CLAIMS

What is claimed is:

1. A weapon system for firing a round from a belt of rounds, the weapon system comprising:

a receiver;

an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising

a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver;

an operating rod (op-rod) assembly at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition; and

a bolt assembly coupled to the op-rod assembly and at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition;

a barrel coupled to the barrel extension and defining a chamber and a bore;

a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly;

a buffer assembly comprising a self-centering spring and a hydraulic piston assembly having a first end coupled to the receiver and a second end coupled to the barrel extension; and

a feeder coupled to the receiver and configured to provide the round to the operating group.

2. The weapon system of claim 1, wherein the barrel extension and the op-rod assembly are interlocked such that the op-rod assembly is limited in axial movement by the barrel extension to provide a redundant containment of the op-rod assembly and bolt assembly within the barrel extension.

3. The weapon system of claim 1, wherein the op-rod assembly and the bolt assembly are interlocked such that the bolt assembly is limited in axial movement by the op-rod assembly to provide a redundant containment of the op-rod assembly and bolt assembly within the barrel extension.

4. The weapon system of claim 3, wherein the op-rod assembly comprises at least two redundant locking cams to force the bolt assembly into a locking position.

5. The weapon system of claim 1, wherein the feeder comprises a feed tray configured to position the belt of rounds such that the bolt assembly forces the round into the chamber, and wherein the round of the belt of rounds is a first round and wherein the belt of rounds further includes a second round adjacent to the first round in the belt of rounds, and wherein the feeder further includes a feed pawl configured to index the belt of rounds from the first round to the second round.

6. The weapon system of claim 5, wherein the feeder includes a feed index cam and the op-rod assembly includes a feed roller, and wherein upon forcing the first round into the chamber, the feed roller actuates the feed pawl via the feed index cam to index the belt of rounds, wherein, upon indexing the belt of rounds, the feeder is configured to force a link associated with the first round out of the weapon system.

7. The weapon system of claim 1, wherein the barrel comprises a quick-release assembly that includes a lock projection on the barrel, first locking lugs on the barrel, second locking lugs on the barrel extension, and a lock surface on the barrel extension, and

wherein, in a locked position, the first locking lugs and the second locking lugs cooperate to prevent relative motion in an axial direction and the lock projection and the lock surface to prevent relative motion in a circumferential direction.

8. The weapon system of claim 7, wherein, in an unlocked position, the lock projection disengages from the lock surface to enable relative circumferential movement such that the first locking lugs and the second locking lugs disengage to enable relative motion in the axial direction and removal of the barrel from the barrel extension.

9. The weapon system of claim 1, wherein the gas accelerator includes a housing body having an inlet mating with a port in the barrel such that, upon firing, at least a portion of the gases from the bore are directed through the inlet into the housing body.

10. The weapon system of claim 9, wherein the gas accelerator further includes a poppet arranged within the housing body and actuated by the portion of the gases, wherein the poppet contacts the op-rod assembly and actuates the op-rod assembly upon actuation by the portion of the gases.

11. The weapon system of claim 9, wherein the housing body defines a vent.

12. The weapon system of claim 9, wherein the housing body is mounted on the barrel, outside of the receiver.

13. The weapon system of claim 1, further comprising a firing pin arranged forward of the op-rod assembly.

14. The weapon system of claim 1, further comprising a firing pin arranged on the bolt assembly.

15. The weapon system of claim 14, wherein a forward portion of the op-rod assembly contacts the firing pin to actuate the firing pin into a primer of the round.

16. A quick release mechanism for attaching and detaching a barrel of a weapon system, comprising:

first locking lugs positioned on a barrel extension of the weapon system;

a lock surface positioned on the barrel extension of the weapon system;

a barrel handle extending from the barrel;

a barrel lock mounted on the barrel handle;

a barrel lock projection extending from the barrel lock, the barrel lock projection having a first radial position engaged with the lock surface and a second radial position disengaged from the lock surface; and

second locking lugs positioned on the barrel, the second locking lugs having a first circumferential position engaged with the first locking lugs and a second circumferential position disengaged with the first locking lugs.

17. The quick release mechanism of claim 16, wherein the barrel lock is configured to be actuated to transition the barrel lock projection from the first radial position into the second radial position.

18. The quick release mechanism of claim 17, further comprising a spring housed in the barrel handle and biasing the barrel lock projection into the first radial position.

19. The quick release mechanism of claim 17, wherein each of the first and second locking lugs is circumferentially segmented such that, in the first circumferential position, the first and second locking lugs are circumferentially aligned and, in the second circumferential position, the first and second locking lugs are circumferentially offset.

20. A feed assembly for presenting a round of a series of rounds to an operating group of a weapon system, comprising:

a feed tray defining an inlet and configured to support the series of rounds; and

a feeder coupled to the feed tray and comprising

a feed index cam configured to be actuated by axial movement of the operating group; and

a feed pawl coupled to the feed index cam and configured to index the series of round in the feed tray upon actuation of the feed index cam.

Claims:

1. A weapon system for firing a round from a belt of rounds, the weapon system comprising:

a receiver;

an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising

a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver;

an operating rod (op-rod) assembly at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition; and

a bolt assembly coupled to the op-rod assembly and at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition;

a barrel coupled to the barrel extension and defining a chamber and a bore,

wherein the op-rod assembly and the bolt assembly are interlocked such that the bolt assembly is limited in axial movement by the op-rod assembly to provide a redundant containment of the op-rod assembly and bolt assembly within the barrel extension;

a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly;

a buffer assembly comprising a spring and a hydraulic piston assembly having a first end coupled to the receiver and a second end coupled to the barrel extension; and

a feeder coupled to the receiver and configured to provide the round to the operating group.

2. The weapon system of claim 1, wherein the barrel extension and the op-rod assembly are interlocked such that the op-rod assembly is limited in axial movement by the barrel extension to provide a redundant containment of the op-rod assembly and bolt assembly within the barrel extension.

3. The weapon system of claim 1, wherein the op-rod assembly comprises at least two redundant locking cams to force the bolt assembly into a locking position.

4. The weapon system of claim 1, wherein the feeder comprises a feed tray configured to position the belt of rounds such that the bolt assembly forces the rounds into the chamber, the rounds including a first round and a second round adjacent to the first round in the belt of rounds, and wherein the feeder further includes a feed pawl configured to index the belt of rounds from the first round to the second round.

5. The weapon system of claim 4, wherein the feeder includes a feed index cam and the op-rod assembly includes a feed roller, and wherein upon forcing the first round into the chamber, the feed roller actuates the feed pawl via the feed index cam to index the belt of rounds, wherein, upon indexing the belt of rounds, the feeder is configured to force a link associated with the first round out of the weapon system.

6. A weapon system for firing a round from a belt of rounds, the weapon system comprising:

a receiver;

an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising

a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver;

an operating rod (op-rod) assembly at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition; and

a bolt assembly coupled to the op-rod assembly and at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition;

a barrel coupled to the barrel extension and defining a chamber and a bore;

a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly;

a buffer assembly comprising a spring and a hydraulic piston assembly having a first end coupled to the receiver and a second end coupled to the barrel extension; and

a feeder coupled to the receiver and configured to provide the round to the operating group,

wherein the barrel comprises a quick-release assembly that includes a lock projection on the barrel, first locking lugs on the barrel, second locking lugs on the barrel extension, and a lock surface on the barrel extension, and wherein, in a locked position, the first locking lugs and the second locking lugs cooperate to prevent relative motion in an axial direction and the lock projection and the lock surface to prevent relative motion in a circumferential direction.

7. The weapon system of claim 6, wherein, in an unlocked position, the lock projection disengages from the lock surface to enable relative circumferential movement such that the first locking lugs and the second locking lugs disengage to enable relative motion in the axial direction and removal of the barrel from the barrel extension.

8. The weapon system of claim 1, wherein the gas accelerator includes a housing body having an inlet mating with a port in the barrel such that, upon firing, at least a portion of the gases from the bore are directed through the inlet into the housing body.

9. The weapon system of claim 8, wherein the gas accelerator further includes a poppet arranged within the housing body and actuated by the portion of the gases, wherein the poppet contacts the op-rod assembly and actuates the op-rod assembly upon actuation by the portion of the gases.

10. The weapon system of claim 8, wherein the housing body defines a vent.

11. The weapon system of claim 8, wherein the housing body is mounted on the barrel, outside of the receiver.

12. A weapon system for firing a round from a belt of rounds, the weapon system comprising:

a receiver;

an operating group configured to operate the weapon system through a charged condition, a firing condition, and a recoil condition, the operating group comprising

a barrel extension at least partially housed within the receiver and arranged to axially translate relative to the receiver;

an operating rod (op-rod) assembly at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition; and

a bolt assembly coupled to the op-rod assembly and at least partially housed within the barrel extension and arranged to axially translate within the barrel extension between the charged condition, the firing condition, and the recoil condition;

a barrel coupled to the barrel extension and defining a chamber and a bore;

a gas accelerator with a first end coupled to the barrel and a second end coupled to the op-rod assembly;

a buffer assembly comprising a spring and a hydraulic piston assembly having a first end coupled to the receiver and a second end coupled to the barrel extension;

a feeder coupled to the receiver and configured to provide the round to the operating group; and

a firing pin arranged forward of the op-rod assembly.

13. The weapon system of claim 1, further comprising a firing pin arranged on the bolt assembly.

14. The weapon system of claim 13, wherein a forward portion of the op-rod assembly contacts the firing pin to actuate the firing pin into a primer of one of the rounds.