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Firearm spade grip assembly

Abstract

A firearm spade grip assembly can comprise a firearm, paddle trigger assembly, and/or a mounting system. A paddle trigger assembly can comprise a base spanning between and comprising a base forward end and a base aft end; a paddle trigger coupled to the base; a trigger actuator coupled to the base; and/or an actuator housing coupled to and extending forward from the base, wherein the trigger actuator is disposed at least partially within the actuator housing. Movement of the paddle trigger can be configured to translate the trigger actuator. A mounting system of a firearm spade grip assembly can comprise a mounting base configured to couple to a firearm receiver base or a firearm receiver of the firearm.

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References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
8434397	12/2012	Deckard	89/37.16	F41A 9/60
12117258	12/2023	Archer	N/A	F41A 27/28
2025/0123068	12/2024	Barnhart	N/A	F41A 19/10

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a nonprovisional of, and claims priority to and the benefit of, U.S. Provisional Patent Application No. 63/487,928, filed Mar. 2, 2023 and entitled “FIREARM SPADE GRIP ASSEMBLY.” The disclosure of the foregoing application is incorporated herein by reference, including but not limited to those portions that specifically appear hereinafter, but except for any subject matter disclaimers or disavowals, and except to the extent that the incorporated material is inconsistent with the express disclosure herein, in which case the language in this disclosure shall control.

TECHNICAL FIELD

(1) The present disclosure relates generally to firearm actuating and mounting systems and methods.

BACKGROUND

(2) Firearms, for example, rifles or light or medium machine gun-style firearms, can be large, heavy, and unwieldy, making effective use thereof difficult for an individual. Such firearms can be impractical or difficult to carry, shoulder, and/or fire accurately and effectively given the significant size, weight, and shape. Therefore, systems and methods for mounting such firearms to decrease the burden on the user with regard to supporting, stabilizing, gripping, shouldering, and/or steadying, while allowing convenient firearm actuation and firing, may be desired.

SUMMARY OF THE DISCLOSURE

(3) The present disclosure relates to a firearm spade grip assembly. In various examples, a firearm spade grip assembly can comprise a firearm, a paddle trigger assembly, and/or a mounting system. In various examples, a paddle trigger assembly can comprise a base spanning between and comprising a base forward end and a base aft end; a paddle trigger coupled to the base; a trigger actuator coupled to the base; and/or an actuator housing coupled to and extending forward from the base, wherein the trigger actuator is disposed at least partially within the actuator housing. In

various examples, a portion of the trigger actuator can extend from the base forward end, wherein the trigger actuator comprises an actuator aft end coupled to the paddle trigger and a traverse block forward of the actuator aft end configured to engage and pull a firearm trigger of a firearm in an aft direction in response to translation of the trigger actuator, wherein movement of the paddle trigger can be configured to translate the trigger actuator. In various examples, the actuator housing can be configured to couple to at least one of a firearm receiver base or a firearm receiver of the firearm. In various examples, the actuator housing can be configured to receive a firearm trigger of the firearm therein. In various examples, a firearm spade grip assembly and/or paddle trigger assembly can further comprise a paddle trigger safety configured to prevent an actuating movement of the paddle trigger in response to being engaged.

(4) In various examples, a firearm spade grip assembly and/or paddle trigger assembly can further comprise a fastener disposed through a bottom surface of the actuator housing that is configured to couple the actuator housing to the firearm. The fastener can be configured to be disposed in a handle fastener receptacle in the firearm. In various examples, a firearm spade grip assembly and/or paddle trigger assembly can further comprise a paddle trigger housing coupled to the base aft end, wherein the paddle trigger can be coupled to the base via the paddle trigger housing. In various examples, the base forward end comprises a void configured to receive a buffer assembly of the firearm.

(5) In various examples, a mounting system can comprise a mounting base configured to couple to the firearm receiver base or the firearm receiver of the firearm; a brass catch coupled to the mounting base comprising a brass catch inlet and a brass catch chute, wherein the brass catch inlet can be configured to align with an ejection port of the firearm, and wherein the brass catch inlet and the brass catch chute are in fluid communication; and/or a mounting support arm coupled to the mounting base. The mounting support arm can comprise a foundation joint and a mount joint, wherein the foundation joint can be configured to allow the firearm to move about a first pivot point, and wherein the mount joint can be configured to allow the firearm to move about a second pivot point. In various examples, a mounting system can further comprise a charging system coupled to the mounting base and comprising a charging block configured to couple to a charging handle of the firearm and a guiderail configured to allow the charging block to translate in the aft direction or a forward direction to charge the firearm.

(6) In various examples, a firearm spade grip assembly can comprise a firearm comprising at least one of a firearm receiver base or a firearm receiver, and a firearm trigger; and/or a paddle trigger assembly coupled to the firearm. The paddle trigger assembly can comprise a base, comprising a base forward end and a base aft end, wherein the base can be coupled to an aft end of the firearm receiver base or an aft end of the firearm receiver; a paddle trigger coupled to the base; a trigger actuator coupled to the paddle trigger and configured to actuate the firearm trigger in response to movement of the paddle trigger; and/or an actuator housing coupled to and extending from the base forward end. The actuator housing can be coupled to the firearm receiver base or the firearm receiver such that the firearm trigger of the firearm is disposed at least partially in the actuator housing. In various examples, the firearm trigger can be completely enclosed between the firearm and the actuator housing. In various examples, the paddle trigger assembly can be coupled to the firearm at least partially by a fastener disposed through a bottom surface of the actuator housing and into a handle fastener receptacle in the firearm. In various examples, the assembly can further comprise a buffer assembly coupled to the firearm receiver, wherein the base forward end can be coupled to the buffer assembly.

(7) In various examples, a firearm spade grip assembly can further comprise a mounting system coupled to the firearm and configured to couple the firearm to a surface. The mounting system can comprise a mounting support arm comprising a foundation joint and a mount joint, as discussed herein.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

- (1) The subject matter of the present disclosure is particularly pointed out and distinctly claimed in the concluding portion of the specification. A more complete understanding of the present disclosure, however, may best be obtained by referring to the detailed description and claims when considered in connection with the drawing figures. Elements with like element numbering throughout the figures are intended to be the same.
- (2) FIG. 1A depicts a block diagram of the components of a firearm spade grip assembly, in accordance with various examples.
- (3) FIG. 1B illustrates a firearm spade grip assembly, in accordance with various examples.
- (4) FIG. 2A illustrates a perspective view of a paddle trigger assembly for the firearm spade grip assembly of FIG. 1B, in accordance with various examples.
- (5) FIG. 2B illustrates a bottom perspective view of the paddle trigger assembly of FIG. 2A, in accordance with various examples.
- (6) FIG. 2C illustrates a top view of the paddle trigger assembly of FIG. 2A, in accordance with various examples.
- (7) FIG. 3A illustrates a paddle trigger and paddle trigger safety, in accordance with various examples.
- (8) FIG. 3B illustrates a paddle trigger and related components, in accordance with various examples.
- (9) FIG. 4A illustrates a perspective view of a mounting system for the firearm spade grip assembly of FIG. 1B, in accordance with various examples.
- (10) FIG. 4B illustrates another perspective view of the mounting system of FIG. 4A coupled to a firearm receiver base, in accordance with various examples.
- (11) FIG. 4C illustrates a side view of the mounting system of FIG. 4A, in accordance with various examples.
- (12) FIG. 5 illustrates a method for assembling a firearm spade grip assembly, in accordance with various examples.
- (13) FIG. 6A illustrates a cross-sectional side view of a paddle trigger assembly coupled to a firearm in an unengaged position, in accordance with various examples.
- (14) FIG. 6B illustrates a cross-sectional side view of a paddle trigger assembly coupled to a firearm in an engaged position, in accordance with various examples.

DETAILED DESCRIPTION

- (15) All ranges may include the upper and lower values, and all ranges and ratio limits disclosed herein may be combined. It is to be understood that unless specifically stated otherwise, references to “a,” “an,” and/or “the” may include one or more than one and that reference to an item in the singular may also include the item in the plural. When referring to components of systems discussed herein, the term “coupled” refers to direct coupling or indirect coupling with other intervening elements, as appropriate. Unless otherwise indicated, the terms “first,” “second,” etc. are used herein merely as labels, and are not intended to impose ordinal, positional, or hierarchical requirements on the items to which these terms refer. Moreover, reference to, e.g., a “second” item does not require or preclude the existence of, e.g., a “first” or lower-numbered item, and/or, e.g., a “third” or higher-numbered item. Further, reference to, e.g., a “first” item and a “second” item, or the coupling thereof, does not mean that there are no intervening items, and such intervening items may be present.
- (16) The detailed description of various examples herein makes reference to the accompanying drawings, which show various examples by way of illustration. While these various examples are described in sufficient detail to enable those skilled in the art to practice the disclosure, it should be

understood that other examples may be realized and that logical, chemical, and mechanical changes may be made without departing from the scope of the disclosure. Thus, the detailed description herein is presented for purposes of illustration only and not of limitation. For example, the steps recited in any of the method or process descriptions may be executed in any suitable combination and/or order and are not necessarily limited to the order or combination presented. Furthermore, any reference to singular includes plural examples, and any reference to more than one component or step may include a singular component or step. Also, any reference to attached, fixed, connected, or the like may include permanent, removable, temporary, partial, full, and/or any other possible attachment option. Additionally, any reference to without contact (or similar phrases) may also include reduced contact or minimal contact.

(17) As used herein, the term “aft,” “rear,” or the like refers to the direction associated with a butt (e.g., the back or rear end) of a firearm or the breech of a firearm barrel, or generally, to the direction of recoil in response to firing a round or cartridge in a firearm. As used herein, the term “forward,” “front,” or the like refers to the direction associated with a muzzle (e.g., the front end) of the firearm or barrel, or generally, to the direction of flight of a projectile (e.g., a bullet) fired from a firearm. An A-R axis has been included to illustrate the axial (A) and radial (R) directions. The negative radial direction can be the direction toward the center of a firearm barrel bore, and the positive radial direction can be the direction away from the center of a firearm barrel bore. The forward and aft directions are axial directions. As an example, an axial direction can be along an axis, or parallel to an axis, along which a bullet will travel in response to being fired from a firearm.

(18) In various examples, a firearm can be incorporated into a firearm spade grip assembly by the original equipment manufacturer (e.g., by firearm spade grip assembly parts being integral and/or monolithic with other firearm parts such as a receiver, buffer assembly, trigger housing, and/or the like), or the other components of a firearm spade grip assembly can be retrofitted to the firearm by coupling such components to the firearm. A firearm spade grip assembly can be configured to mount a firearm on a surface (e.g., on a platform or on or within a vehicle such as an automobile, airplane, helicopter, watercraft, and/or the like), allow the user to grip the firearm using one or two hands (e.g., by grasping one or two handles), and/or activate or fire the firearm by translating an actuator disposed in an aft portion of the firearm and/or firearm spade grip assembly.

(19) In various examples, with reference to FIG. 1A, a firearm spade grip assembly **10** can comprise a firearm **15**, a paddle trigger assembly **20**, and/or a mounting system **25**. The mounting system can be configured to mount the firearm to a surface, and/or allow the firearm to pivot (i.e., aim) in various directions, as discussed herein. The paddle trigger assembly can be configured to allow the user to grip, pivot/move, aim, and actuate (i.e., fire) the firearm from a convenient location (e.g., from behind or at an aft portion of the firearm and/or firearm spade grip assembly). For example, with reference to FIG. 1B, spade grip assembly **100** comprises a paddle trigger assembly **200** and a mounting system **400** coupled to a firearm (coupled to firearm receiver base **60**). Firearm receiver base **60** may belong to an FN brand M249 SAW light machine gun, but it should be understood that the examples discussed herein can be applied to any suitable firearm. Firearm receiver base **60** can be comprised in and/or coupled to the firearm receiver. Therefore, anything coupled to firearm receiver base **60** can be deemed as coupled to the firearm receiver. In various examples, paddle trigger assembly **200** can be directly coupled to firearm receiver base **60** and/or a firearm receiver (or other suitable component of a firearm). In various examples, paddle trigger assembly **200** can be coupled to firearm receiver base **60** or a firearm receiver at least partially via another component of the firearm, such as firearm trigger housing **72**, which is coupled to firearm receiver base **60**.

(20) With additional reference to FIGS. 2A-2C, paddle trigger assembly **200** from FIG. 1B is depicted, in accordance with various examples. In various examples, a paddle trigger assembly can comprise a paddle trigger **202** (e.g., a butterfly trigger having wings **203** depicted in FIG. 3A)

coupled to a trigger actuator. In response to the paddle trigger being actuated (e.g., being pressed, pivoted, or otherwise translated or moved), the trigger actuator can actuate the firearm (e.g., by pulling the trigger of the firearm), thus firing the firearm. For example, with additional reference to FIGS. 6A and 6B, paddle trigger assembly **200** can comprise paddle trigger **602** (paddle trigger **202** in FIGS. 2A-2C) coupled to trigger actuator **650**. Trigger actuator **650** can comprise an actuator aft end **652** coupled to paddle trigger bar **605** (paddle trigger bar **205** in FIG. 3B) and/or paddle trigger **602** and a forward end **654** extending forward. Trigger actuator **650** can further comprise one or more traverse blocks (e.g., traverse block **655A**) configured to engage firearm trigger **632** (firearm trigger **32** in FIG. 2A) and pull firearm trigger **632** in an aft direction in response to paddle trigger **602** being engaged, for example, by being pressed toward a paddle trigger housing (e.g., in a forward direction), thus firing the firearm. Traverse blocks **655A,B** can span substantially perpendicular to the forward-aft direction (in this context, “substantially” means plus or minus 30 degrees). Traverse block **655B** may be configured to push firearm trigger **632** in a forward direction in response to paddle trigger **602** being disengaged, to cease firing the firearm and/or reset the trigger to fire another round. A spring **651** can be coupled to and/or engaged with trigger actuator **650**, spring **651** being biased toward the unengaged position (i.e., the position of the trigger actuator that does not pull the firearm trigger and fire the firearm). Thus, with the paddle trigger and paddle trigger assembly starting in the unengaged position **600A** (not engaging firearm trigger **632**), in response to paddle trigger **602** being engaged (e.g., pressed in a forward direction), paddle trigger bar **605** can pivot (e.g., about pivot point **609**, which can be a pin, bolt, or the like), causing trigger actuator **650** to translate in an aft direction into an engaged position **600B**, compressing spring **651** against its bias. In response, traverse bar **655A** can engage firearm trigger **632**, thus pulling or engaging firearm trigger **632** in an aft direction to fire the firearm. In response to paddle trigger **602** being released, the spring bias of spring **651** can return the paddle trigger and the trigger actuator to unengaged position **600A** (e.g., by translating trigger actuator **650** in a forward direction). When unengaged, traverse block **655A** can rest against or proximate to firearm trigger **632** (e.g., within one or two millimeters), without putting pressure (e.g., aftward pressure) on firearm trigger **632**.

(21) In various examples, a paddle trigger assembly can comprise an actuator housing in which the trigger actuator can be at least partially disposed and/or enclosed. For example, paddle trigger assembly **200** can comprise actuator housing **230** spanning between a forward end **232** and an aft end **234**. Actuator housing **230** can at least partially enclosing trigger actuator **650** therein. Firearm trigger **32** (or **632**) can be at least partially disposed in actuator housing **230** within trigger void **235**. When installed or coupled to the firearm (e.g., to firearm receiver base **60** and/or trigger housing **72**), paddle trigger assembly **200** can fully enclose the forward end of trigger actuator **650** and/or firearm trigger **32** (or **632**). Such a configuration provides a safety feature configured to prevent or mitigate the risk of accidental actuation of the firearm trigger by bumping or otherwise accidentally causing trigger actuator **650** and/or firearm trigger **32** to move and fire the firearm.

(22) In various examples, an actuator housing can be coupled to a firearm in any suitable manner. For example, an actuator housing can be coupled to a firearm receiver and/or trigger housing via tight fit, sliding an actuator housing onto the respective firearm component (e.g., by complementary rails), an adhesive, and/or a fastener(s). With reference to paddle trigger assembly **200**, actuator housing **230** can be coupled to the firearm receiver, firearm receiver base **60**, and/or trigger housing **72** via a fastener being disposed through a coupling void **242** disposed in a bottom surface **236** of actuator housing **230**. The fastener (e.g., a screw or bolt comprising threading) can pass through actuator housing **230** and be disposed in trigger housing **72**, firearm receiver base **60**, and/or the firearm receiver by screwing into threading complementary to the fastener threading. The complementary threading in the trigger housing **72**, firearm receiver base **60**, and/or the firearm receiver can be in a firearm handle fastener receptacle configured to fasten a firearm handle and/or trigger guard to the firearm (e.g., at trigger housing **72** and/or firearm receiver base **60**). As

shown in FIGS. 6A and 6B, actuator housing **630** (similar to actuator housing **230**) can be coupled to the firearm receiver or receiver base **660** and/or trigger housing **672** via a fastener **698** being disposed through a coupling void **642** disposed in a bottom surface of actuator housing **630**. The fastener (e.g., a screw or bolt comprising threading) can pass through actuator housing **630** and be disposed in trigger housing **672**, firearm receiver base **660**, and/or the firearm receiver by screwing into threading complementary to the fastener threading. The complementary threading in the trigger housing **672**, firearm receiver base **660**, and/or the firearm receiver can be in a firearm handle fastener receptable (e.g., firearm coupling void **699**) configured to fasten a firearm handle and/or trigger guard to the firearm (e.g., at trigger housing **672** and/or firearm receiver base **660**). In various examples, the actuator housing can be coupled to a firearm at a location at which the handle and/or trigger guard for the firearm is configured to be coupled.

(23) In various examples, a paddle trigger assembly can comprise a paddle trigger housing configured to couple to and/or mount the paddle trigger and/or house other paddle trigger components. In various examples, the paddle trigger housing can be coupled to the actuator housing, and the actuator housing can extend in the forward direction from the paddle trigger housing. In various examples, paddle trigger assembly **200** comprises paddle trigger housing **240** to which paddle trigger **202** can couple. Paddle trigger housing **240** (**640** in FIGS. 6A,B) can be coupled to actuator housing **230** via a base **210** disposed therebetween. Paddle trigger **202** can be coupled to paddle trigger housing **240** on an aft surface **241**, and can be disposed on and/or contact a ledge **244**, on which paddle trigger **202** can pivot to be engaged or disengaged.

(24) In various examples, with additional reference to FIGS. 3A and 3B, paddle trigger **202** can be coupled to a paddle trigger bar **205**. Paddle trigger bar **205** can be coupled to and/or at least partially disposed in paddle trigger housing **240**. Paddle trigger **202** can be coupled to the trigger actuator (e.g., trigger actuator **650**) by paddle trigger bar **205**. During operation, in response to paddle trigger **202** being actuated (e.g., pressed in the forward direction), a top portion of paddle trigger bar **205** coupled to paddle trigger **202** can travel forward with paddle trigger **202**, and paddle trigger bar **205** can pivot about a pivot point, such that a lower portion of paddle trigger bar **205** moves in an aft direction. Such lower portion of paddle trigger bar **205** can be coupled to the trigger actuator, such that in response to the lower portion of paddle trigger bar **205** moving in the aft direction, the trigger actuator moves in the aft direction therewith, actuating the firearm trigger.

(25) In various examples, a paddle trigger assembly can have a paddle trigger safety configured to prevent an actuating movement of the paddle trigger and/or prevent actuation of the firearm trigger in response to movement of the paddle trigger. With continued reference to FIGS. 2A-2C and 3A, paddle trigger assembly **200** can comprise a paddle trigger safety **260** disposed in and/or coupled to paddle trigger housing **240**. Paddle trigger safety **260** can comprise a rod having a first end **262** and a second end **264**. Paddle trigger safety **260** can be disposed within and/or through paddle trigger housing **240** substantially perpendicular to the forward-aft direction (in this context, “substantially” means plus or minus 30 degrees), such that, in response to being engaged, the paddle trigger safety **260** traverses the forward-aft path of travel of paddle trigger **202** and/or paddle trigger bar **205**. Paddle trigger safety can be configured to be disposed through and protrude from side surfaces of paddle trigger housing **240**, in various examples.

(26) When unengaged, one side of the paddle trigger safety can protrude from a side surface of paddle trigger housing **240** (e.g., more than the other side). For example, as shown in FIGS. 2A-2C, first side **262** of paddle trigger safety **260** protrudes from the respective side surface of paddle trigger housing **240** to display a safety indicator **269**. Safety indicator **269** may indicate whether paddle trigger safety **260** is engaged. For example, safety indicator **269** can comprise a color (e.g., red), which, when exposed by being external to paddle trigger housing **240**, indicates that the firearm is ready to fire using paddle trigger assembly **200**. Such an unengaged position of paddle trigger safety **260** can cause safety ridges **266** disposed on and radially protruding from the paddle trigger safety rod to be at least partially aligned with a paddle trigger channel **209** disposed in

paddle trigger bar **205** and/or to be at least partially misaligned with paddle trigger **202** and/or paddle trigger bar **205**. Similarly, the unengaged position of paddle trigger safety **260** can cause safety channels **267** to be at least partially aligned with paddle trigger ridges **208** disposed in paddle trigger bar **205**. Therefore, the ridges and channels between paddle trigger **202**/paddle trigger bar **205** and paddle trigger safety **260** can be complementary and disposed in a complementary manner when paddle trigger safety **260** is in the unengaged position, such that safety ridges **266** do not block movement of paddle trigger **202** and/or paddle trigger bar **205** (i.e., safety ridges **266**), allowing movement of the trigger actuator and of the firearm trigger.

(27) To engage paddle trigger safety **260**, first side **262** of paddle trigger safety **260** can be pressed toward paddle trigger housing **240** such that paddle trigger safety **260** translates within paddle trigger housing **240**. In response to such translation, first end **262** can be disposed close to, flush with, or within paddle trigger housing **240** (causing safety indicator **269** to be within paddle trigger housing **240** and out of sight from a user), and second side **264** of paddle trigger safety **260** can protrude further outside of paddle trigger housing **240** than when paddle trigger safety **260** is in the unengaged position. The absence of safety indicator **269** from view can indicate that paddle trigger safety **260** is engaged and the paddle trigger assembly **200** is in safe mode preventing or mitigating the risk of actuating the firearm trigger.

(28) When engaged, such an engaged position of paddle trigger safety **260** can cause safety ridges **266** disposed on and radially protruding from the paddle trigger safety rod to be at least partially aligned with a paddle trigger ridges **208** disposed in paddle trigger bar **205**. Similarly, the engaged position of paddle trigger safety **260** can cause at least one of safety channels **267** to be at least partially aligned with a paddle trigger channel **209** disposed in paddle trigger bar **205**. Therefore, the ridges and channels between paddle trigger **202**/paddle trigger bar **205** and paddle trigger safety **260** can be disposed when paddle trigger safety **260** is in the engaged position, such that safety ridges **266** block movement of paddle trigger **202** and/or paddle trigger bar **205** (i.e., safety ridges **266**), preventing or mitigating the risk of movement of the trigger actuator and of the firearm trigger.

(29) In various examples, a paddle trigger assembly can comprise a base. The base can be configured to couple to the receiver and/or buffer assembly of the firearm. The base can be the component of a paddle trigger assembly to which other components of a paddle trigger assembly couple to complete the assembly. For example, paddle trigger assembly **200** comprises base **210**. Base **210** comprises a forward end **212** and an aft end **214**. Actuator housing **230** (e.g., aft end **234** thereof) can be coupled to base forward end **212** and extend forward therefrom. In various examples, actuator housing **230** and base **210** can be separate components coupled together, or actuator housing **230** and base **210** can be one integral and/or monolithic component. Paddle trigger housing **240** can be coupled to base aft end **214**. In various examples, paddle trigger housing **240** and base **210** can be separate components coupled together, or paddle trigger housing **240** and base **210** can be one integral and/or monolithic component. In various examples, a paddle trigger (e.g., paddle trigger **202**) can be coupled directly to the base of the paddle trigger assembly (e.g., such that there is no separate paddle trigger housing), and other paddle trigger components (e.g., paddle trigger bar **205**) can be disposed in and/or coupled to the base.

(30) Paddle trigger housing **240** and/or actuator housing **230** can be coupled to base **210** in any suitable manner. For example, paddle trigger housing **240** and/or actuator housing **230** can be coupled to base **210** via tight fit, sliding paddle trigger housing **240** into aft end **214** of base **210** or sliding actuator housing **230** into forward end **212** of base **210** (e.g., by complementary rails), an adhesive, and/or a fastener(s)). For example, paddle trigger housing **240** can be coupled to aft end **214** of base **210** by sliding paddle trigger housing **240** downward on complementary rails between paddle trigger housing **240** and base aft end **214**, and then securing such coupling by coupling top plate **249** to paddle trigger housing **240** and base aft end **214**. Top plate **249** can be coupled to paddle trigger housing **240** and/or base **210** by fasteners (e.g., screws, bolts, rivets, pins, and/or the

like).

(31) The firearm to which paddle trigger assembly **200** couples can comprise a buffer assembly (e.g., buffer assembly **270** depicted in FIG. 3B). Buffer assembly **270** can be separate from a paddle trigger assembly, or can be considered a part of paddle trigger assembly (e.g., in response to buffer assembly **270** being coupled to base **210**). Buffer assembly **270** can comprise a buffer tube **280** and a buffer plate **290**. Buffer tube **280** can be coupled to buffer plate **290**. For example, buffer tube **280** and buffer plate **290** can be fixedly coupled (e.g., as one integral and/or monolithic component). In various examples, base **210** can comprise a base cavity therein. Buffer tube **280** (depicted in FIG. 3B) can be disposed in the base cavity, e.g., as part of the coupling between the firearm (via buffer assembly **270**) and paddle trigger assembly **200** (e.g., as depicted in FIG. 6A, buffer tube **680** disposed in base cavity **611**). Buffer tube **280** can comprise a tube body **285** and a buffer protrusion **286**. The tube body and the buffer protrusion can comprise different cross-sectional areas. For example, tube body **285** can comprise a circular cross-sectional area that is larger than a circular cross-sectional area of buffer protrusion **286**. The cross-sectional areas of tube body **285** and tube body **285** can be concentric. The base cavity configured to receive buffer tube **280** can comprise a shape(s) and dimensions complementary to buffer tube **280**. For example, the base cavity can comprise an aft section having a shape and dimensions complementary to those of buffer protrusion **286** and a main portion having shape and dimensions complementary to those of tube body **285**. Buffer tube **280** can comprise a void disposed through an aft portion thereof (e.g., void **287** disposed through buffer protrusion **286**), through which a fastener (e.g., a screw, bolt, or the like) can pass through to couple buffer tube **280** and/or buffer assembly **270** to base **210** of paddle trigger assembly **200**. For example, as seen in FIG. 6A, fastener **691** is disposed through an aft surface of aft end of base **610** into buffer tube **680** to couple buffer tube **680** to base **610**. Void **287** within buffer tube **280** can comprise threading complementary to the fastener configured to be received therein.

(32) With reference to FIGS. 2A-2C and 3B, buffer plate **290** can be configured to couple to base forward end **212** of base **210**. Base **210** can comprise a void in base forward end **212** (e.g., void **619** in the forward end of base **610** in FIG. 6A), which can have a shape complementary to buffer aft protrusion **293** (buffer aft protrusion **693** in FIG. 6A), in which buffer plate **290** can be disposed. For example, buffer tube **280** can be disposed in the base cavity as buffer plate **290** can be disposed in the void in base forward end **212** (the base cavity and void in base forward end **212** can be continuous and/or fluidly connected). Buffer plate **290** can be coupled to base forward end **212** in any suitable manner including by fastener (e.g., the fastener disposed through void **287** in buffer tube **280**) and/or by tight fit within the void in base forward end **212**.

(33) Buffer plate **290** can provide a buffer forward surface with a buffer forward protrusion **292** extending therefrom. Buffer forward protrusion **292** can comprise a shape that is complementary to an aft void in a firearm receiver, such that the aft void of the firearm receives buffer forward protrusion **292**, and forward protrusion **292** remains disposed therein. The shapes of buffer forward protrusion **292** and the aft void in the firearm can be complementary so as to limit movement of forward protrusion **292** within the firearm aft void laterally and/or radially.

(34) In various examples, a buffer assembly can comprise one or more coupling apertures configured to aid in coupling the base and the paddle trigger assembly to a firearm. For example, as shown in FIG. 3B, buffer plate **290** can comprise buffer coupling voids **297** disposed through buffer forward protrusion **292** configured to align with firearm coupling apertures of the firearm in a firearm aft portion (e.g., an aft portion of a receiver). A fastener (e.g., a bolt, screw, fastening pin, buffer retainer pin, and/or the like) can be disposed through the buffer coupling voids **297** and the firearm coupling apertures to couple the base to the firearm (via buffer assembly **270**). That is, base **210** can be coupled to buffer assembly **270**, as discussed herein, and then buffer plate **290** of buffer assembly **270** can be coupled to the firearm via buffer coupling voids **297**. In various examples, such a protrusion comprising a base coupling aperture can be coupled to, or integral and/or

monolithic with, a forward surface of the base.

(35) In various examples, with additional reference to FIGS. **6A** and **6B**, buffer coupling voids **297** can be disposed through buffer forward protrusion **292** in a direction substantially perpendicular to the forward-aft direction (in this context, “substantially” means plus or minus 30 degrees). Firearm coupling apertures **697** disposed through the firearm receiver can be positioned complementary to the positions of buffer coupling apertures **297**, such that, in response to buffer forward protrusion **292** being disposed in firearm aft void **689**, buffer coupling apertures **297** of buffer plate **290** (buffer plate **690** in FIGS. **6A,B**) can be aligned with the firearm coupling apertures **697**. In response, fasteners **696** (e.g., buffer retainer pins) can be disposed through buffer coupling voids **297** and the firearm coupling apertures **697**. For example, retaining pins can be disposed therethrough, similar to takedown pins holding the upper and lower receivers together in an AR-15 style rifle. The retaining pins can maintain their respective positions when installed in any suitable manner, such as by tight fit, a component with radially-outward spring force configured to retain the fasteners in place, and/or the like.

(36) Without the presence of paddle trigger assembly **200**, buffer assembly **270** can be coupled to the firearm, and a firearm stock can be coupled to the buffer assembly **270**. For example, a stock can comprise a void in a stock forward end in fluid communication with a stock cavity disposed within the stock. The void in the stock forward end can have a shape complementary to, and be configured to receive, buffer aft protrusion **293**, in which buffer plate **290** can be disposed. Buffer plate **290** can be coupled to the stock forward end in any suitable manner including by fastener (e.g., the fastener disposed through void **287** in buffer tube **280**) and/or by tight fit within the void in the stock forward end. For example, buffer tube **280** can be disposed in the stock cavity as buffer plate **290** can be disposed in the void in stock forward end. The stock cavity can be configured to receive buffer tube **280**, and a fastener can be disposed through an aft surface of the stock and into void **287** of buffer tube **280**. Accordingly, paddle trigger assembly **200** can be retrofitted to a firearm from the original equipment manufacturer by, for example, decoupling the firearm stock from buffer assembly **270** and coupling paddle trigger assembly **200** to buffer assembly **270**, as discussed herein.

(37) In various examples, a paddle trigger assembly can comprise one or more handles for a user to grip. A handle can be disposed in an aft portion of the paddle trigger assembly, or aft of the actuator housing, traverse block, base, and/or paddle trigger, and/or the handle can be the aft-most component of a paddle trigger assembly. For example, in paddle trigger assembly **200**, handles **295** are the aft-most components. A handle **295** (also called a “spade grip”) can be disposed to the side of, or laterally spaced from, an axis along which the components of paddle trigger assembly **200** span (e.g., an axis parallel to the axis of a firearm barrel). In paddle trigger assembly **200**, with two handles **295**, paddle trigger **202** and other components of paddle trigger assembly **200** can be disposed between handles **295**. Paddle trigger **202** can be disposed between handles **295** such that a user can grip handles **295** and engage paddle trigger **202** with the users' thumbs.

(38) Handles in a paddle trigger assembly can be coupled thereto in any suitable manner. For example, handles **295** are coupled to base **210** by brackets **274**. A top bracket **274** can be coupled to a top surface of base **210**. A bottom bracket **274** can be coupled to a bottom surface of base **210**. Brackets **274** can be U-shaped or V-shaped to allow coupling of two handles **295**—one on either side of paddle trigger **202**. In various examples, the handles and/or brackets for coupling the handles can be coupled to any suitable component of a paddle trigger assembly.

(39) As discussed herein, paddle trigger **202** is coupled to an aft surface of base **210** and/or paddle trigger housing **240** and disposed in a substantially vertical position such that paddle trigger **202** is engaged by pressing paddle trigger **202** in the forward direction, and disengaged by the paddle trigger **202** moving in the aft direction. However, the paddle trigger can be disposed in any suitable position on a paddle trigger assembly and engaged in any suitable manner or direction. For example, a paddle trigger can be disposed in a substantially horizontal position (facing upward or

downward), engagement of which can occur by pressing the paddle trigger upward or downward. In various examples, the paddle trigger can be coupled to a top surface or a bottom surface of the base and/or paddle trigger housing. In various examples, the paddle trigger can face one side (rather than aft-ward, upward, or downward) and be engaged by pressing the paddle trigger to one side. In various examples, the paddle trigger can be coupled to a side surface of the base and/or paddle trigger housing. The paddle trigger can be disposed in any suitable position to allow engagement thereof by a user.

(40) With reference to FIGS. 1B and 4A-4C, spade grip assembly **100** can further comprise a mounting system **400**. Mounting system **400** can comprise a mounting support arm **450** configured to couple and mount the firearm to the surface (e.g., on a platform, vehicle, and/or the like). The firearm can be coupled to any suitable component of a mounting system to allow movement and aiming of the firearm.

(41) A mounting support arm can comprise one or more joints configured to allow the firearm to pivot thereabout to aim the firearm in different directions. For example, the mounting support arm can comprise or be coupled to a ball joint about which the firearm can pivot in vertical, horizontal, and diagonal directions at any suitable angle. As another example, mounting support arm **450** can comprise two joints, foundation joint **452** and mount joint **454**. Foundation joint **452** can be configured to allow the firearm to pivot and/or move about a first pivot point **453** (e.g., in a substantially horizontal direction **497**). Mount joint **454** can be configured to allow the firearm to pivot and/or move about a second pivot point **455** (e.g., in a substantially vertical direction **498**) (as used in this context, “substantially” means plus or minus 30 degrees).

(42) In various examples, mounting system **400** can comprise a mounting base **410** to which the firearm can couple (e.g., by firearm receiver base **60** coupling to mounting base **410**). Mounting plate **410** can comprise mounting arms **412**, **414** protruding from a side of mounting base **410**, to which the firearm can couple. The extension of mounting arms **412**, **414** from the side of mounting base **410** can create a mounting base void **416**, providing clearance for the mounting support arm **450** between mounting base **410** and the firearm, as well as clearance for other components of mounting system **400** (e.g., charging block **420**, discussed herein). Mounting arms **412**, **414** can be spaced and positioned, and can comprise mounting apertures **416** and **418**, complementary to firearm mounting apertures **66** and **68** in firearm receiver base **60**. Accordingly, in response to mounting arms **412**, **414** and mounting apertures **416**, **418** being aligned with firearm mounting apertures **66** and **68**, fasteners (e.g., bolts, screws, rivets, retaining pins, and/or the like) can be disposed therethrough, coupling the firearm (e.g., by firearm receiver base **60**) to mounting base **450** and/or mounting system **400**. Mounting base **450** can be coupled to the firearm such that mounting base **450** moves and pivots with the firearm as the firearm is moved and aimed via the joint(s) comprised in the mounting system.

(43) In various examples, a mounting system can comprise a charging system coupled to the mounting base and/or mounting support arm. The components of a firearm spade grip assembly can create difficulty for a user to reach and/or operate the charging handle or system of the firearm because of such components causing obstructions to the firearm charging handle and/or the charging motion. Accordingly, the charging system can be configured to aid the user of the firearm of the firearm spade grip assembly in charging the firearm by providing a more convenient gripping point, angle, and/or movement to charge the firearm.

(44) For example, charging system **420** of mounting system **400** can comprise a charging block **430** configured to couple to and/or engage the firearm charging handle. Charging block **430** can comprise a charging handle receptacle **437**, which can be a void disposed in charging block **430**. The firearm charging handle can be disposed in charging handle receptacle **437** such that, in response to charging block **430** being translated, the firearm charging is translated therewith, charging the firearm.

(45) In various examples, charging block **430** can comprise one or more guiderail channels,

through which guiderails can be disposed. Charging system **420** can comprise guiderails **435** disposed through the guiderail channels in charging block **430**, along which charging block **430** can translate to charge the firearm. Guiderails in a mounting system can be coupled to and between two points in the mounting system **400**. For example, guiderails **435** can be coupled to and between mounting support arm **450** (e.g., via mounting joint block **425** (e.g., in which mount joint **454** can be housed)) and mounting base **410** (e.g., via mounting bracket **437** coupled to and extending from mounting base **410**). Mounting system **400** can comprise two guiderails **435** to stabilize charging block **430** within a two-dimensional or three-dimensional space.

(46) In various examples, mounting system **400** can comprise a charging block handle **432** coupled to and extending from charging block **430** to facilitate gripping of and moving charging block **430** to charge the firearm.

(47) In various examples, a mounting system can comprise a brass catch configured to receive and direct expended brass casings ejected from the firearm resulting from firing the firearm. For example, mounting system **400** can comprise brass catch **460**. Brass catch **460** can comprise a brass catch inlet **463**, which may be disposed at a position complementary to the firearm ejection port in response to the firearm being coupled to mounting system **400** (e.g., via mounting base **410**). Brass catch inlet **463** can be position such that, in response to an expended brass casing from a fired firearm cartridge being ejected through the firearm ejection port, brass catch **460** receives the expended brass casing through brass catch inlet **463**. Brass catch **460** can further comprise a brass catch chute **466** comprising a channel disposed therethrough that is in fluid communication with brass catch inlet **463**. Accordingly, expended brass casings can enter brass catch **460** through brass catch inlet **463** and be directed to a desired location through brass catch chute **466** (e.g., into a brass receptacle or bin, or disposed in a desired direction from the firearm spade grip assembly).

(48) FIG. 5 depicts a method **500** for assembling a firearm spade grip assembly. To retrofit components of a firearm spade grip assembly to an existing firearm, certain firearm components can be removed from the firearm (step **502**). For example, the firearm handle, trigger guard, and/or buttstock can be removed from a firearm. The handle and/or trigger guard can be removed by removing a firearm handle fastener from the handle (e.g., from the bottom of the firearm handle), which couples the firearm handle and/or trigger guard to firearm receiver base **60**. Removing the trigger guard, if separate from the firearm handle, can comprise removing separate fasteners from the firearm handle fastener. The buttstock can be removed by removing a fastener coupling the buttstock to the rest of the firearm (e.g., the firearm receiver and/or buffer assembly). For example, the buttstock can be removed by removing a fastener disposed through the buttstock coupling the buttstock to buffer tube **280** (as discussed herein).

(49) With additional reference to FIGS. **6A** and **6B**, in response to removing the firearm components from the firearm in step **502**, the paddle trigger assembly of a spade grip assembly can be coupled to the firearm. As discussed herein, paddle trigger assembly **200** can be coupled to the firearm (step **504**). For example, base **210** (e.g., base **610**) of paddle trigger assembly **200** can be coupled to firearm **615** (e.g., via the firearm receiver and/or a buffer assembly), as discussed herein. For example, buffer aft protrusion **693** can be inserted into void **619** in the forward end of base **610**, and forward protrusion **292** of buffer plate **290** can be inserted into the receiver, aligning coupling apertures **297** with firearm coupling apertures **697** disposed through the firearm receiver (that may have previously been used to retain the buttstock), and disposing a fastener therethrough. As another example, as discussed herein, actuator housing **630** can be coupled to the firearm (e.g., via the firearm receiver, firearm receiver base **60** (**660** in FIGS. **6A,B**), and/or firearm trigger housing **672**), by inserting a fastener **698** through a coupling void **242** (**642** in FIGS. **6A,B**) disposed in a bottom surface **236** of actuator housing **230** (**630** in FIGS. **6A,B**). The fastener (e.g., a screw or bolt) can pass through actuator housing **230** and be disposed in a firearm coupling void (e.g., firearm coupling void **699**), for example, in trigger housing **672**, firearm receiver base **660**, and/or the firearm receiver. Thus, the actuator housing and/or paddle trigger assembly can be coupled to

the firearm.

(50) Further to coupling the firearm to the firearm spade grip assembly, the firearm can be coupled to mounting assembly **400** (step **506**). The firearm receiver and/or firearm receiver base **60** can be coupled to any suitable component of mounting assembly **400**. For example, the firearm receiver and/or firearm receiver base **60** can be coupled to mounting base **410** at mounting arms **412**, **414**, e.g., by aligning mounting apertures **416**, **418** with firearm mounting apertures **66** and **68**, and inserting and coupling/securing fasteners (e.g., bolts, screws, rivets, retaining pins, and/or the like) therethrough.

(51) The paddle trigger assemblies and methods herein can allow the coupling or retrofitting of a system having a paddle trigger and spade grip to a firearm from the original equipment manufacturer without manipulation or adjustment of the action or fire and/or trigger control group of the firearm.

(52) As will be appreciated, the spade grip systems and methods described herein maybe adapted to any desired or suitable firearm, such as firearms of different makes, models, sizes, calibers, and/or configurations.

(53) Benefits, other advantages, and solutions to problems have been described herein with regard to specific example. Furthermore, the connecting lines shown in the various figures contained herein are intended to represent exemplary functional relationships and/or physical couplings between the various elements. It should be noted that many alternative or additional functional relationships or physical connections may be present in a practical system. However, the benefits, advantages, solutions to problems, and any elements that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as critical, required, or essential features or elements of the disclosure. The scope of the disclosure is accordingly to be limited by nothing other than the appended claims, in which reference to an element in the singular is not intended to mean “one and only one” unless explicitly so stated, but rather “one or more.” Moreover, where a phrase similar to “at least one of A, B, or C” or “at least one of A, B, and C” is used in the claims or specification, it is intended that the phrase be interpreted to mean that A alone may be present in an example, B alone may be present in an example, C alone may be present in an example, or that any combination of the elements A, B and C may be present in a single example; for example, A and B, A and C, B and C, or A and B and C. Different cross-hatching may be used throughout the figures to denote different parts but not necessarily to denote the same or different materials.

(54) Systems, methods and apparatus are provided herein. In the detailed description herein, references to “one example”, “an example”, “various examples”, etc., indicate that the example described may include a particular feature, structure, or characteristic, but every example may not necessarily include the particular feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same example. Further, when a particular feature, structure, or characteristic is described in connection with an example, it is submitted that it is within the knowledge of one skilled in the art to affect such feature, structure, or characteristic in connection with other examples whether or not explicitly described. After reading the description, it will be apparent to one skilled in the relevant art(s) how to implement the disclosure in alternative examples.

(55) Furthermore, no element, component, or method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the claims. No claim element herein is to be construed under the provisions of 35 U.S.C. 112(f) unless the element is expressly recited using the phrase “means for.” As used herein, the terms “comprises”, “comprising”, or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus.

Claims

1. A firearm spade grip assembly, comprising: a paddle trigger assembly, comprising: a base spanning between and comprising a base forward end and a base aft end; a paddle trigger coupled to the base; a trigger actuator coupled to the base, wherein a portion of the trigger actuator extends from the base forward end, wherein the trigger actuator comprises an actuator aft end coupled to the paddle trigger and a traverse block forward of the actuator aft end configured to engage and pull a firearm trigger of a firearm in an aft direction in response to translation of the trigger actuator, wherein movement of the paddle trigger is configured to translate the trigger actuator; and an actuator housing coupled to and extending forward from the base, wherein the trigger actuator is disposed at least partially within the actuator housing.
2. The assembly of claim 1, wherein the actuator housing is configured to couple to at least one of a firearm receiver base or a firearm receiver of the firearm.
3. The assembly of claim 1, wherein the actuator housing is configured to receive a firearm trigger of the firearm therein.
4. The assembly of claim 1, further comprising a fastener disposed through a bottom surface of the actuator housing that is configured to couple the actuator housing to the firearm.
5. The assembly of claim 4, wherein the fastener is configured to be disposed in a handle fastener receptacle in the firearm.
6. The assembly of claim 1, further comprising a paddle trigger housing coupled to the base aft end, wherein the paddle trigger is coupled to the base via the paddle trigger housing.
7. The assembly of claim 1, wherein the base forward end comprises a void configured to receive a buffer assembly of the firearm.
8. The assembly of claim 1, further comprising a paddle trigger safety configured to prevent an actuating movement of the paddle trigger in response to being engaged.
9. The assembly of claim 1, further comprising a mounting system configured to couple the firearm to a surface.
10. The assembly of claim 9, wherein the mounting system comprises a mounting base configured to couple to a firearm receiver base or a firearm receiver of the firearm.
11. The assembly of claim 10, wherein the mounting system further comprises a charging system coupled to the mounting base and comprising a charging block configured to couple to a charging handle of the firearm and a guiderail configured to allow the charging block to translate in the aft direction or a forward direction to charge the firearm.
12. The assembly of claim 10, wherein the mounting system further comprises a brass catch coupled to the mounting base comprising a brass catch inlet and a brass catch chute, wherein the brass catch inlet is configured to align with an ejection port of the firearm, and wherein the brass catch inlet and the brass catch chute are in fluid communication.
13. The assembly of claim 10, wherein the mounting system further comprises a mounting support arm configured to support the mounting system, wherein the mounting support arm comprises a foundation joint and a mount joint, wherein the foundation joint is configured to allow the firearm to move about a first pivot point, and wherein the mount joint is configured to allow the firearm to move about a second pivot point.
14. A firearm spade grip assembly, comprising: a firearm comprising at least one of a firearm receiver base or a firearm receiver, and a firearm trigger; and a paddle trigger assembly coupled to the firearm, comprising: a base, comprising a base forward end and a base aft end, wherein the base is coupled to an aft end of the firearm receiver base or an aft end of the firearm receiver; a paddle trigger coupled to the base; a trigger actuator coupled to the paddle trigger and configured to actuate the firearm trigger in response to movement of the paddle trigger; and an actuator housing coupled to and extending forward from the base, wherein the actuator housing is coupled to the

firearm receiver base or the firearm receiver such that the firearm trigger of the firearm is disposed at least partially in the actuator housing.

15. The assembly of claim 14, wherein the firearm trigger is completely enclosed between the firearm and the actuator housing.

16. The assembly of claim 14, wherein the paddle trigger assembly is coupled to the firearm at least partially by a fastener disposed through a bottom surface of the actuator housing and into a handle fastener receptacle in the firearm.

17. The assembly of claim 14, further comprising a buffer assembly coupled to the firearm receiver, wherein the base forward end is coupled to the buffer assembly.

18. The assembly of claim 14, further comprising a mounting system coupled to the firearm and configured to couple the firearm to a surface, wherein the mounting system comprises a mounting support arm comprising a foundation joint and a mount joint, wherein the foundation joint is configured to allow the firearm to move about a first pivot point, and wherein the mount joint is configured to allow the firearm to move about a second pivot point.
