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(54) **FIREARM BARREL FOR LEVER ACTION FIREARM**

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(57) **ABSTRACT**

A firearm barrel for a lever action firearm. The firearm barrel has an inner barrel, and outer barrel, and a muzzle keeper. The firearm barrel may also include a gas bushing.

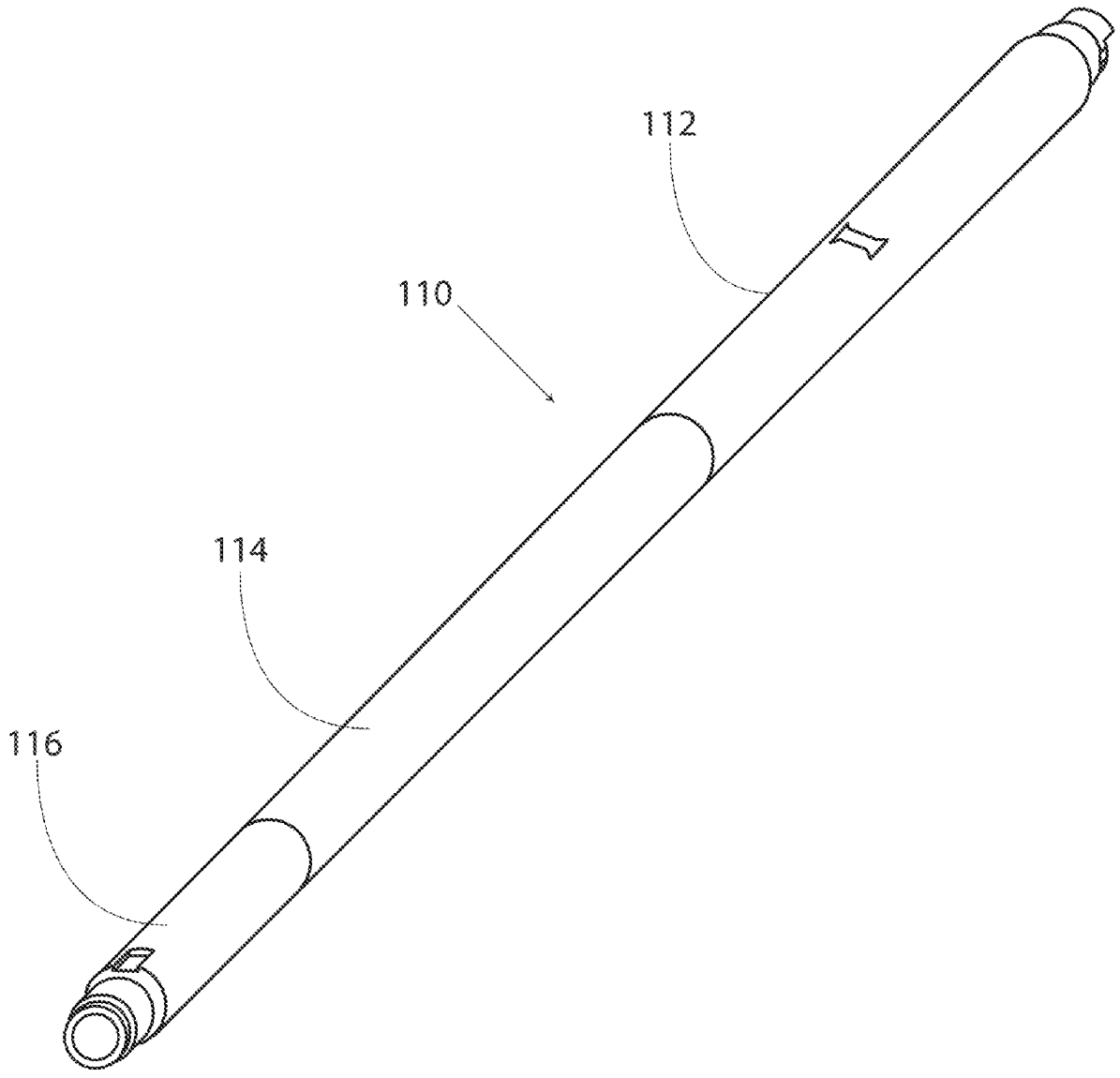

Fig. 1

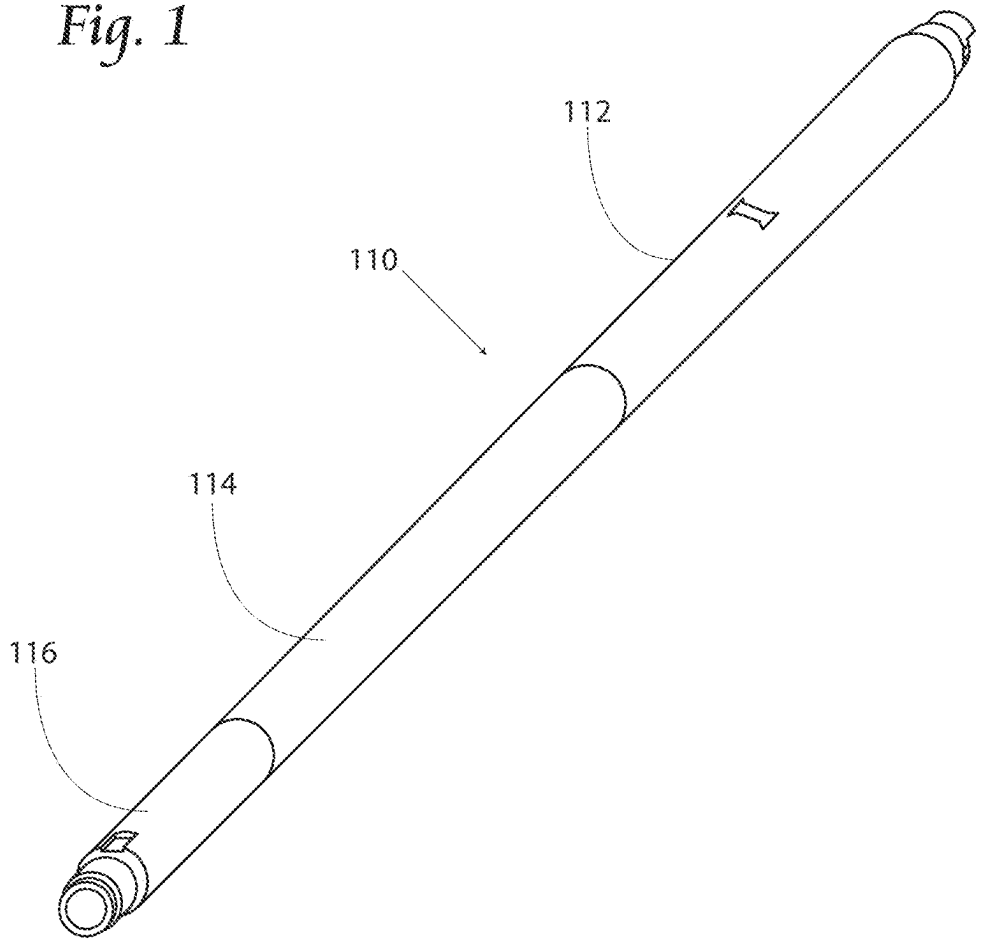

Fig. 2

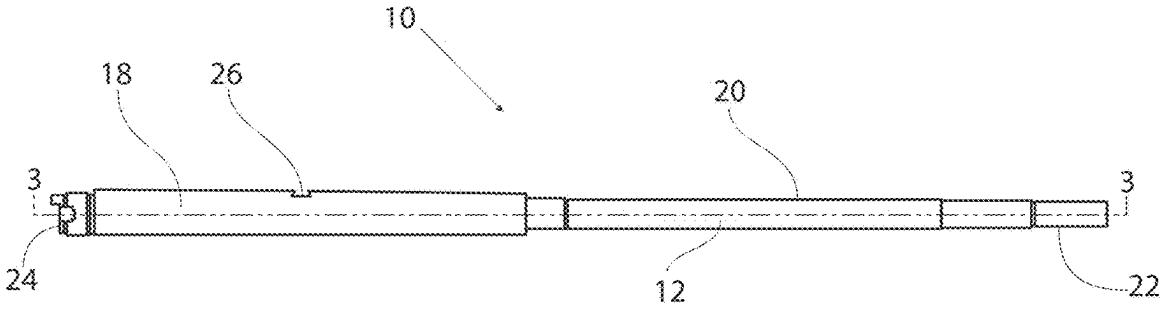

Fig. 3

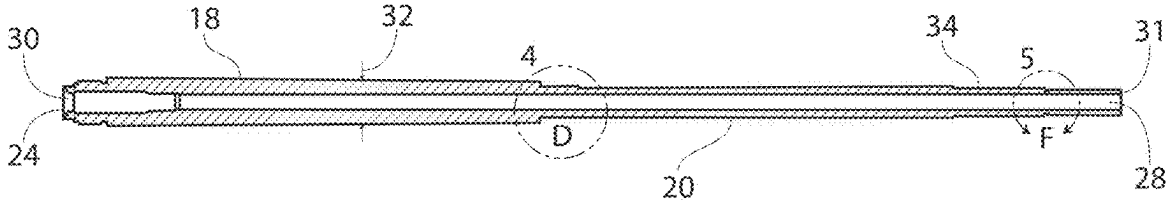

Fig. 4

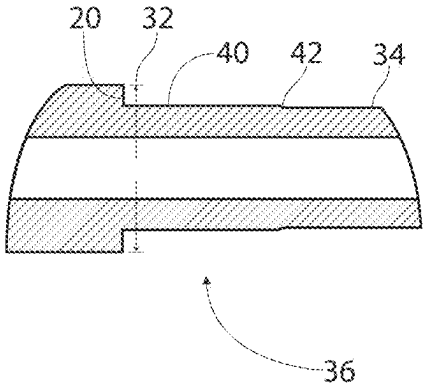

Fig. 5

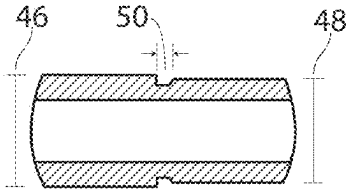

Fig. 6

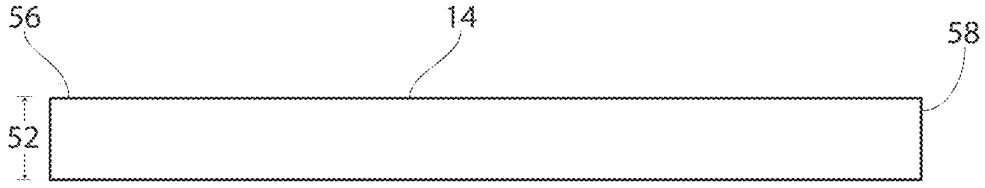

Fig. 6A

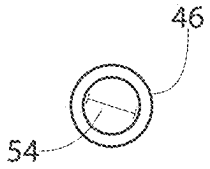

Fig. 7

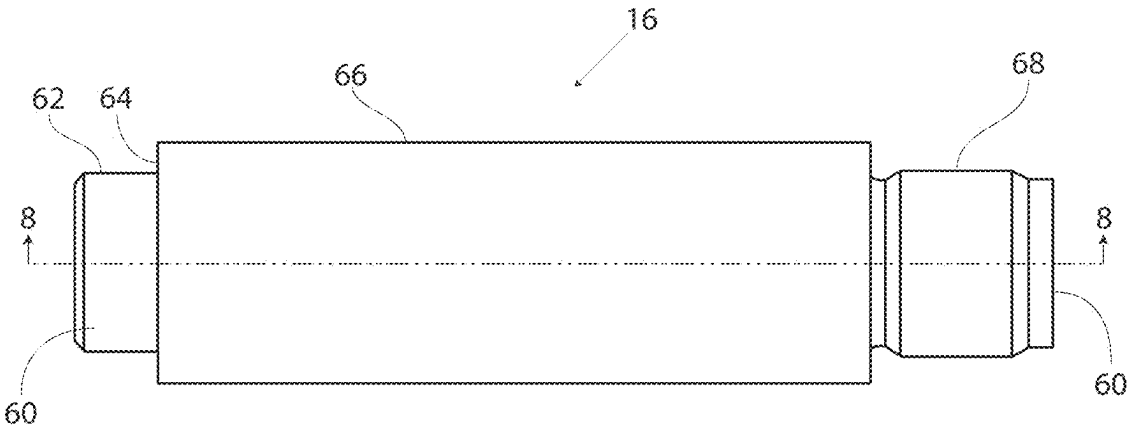

Fig. 7A

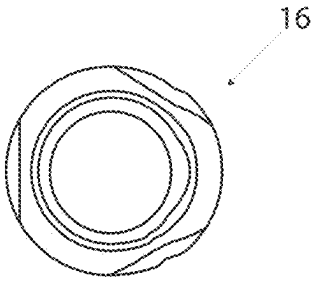

Fig. 8

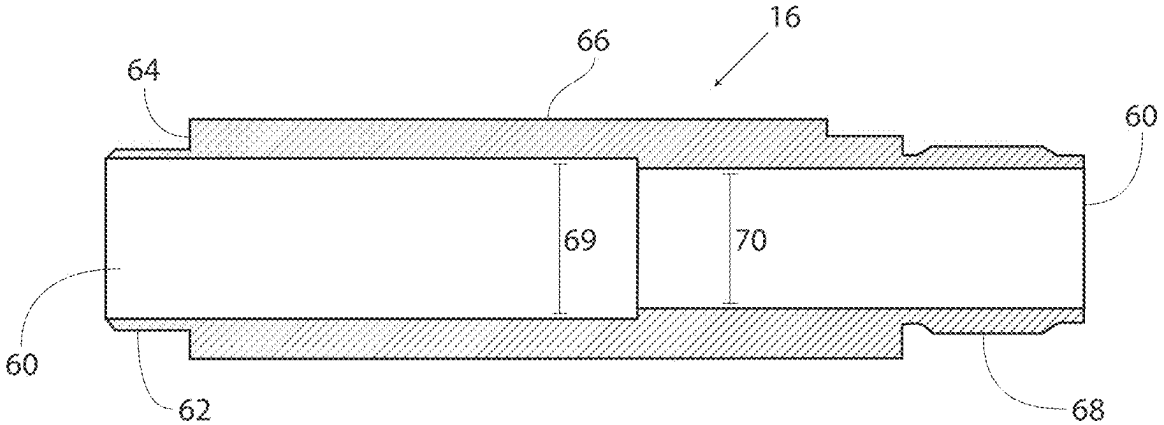

Fig. 9

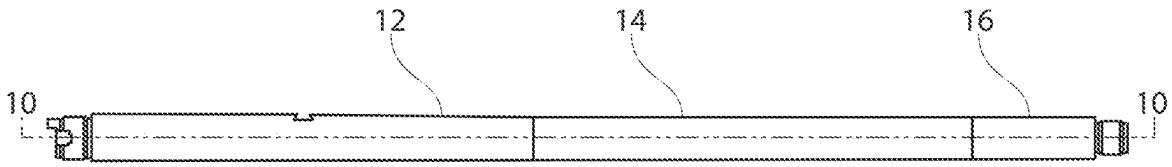

Fig. 10

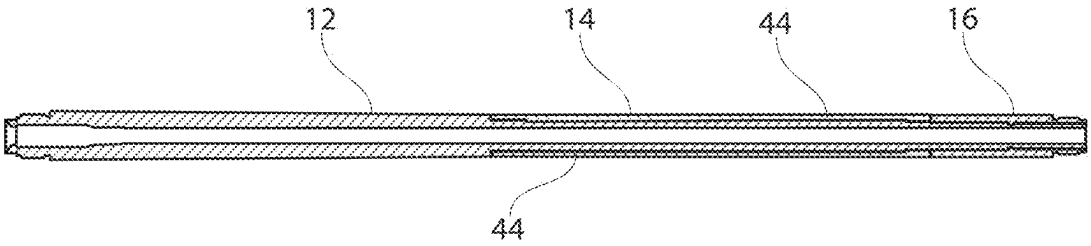

Fig. 11

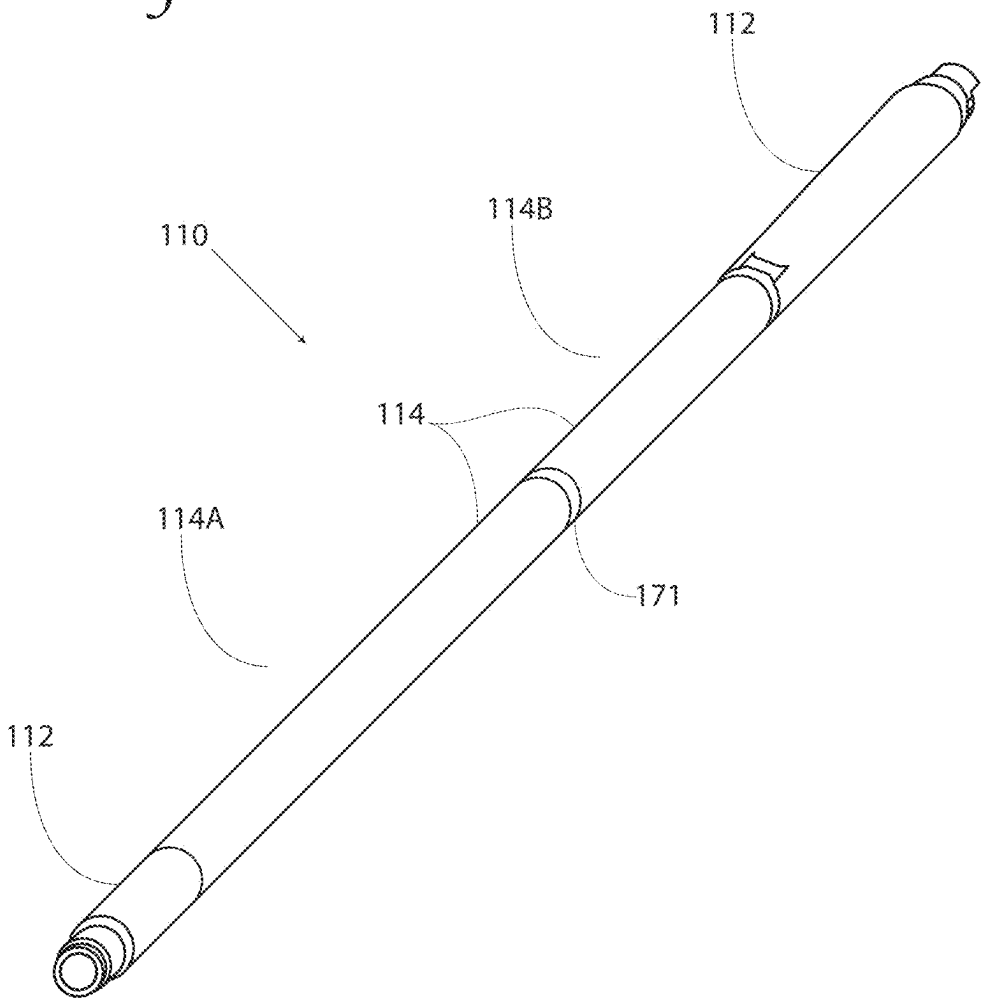

Fig. 12

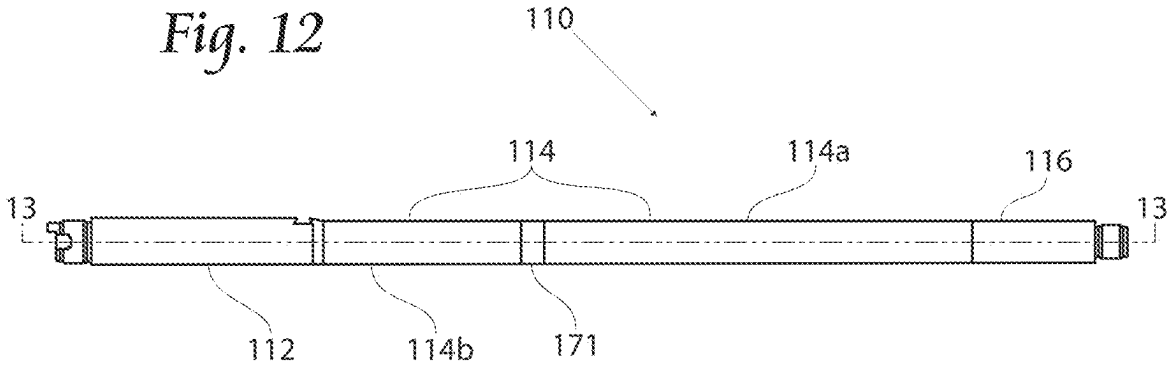
110
114
114a
116
13
13
112
114b
171

Fig. 13

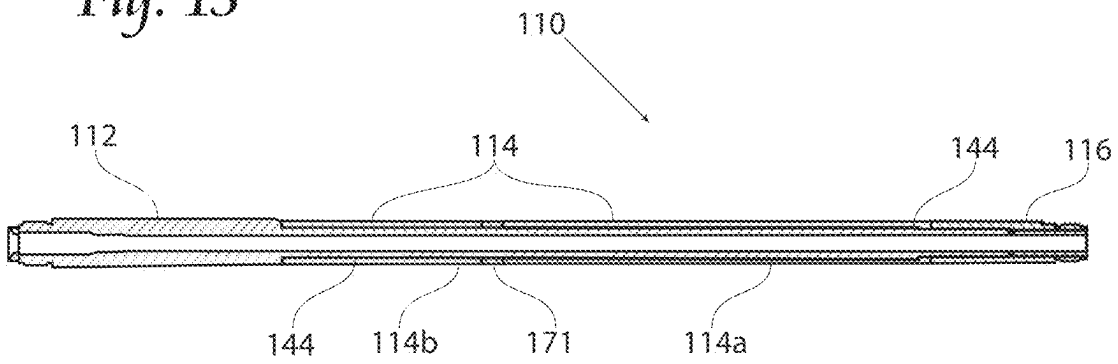
110
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Fig. 14

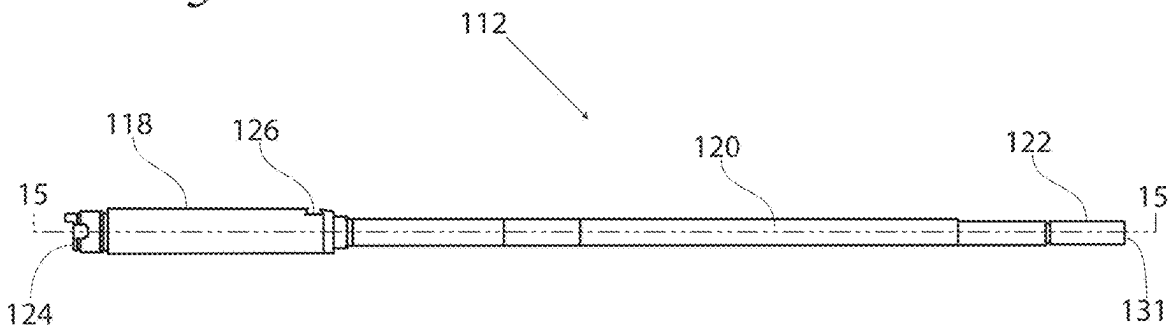
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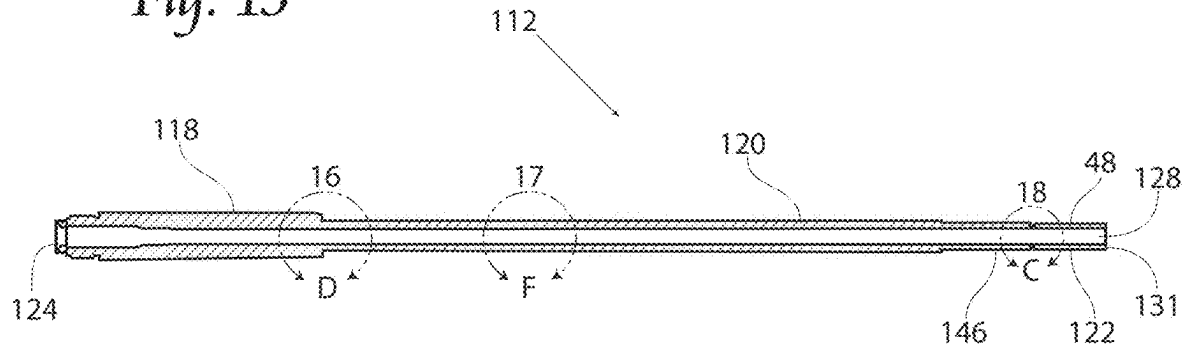
Fig. 15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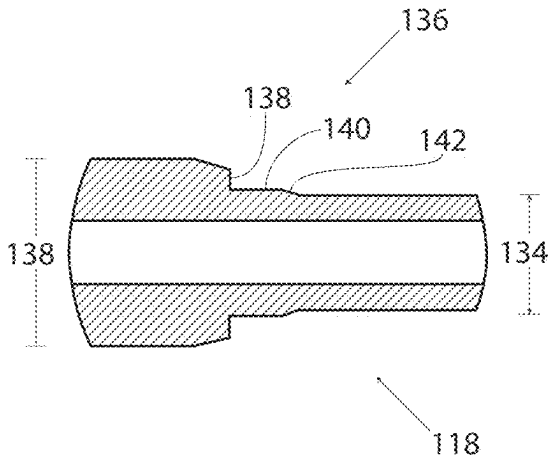
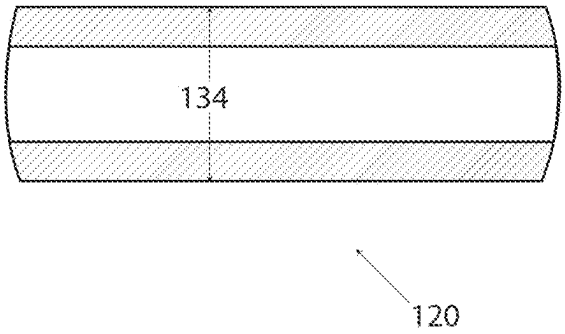


Fig. 16

Fig. 17



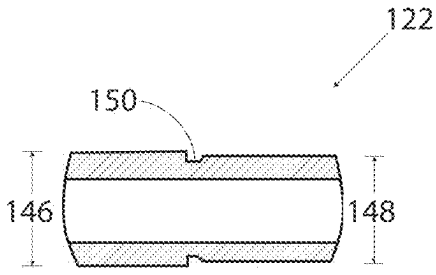


Fig. 18

Fig. 19

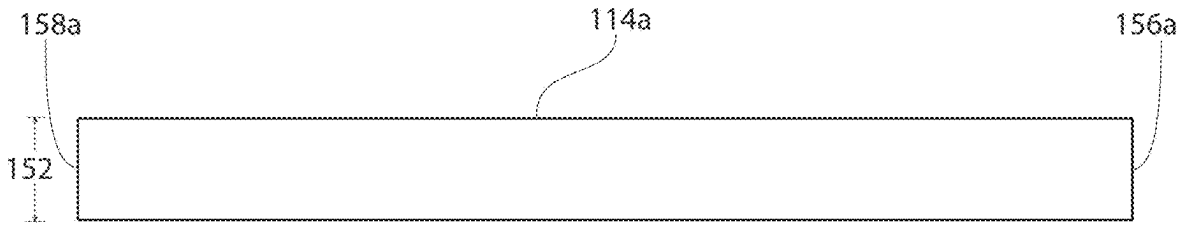


Fig. 19A

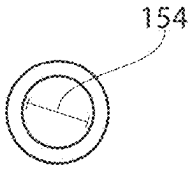


Fig. 20

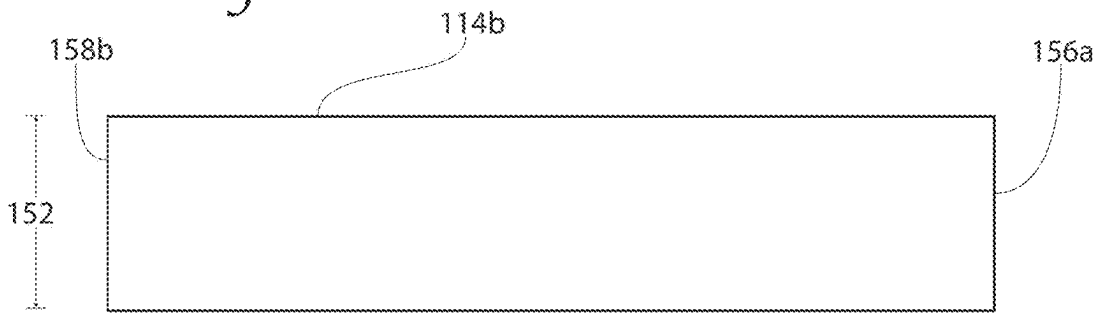
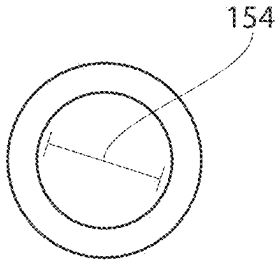


Fig. 20A



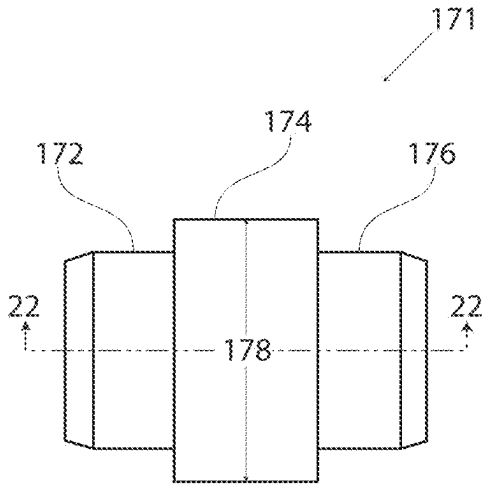


Fig. 21

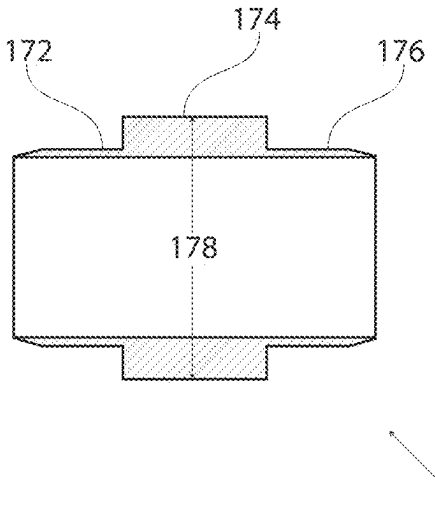


Fig. 22

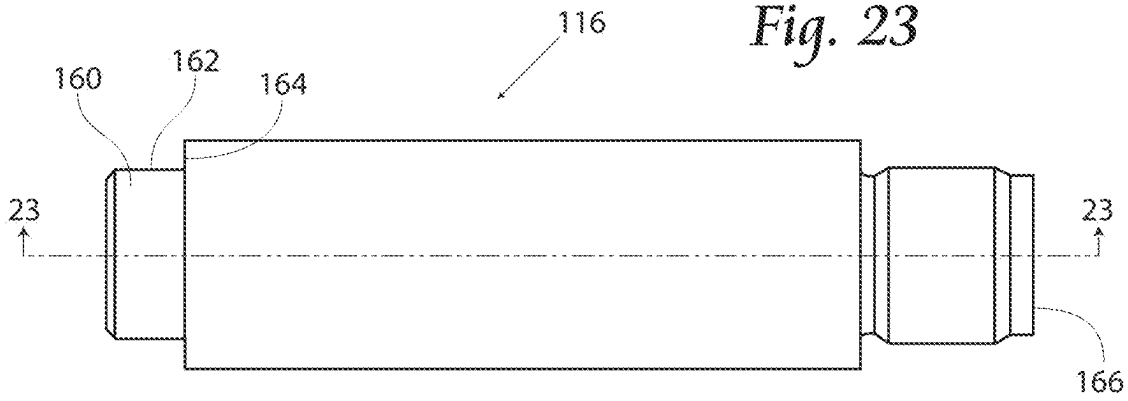


Fig. 23

Fig. 23A

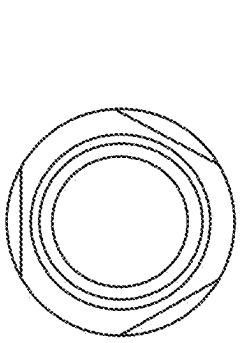
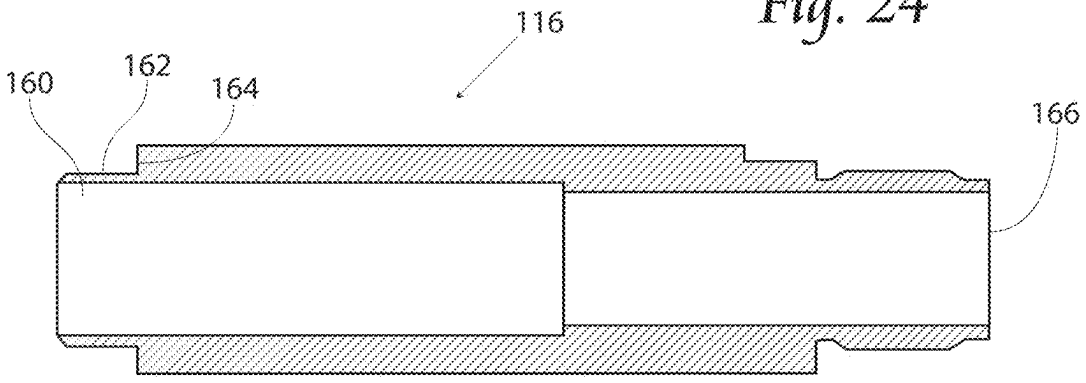


Fig. 24



FIREARM BARREL FOR LEVER ACTION FIREARM

BACKGROUND OF THE INVENTION

[0001] The present invention relates to barrels used in firearms, and, more particularly to a lever action firearm. Lever action firearms are typically rifles, but could also be shotguns and even pistols.

[0002] Lever action firearms generally have a cocking handle or bolt handle located around the trigger guard. The cocking handle is manually operated to move a bolt of the firearm to feed or remove cartridges in and out of the firearm chamber, and cock the firing mechanism to allow the firearm to be fired.

[0003] As with firearms in general, one of the areas of issue or concerns with lever action firearms is the accuracy of the firearm and the ability to handle the firearm after being fired. The barrel of the firearm tends to heat up after continuous use and the accuracy may diminish, as well. Thus, a need exists for a lever action firearm barrel with improved accuracy and ease of handling.

SUMMARY OF THE INVENTION

[0004] The present invention is directed towards a firearm barrel for a lever action firearm. The barrel generally comprises an inner barrel and an outer sleeve. The inner barrel has a support area for receiving the outer sleeve. A muzzle keeper is attached to the end of the outer barrel.

BRIEF DESCRIPTION OF DRAWINGS

[0005] FIG. **1** is a perspective view of an inner barrel for a firearm barrel according to the present invention.

[0006] FIG. **2** is a side view of the firearm barrel of FIG. **1**.

[0007] FIG. **3** is a cross-sectional view of the firearm barrel of FIG. **1**.

[0008] FIG. **4** is close-up view of the firearm barrel taken along line **4-4** of FIG. **3**.

[0009] FIG. **5** is a close-up view of the firearm barrel taken along line **5-5** of FIG. **3**.

[0010] FIG. **6** is a side view of an outer sleeve for a firearm barrel according to the present invention.

[0011] FIG. **6**A is a front view of the outer sleeve shown in FIG. **6**.

[0012] FIG. **7** is a side view of a muzzle keeper used with the present invention.

[0013] FIG. **7**A is a front view of the muzzle keeper of FIG. **7**

[0014] FIG. **8** is a cross-sectional view of the muzzle keeper shown in FIG. **7** taken along the line **8-8** of FIG. **7**.

[0015] FIG. **9** is planar side view of an assembled firearm barrel according to the present invention.

[0016] FIG. **10** is a cross-sectional view of the barrel of FIG. **9** taken along the line **10-10**.

[0017] FIG. **11** is a perspective view of an alternate embodiment of a firearm barrel according to the present invention.

[0018] FIG. **12** is a planar side view of the barrel shown in FIG. **11**.

[0019] FIG. **13** is a cross-sectional view of the barrel of FIG. **12** taken along the line **13-13** of FIG. **12**.

[0020] FIG. **14** is side view of an inner barrel used in the embodiment shown in FIG. **11**.

[0021] FIG. **15** is a cross-sectional view of the inner barrel of FIG. **14** taken along the line **15-15**.

[0022] FIG. **16** is a close-up view of the inner barrel of the area of line **16-16** of FIG. **14**.

[0023] FIG. **17** is a close-up view of the inner barrel of the area of line **17-17** of FIG. **14**.

[0024] FIG. **18** is a close-up view of the inner barrel of the area of line **15-15** of FIG. **14**.

[0025] FIG. **19** is planar side view of a rear section of an outer sleeve used in the embodiment of FIG. **11**.

[0026] FIG. **19**A is a front view of the rear section of FIG. **19**.

[0027] FIG. **20** is a planar side view of a front section of an outer sleeve used in the embodiment of FIG. **11**.

[0028] FIG. **20**A is a front view of the front section shown in FIG. **20**.

[0029] FIG. **21** is a planar side view of a gas bushing used in the embodiment of FIG. **11**.

[0030] FIG. **22** is cross-sectional view of the gas bushing shown in FIG. **21**.

[0031] FIG. **23** is planar side view of a muzzle keeper used in the embodiment of FIG. **11**.

[0032] FIG. **23**A is a front view of the muzzle keeper of FIG. **23**.

[0033] FIG. **24** is a cross-sectional view of the muzzle keeper of FIG. **23**.

DETAILED DESCRIPTION OF THE INVENTION

[0034] Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structures. While the preferred embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

[0035] FIG. **1** is a perspective view of a firearm barrel **10** according to the present invention. The firearm barrel **10** is designed specifically for use with a lever action firearm. The barrel **10** generally comprises an inner barrel **12** an outer sleeve **14** and a muzzle keeper **16**. The inner barrel **12** is preferably machined from a metal material such as steel, e.g. stainless steel. As will be appreciated further in the discussion below, the arrangement and materials of the firearm barrel **10** provide an advantageous device compared to prior art firearms.

[0036] FIG. **2** shows a side view of the inner barrel **12**. The inner barrel **12** has a rear section **18**, an intermediate section **20** and a front section **22**. The rear section **18** provides an area for the forearm of a firearm (not shown) to be attached to the firearm barrel **10**. The intermediate section provides an area for the outer sleeve **14** to be situated, and the front section **22** provides an area for the muzzle keeper **16** to be positioned.

[0037] Still referring to FIG. **2**, the rear section **18** further comprises an attachment end **24** that allows the barrel **10** to be attached or coupled to the gun's firing chamber (not shown), and the rear section **18** also has an attachment area **26** for a rear site (not shown). The diameter of the rear section **18** is also greater than the diameter of the intermediate section **20** and the front section **22**.

[0038] FIG. **3** provides a cross-sectional view of the inner barrel **12**. The inner barrel **12** comprises an elongated tube **28** having an entrance end **30** and an exit end **31**. The inner

barrel **12** has a first outer diameter (OD) **32** for the rear section **18**, and a second OD **34** for the intermediated section **20**. As can be seen more clearly in the close-up view in FIG. **4**, the first OD **32** transfers to the second OD **34** by way of a support area **36**. The support area **36** comprises an abutment wall **38**, which leads down to a support shelf **40** for the outer sleeve **14** to rest upon (see FIG. **10**). Preferably the abutment wall **38** and the support shelf **40** form a right angle so that the outer sleeve **14** will tightly abut the inner barrel **12**. A tapered section **42** extends from the support shelf **40** to the second OD **34**, which will provide for a slight gap **44** (see FIG. **9**) when the outer sleeve **14** is assembled onto the inner barrel **12**. For example, in a preferred embodiment, the gap **44** may be preferably less than 0.10", and less than 0.005". However, it is understood that the gap **44** would be attributable to an arrangement wherein the outer sleeve is a separate structure than the inner barrel, thereby constituting a gap between the two.

[0039] Referring further to FIG. **3**, the inner barrel **12** also has a third OD **46** and a fourth OD **48**, which both are formed on the front section **22** to accommodate the eventual attachment of the muzzle keeper **16**. As shown in the close-up view of FIG. **5**, the front section **22** transitions from the third OD **46** to the fourth OD by way of a notch **50**, which will matingly receive the muzzle keeper **16** for a secure arrangement.

[0040] Turning now to FIG. **6** and FIG. **6**A, a planar view of the outer sleeve **14** is shown. The outer sleeve **14** has an OD **52** and an inner diameter (ID) **54**, as well as a first end **56** and a second end **58**. The OD **52** is preferably equal to the first OD **32** of the inner barrel **12**, while the ID **54** of the outer sleeve **14** is such that the first end **56** will nest and sit on the support shelf **40**. The outer sleeve **14** may be made of any suitable material, but is preferably made of carbon fiber material, which contributes to the capability of the firearm barrel **10** to dissipate heat when fired and allow for quicker and easier handling after firing. Likewise, the slight gap **44** also provides for dissipation of heat, as the outer sleeve **14** is not directly in contact with the inner barrel **12** along the majority, e.g. the intermediate section **18** of the inner barrel **12**.

[0041] FIG. **7** (planar), FIG. **7**A (front view) and FIG. **8** (cross-sectional) depict the muzzle keeper **16**. As discussed above, the muzzle keeper **16** will be situated on the front section **22** of the inner barrel **12**. The muzzle keeper **16** has a first end **60** that will be inserted over the inner barrel **12** and will provide a front support **62** for the outer sleeve **14**. The muzzle keeper **16** also has an abutment wall **64** for the outer sleeve **14** to fit against when the barrel **10** is fully assembled. The muzzle keeper also has a second end **66** that will is located at the exit end **31** of the inner barrel **12** when fully assembled. The muzzle keeper generally has a main body **66** and a muzzle **68** section, with the main body **66** having an OD substantially equal to the OD the outer sleeve **14** and that of the rear section **16** of the inner barrel **12**.

[0042] Still referring to FIG. **8**, the muzzle keeper **16** transitions from a first ID **69** to a second ID **70**, with the second ID **70** being less than that of the first ID. This allows for the muzzle keeper **16** to matingly fit within the notch **50**, as discussed above.

[0043] The resultant assembled barrel **10** is shown in FIGS. **9** and **10**. As is appreciated in the planar view in FIG. **10**, the three main sections of the firearm barrel **10** fit securely together with one another, with the OD of the barrel consistent along the length of the barrel **10**. In the same fashion, the cross-sectional view shown in FIG. **10** demonstrates the improved barrel **10** of the present invention.

[0044] FIG. **11** shows a perspective view of a second embodiment of a firearm barrel **110** according to the present invention. The second embodiment **110** is similar to that of the barrel **10**, with the second embodiment also having an inner barrel **112**, an outer sleeve **114**, and a muzzle keeper **116** as described for the barrel **10**. The second embodiment **110** differs in that the barrel **110** further incorporates a gas bushing **171**, as will be discussed below.

[0045] FIG. **12** provides a planar view of the firearm barrel **110**. As noted, the barrel **110** comprises the inner barrel **112** and the muzzle keeper **116**, in the same fashion as similar parts described for the firearm barrel **10**, discussed above. The outer sleeve **114** differs from the outer sleeve **14** in that it is comprised of two separate sections, a front section **114***a* and a rear section **114***b*. Preferably, the front section **114***a* is longer than the rear section **114***b*.

[0046] The arrangement of the outer sleeve **114** is further exemplified in the cross-sectional view of firearm barrel **110** shown in FIG. **13**. The gas bushing **171** is situated between the front section **114***a* and the rear section **114***b*. As will be appreciated from the discussion below, the gas bushing **171** provides a support for both sections **114***a*, **114***b* to maintain a gap **144** between the outer sleeve **114** and the inner barrel **112**.

[0047] FIG. **14** shows a side view of the inner barrel **112**. The inner barrel **112** has a rear section **118**, and intermediate section **120** and a front section **122**. The rear section **118** provides an area for the forearm of a firearm (not shown) to be attached to the firearm barrel **110**. The intermediate section **120** provides for an area for the outer sleeve sections **114***a*, **114***b*, as well as the gas bushing **171** to be situated, and the front section **122** provides an area for the muzzle keeper **116** to be positioned.

[0048] Still referring to FIG. **14**, the rear section **118** further comprises an attachment end **124** that allows the barrel **110** to be attached or coupled to the firearm's firing chamber (not shown), and the rear section **118** also has an attachment area **126** for a rear site (not shown). The outer diameter of the rear section **118** is also greater than the outer diameter of the intermediate section **120** and the front section **122**.

[0049] FIG. **15** provides a cross-sectional view of the inner barrel **112**. The inner barrel **112** comprises an elongated tube **128** having an entrance end **130** and an exit end **131**. The inner barrel **12** has a first outer diameter (OD) **132** for the rear section, and a second OD **134** for the intermediated section **120**. As can be seen more clearly in the close-up view in FIG. **16**, the first OD **132** transfers to the second OD **134** by way of a support area **136**. The support area **136** comprises an abutment wall **138**, which leads down to a support shelf **140** for the outer sleeve **114** to rest upon (see FIG. **13**). Preferably the abutment wall **138** and the support shelf **140** form a right angle so that the outer sleeve **114** will tightly abut the inner barrel **112** at the abutment wall **138**. A tapered section **142** extends from the support shelf **140** to the second OD **134**, which will provide for a slight gap **144** (see FIG. **13**) when the outer sleeve **114** is assembled onto the inner barrel **112**. For example, in a preferred embodiment, the gap **144** may be preferably less than 0.10", and less than 0.005". However, it is understood that the gap **144** would be attributable to an arrangement

wherein the outer sleeve is a separate structure than the inner barrel, thereby constituting a gap between the two.

[0050] FIG. **17** shows a close-up view of the central area of the outer sleeve **114** that will support the gas bushing **171** (not shown). FIG. **17** demonstrates that the second OD **134** of the outer sleeve **114** is preferably consistent along the length of the intermediate section **120** of the outer sleeve **114**.

[0051] Referring again to FIG. **15**, the inner barrel **112** also has a third OD **146** and a fourth OD **148**, which both are formed on the front section **122** to accommodate the eventual attachment of the muzzle keeper **116**. As shown in the close-up view of FIG. **18**, the front section **122** transitions from the third OD **146** to the fourth OD **148** by way of a notch **150**, which will matingly receive the muzzle keeper **16** for a secure arrangement.

[0052] Turning now to FIGS. **19** and **20**, a planar view of the outer barrel **114** (section **114***a*, FIG. **19**, section **114***b*, FIG. **20**) is shown. Each section **114***a*, **114***b* of the sleeve **14** has an OD **152** and an inner diameter (ID) **154**. Each of the sections **114***a*, **114***b*, has a respective first end **156***a*, **156***b*, and a respective second end **158***a*, **158***b*. The OD **152** is preferably equal to the first OD **132** of the inner barrel **112**, while the ID **154** of the outer sleeve **114** is such that the first end **156***a* will nest and sit on the support shelf **140**. The outer sleeve **114** may be made of any suitable material, but is preferably made of carbon fiber material, which contributes to the capability of the firearm barrel **110** to dissipate heat when fired and allow for quicker and easier handling after firing. Likewise, the slight gap **144** also provides for dissipation of heat, as the outer sleeve **114** is not directly in contact with the inner barrel **112** along the majority, e.g. the intermediate section **118** of the inner barrel **112**.

[0053] FIG. **21** (planar) and FIG. **22** (cross-sectional) depict the gas bushing **171** used with the firearm barrel **110**. The gas bushing **171** generally comprises a front section **172**, a central section **174**, and a rear section **176**. The front section **172** and the rear section **176** have an OD is equal to that of the support shelf **140**, to provide support for the outer sleeve sections **114***a* and **114***b*. That is, the rear section **176** will provide support for the second end **158***a*, and the front section **176** will provide support for the front end **156***b*, thereby maintaining the air gap **144** along the intermediate section **118** of the inner barrel **112**. The central section **174** has a greater OD **178**, essentially equal to the OD of the rear section of the inner barrel.

[0054] FIG. **23** (planar), FIG. **23**A (front view) and FIG. **24** (cross-sectional) depict the muzzle keeper **116**. As discussed above, the muzzle keeper **16** will be situated on the front section **122** of the inner barrel **112**. The muzzle keeper **116** has a first end **160** that will be inserted over the inner barrel **112** and will provide a front support **162** for the front end **158***b* of front section **114***a*. The muzzle keeper **116** also has an abutment wall **164** for the front end **158***b* to fit against when the barrel **110** is fully assembled. The abutment wall is preferably forms a right angle with the front support **162**. The muzzle keeper **116** also has a second end **166** that will is located at the exit end **131** of the inner barrel **112** when fully assembled. The muzzle keeper generally has a main body **166** and a muzzle **168** section, with the main body **166** having an OD substantially equal to the OD the outer sleeve **114** and that of the rear section **116** of the inner barrel **112**.

[0055] Still referring to FIG. **23**, the muzzle keeper **116** transitions from a first ID **169** to a second ID **170**, with the second ID **170** being less than that of the first ID **169**. This allows for the muzzle keeper **116** to matingly fit within the notch **150**, as discussed above.

[0056] The resultant assembled barrel **10** is shown in FIGS. **12** and **13**.

[0057] Thus, referring again to FIGS. **12** and **13**, as with the barrel **10**, the three main sections of the firearm barrel **110** fit securely together with one another, with the OD of the barrel consistent along the length of the barrel **110**. In the same fashion, the cross-sectional view shown in FIG. **13** demonstrates the improved barrel of the present invention, captured in embodiment **110**.

[0058] It should be understood that the outer sleeves **14** and **114** are a separate and distinct structure from the inner barrels **12** and **114**. That is, while the outer sleeves **14** and **114** can preferably be made of a material such as carbon fiber or other similar mater, the sleeves will still be a solid structure and not a material that is wrapped or adhered onto the outer surface of an inner barrel.

[0059] The foregoing is considered as illustrative only of the principles of the invention. Furthermore, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described. While the preferred embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

1. A firearm barrel for a lever action firearm, the firearm barrel comprising:

an inner barrel;

an outer sleeve situated over the inner barrel; and

a muzzle keeper located on the inner barrel.

2. The firearm barrel according to claim **1**, wherein the inner barrel comprises a rear section, an intermediate section, and a front section, wherein the outer sleeve is situated over the intermediate section of the inner barrel.

3. The firearm barrel according to claim **2**, wherein a gap is formed between the outer sleeve and the intermediate section of the inner barrel.

4. The firearm barrel according to claim **3**, wherein the outer sleeve is formed of a carbon fiber material.

5. The firearm barrel according to claim **1**, wherein the rear section of the inner barrel has an outer diameter (OD) that is substantially the same as an OD of the outer sleeve.

6. The firearm barrel of claim **5**, wherein the rear section of the inner barrel further comprises a support area for supporting the outer sleeve.

7. A firearm barrel for a lever action firearm, the firearm barrel comprising:

an inner barrel;

an outer sleeve situated over the inner barrel;

a gas bushing situated over the inner barrel; and

a muzzle keeper located on the inner barrel.

8. The firearm barrel according to claim **7**, wherein the outer sleeve further comprises a front section and a rear section, said gas bushing situated between said front section and said rear section of said outer sleeve.

9. The firearm barrel according to claim **7**, wherein a gap is formed between the outer sleeve and the inner barrel.

10. The firearm barrel according to claim **9**, wherein the outer sleeve is formed a carbon steel material.

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