A bullpup assembly for converting an AR-15 type firearm having an AR-15 stock in unmodified assembly into a bullpup configuration. The bullpup assembly includes a frame body coupleable with the body of the firearm, the frame comprising a bullpup trigger, and the frame being configured to replace the AR-15 stock, and a trigger link coupled with the bullpup trigger and coupleable with a firearm trigger of the firearm, wherein actuation of the bullpup trigger actuates the firearm trigger via the trigger link.
AR-15 TYPE BULLPUP CONVERTED FIREARM AND METHOD OF ASSEMBLY THEREOF

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/513,744 filed on Aug. 1, 2011, the entirety of which is hereby incorporated by reference herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] Aspects of the present invention relate to AR-15 and similar type firearms, and more particularly an apparatus and method for converting AR-15 type firearms to bullpup configurations.

[0004] 2. Background

[0005] Firearms with and without a bullpup configuration are well known for military and private use. Generally, conventional firearms include an elongated stock, also known as a buttstock, to which the barrel and firing mechanism are attached, that is held against one’s shoulder when firing the gun. The stock provides a means for the shooter to firmly support the device and easily aim it. The stock also transmits recoil into the shooter’s body.

[0006] Bullpups are firearm configurations in which the action is located behind the trigger group and alongside the shooter’s face, so there is no wasted space for the stock as in conventional designs. This permits a shorter firearm length for the same barrel length for improved maneuverability, and reduces weight. Thus, firearm purchasers often prefer the bullpup configuration over the conventional configuration.

[0007] In the related art, firearms are generally manufactured to either have a conventional configuration or a bullpup configuration. Thus, one must decide whether to purchase a conventional or bullpup configuration, and converting an already manufactured conventional configuration firearm in the related art, typically requires substantial reengineering by a professional gunsmith. Once converted, the bullpup configured firearm likewise is not easily converted back into a conventional configuration without substantial reengineering. Thus, there is a need in the art for an apparatus and method for converting a firearm from a conventional configuration to a bullpup configuration and converting back to a conventional configuration without substantially reengineering the firearm, such as by a professional gunsmith.

[0008] In particular, the AR-15 and similar type model firearms are generally manufactured with a conventional configuration. Thus, there is a need in the art for apparatuses and methods for converting conventional AR-15 type firearms to bullpup configurations and converting back to conventional configurations without substantially reengineering the firearm, such as by a professional gunsmith.

SUMMARY OF THE INVENTION

[0009] Aspects of the present invention provide, among other things, features for reconfiguring a conventional AR-15 type firearm to a bullpup configuration.

[0010] Aspects of an example bullpup assembly include a bullpup frame securably engageable with a firearm. The bullpup frame includes a bullpup trigger and trigger link, wherein a first end of the trigger link is coupled to or otherwise interoperates with the bullpup trigger. The other end of the trigger link abuttingly connects or otherwise interoperates with the original trigger of the firearm (also interchangeably referred to herein as the “firearm trigger”) so that actuation of the bullpup trigger actuates the firearm trigger.

[0011] Aspects of an example bullpup configured firearm in accordance with aspects of the present invention include a firearm body, a firearm barrel, a firearm trigger, a bullpup frame securably engageable with the firearm, and a shoulder butt portion securable to the firearm body. The bullpup frame includes or assemblably operates in conjunction with a bullpup trigger and trigger link, wherein a first end of the trigger link is coupled to or otherwise interoperates with the bullpup trigger. The other end of the trigger link abuts the trigger of the firearm so that actuation of the bullpup trigger actuates the firearm trigger.

[0012] Aspects of the present invention further provide methods for modifying a conventional AR-15 type firearm to a bullpup configuration. The method includes removing a stock and handle from a conventional configuration firearm and then securably engaging the bullpup frame to the disassembled firearm, such that actuation of a trigger of the lower bullpup frame actuates a trigger of the disassembled firearm. In addition, shoulder butt portion is secured to the firearm body.

[0013] Additional advantages and novel features of various aspects of the present invention will be set forth in part in the description that follows, and in part will become more apparent to those skilled in the art upon examination of the following or upon learning by practice thereof.

BRIEF DESCRIPTION OF THE FIGURES

[0014] In the drawings:

[0015] FIG. 1 shows a side view of an example AR-15 type firearm having a conventional configuration;

[0016] FIG. 2 shows a side view the firearm of FIG. 1 with selected components removed;

[0017] FIG. 3 shows a perspective exploded view of a bullpup assembly in accordance with aspects of the present invention;

[0018] FIG. 4 shows a perspective partial visible view of the frame of the bullpup assembly of FIG. 3;

[0019] FIG. 5 shows a side partial visible view of the frame of the bullpup assembly of FIG. 3;

[0020] FIG. 6 shows a side partial visible view of a modified firearm having a bullpup configuration in accordance with aspects of the present invention;

[0021] FIG. 7 shows a perspective partial visible view of the modified firearm of FIG. 6; and

[0022] FIG. 8 shows a side partial visible view of the frame of an example bullpup assembly having an optional second handle, in accordance with aspects of the present invention.

DETAILED DESCRIPTION

[0023] Aspects of the present invention include a bullpup assembly for an AR-15 type firearm, a bullpup configured AR-15 type firearm, and a method for converting a conventional AR-15 type firearm into a bullpup configured AR-15 type firearm.

[0024] FIG. 1 shows a side view of an example AR-15 type firearm 10 having a conventional configuration, i.e., does not have a bullpup configuration. The firearm 10 includes a body 12, a stock 14, a handle 16, a grip 18, a barrel 20, a firearm trigger 22, a magazine 24, a gas tube holder 26, a sight 30, a sight locking pin 31 for securing a portion of the sight, and other features known in the art. The stock 14 is attached to the main body 12 (e.g., via one or more screws and/or other
attachment features), and in operation, is held against an operator’s shoulder when firing the firearm 10. The stock 14 allows the operator to firmly support the device and easily aim it.

[0025] FIG. 2 shows a side view of an example AR-15 type firearm 50 having multiple components removed. In particular, the stock 14 and the handle 16 shown in FIG. 1 have been removed. The other elements, including the body 12, the firearm trigger 22, the grip 18, the gas tube holder 26, the barrel 20, the magazine 24, and the sight 30, including the sight locking pin 31, remain. Generally, the mechanism of the firearm that contribute to firing operation remain operable in accordance with conventional operation. When the stock 14 is removed, one or more attachment features, such as an attachment screw receiving surface 32, remains. In conventional assembly, as shown in FIG. 1, the attachment screw receiving surface 32 may have, for example, a threaded screw receiving opening, by which the stock 14, having a corresponding opening for receiving a screw may be secured to the body 12.

[0026] FIG. 3 shows a perspective exploded view of a bullpup assembly 100. More specifically, FIG. 3 shows the elements of the bullpup assembly 100 before it has been assembled onto the firearm of FIG. 2. The bullpup assembly 100 includes: 1) a bullpup frame 102 (also interchangeably referred herein as a frame body), 2) a trigger link assembly 105, which includes a trigger link 106 and a bullpup trigger 108, along with a firearm trigger engagement feature 104; and 3) a shoulder butt 116. The bullpup frame 102 includes a hollow body 110 (also interchangeably referred herein as an interior cavity) integrally formed with a handle 112, a trigger guard 114, one or more sight locking pin receiving openings 120, and an opening for receiving a screw or other securing mechanism for securing the bullpup frame 102 to the body of the firearm.

[0027] FIG. 4 shows a perspective view of the bullpup frame 102, where the body 110 is shown as transparent for clarity. As shown in FIG. 4, the bullpup trigger 108 may be located within the body 110. Further, the bullpup trigger 108 may be linearly coupled within the body 110 via a coupling mechanism 108b, such as a screw, a pin, or the like. The bullpup trigger 108 may also be coupled with the trigger link 106, which extends through the body 110 to an attached firearm trigger engagement feature 104. Thus, force imparted on the bullpup trigger 108 (e.g., linear action during firing) may be transferred via the trigger link 106 toward the opposite end of the trigger link 106 from the end of the trigger link 106 that is coupled with or otherwise interoperable with the bullpup trigger 108. Also shown in FIG. 4 is the location for an opening for receiving a screw or other securing mechanism, and a securing mechanism 118, such as a screw.

[0028] FIG. 5 shows a side view of the bullpup frame 102, where the body 110 is shown as transparent for clarity.

[0029] FIG. 6 shows a side view of an example AR-15 type firearm modified to a bullpup configuration, where the bullpup frame 102 is shown as transparent for clarity. FIG. 7 shows a perspective view of the example firearm of FIG. 6. In particular, FIGS. 6 and 7 show the disassembled firearm 50 of FIG. 2 after it has been coupled with the bullpup assembly 100. FIGS. 6 and 7 show various elements that are included in FIGS. 2 and 3, in an assembled configuration. As shown in FIGS. 6 and 7, the bullpup frame 102, including the bullpup trigger 108 and the trigger link 106, is abuttably assembled with the lower portion of the disassembled firearm 50. The upper surface outer edge of the bullpup frame 102 is shaped and sized so as to abut corresponding surface features of the firearm 50, and the sight locking pin receiving openings 120 are located so as to allow a sight locking pin 31 to be inserted through the pin receiving openings 120 and the sight 30, in order to partially secure the bullpup frame 102 to the firearm 50.

[0030] The trigger link 106 may be within the hollow body 110 of the bullpup frame 102, around the magazine 24 and/or magazine well, and operably engage the firearm trigger 22 via the firearm trigger engagement feature 104. Because the trigger link 106 operably engages the firearm trigger 22 on one end and is operably engaged with the bullpup trigger 108 on the other end, motion of the bullpup trigger 108 produces corresponding motion of the firearm trigger 22 via the trigger link 106, such as when the firearm is fired.

[0031] In assembly, in addition to the sight locking pin 31 being inserted through the pin receiving openings 120 to secure a portion of the bullpup frame to the firearm 50, the attachment screw receiving surface 32 is aligned with the opening for receiving a screw or other securing mechanism in the bullpup frame 102, and the securing mechanism 118 is engaged through the opening in the bullpup frame 102 and into the threaded opening in the screw receiving surface 32, in order to secure the bullpup frame to the firearm 50.

[0032] The bullpup frame may comprise any material suitable for use with a firearm. Of limited concern may be the heat produced within the barrel of a gun during firing. Thus, the material chosen for some portions of the bullpup frame may need to retain form and properties under high heat. In some variations, the frame or portions of the frame may comprise a hard plastic having a high melting point or a metal. Optionally, the bullpup frame may further comprise one or more heat shielding elements that may be located within the bullpup frame or that may be integral with one or both of these frames. Such heat shielding elements may comprise metal shielding, such as firearm grade aluminum, that is located within the bullpup frame at appropriate locations (e.g., near the barrel).

[0033] FIG. 8 shows a side view of a similar example bullpup frame 150 to the bullpup frame 102 shown in FIG. 5, with the body 110 being shown as transparent for clarity. The bullpup frame 150 of FIG. 8 further includes a second handle 130. The second handle 130 may optionally be retractable, such as via pivoting about pivot point 131 (e.g., a pin) and lockable in extended and/or retracted position, such as via locking feature 132 (e.g., a locking pin biased to extend to an extending position through a locking opening in the handle 130 or body 110, and selectively retractable, such as by depressing the locking pin through the locking opening).

[0034] A method for assembling the modified firearm having a bullpup configuration will now be described. Starting with the conventional firearm 10 of FIG. 1, the stock 14 and the handle 16 are removed. The stock 14 and the handle 16 may be easily removed without the need for a gunsmitth, for example, because the elements may be secured to the body 12 via screws or other securing features, and mating surfaces. For the stock 14, the operator may simply unscrew the stock 14 from the body 12 and/or otherwise disconnect or remove any securing features. Similarly, the operator may remove the handle 16 by removing the securing feature that attaches the handle 16 to the attachment screw receiving surface 32. Once the stock 14 and the handle 16 have been removed, the conventional AR-15 type firearm is in the state shown in FIG. 2.
Next, the operator proceeds to attach the bullpup frame 102 (FIGS. 3 to 5) to the firearm of FIG. 2. The bullpup frame 102 may be abutably placed against the bottom portion of the firearm 50, as shown in FIGS. 6 and 7. As shown in FIGS. 6 and 7, a portion of the body 12, the firearm trigger 22, magazine 24, and a portion of the barrel 20 of the firearm 50 may be located within the bullpup frame 102. The pin receiving openings 120 may be aligned with corresponding openings in the sight 30, and the sight locking pin 31 may be inserted through the pin receiving openings 120 to secure a portion of the bullpup frame 102 to the firearm 50. The securing mechanism 118 may be aligned with the mating piece 32 and the trigger link 106 may be aligned with the firearm trigger 22. The location for the opening in the bullpup frame for receiving the securing mechanism is aligned with the threaded opening in the attachment screw receiving surface 32, and a securing mechanism 118 is then engaged with the threaded opening to secure to further secure the bullpup frame 102 to the firearm 50.

After the above steps are taken, the bullpup configured AR-15 type firearm shown in FIGS. 6 and 7 is completed. Whenever the operator desires to return the AR-15 type bullpup configuration back to a conventional AR-15 type configuration, the user need only reverse the above steps. One or all of the above steps of assembling or disassembling the bullpup configuration may be carried out so as to avoid the need for machining or other assistance by a professional gunsmith. Rather, a relatively unskilled operator need only screw/unscrew and assemble the relevant elements of the firearm. As shown in FIGS. 1, 2, 6 and 7, the complex functionality of the firing mechanism remains unaltered when the firearm is in the conventional state or the bullpup state. Thus, the above-described apparatus and method allows a firearm purchaser to easily and safely modify the firearm without the assistance of an expert.

Example aspects have been described in accordance with the above advantages. It will be appreciated that these examples are merely illustrative of aspects of the invention. Many variations and modifications will be apparent to those skilled in the art.

1. A bullpup assembly for converting an AR-15 type firearm having an AR-15 stock in unmodified assembly into a bullpup configuration, comprising:
   a frame body coupleable with the body of the firearm, the frame comprising a bullpup trigger, and the frame being configured to replace the AR-15 stock; and
   a trigger link coupled with the bullpup trigger and coupleable with a firearm trigger of the firearm, wherein actuation of the bullpup trigger actuates the firearm trigger via the trigger link.
2. The bullpup assembly of claim 1, further comprising:
   a shoulder butt coupleable with an end of the firearm.
3. The bullpup assembly of claim 1, wherein the frame body comprises openings coupleable with a sight locking pin of the firearm.
4. The bullpup assembly of claim 1, wherein the frame body comprises a handle adjacent to the bullpup trigger.
5. The bullpup assembly of claim 1, wherein the bullpup trigger is linearly coupled within the frame body via a coupling mechanism.
6. The bullpup assembly of claim 1, wherein the trigger link is configured to extend past a magazine of the firearm.
7. The bullpup assembly of claim 4, wherein the lower frame body further comprises a second handle.
8. The bullpup assembly of claim 1, further comprising:
   a firearm trigger engagement feature coupled to an end portion of the trigger link,
   wherein the firearm trigger engagement feature is configured to abut the firearm trigger.
9. The bullpup assembly of claim 1, wherein the frame body comprises an interior cavity, and wherein the trigger link is disposed within the interior cavity.
10. The bullpup assembly of claim 1, wherein the frame body comprises a trigger guard adjacent the bullpup trigger.
11. The bullpup assembly of claim 1, wherein the frame body further comprises a securing mechanism alignable with a receiving surface disposed at an end of the firearm.
12. The bullpup assembly of claim 1, wherein an upper surface of the frame body is configured to abut corresponding surface features of the firearm.
13. The bullpup assembly of claim 11, wherein the frame body is secured to the firearm when the securing mechanism is coupled to the receiving surface.
14. The bullpup assembly of claim 7, wherein the second handle is retractable by pivoting about a pivot point.
15. A method of converting an AR-15 type firearm into a bullpup configuration, the method comprising:
   removing a stock and a handle from the AR-15 type firearm;
   mating a lower portion of the firearm with a frame body, the frame body comprising a bullpup trigger and a trigger link coupled with the bullpup trigger; and
   coupling the trigger link with a trigger of the firearm such that actuation of the bullpup trigger actuates the firearm trigger via the trigger link.
16. The method of claim 15, wherein the frame body further comprises a firearm trigger engagement feature coupled to an end portion of the trigger link, and wherein coupling the trigger link with the trigger of the firearm comprises abutting the firearm trigger engagement feature with the firearm trigger.
17. The method of claim 15, further comprising:
   coupling a shoulder butt with an end of the firearm.
18. The method of claim 15, wherein the frame body comprises openings, the method further comprising:
   securing the frame body to the firearm by mating a sight locking pin of the firearm with the openings.
19. The method of claim 15, wherein the frame body further comprises a securing mechanism, the method further comprising:
   securing the frame body to the firearm by mating the securing mechanism to a receiving surface disposed at an end of the firearm.
20. The method of claim 1, further comprising:
   abutting an upper surface of the frame body with corresponding surface features of the firearm.

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