



BARREL INSERT AND REAR BARREL SECTION FOR WEAPONS

BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to weapons for firing projectiles. In one particular aspect, although not exclusively, the present invention relates to the conversion of barrel in guns such as firearms and larger calibre weapons to a smaller calibre barrel using a barrel insert.

10 In a second aspect, the present invention relates to loading projectiles into guns such as firearms and larger calibre weapons. The second aspect of the invention has particular application to guns incorporating barrels each having a plurality of projectiles stacked axially within the barrel together with discrete selectively ignitable propellant charges for propelling the projectiles sequentially
15 through the muzzle of the barrel. Such barrels will be referred to hereinafter as of the type described.

Discussion of the Background Art

Prior attempts to reduce the calibre of a conventional weapon have been
20 significantly hampered by complexity, particularly in relation to the breech due to the mechanical requirement for feeding rounds and secure fitment to an existing barrel.

Supplementary barrels provided for diversifying available fire power on weapons, such as for launching grenades from rifles, have limited operational
25 capacity in view of the complex and/or costly arrangements presently available for rapid re-loading whilst the weapon is in use.

SUMMARY OF THE INVENTION

Object of the Invention

30 It is an object of certain embodiments of the invention to provide an apparatus for and method of easily and conveniently converting a weapon or gun to a smaller calibre.



It is an object of certain embodiments of the invention to provide a barrel assembly incorporating projectiles that can be used to facilitate rapid reloading of a gun having a barrel of the type described

5 Disclosure of the Invention

The present invention provides, in a first aspect, a barrel assembly for insertion into a parent barrel of a gun wherein said barrel assembly has a plurality of projectiles axially disposed within at least one barrel and associated with discrete selectively ignitable propellant charges for propelling the projectiles from
10 said at least one barrel wherein said barrel assembly includes a parent barrel engaging means. In a related aspect, the present invention provides a method for converting the calibre of a gun to a smaller calibre comprising the step of inserting a barrel assembly having a plurality of projectiles axially disposed within at least one barrel and associated with discrete selectively ignitable propellant charges for
15 propelling the projectiles from the at least one barrel wherein said barrel assembly includes a parent barrel engaging means.

In one embodiment of the first aspect the barrel assembly may comprise a single barrel. In other embodiments the barrel assembly may include a cluster of barrels aligned whereby the cluster of barrels may be retained in a close packed
20 array for insertion in the parent barrel. Where a cluster of barrels are used in the barrel assembly, the barrel assembly preferably includes a housing in which the barrels are retained. The housing may be formed integrally with the barrels. In this form the housing and barrels may be disposable once the projectiles have been exhausted. Alternatively the barrel assembly may be reloaded with
25 projectiles and used again.

The housing may be formed separately to the barrels and the barrels inserted into the housing prior to the housing being inserted into the parent barrel. In this form the barrels may be inserted into the housing whilst the housing is retained within the parent barrel or when the housing has been extracted from the
30 parent barrel.

The housing may be formed out of any convenient material. It is preferred that the housing is formed from a material of sufficient structural strength to effectively retain the barrels in alignment during firing but is not so hard and stiff

that the parent barrel is damaged by the repeated insertion and withdrawal of the housing into the parent barrel.

The parent barrel may be of any convenient type. For example the parent barrel may be of a conventional mechanically operated gun and the insertion of the barrel assembly provides the gun with a fully electronic firing system. The parent barrel may be of an electronically operated gun, operated in a manner similar to that of the barrel assembly.

One embodiment of the first aspect of the invention provides for a full length barrel assembly to be inserted into the parent barrel from the muzzle. This embodiment is particularly applicable to guns of the conventional type whereby ready access through the breach of the barrel is not available. In this embodiment the barrel assembly may be inserted through the muzzle of the parent barrel and be retained therein. The barrel assembly includes means for engaging with the bore of the parent barrel and may also include means for retaining said barrel assembly with the parent barrel. However, an alternative embodiment provides a gun wherein the parent barrel is formed in two sections and hence access through the breach section barrel is readily available. In this embodiment, the barrel assembly may be inserted in two parts. A primary or forward barrel section may be inserted within the parent barrel towards the muzzle end of the parent barrel. This forward barrel section is, in effect, a barrel extension and does not contain any projectiles. A second or rear barrel section contains the projectiles and may be inserted into a rear portion of the parent barrel and be engaged with the forward barrel section to form a complete barrel assembly with projectiles and firing means.

The barrel assemblies may be inserted from the front or rear of the parent barrel depending on the configuration of the gun. The barrel assembly may be engaged with the bore of the parent barrel by a plurality of stand off sections or tabs that extend from the barrel assembly to form an interference fit within the bore of the parent barrel. These stand off sections may have the same diameter as the bore diameter of the parent barrel. Such stand off sections may be constructed of metal or insulating material and may facilitate operation of the firing system. The orientation of the barrel assembly may be affixed by a key system that may be located at the muzzle, breach or both of the parent barrel. Where a cluster of

barrels are incorporated into the barrel assembly, the housing preferably includes a plurality of stand off sections for engagement with the bore of the parent barrel.

The barrel assembly that includes one or more barrels may incorporate an electronic firing system that is hard wired to a firing mechanism outside of the parent barrel. In one embodiment the trigger mechanism of the parent gun may
5 be adapted to fire the projectiles from the barrel assembly. Where stand off sections are used to engage the bore of the parent barrel the wires required to operate the barrel assembly may be retained in the space defined thereby and may be exited the parent barrel either through the muzzle or rear section thereof.
10 Preferably the firing mechanism may be by signal wires entering by the rear section of the parent barrel.

In a second aspect, the present invention provides a barrel assembly for loading a gun having a barrel extension wherein said barrel assembly has a plurality of projectiles axially disposed within a barrel and associated with discrete
15 selectively ignitable propellant charges for propelling the projectiles from the barrel wherein said barrel assembly includes a barrel extension engaging means. In a related aspect the present invention provides a method for loading a gun having a barrel extension including the steps of engaging a barrel assembly including a plurality of projectiles with a barrel extension wherein said plurality of projectiles
20 are axially disposed within a barrel and associated with discrete selectively ignitable propellant charges for propelling the projectiles from the barrel wherein said barrel assembly includes a barrel extension engaging means.

In a preferred embodiment, the barrel extension engaging means is a chamfered leading section of the barrel assembly that engages an associated
25 surface on the barrel extension. The use of a chamfered barrel extension engaging means permits the barrel assembly to be inserted obliquely into the barrel extension and subsequently brought into alignment with said barrel extension and clamped or retained in place. Preferably the barrel assembly is urged forward to sealably engage the barrel extension. The barrel assembly and
30 barrel extension are suitably associated a locking system for releasably locking the barrel assembly to the extension.

In an alternative embodiment the barrel extension engaging means may include a stepped section that engages a corresponding stepped section in the

barrel extension. Another alternative is to simply abut the barrel assembly with the barrel extension. A sleeve may be provided over the interface between the barrel assembly and the barrel extension to assist in retaining the barrel assembly in alignment with the barrel extension.

5 In one embodiment of the second aspect of the invention, the barrel assembly containing the projectiles may have a lever attached to aid locating and locking this section of barrel with the main section of barrel on the weapon system. During transport and storage of the barrel section, the lever may be folded to form a low profile along the barrel section. When the projectile section of barrel is being
10 attached to the weapon system, the lever may be raised to aid in locating and locking the section of barrel, much like a conventional bolt-action rifle. To aid in orientating and locking the barrel section a keyring arrangement on the barrel assembly may also be used. In a preferred configuration when the lever is rotated to the lock position the key mechanism is also locked into position.

15 In another embodiment of the invention, the barrel assembly is pushed into the barrel extension obliquely and then pushed down to be locked from behind by a spring loaded mechanical lock system. This same mechanical lock system may act as the ejection system for the spent barrel assembly.

In yet another embodiment of the second aspect of the invention, one or
20 more spare barrel assemblies containing projectiles may be housed on the weapon, usually underneath the weapon. When the last projectile is fired in the operative barrel assembly this spent barrel assembly may be automatically ejected and a spare barrel assembly automatically pushed and locked into position ready for a new fire command.

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The present invention has particular application to barrel assemblies of the type described in the earlier International Patent Application Nos. PCT/AU94/00124 and PCT/AU96/00459 by the present inventor. Such barrel assemblies include a barrel, a plurality of projectiles axially disposed within the
30 barrel for operative sealing engagement with the bore of the barrel, and discrete propellant charges for propelling respective projectiles sequentially through the muzzle of the barrel.

The projectiles may be round, conventionally shaped or dart-like and the fins thereof may be offset to generate a stabilising spin as the dart is propelled from a barrel that may be a smooth-bored barrel.

5 The propellant charge may be in the form of a solid block and assist in operatively spacing the projectiles in the barrel. Alternatively, the propellant charge may be encased in metal or other rigid case which may include an embedded primer having external contact means adapted for contacting a pre-positioned electrical contact associated with the barrel. For example the primer could be provided with a sprung contact which may be retracted to enable
10 insertion of the cased charge into the barrel and to spring out into a barrel aperture upon alignment with that aperture for operative contact with its mating barrel contact. If desired the outer case may be consumable or may chemically assist the propellant burn. Furthermore an assembly of stacked and bonded or separate cased charges and projectiles may be provided for reloading a barrel.

15 Each projectile may include a projectile head and extension means for at least partly defining a propellant space. The extension means may include a spacer assembly that extends rearwardly from the projectile head and abuts an adjacent projectile assembly. Such an extension means may assist the detent in the barrel in supporting the projectiles in position within the barrel when a leading
20 charge is fired.

A spacer assembly may extend through the propellant space and the projectile head whereby compressive loads are transmitted directly through abutting adjacent spacer assemblies. In such configurations, the spacer assembly may add support to the detent and extension means. The extension means may
25 be a thin cylindrical rear portion of the projectile head. Furthermore the extension means may form an operative sealing contact with the bore of the barrel to prevent burn leakage past the projectile head.

The spacer assembly may include a rigid collar that extends outwardly to engage a thin cylindrical rear portion of a malleable projectile head in operative
30 sealing contact with the bore of the barrel. Thus axially compressive loads are transmitted directly between spacer assemblies thereby avoiding deformation of the malleable projectile head.

Complementary wedging surfaces may be disposed on the spacer assembly and projectile head respectively whereby the projectile head is urged into engagement with the bore of the barrel in response to relative axial compression between the spacer means and the projectile head. In such
5 arrangement the projectile head and spacer assembly may be loaded into the barrel and there after an axial displacement is caused to ensure good sealing between the projectile head and barrel. Suitably the extension means may be urged into engagement with the bore of the barrel.

The projectile head may define a tapered aperture at its trailing end into
10 which is received a complementary tapered spigot disposed on the leading end of the spacer assembly. Relative axial movement between the projectile head and the complementary tapered spigot causes a radially expanding force to be applied to the projectile head.

The barrel may be non-metallic and the bore of the barrel may include
15 recesses that may fully or partly accommodate the ignition means. In this configuration the barrel houses electrical conductors which facilitate electrical communication between the control means and ignition means. This configuration may be utilised for disposable barrel assemblies that have a limited firing life. The ignition means and control wire or wires therefor can be integrally manufactured
20 with the barrel.

A barrel assembly may alternatively include ignition apertures in the barrel and the ignition means are disposed outside the barrel and adjacent the apertures. A non-metallic outer barrel may surround the barrel. The non-metallic outer barrel may include recesses adapted to accommodate the ignition means. The outer
25 barrel may also house electrical conductors that facilitate electrical communication between the control means and ignition means. The outer barrel may be formed as a laminated plastic barrel that may include a printed circuit laminate for the ignition means.

The rear end of the projectile may include a skirt about an inwardly reducing
30 recess such as a conical recess or a part-spherical recess or the like into which the propellant charge portion extends and about which rearward movement of the projectile will result in radial expansion of the projectile skirt. This rearward movement may occur by way of compression resulting from a rearward wedging

movement of the projectile along the leading portion of the propellant charge it may occur as a result of metal flow from the relatively massive leading part of the projectile to its less massive skirt portion.

Alternatively the projectile may be provided with a rearwardly divergent
5 peripheral sealing flange or collar which is deflected outwardly into sealing engagement with the bore upon rearward movement of the projectile. Furthermore the sealing may be effected by inserting the projectiles into a heated barrel which shrinks onto respective sealing portions of the projectiles. The projectile may comprise a relatively hard mandrel portion that cooperates with a
10 deformable annular portion. The deformable annular portion may be moulded about the mandrel to form a unitary projectile which relies on metal flow between the nose of the projectile and its tail for outward expansion about the mandrel portion into sealing engagement with the bore of the barrel.

The projectile assembly may include a rearwardly expanding anvil surface
15 supporting a sealing collar thereabout and adapted to be radially expanded into sealing engagement with the barrel bore upon forward movement of the projectile through the barrel. In such a configuration it is preferred that the propellant charge have a cylindrical leading portion which abuts the flat end face of the projectile.

The projectiles may be adapted for seating and/or location within
20 circumferential grooves or by annular ribs in the bore or in rifling grooves in the bore and may include a metal jacket encasing at least the outer end portion of the projectile. The projectile may be provided with contractible peripheral locating rings that extend outwardly into annular grooves in the barrel and which retract into the projectile upon firing to permit its free passage through the barrel.

25 The electrical ignition for sequentially igniting the propellant charges of a barrel assembly may preferably include the steps of igniting the leading propellant charge by sending an ignition signal through the stacked projectiles. The ignition of the leading propellant charge may arm the next propellant charge for actuation by the next ignition signal. Suitably all propellant charges inwardly from the end of a
30 loaded barrel are disarmed by the insertion of respective insulating fuses disposed between normally closed electrical contacts. The fuses being set to burn to enable the contacts to close upon transmission of a suitable triggering signal and each

insulating fuse being open to a respective leading propellant charge for ignition thereby.

Ignition of the propellant may be achieved electrically or ignition may utilise conventional firing pin type methods such as by using a centre-fire primer igniting the outermost projectile and controlled consequent ignition causing sequential ignition of the propellant charge of subsequent rounds. This may be achieved by controlled rearward leakage of combustion gases or controlled burning of fuse columns extending through the projectiles.

In another form the ignition is electronically controlled with respective propellant charges being associated with primers which are triggered by distinctive ignition signals. For example the primers in the stacked propellant charges may be sequenced for increasing pulse width ignition requirements whereby electronic controls may selectively send ignition pulses of increasing pulse widths to ignite the propellant charges sequentially in a selected time order. Preferably however the propellant charges are ignited by a set pulse width signal and burning of the leading propellant charge arms the next propellant charge for actuation by the next emitted pulse.

A number of projectiles can be fired simultaneously, or in quick succession, or in response to repetitive manual actuation of a trigger, for example. In such arrangements the electrical signal may be carried externally of the barrel or it may be carried through the superimposed projectiles which may clip on to one another to continue the electrical circuit through the barrel, or abut in electrical contact with one another. The projectiles may carry the control circuit or they may form a circuit with the barrel.

The barrel assembly may be incorporated in a variety of ordnance. In one embodiment the barrel assembly of the present invention may be incorporated into firearm such as a pistol, rifle or other small arm. In another embodiment the barrel assembly of the present invention may be incorporated in a large calibre fixed mounted gun. The present invention also includes guns incorporating the barrel assembly described above. The guns of the present invention may also include other features and components associated with guns of the prior art, including butts, handles, sights, fixed mounts, and the like.

BRIEF DETAILS OF THE DRAWINGS

In order that this invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a typical embodiment of the invention and wherein:

- 5 FIG. 1 is a side elevational view of FN-FNC rifle modified to incorporate an overhead barrel assembly;
 FIG. 2 is a cut-away cross sectional view of the rifle of FIG. 1;
 FIG. 3 is an exploded perspective view of the rifle of FIGs 1 and 2;
 FIG. 4 is a representation of a Steyr rifle having a 20 mm barrel inserted
10 within a 40 mm parent barrel;
 FIG. 5 is a cut away cross section of the Steyr rifle of FIG. 4;
 FIG. 6 is an exploded view of the Steyr rifle of FIGs 4 and 5;
 FIG. 7 is side elevational view of a Steyr rifle having an overhead barrel in accordance with a second aspect of the invention;
15 FIG. 8 is an exploded perspective view the Steyr rifle of Figure;
 FIG. 9 is a cut-away cross sectional view of the Steyr rifle of Figures 7 and 8;
 FIG. 10 shows an FN-FNC barrel with a 40 mm overhead barrel;
 Figure 11 shows a cut away cross section of the rifle of Figure 10; and
20 Figure 12 is an exploded view of the rifle shown in Figures 10 and 11.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

FIG. 1 shows a rifle 10 incorporating a stock 11, a primary barrel 12 and an overhead barrel 13.

- 25 In FIG. 2 it can be seen that inside the overhead barrel 13 there is a forward barrel extension insert 14 together with a rear barrel section, in the form of a barrel assembly 15a, housing axially stacked projectiles 16. Additional or spare barrel assemblies 15b and 15c are stored within the stock 11 of the rifle 10. The spare barrel assemblies are arranged to be fed into alignment with the barrel insert 14
30 once the first barrel assembly 15a is exhausted after firing all projectiles 16. If required, the feed for the spare assemblies may occur automatically after the ejection of a spent barrel assembly 15.

The exploded view in FIG. 3 shows the forward barrel insert 14 withdrawn from the overhead barrel 13. The barrel assembly 15a is retained in place by a shroud 19 so as to keep the barrel assembly 15a in alignment with the barrel insert 14. The barrel assembly also includes a chamfered leading end 17 for ready engagement with a complementary trailing end 18 of the barrel insert 14, as shown in FIG. 2. A spring may be provided in the stock for urging the barrel assembly 15a forward to sealably engage with the barrel insert 14.

FIG. 4 shows a Steyr rifle 20 having a 40 mm overhead barrel 21 into which a 20 mm barrel insert 22 has been fitted. The barrel insert 22 has a forward barrel extension 23 incorporating a muzzle 24.

Turning to the sectional view of the rifle 20 in FIG. 5, the barrel extension 23 includes stand-offs, in the form of flanges 25 spaced at intervals along the extension, for engaging the bore of the parent barrel 21. A barrel assembly 26 containing axially stacked projectiles 27 is inserted into the rear of the barrel 21 below a shroud 28, thereby forming a rear barrel section. The barrel assembly 26 also incorporates flanges 25 for supporting the barrel assembly together with electronic firing means (not shown).

The electronic firing means may suitably be similar to any of the electronic firing arrangements, such as recesses provided in the barrel assembly 26 to accommodate ignition means or integrally manufactured with the barrel, as described in the present inventor's earlier International Patent Applications. In such a configuration a 40 mm barrel 21 may be converted into an electronically controlled 20 mm weapon.

The Steyr rifle 30 shown in Figures 7, 8 and 9 includes a front overhead barrel section 31 and a rear barrel section 32. A rear barrel assembly 33 of the rear section houses a plurality of projectiles 35 and is provided with a chamfered leading end 34 for ready engagement with a rear end of the barrel extension 31. The 40 mm overhead barrel is retained in place by a shroud 37 that conforms to the barrel of the barrel assembly 33 containing the projectiles 35.

Figures 10, 11 and 12 show an FM-FMC rifle 40 with a 40 mm overhead barrel 41. The 40 mm overhead barrel is in two parts, the muzzle 42 and/or its barrel extension 43, and retained within a housing 44 as is seen in FIG. 12. The rear barrel section comprising a barrel assembly 45 containing the projectiles 46 is

provided with a chamfered leading end 47 to allow ready engagement with a complementary trailing end 48 of the barrel extension 43. A shroud 49 engages the barrel assembly to retain it in position on the rifle 40.

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INDUSTRIAL APPLICATION

The use of a barrel assembly for insertion into a parent barrel in accordance with the first aspect of the invention provides an means of increasing the flexibility of the gun to fire a variety of type and calibre of projectiles, thereby enabling a single gun to be more useful in a variety of situations.

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The relatively simple retrofitted barrel assembly that is inserted into an existing parent barrel provides significant advantages in terms of reliability, availability and cost, especially during manufacture, for expanding the operational capability of a gun or other weapon.

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The second aspect of the invention allows a barrel assembly preloaded with projectiles to be readily attached to the barrel section of the weapon. Once all the projectiles have been fired, the barrel assembly may then be discarded and a fresh barrel assembly containing projectiles may be attached to the weapon system.

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By having the projectile carrying rear section also act as part of the barrel, empty weapon weight may be reduced at the expense of weight in the projectile section. By preloading projectiles in a section of barrel, quality control may be enhanced. Transport and storage of projectiles and propellant may also be made easier.

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In one particular application, a single use grenade launcher on an infantry weapon, which is typically underhung in relation to a primary barrel, substitutes an electronically fired barrel containing 5 or 6 projectiles having a higher muzzle velocity. A conventional grenade launcher requires a re-load action after each use, calling for reacquisition of the target and re-aiming, including adjustment for any aiming error in the previous shot. The invention reduces the amount of re-

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loading, provides improved accuracy and better ballistics solution in use – wherein only an immediate adjustment for aiming error is required with the weapon still aimed at the target. Most importantly, the weapon can more quickly and accurately

deliver firepower in the critical first 10 seconds of an engagement with enemy forces.

It will of course be realised that the above has been given only by way of illustrative example of the invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of the invention as is herein set forth in the following claims.

CLAIMS

1. A barrel assembly for insertion into a parent barrel of a gun wherein said barrel assembly has a plurality of projectiles axially disposed within at least one
5 barrel of said barrel assembly and associated with discrete selectively ignitable propellant charges for propelling the projectiles from said at least one barrel wherein said barrel assembly includes a parent barrel engaging means.

2. The barrel assembly according to claim 1 wherein the barrel assembly
10 comprises a single barrel.

3. The barrel assembly according to claim 1 wherein the barrel assembly includes a cluster of barrels aligned whereby the cluster of barrels may be retained in a close packed array for insertion in the parent barrel.

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4. The barrel assembly according to claim 3 wherein the barrel assembly includes a housing in which the barrels are retained.

5. The barrel assembly according to claim 4 wherein the housing is formed
20 integrally with the barrels.

6. The barrel assembly according to claim 4 wherein the housing is formed separately to the barrels and the barrels inserted into the housing prior to the housing being inserted into the parent barrel.

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7. The barrel assembly according to claim 1 wherein the housing is formed from a material of sufficient structural strength to effectively retain the barrels in alignment during firing but is not so hard and stiff that the parent barrel is damaged by the repeated insertion and withdrawal of the housing into and from the parent
30 barrel.

8. The barrel assembly according to claim 1 wherein the insertion of the barrel assembly provides the gun with an electronic firing system.

9. The barrel assembly according to claim 1 wherein the barrel assembly may be inserted into the parent barrel from the muzzle and retained therein.

5 10. The barrel assembly according to claim 9 wherein the barrel assembly includes means for engaging with the bore of the parent barrel.

10 11. The barrel assembly according to claim 1 wherein the barrel assembly is arranged for insertion in two sections, including a forward barrel extension and a rear barrel section.

12. The barrel assembly according to claim 11 wherein the forward barrel section does not contain projectiles and may be inserted within the parent barrel towards the muzzle end of the parent barrel.

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13. The barrel assembly according to claim 11 wherein a rear barrel section contains the projectiles and may be inserted into a rear section of the barrel and be engaged with the forward barrel section to form a complete barrel assembly with projectiles and firing means.

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14. The barrel assembly according to claim 1 wherein the barrel assembly may be engaged with the bore of the parent barrel by a plurality of stand off sections or tabs that extend from the barrel assembly to form an interference fit within the bore of the parent barrel.

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15. The barrel assembly according to claim 14 wherein the stand off sections have substantially the same diameter as the bore diameter of the parent barrel.

30 16. The barrel assembly according to claim 14 wherein the stand off sections may be constructed of either metal or an insulating material.

17. The barrel assembly of claim 1 wherein the orientation of the barrel assembly is affixed by a key system located at the muzzle, breach or both of the parent barrel.

5 18. The barrel assembly according to claim 1 further incorporating an electronic firing system that is hard wired to a firing mechanism outside of the parent barrel.

19. The barrel assembly according to claim 18 wherein the firing mechanism fires the projectiles by way of signal wires entering a rear section of the parent
10 barrel.

20. A method for converting a gun having a barrel of a predetermined calibre to a gun of a smaller calibre, said method comprising the step of inserting a barrel assembly having a plurality of projectiles axially disposed within at least one barrel
15 of said barrel assembly and associated with discrete selectively ignitable propellant charges for propelling the projectiles from said at least one barrel wherein said barrel assembly includes a parent barrel engaging means.

21. A barrel assembly for loading a gun, said barrel assembly forming a rear
20 barrel section for engagement with a barrel extension, wherein said barrel assembly has a plurality of projectiles axially disposed within a barrel of said barrel assembly and associated with discrete selectively ignitable propellant charges for propelling the projectiles from the barrel wherein said barrel assembly includes a barrel extension engaging means.

25 22. The barrel assembly according to claim 21 wherein the barrel extension engaging means is a chamfered leading section of the barrel assembly that engages a complementary surface on the barrel extension.

30 23. The barrel assembly according to either claim 21 or claim 22 wherein the barrel assembly is urged forward to sealably engage the barrel extension.

24. The barrel assembly according to claim 21 wherein the barrel extension engaging means includes a stepped section that engages a corresponding stepped section in the barrel extension.

5 25. The barrel assembly according to claim 21 wherein the barrel assembly abuts the barrel extension.

26. The barrel assembly according to any one of claims 21 to 25 wherein a sleeve is provided over the interface between the barrel assembly and the barrel
10 extension to assist in retaining the barrel assembly in alignment with the barrel extension.

27. The barrel assembly according to any one of claims 21 to 26 wherein the barrel assembly and barrel extension are suitably associated a locking system for
15 releasably locking the barrel assembly to the barrel extension.

28. The barrel assembly according to claim 27 wherein the barrel assembly containing the projectiles has a lever attached to aid locating and locking the rear section of barrel with the barrel extension.

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29. The barrel assembly according to claim 28 wherein the lever may be either folded to form a low profile along the barrel section to facilitate transport and storage of the barrel section, or the lever may be raised for locating and locking the rear section of barrel.

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30. The barrel assembly according to claim 29 wherein a keyring arrangement is provided on the barrel assembly for orientating and locking the barrel section.

31. The barrel assembly according to claim 27 wherein the barrel assembly is
30 arranged to be pushed into the barrel extension obliquely and then pushed down to be locked from behind by a spring loaded mechanical lock system.

32. The barrel assembly according to claim 31 wherein the mechanical lock system also acts as an ejection system for the spent barrel assembly.

5 33. A gun having a forward barrel extension and a barrel assembly for loading the gun, said barrel assembly forming a rear barrel section for engagement with the barrel extension, wherein said barrel assembly has a plurality of projectiles axially disposed within a barrel and associated with discrete selectively ignitable propellant charges for propelling the projectiles from the barrel wherein said barrel assembly includes a barrel extension engaging means..

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34. A gun according to claim 33 wherein one or more spare barrel assemblies containing projectiles may be housed on the gun.

15 35. A gun according to claim 34 configured such that, subsequent to the last projectile being fired from an operative engaged barrel assembly, the spent barrel assembly may be automatically ejected and a spare barrel assembly automatically pushed and locked into position ready for a new fire command.

20 36. A method for loading a gun having a forward barrel extension, said method including the steps of engaging a barrel assembly including a plurality of projectiles with a barrel extension wherein said plurality of projectiles are axially disposed within a barrel of said barrel assembly and associated with discrete selectively ignitable propellant charges for propelling the projectiles from the barrel wherein said barrel assembly includes a barrel extension engaging means.

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