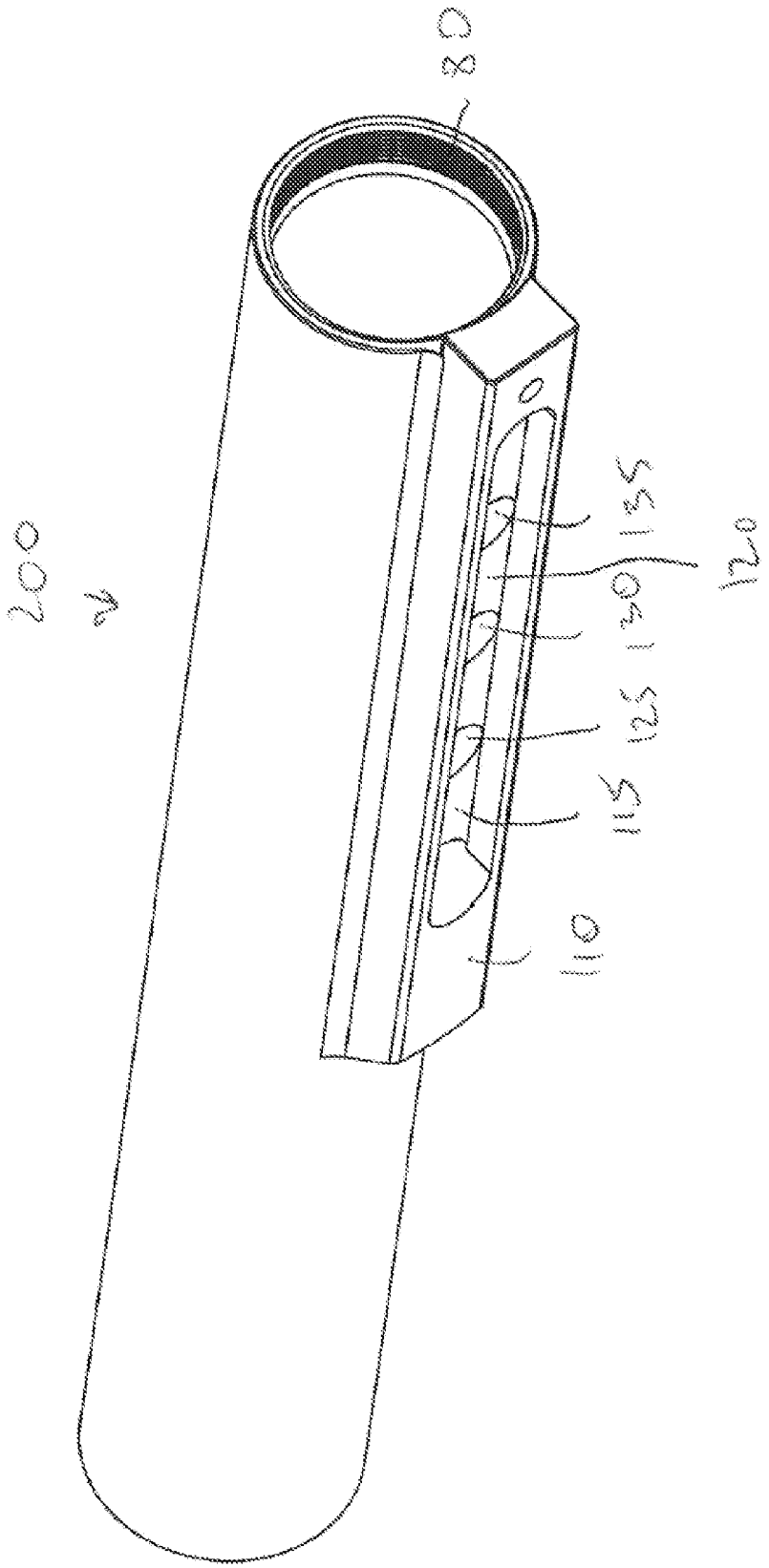


Figure 10

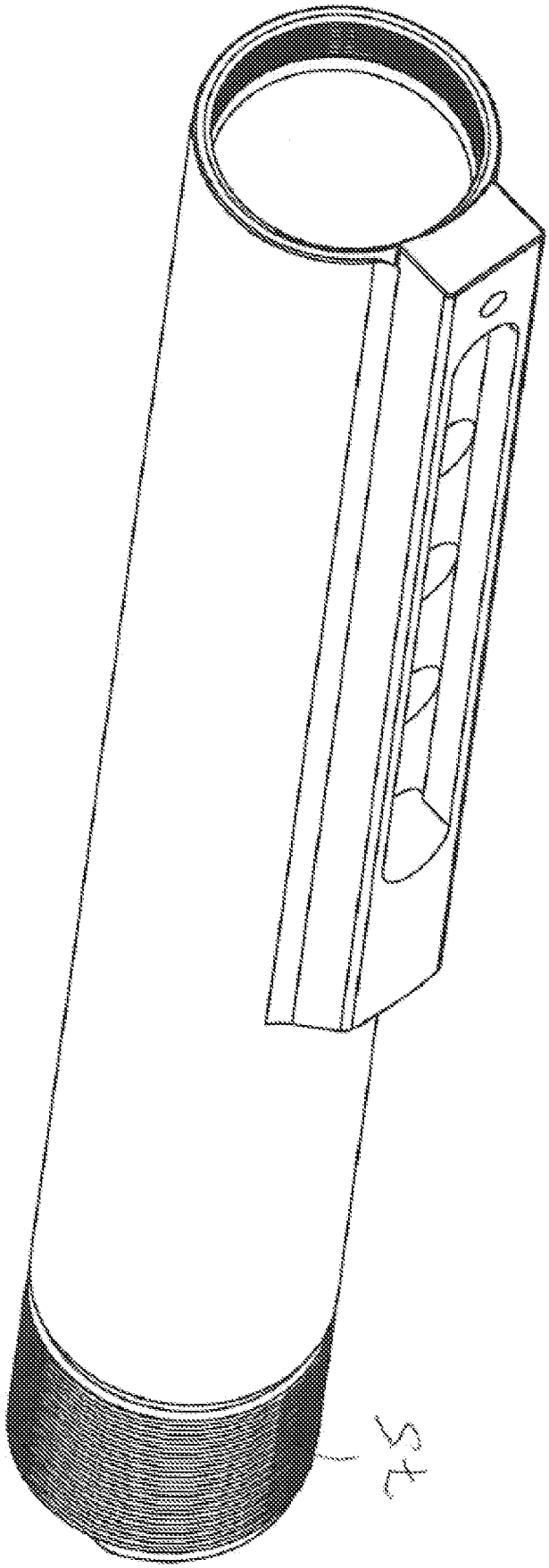


Figure 11

RECEIVER EXTENSION AND A METHOD OF MANUFACTURING IT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 63/108,310, filed on Oct. 31, 2020, which is incorporated herein by reference in its entirety.

FIELD

[0002] The present invention relates to firearm manufacture. More particularly, the present invention relates to a firearm receiver extension and a method of manufacturing it.

BACKGROUND

[0003] The AR15/M16 family of firearms and their derivatives, have butt stocks that are attached to the weapon by means of a tube which projects from the rear of the weapon, known as the buffer tube. Buffer tubes typically have a series of even spaced holes along the bottom of the tube, and the butt stock is secured by a pin that engages within one of the holes. The spaced holes allow the user to adjust the position of the butt stock to shorten or lengthen the total length of the weapon, or more importantly the distance from the back of the weapon, the butt plate, to the trigger and sight of the weapon to accommodate different sized users. A shorter user will desire a shorter distance from the butt plate to the trigger and sight than a taller user. A properly sized weapon will improve the users ability to aim and fire the weapon There are a number of common problems with prior art buffer tubes, including they are expensive to manufacture. Therefore, a need exists for a better type of buffer tube for firearms.

BRIEF DESCRIPTION OF THE FIGS

[0004] FIG. **1** depicts an exploded, partial view of a firearm according to some embodiments presently disclosed.

[0005] FIG. **2** depicts an exploded view of a receiver extension according to some embodiments presently disclosed.

[0006] FIG. **3** depicts an exploded view of a receiver extension according to some embodiments presently disclosed.

[0007] FIG. **4** depicts a receiver extension according to some embodiments presently disclosed.

[0008] FIG. **5** depicts a receiver extension according to some embodiments presently disclosed.

[0009] FIG. **6** depicts a receiver extension according to some embodiments presently disclosed.

[0010] FIG. **7** depicts a receiver extension according to some embodiments presently disclosed.

[0011] FIGS. **8-11** depict a process according to some embodiments presently disclosed.

DETAILED DESCRIPTION

[0012] In the following description, numerous specific details are set forth to clearly describe various specific embodiments disclosed herein. One skilled in the art, however, will understand that the presently claimed invention may be practiced without all of the specific details discussed below. In other instances, well known features have not been described so as not to obscure the invention.

[0013] Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Unless limited otherwise, the terms "connected," "coupled," and "mounted," and variations thereof herein are used broadly and encompass direct and indirect connections, couplings, and mountings. In addition, the terms "connected" and "coupled" and variations thereof are not restricted to physical or mechanical connections or couplings.

[0014] Referring to FIG. **1**, an exploded view of a portion of a firearm **10** is shown according to some embodiments presently disclosed. The firearm **10** may comprise a lower receiver **15**.

[0015] The lower receiver **15** comprises an upwardly extending lobe **30**. According to some embodiments, the upwardly extending lobe **30** is used to mount a buttstock **25** to the lower receiver **15** and is used to align a receiver extension (i.e. buffer tube) **20** with a bolt carrier (not shown) housed within an upper receiver (not shown). The receiver extension **20** generally houses an action (or recoil) spring **45** and a buffer assembly **50** (shown in FIG. **1**). Upon discharge of a round, the bolt carrier within the upper receiver is driven rearward by action of the gas discharged by the firing action. The buffer assembly **50** and the action spring **45** dampen the kickback experienced by a user while also redirecting the firing mechanism back toward the chamber in preparation for firing another round.

[0016] Referring to FIGS. **2-4**, the receiver extension (i.e. buffer tube) **20** is shown according to some embodiments presently disclosed. The buffer tube **20** comprises a housing **60**. The housing **60** comprises a first open end **65** and a second open end **70**. The first open end **65** may comprise an external thread **75** for coupling the buffer tube **20** with the upwardly extending lobe **30**. The buffer tube **20** may further comprise an end cap **85** coupled with the second end **70**. According to some embodiments, the end cap **85** is removably coupled with the second end **70**.

[0017] The second open end **70** may comprise an internal thread **80** for coupling the buffer tube **20** with an external thread **90** of the cap **85**. According to some embodiments, the buffer tube **20** may comprise a fastener **95** for coupling the housing **60** with the cap **85**. The housing **60** may comprise an aperture **100** for accommodating the fastener **95**. The end cap **85** may comprise an aperture **105** for accommodating the fastener **95**.

[0018] According to some embodiments, the buffer tube **20** may comprise an elongated bottom member **110** provided with a downwardly facing recessed channel **115** exposing a flat surface **120** formed with a lock receiving structure. The lock receiving structure may be defined by a series of spaced a part cylindrical latch pin receiving recesses **125**, **130**, **135** which serve to establish different axial positions for the sliding stock **25** along the buffer tube **20**.

[0019] According to some embodiments presently disclosed, the buffer tube **20** may be formed using the following process. According to some embodiments, an extrusion process is used to push a first material through a die to form shape **200** (shown in FIG. **8**). The first material may be aluminum, metal, steel, and/or polymer. According to some embodiments, the shape **200** may be cut to desired length. According to some embodiments, the shape **200** is machined

to form the housing **60** as shown in FIG. **2**. According to some embodiments, the shape **200** is machined to form internal threads **80** as shown in FIG. **9**. According to some embodiments, the shape **200** is machined to form the elongated bottom member **110**, the recessed channel **115** and the cylindrical latch pin receiving recesses **125**, **130**, **135** as shown in FIG. **10**. According to some embodiments, the shape **200** is machined to form external thread **75** as shown in FIG. **11**.

[0020] According to a method presently disclosed, the buffer tube **20** may be formed using the following process. According to some embodiments, forming a first shape **200** as shown in FIG. **8**. The first shape **200** may be formed using an extrusion process where a first material is heated and pushed through a die to form shape **200**. The first shape **200** comprises a main body **202** and a protrusion **201** running along the entire length of the main body **202**. The first material may be aluminum, metal, steel, and/or polymer. According to some embodiments, the first shape **200** may be cut to desired length. According to some embodiments, the main body **202** is a hollow cylinder. According to some embodiments, the main body **202** comprises a through aperture **203**.

[0021] According to some embodiments, a second shape **200** formed as shown in FIG. **9**. The second shape **200** may be formed by providing internal threads **80** as shown in FIG. **9**. The internal thread **80** may be formed using a machining process. The internal thread **80** may be machined. The internal thread **80** are formed in the aperture **203**. The internal thread **80** are formed along a portion of an internal surface of the aperture **203**.

[0022] According to some embodiments, a third shape **200** may be formed as shown in FIG. **10**. The third shape **200** is formed by providing the elongated bottom member **110**, the recessed channel **115** and the cylindrical latch pin receiving recesses **125**, **130**, **135** as shown in FIG. **10**. The elongated bottom member **110** may be formed by machining the protrusion **201**. The recessed channel **115** and the cylindrical latch pin receiving recesses **125**, **130**, **135** may be formed by machining the elongated bottom member **110**.

[0023] According to some embodiments, a fourth shape **200** may formed as shown in FIG. **11**. The fourth shape **200** may be formed by providing external thread **75** as shown in FIG. **11**. The external thread **75** may be formed using a machining process. The external thread **75** may be machined.

[0024] Referring to FIGS. **5-7**, another receiver extension (i.e. buffer tube) **220** is shown according to some embodiments presently disclosed. The buffer tube **220** comprises a housing **260**. The housing **260** comprises a first open end **265** and a second closed end **270**. The first open end **165** may comprise and external thread **275** for coupling the buffer tube **220** with the upwardly extending lobe **30**.

[0025] According to some embodiments, the buffer tube **220** may comprise an elongated bottom member **310** provided with a downwardly facing recessed channel **315** exposing a flat surface **320** formed with a lock receiving structure. The lock receiving structure may be defined by a series of spaced a part cylindrical latch pin receiving recesses **325**, **330**, **335** which serve to establish different axial positions for the sliding stock **25** along the buffer tube **220**.

[0026] According to some embodiments presently disclosed, the buffer tube **220** may be formed using the following process. According to some embodiments, a hollow (i.e. cylindrically shaped) pipe **231** is provided made out of first material. The first material may be aluminum, metal, steel, and/or polymer. The pipe **231** is machined to form threads **275**. The pipe **231** is over molded (i.e. covered) with polymer **232** to create the elongated bottom member **310** with the downwardly facing recessed channel **315** and the recesses **325**, **330**, **335**. Although FIGS. **6-7** show pipe **231** and polymer **232** as separate structures, this is only for explanation purposes. It is to be understood that polymer **232** is formed over the pipe **231** and cannot be removed from the pipe **231** once formed.

[0027] According to some embodiments presently disclosed, the first material is steel, aluminum, metal, polymer, and/or sintered metal powder. According to some embodiments presently disclosed, the second material is steel, aluminum, metal, polymer, and/or sintered metal powder. According to some embodiments presently disclosed, the first melting point is lower than the second melting point.

[0028] While several illustrative embodiments of the invention have been shown and described, numerous variations and alternative embodiments will occur to those skilled in the art. Such variations and alternative embodiments are contemplated, and can be made without departing from the scope of the invention as defined in the appended claims.

[0029] As used in this specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the content clearly dictates otherwise. The term "plurality" includes two or more referents unless the content clearly dictates otherwise. Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the disclosure pertains.

1. (canceled)

2. A method comprising:

providing a hollow metal pipe;

the non-metallic sleeve comprises an elongated bottom member, wherein the elongated bottom member comprises a recessed channel and one or more recesses.

3. The method of claim **2** further comprises forming external threads on an outer surface of the hollow metal pipe.

* * * * *