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GRENade LAUNCHER HAVING a ROTATABLE FORWARDLY SLIDING BARREL
AND REMOVABLE FIRING MECHANISM
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FIG. 1
RIFLE BORE
LAUNCHER BORE

FIG. 2

FIG. 3

FIG. 4

FIG. 7

FIG. 8

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GRENADE LAUNCHER HAVING A ROTATABLE FORWARDLY SLIDING BARREL AND REMOVABLE FIRING MECHANISM

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23 Claims

ABSTRACT OF THE DISCLOSURE

A firearm comprising a rotary locked, concentric barrel assembly including an outer housing having a cartridge loading opening and an inner barrel received for sliding movement between an extended loading position and an unlocked telescoped position, a double action firing mechanism disposed rearwardly of the barrel and removable fixed to the housing, and a trigger carried on the barrel for operating the firing mechanism when the barrel is in a locked firing position, the barrel being rotatable from said locked firing position to said unlocked telescoped position for automatically disconnecting the trigger from the firing mechanism during cartridge loading and unloading.

This invention relates to grenade launchers.

A primary object of this invention is to provide an improved grenade launcher of a type having a double action firing mechanism wherein launcher cocking and firing is accomplished in one trigger motion.

Another object of this invention is to provide a grenade launcher of the above described type featuring a significantly improved locking action with fully automatic safety provisions.

A further object of this invention is to provide an improved grenade launcher which is particularly suited for quick and easy one-handed loading and unloading.

Another object of this invention is to provide an improved grenade launcher which is readily field stripped into three separate self-contained parts and which is facile to reassemble.

Another object of this invention is to provide an improved grenade launcher of a single shot type requiring a minimum number of hand movements to operate and which is of rugged, compact and lightweight construction.

Another object of this invention is to provide an improved grenade launcher attachable to a conventional small arm barrel such as that of a small caliber rifle for rapid and accurate grenade firing independently of and without interfering with normal rifle operation.

A still further object of this invention is to provide an improved composite firearm for quickly and easily firing both high and low trajectory rounds and which is particularly designed to minimize any possibility of inadvertent firing a round other than that intended even under stress of combat conditions.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

A better understanding of the objects, advantages, features, properties and relationships of this invention will be obtained from the following detailed description and the accompanying illustrative drawings of an exemplary embodiment of this invention.

In the drawings:

FIG. 1 is a side view, partly broken away, showing a preferred embodiment of a grenade launcher mounted on a barrel of a small caliber rifle with the launcher being shown in a locked firing position;

FIG. 2 is a side view similar to FIG. 1, partly broken away, showing the launcher in an unlocked telescoped position in broken lines and in a loading position in full lines;

FIG. 3 is an enlarged view, partly broken away and partly in section, taken generally along line 3-3 of FIG. 1;

FIG. 4 is an enlarged view, partly broken away and partly in section, taken generally along line 4-4 of FIG. 2;

FIG. 5 is an enlarged longitudinal side view of the launcher, partly broken away and partly in section, showing one side of a firing mechanism incorporated in this invention with the firing mechanism being shown immediately after having been fired;

FIG. 6 is a side view, partly broken away and partly in section, of an opposite side of the firing mechanism of FIG. 5 showing in full lines a neutral position of the firing mechanism and a cocked position thereof in broken lines;

FIG. 7 is a section view, partly broken away, taken generally along line 7-7 of FIG. 1 and showing a mount for attaching the launcher to the rifle barrel;

FIG. 8 is a side view, partly broken away and partly in section, of the mount of FIG. 7;

FIG. 9 is an enlarged isometric view, showing a sear incorporated in the firing mechanism of this invention; and

FIG. 10 is a partial section view, on a reduced scale, generally taken along line 10-10 of FIG. 5.

Referring now in detail to the drawings, a preferred embodiment of a grenade launcher 10 constructed in accordance with this invention is shown having a pair of concentric tubular cylinders providing a housing 12 and a barrel 14 received therein for sliding movement.

The housing 12 is shown for illustrative purposes in a composite firearm assembly wherein the launcher 10 is centrally mounted below a barrel 16 of a conventional small arm such as a rifle 18 having a buttstock 20 through which recoil thrust is directed upon firing either the rifle or the launcher. The launcher 10 is firmly secured to the rifle barrel 16 by a pair of mounts 21, 22, the latter being shown extending upwardly from a forward position of the grenade housing 12 and detachably secured to the rifle barrel 16 by a clamping plate and screw arrangement 24.

To minimize any heat transfer between the launcher 10 and the rifle 18, a heat shield 26 of arcurate cross section embraces the rifle barrel 16 upon fitting the shield 26 within an upwardly opening U shaped seat 28 formed in mount 22. The heat shield 26 preferably is a composite part including a metal liner 30 formed, e.g., of steel having a series of spaced, raised ribs 32 engaging the rifle barrel 16 to effect localized contact, and an insulating interliner 34 preferably formed of a suitable plastic of low heat conductivity secured between the liner 30 and the seat 28.

So that rifle sight 36 can be alternately used as a grenade launcher sight for ranges up to approximately 50 meters, the launcher 10 is mounted with its longitudinal axis or bore centerline converging with the rifle bore centerline in a direction of discharge. The longitudinal axis of the launcher and rifle barrels are normally disposed in a common vertical plane during use. It is to be understood that separate high elevational grenade launcher sights are mounted on the composite firearm for grenade trajectories of increased ranges beyond approximately 50 meters.

A launcher firing mechanism 38 is provided including a generally rectangular frame 42 having a large central opening 44. The frame 42 is attached to the housing 12 by a removable mounting pin 46 extending through an upper lug 48 of the frame 42. The latter is retained in position on the housing 12 by a thrust transfer plate 50.
projecting rearwardly from an upper portion of the frame 42 and received in a corresponding recess 52 inside the housing 12. A suitable casing 54 protectively encloses the firing mechanism frame 42.

An aperture 50 of the recoil plate 56 is secured at the front of the frame 42, and a spring loaded hook type extractor 57 is held captive between the frame 42 and the recoil plate 56, the parts being maintained in assembly by a threaded striker bushing 58. The latter has a central opening 69 configured to receive a nose 61 of a firing pin 62. The rear end of the striker 62 carries an adjustable end nut 64 received for sliding movement in a rear opening 66 formed in the frame 42 in coaxial alignment with the striker bushing 58 whereby the striker is supported for reciprocable movement within the frame 42 along an axis extending through the opening 60 in the striker bushing 58.

The striker 62 is biased toward the recoil plate 56 by a main compression spring 68 coiled about the striker 62 with opposite ends of the spring 68 abutting a rear shoulder 70 of an enlarged annulus 72, fixed intermediate the end of the striker 62, and an abutment ring 74 slidably mounted on the striker 62 adjacent its end nut 64. To maintain the nose 61 of the striker 62 within the striker bushing 58 in a normal or neutral position slightly retracted from a breech face 75 of the recoil plate 56, a rebound compression spring 76 is coiled about the striker 62. Opposite ends of the spring 76 seat against a forward shoulder 78 of the above mentioned annulus 72 and a rear face 80 of the striker bushing 58 to continuously urge striker 62 rearwardly of breech face 75. By means of the rear adjusting end nut 64, main compression spring 68 is readily set regardless of manufacturing variances and tolerances to a predetermined stroke length upon retracting and releasing the striker 62. Once set, the nut 64 is preferably fixed to the striker 62 in an adjusted position by a pin 82.

In accordance with another aspect of this invention, the firing mechanism 38 is particularly suited to provide automatic cocking and firing of a loaded cartridge (such as that shown at 84 in the barrel 14 immediately in front of breech face 75 of the recoil plate 56) responsive to one continuous trigger movement.

To withdraw the striker 62 from its neutral position away from the recoil plate 56, a rotatable rear 86 is provided including a bridge portion 88 having a flat sear edge 90 engageable with the forward shoulder 78 of the annulus 72. Opposite ends of the bridge portion 88 are opposed and generally connected to a shaped arms 92, 94 each having a flat face engageable with the housing 12 engaging shoulder 126 of the barrel 14. A pair of supporting arms such as at 100 are each pivotally mounted at an upper end on an upper portion of the frame 42 by a pin 102 and are respectively connected to one of the S shaped arms 92, 94 by a pivot pin such as at 104. Lower ends of the supporting arms 100 are interconnected by a cross pin 106 held captive by a traveling yoke 108 mounted on a guide rod 110 secured to the frame 42 to extend generally longitudinally thereof for supporting the traveling yoke 108 for substantially straight line reciprocating movement.

With the striker 62 in neutral position, the rear edge 90 is positioned to engage the forward shoulder 78 of the annulus 72 such that rearward movement of the traveling yoke 108, from its forwardmost neutral position shown in full lines in FIG. 6, will withdraw the striking 62 against the bias of the main compression spring 68 responsive to rearward movement of the sear 86. Rearward movement of the sear 86 simultaneously compresses a return spring 112 coiled about a plunger 114 having one end seated within a hole 116, formed in the rear portion of the frame 42. The plunger 114 extends into a cylindrical opening formed in a pivot sleeve 118 attached to an end recess 120 receiving a protrusion 122 formed on the bridge portion 88 of the sear 86. The spring 112 thus maintains the pivot sleeve 118 in pressing engagement against the sear and provides a resilient pivotal connection between the sear 86 and the frame 42.

A double action cocking and firing movement of the firing mechanism 38 is accomplished by the rearward movement of the striking yoke 108 to a first rearward position, shown in broken lines in FIG. 6, wherein the accurate free ends 96, 98 of the S shaped arms 92, 94 contact a rear wall surface 124 of the frame 42 to cock the striker 62. Continued rearward movement of the traveling yoke 108 causes the S shaped sear portion 92, 94 to act about their pivot pins 104, lifting the near edge 90 to release the traveling yoke 108, which drives forward under the force of its main compression spring 68 to fire the cartridge 84 (FIG. 5).

The sear 86 and its associated linkage including the yoke 108 automatically move forwardly under the force of the return spring 112 simultaneously with the rearward movement of the striker 62 as a result of impact and the assistance of the rebound spring 76 whereby the rear 86 is again positioned to latch the striker annulus 72 in readiness for the next firing cycle.

The above described firing mechanism ensures against accidental discharge due to shock and effectively prevents any possibility of the launcher 10 being left cocked. Spring set accordingly is virtually eliminated. In addition to being simple and reliable, the firing mechanism 38 is quick to operate and effectively permits a rapid second striker blow in the event of a misfire.

Referring now to the barrel assembly of the launcher 10, to promote simplicity of operation, the launcher of this invention is designed to provide one-handed loading and unloading. In addition, ease of operation is coupled with automatic safety provisions to completely eliminate any possibility whatsoever of firing the launcher until it is fully locked.

A radial projection or shoulder 126 is formed on a rear bottom portion of the launcher barrel 14 and projects through a longitudinal cartridge loading opening 128 formed in a rear, bottom side wall portion of the launcher housing 12. As best shown in FIGS. 3, 5, shoulder 126 has a recess 130 which receives an accurate peripheral segment 132 of the recoil plate 56 projecting radially below the rear bottom portion of the housing 12. A chamber locking lug 134 is defined rearwardly of the recess 130 at the extreme rear end of the barrel 14 for engaging a rear face 136 of the peripheral segment 132 of the recoil plate 56. With the chamber locking lug 134 thus positioned immediately in front of the firing mechanism 138 in engagement with the rear face 136 of the recoil plate 56, a corner edge projection 138 of the barrel end and of the recess 130 maintains an end flange 140 of the cartridge 84 in position adjacent the breech face 75 to be fired upon operating the firing mechanism 38.

The barrel assembly is releasably latched in a locked firing position (FIGS. 1, 3 and 5) by a catch 142 engageable with a peripheral recess 144 shown notched in the edge of segment 132. The catch 142 is shown disposed rearwardly of a hand or pistol grip 146 directly attached by a suitable fastener 148 to the shoulder 126 of the barrel 14. The catch 142 is pivotally supported on the barrel 14 by a pivot pin 150, and a compression spring 152 seated between the pistol grip 146 and a lower recessed end portion of the catch 142 releasably holds the catch in the peripheral recess 144 to maintain the barrel 14 in locked firing position. It will be noted that in locked firing position, the pistol grip 146 is generally disposed in a common vertical plane containing the barrel and rifle barrels. The pistol grip 146 thus provides both clear visual as well as tactical indication of the locked firing position of the launcher.

To expose the cartridge loading opening 128, the catch 142 is pressed to release the barrel 14. The pistol grip 146 and the entire barrel 14 are then to be rotated clockwise approximately 40° from locked firing position, to an extent limited by the housing 12 engaging shoulder 126 of
the barrel 14, whereupon the chamber locking lug 134 is angularly displaced behind the recoil plate 56 to clear its peripheral segment 132. The pistol grip 146 may then be depressed while the receiver housing 12 to expose the cartridge loading opening 128. As the barrel 14 is moved forwardly, the expended cartridge 84 is automatically held in ejection position by the extractor 57 to fall through the opening 128 by gravity.

In the illustrated embodiment, a guideway 154 axially extends along the axis of the barrel 14 for receiving a rear guide lug 156 integrally formed on the barrel 14 for guiding its longitudinal sliding movement relative to the housing 12.

Fouling difficulties are minimized by the provision of a bearing guide or sleeve 158 mounted on the housing 12 to circumferentially extend about the barrel 14. The bearing sleeve 158 has an interrupted inside wall providing a series of spaced contact surfaces 160 engaging the barrel 14. Between contact surfaces 160 are recessed portions 161 spaced apart from bore 14 a distance less than the clearance between the barrel 14 and housing 12. Such construction prevents undesired frictional matter from detaching between the barrel 14 and the housing 12 while at the same time permitting any small particles of dirt therebetween, e.g., to be expelled in a self-cleaning action to minimize any possibility of interference directly between adjoining metal surfaces of the barrel assembly. In the specific illustrated embodiment, the bearing sleeve 158 is secured in an annular groove 162 in a forward end portion of the interior wall of the housing 12, and the bearing sleeve is preferably formed of nylon or a similar tough, heat resistant, self-lubricating material. The barrel 14 carries a plurality of external projections such as shown at 164 spaced apart about a rear barrel portion and providing contact faces engaging the inside wall of the housing 12 to ensure smooth sliding movement of the barrel 14.

The contact surfaces 160 additionally effect a frictional grip on the barrel 14 irrespective of the attitude of the launcher 10. With the cartridge loading opening 128 now fully exposed with the barrel 14 extended in loading position as shown in full lines in FIG. 2, a shooter is then free to release his hand from the pistol grip 146 to insert a fresh cartridge into the barrel 14 and then grasp the pistol grip 146 and pull the barrel 14 rearwardly from the loading position into an unlocked telescoped position (shown in FIG. 4 and in broken lines in FIG. 2). The pistol grip 146 is then merely rotated counterclockwise from its unlocked telescoped position (FIG. 4) into locked firing position (FIGS. 1 and 3). On when the barrel 14 is in locked firing position and fully locked is the firing mechanism 38 conditioned to be operated. This operating feature is in accordance with still another aspect of this invention wherein a trigger assembly 168 is carried by the launcher barrel 14 for operating the firing mechanism 38. With the barrel 14 and the trigger assembly 168 being rotatably movable relative to the housing 12 and the traveling yoke 108 of the firing mechanism 38, the trigger assembly 168 is operatively aligned with the firing mechanism 38 only in locked firing position and is automatically misaligned and disconnected from the firing mechanism 38 during cartridge loading and unloading to provide a significant safety feature.

A launcher trigger 170 is located forwardly of the pistol grip 146 and has an integral rearwardly extending trigger extension 172 received for reciprocating movement in an enlarged bore 174 formed in barrel shoulder 126 to which the pistol grip 146 is attached. With the barrel 14 in locked firing position, the rear end of the elongated opening 174 confronts a contact face 176 of the traveling yoke 108 whereby upon squeezing the trigger 170 the trigger extension 172 moves along an axis parallel to the axis of movement of the traveling yoke 108 to abut its contact face 176 to operate the firing mechanism 38. A groove 178 longitudinally extends partially along the bottom surface of the trigger extension 172, and a retaining pin 180 is fixed to the barrel 14 within the groove 178 to limit forward and reverse movement of the trigger assembly 168.

The trigger assembly 168 is continuously biased toward an extended relaxed position (FIG. 13) by a compression spring 182 seated within the elongated opening 174 and coiled about a reduced diameter portion 183 of trigger extension 172 whereby the trigger assembly 168 of the barrel 14 is normally disassociated from the housing 12 and its firing mechanism 38 is readily permitted angular displacement of the barrel during cartridge loading and unloading and to automatically disconnect the trigger from the firing mechanism 38.

The trigger 170 has an additional stabilizing rod 184 integrally formed at its base and extending rearwardly into the pistol grip 146 for sliding movement. Lateral movement of the trigger assembly 168 is thereby effectively prevented to virtually eliminate any possibility of the trigger extension 172 being bound up on its retaining pin 180.

With the launcher 10 mounted on the rifle barrel 16 to form a composite firearm, any possibility of inadvertently firing a round other than that intended, even under combat stress, is minimized by the above-described placement of the launcher trigger 170 forwardly of its pistol grip 146 such that the launcher trigger 170 is remotely spaced apart from a rifle trigger 146 shown immediately below the receiver 187 and immediately in front of a rifle hand grip 189 attached adjacent the forward end of the buttstock 20.

To effect fully automatic safety provisions, a manually releasable cross bolt safety 190 is mounted for movement within a generally rectangular transverse opening 200 extending through the barrel shoulder 126 so as to communicate with the elongated opening 174 receiving the trigger extension 172.

The cross bolt safety 190 has a depending locking face 194 engageable with an intermediate shoulder 196 of trigger extension 172 for physically blocking rearward movement of the trigger 170. A recess 198 is preferably provided in the cross bolt safety 190 (FIG. 5) for receiving a head of a detent plunger 201 which is spring biased into engagement with the cross bolt safety 190 to maintain it in a non-firing safety position. Upon moving the cross bolt safety 190 to the shooter's left into a release position, the locking face 194 is moved out of the elongated opening 174 to free the trigger extension 172 for rearward movement upon squeezing the trigger 170 to fire the cartridge 84. After the trigger 170 is released to return under the force of spring 182 to its relaxed position wherein the trigger assembly 168 is disassociated from the firing mechanism 38, catch 142 is released and the pistol grip 146 is rotated from its vertical firing position into its unlocked telescoped position. Upon moving into unlocked telescoped position, the cross bolt safety 190 automatically engages a portion of housing 12 defining the cartridge loading opening 128 to move the cross bolt safety 190 into non-firing safety position. Such action ensures against accidental discharge of the launcher 10 when the next fresh cartridge is loaded with the barrel assembly in locked firing position.

By virtue of the above-described construction, the launcher 10 is readily field stripped from a rifle 16 simply by bodily removing the firing mechanism 38 as a unit upon moving the barrel 14 into, e.g., loading position and extracting the mounting pin 46. The barrel 14 may then be withdrawn rearwardly from the housing to separate the launcher into three readily reassembled component parts for easy cleaning and maintenance.

From the above description, it will be apparent that the firing mechanism of this invention can be carried only by pulling the trigger. The firearms, however, must be in locked firing position and the automatically engaged cross bolt safety must first be manually deactivated. Once the safety is off, the launcher is quickly and easily fired by a single trigger movement and is particularly suited for
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rapid firing by the significantly simplified one-handed loading, firing and unloading sequence of operations.

As will be apparent to persons skilled in the art, various modifications and adaptations of the foregoing specific disclosure can be made without departing from the underlying principles and teachings of the present invention.

1. A firearm comprising a barrel assembly having a cartridge loading opening and movable means for exposing and closing the cartridge loading opening, said movable means being movable between a loading position and a firing position for exposing and closing the cartridge loading opening, a fixed firing mechanism secured to the barrel assembly and having an actuating drive member, and a trigger carried by said movable means and having an extension mounted for reciprocal linear movement thereon for operating the firing mechanism solely when said means is in said firing position, the trigger extension being normally disassociated from the firing mechanism during cartridge loading and unloading.

2. The firearm of claim 1 wherein the firing mechanism of a double action type having means cooperating with the actuating drive member for automatically cocking and firing responsive to a single trigger movement when said movable means is in said firing position.

3. The firearm of claim 1 further comprising a small arm having a barrel, the barrel assembly being mounted below the small arm barrel and having a longitudinal axis disposed in a common plane containing the longitudinal axis of the small arm barrel and converging therewith in a direction of discharge.

4. The firearm of claim 1 further comprising a small arm having a barrel and a trigger for firing the small arm, the barrel assembly being mounted below the small arm barrel, said movable means of the barrel assembly including a hand grip disposed forwardly of the small arm trigger, and the barrel assembly trigger being disposed forwardly of the barrel assembly hand grip in remotely spaced relation to the small arm trigger.

5. The firearm of claim 4 wherein the barrel assembly trigger has a rearwardly directed extension received in the movable means for engaging the actuating drive member of the firing mechanism, and an additional stabilizing rod integrally with the trigger and extending rearwardly into the hand grip for sliding movement therein to maintain the barrel assembly trigger against lateral movement relative to the movable means.

6. A firearm comprising a barrel assembly having a cartridge loading opening and movable means for exposing and closing the cartridge loading opening, a fixed firing mechanism secured to the barrel assembly and having an actuating drive member, a hand grip mounted on said movable means for moving it between a loading position and a firing position for exposing and closing the cartridge loading opening, and a trigger carried by said movable means for movement therewithin into operative cooperation with the actuating drive member for operating the firing mechanism solely when said means is in said firing position such that the trigger is automatically disconnected from the firing mechanism during cartridge loading and unloading, a small arm having a barrel, and a mount extending upwardly from the barrel assembly for detachably securing it below the small arm barrel, the mount having an upwardly opening seat of generally U-shaped cross section, and a heat shield having an arcuate configuration contoured to fit within the seat of the mount for embracing the small arm barrel and for minimizing heat transfer therethrough.

7. The firearm of claim 6 wherein the heat shield includes a metal liner having a series of raised ribs spaced apart and engaging the small arm barrel to effect localized contact therewith, and an insulating interliner secured between the metal liner and the mount.

8. A firearm comprising a firing mechanism, first and second concentric cylinders axially reciprocable relative to one another between a loading position and an unlocked telescoped position, a trigger carried by the first cylinder and having an extension for operating the firing mechanism, the first cylinder and the trigger being rotatably movable relative to the second cylinder between said unlocked telescoped position wherein the trigger extension is angularly displaced in misaligned relation to the firing mechanism, and a locked firing position wherein the trigger extension is operatively aligned with but normally disassociated from the firing mechanism, the trigger extension and the firing mechanism being connected upon actuation of the trigger in the firing position.

9. The firearm of claim 8 wherein the cylinders extend forwardly of the firing mechanism and constitute a barrel assembly, one of the cylinders having a cartridge loading opening, the cartridge loading opening is formed in a rear bottom portion of the second cylinder, the first cylinder being received within the second cylinder, the second cylinder having an internal longitudinal guide-way therein, and the first cylinder having a rear guide position extending axially rearwardly of the barrel assembly when the barrel assembly is moved between said unlocked telescoped position and said loading position.

10. The firearm of claim 8 wherein the first and second cylinders constitute a barrel assembly extending forwardly of the firing mechanism, and wherein the firearm further comprises a small arm having a barrel, the barrel assembly being mounted below the small arm barrel and having a longitudinal axis disposed in a common plane containing the longitudinal axis of the small arm barrel and converging therewith in a direction of discharge, and a hand grip attached to the first cylinder for manipulating it relative to the second cylinder, the hand grip extending downwardly of the barrel assembly and disposed in said common plane when in said locked firing position providing visual indication of the same.

11. A firearm comprising a firing mechanism, a barrel assembly extending forwardly of the firing mechanism and including first and second concentric cylinders, one of the cylinders having an apertured side wall providing a cartridge loading opening, the cylinders being axially reciprocable relative to one another between a loading position wherein the cartridge loading opening is exposed and an unlocked telescoped position wherein the cartridge loading opening is closed, a trigger carried by the first cylinder for operating the firing mechanism, the first cylinder and the trigger being rotatably movable relative to the second cylinder between said unlocked telescoped position wherein the trigger is angularly displaced in misaligned relation to the firing mechanism, and a locked firing position wherein the trigger is operatively aligned with the firing mechanism to provide a rotatably locked barrel assembly having a trigger automatically disconnected from the firing mechanism during cartridge loading and unloading, and a manually releasable safety mounted for movement on the first cylinder and cooperating therewith to establish a safety position blocking trigger movement and a release position permitting trigger movement, the safety automatically engaging the second cylinder and being moved thereby into safety position responsive to rotation of the first cylinder from said locked firing position into said unlocked telescoped position.

12. A firearm comprising a firing mechanism, a barrel assembly extending forwardly of the firing mechanism and including first and second concentric cylinders, quick disconnect means for detachable connection of the firing mechanism to the barrel assembly, the firing mechanism being bodily removable as a unit from the barrel assembly and permitting separation of the first and second cylinders to facilitate field stripping the firearm, one of the cylinders having an apertured side wall providing a
cartridge loading opening, the cylinders being axially reciprocable relative to one another between a loading position wherein the cartridge loading opening is exposed and an unlocked telescoped position wherein the cartridge loading opening is closed, and a trigger carried by the first cylinder for operating the firing mechanism, the first cylinder and the trigger being rotatably movable relative to the second cylinder between said unlocked telescoped position wherein the trigger is angularly displaced in misaligned relation to the firing mechanism, and a locked firing position wherein the trigger is operatively aligned with the firing mechanism to provide a rotatably locked barrel assembly having a trigger automatically disconnected from the firing mechanism during cartridge loading and unloading.

13. A firearm comprising a firing mechanism, a barrel assembly extending forwardly of the firing mechanism and including first and second concentric cylinders, the first cylinder being received within the second cylinder, the second cylinder including a bearing sleeve mounted on a forward portion thereof and circumferentially extending about the first cylinder, the bearing sleeve having an interrupted inside wall providing spaced contact surfaces engaging the first cylinder, the first cylinder carrying a plurality of external projections spaced apart around the second cylinder, and contact faces engaging the second cylinder, one of the cylinders having an apertured side wall providing a cartridge loading opening, the cylinders being axially reciprocable relative to one another between a loading position wherein the cartridge loading opening is exposed and an unlocked telescoped position wherein the cartridge loading opening is closed, and a trigger carried by the first cylinder for operating the firing mechanism, the first cylinder and the trigger being rotatably movable relative to the second cylinder between said unlocked telescoped position wherein the trigger is angularly displaced in misaligned relation to the firing mechanism, and a locked firing position wherein the trigger is operatively aligned with the firing mechanism to provide a rotatably locked barrel assembly having a trigger automatically disconnected from the firing mechanism during cartridge loading and unloading.

14. A firearm comprising a firing mechanism, a barrel assembly extending forwardly of the firing mechanism and including first and second concentric cylinders, the second cylinder having a cartridge loading opening formed in a rear bottom portion thereof, the first cylinder being received within the second cylinder, the first cylinder being axially reciprocable relative to the second cylinder by means of a rear radial projection extending through the cartridge loading opening, the cylinders being axially reciprocable relative to one another between a loading position wherein the cartridge loading opening is exposed and an unlocked telescoped position wherein the cartridge loading opening is closed, and a trigger carried by the first cylinder for operating the firing mechanism, the first cylinder and the trigger being rotatably movable relative to the second cylinder between said unlocked telescoped position wherein the trigger is angularly displaced in misaligned relation to the firing mechanism, and a locked firing position wherein the trigger is operatively aligned with the firing mechanism to provide a rotatably locked barrel assembly having a trigger automatically disconnected from the firing mechanism during cartridge loading and unloading, the first cylinder being axially reciprocable relative to the housing between an unlocked telescoped position wherein the trigger is misaligned relative to the first cylinder, and a locked firing position wherein the trigger is operatively aligned with the first cylinder, and a spring biased catch pivotally supported on the radial projection of the first cylinder and engaging an arcuate peripheral segment projecting radially below the rear bottom portion of the second cylinder, and the rear radial projection having a recess therein for receiving the recoil plate and defining a lug at the rear of the first cylinder engaging a rear face of the peripheral segment of the recoil plate when the first cylinder is axially moved from said unlocked telescoped position to said locked firing position.

15. The firearm of claim 14 wherein the recoil plate has a peripheral recess therein, and a spring biased catch pivotally supported on the radial projection of the first cylinder and engaging an arcuate peripheral segment projecting radially below the rear bottom portion of the second cylinder, and the rear radial projection having a recess therein for receiving the recoil plate and defining a lug at the rear of the first cylinder engaging a rear face of the peripheral segment of the recoil plate when the first cylinder is axially moved from said unlocked telescoped position to said locked firing position.

16. A firearm comprising a firing mechanism, a barrel assembly extending forwardly of the firing mechanism and including first and second concentric cylinders, the second cylinder having a peripheral recess therein, and a spring biased catch pivotally supported on the radial projection of the first cylinder and engaging an arcuate peripheral segment projecting radially below the rear bottom portion of the second cylinder, and the rear radial projection having a recess therein for receiving the recoil plate and defining a lug at the rear of the first cylinder engaging a rear face of the peripheral segment of the recoil plate when the first cylinder is axially moved from said unlocked telescoped position to said locked firing position.

17. The firearm of claim 16 wherein a manually releasable safety cross bolt extends through the radial projection transversely to the trigger extension for movement between a safety position wherein the cross bolt physically blocks movement of the trigger extension, and a release position wherein the trigger extension is free of interference from the cross bolt, the latter automatically engaging a portion of the second cylinder adjacent its cartridge loading opening upon rotating the first cylinder into said unlocked telescoped position for automatically moving the cross bolt into safety position.

18. A firearm comprising a housing having a generally cylindrical bore and a recoil plate defining a breech face at the rear of the bore, a movable striker supported on the housing behind the recoil plate and having a rear radial projection extending through the housing, the housing being axially reciprocable relative to the second cylinder between a loading position wherein the cartridges are received by the housing and an unlocked telescoped position wherein the cartridges are exposed, and a trigger carried by the first cylinder engaging a rear face of the peripheral segment of the recoil plate when the first cylinder is axially moved from said unlocked telescoped position to said locked firing position.

19. The firearm of claim 18 wherein the recoil plate is movable to a first position for withdrawing the barrel and striker away from the recoil plate to a cocked position, and the sear while in cocked position being rotatable
by the linkage away from the striker upon continued movement of the linkage beyond its said first position to release the cocked striker.

20. A firearm comprising a housing having a firing mechanism frame and a generally cylindrical bore, the frame having a recoil plate fixed thereto and defining a breech face at the rear of the bore, a movable striker supported on the frame behind the recoil plate and biased toward the same, a sear for cocking the striker, and a sear linkage mounted on the frame and supporting the sear for both rectilinear and rotary movement, the sear linkage being moveable to a first position for withdrawing the sear and striker away from the recoil plate to a cocked position, the sear while in cocked position being rotatable by the linkage away from the striker upon continued movement of the linkage beyond its said first position to release the cocked striker, the firing mechanism frame being bodily removable from the housing for quick and easy assembly and disassembly.

21. The firearm of claim 20 further including a return spring between the housing and the sear continuously urging the sear and its linkage toward the recoil plate for engaging the sear with the striker.

22. A firearm comprising a housing having a generally cylindrical bore and a recoil plate defining a breech face at the rear of the bore, a moveable striker supported on the housing behind the recoil plate and biased toward the same, a sear for cocking the striker, the sear including a bridge portion having a sear edge engageable with the striker, and a pair of generally S shaped arms each having an end fixed to opposite ends of the bridge portion, respectively, and an opposite free end, and a linkage mounted on the housing and including a pair of supporting arms each pivotally mounted at one end on the housing and having a connecting pin at its other end interconnecting the supporting arms, the latter each being pivotally connected to one of the S shaped arms of the sear, and a trigger operated traveling yoke mounted on the housing for substantially straight line reciprocating movement, the traveling yoke embracing the connecting pin in captured relation and movable to a first position for withdrawing the sear and striker away from the recoil plate to a cocked position wherein the free ends of the sear engage the housing, the sear while in cocked position being rotatable by the linkage away from the striker upon continued movement of the traveling yoke beyond its said first position to release the cocked striker.

23. The firearm of claim 22 wherein the free ends of the sear arms are each contoured to provide a cocking movement upon engaging the housing to effect rotation of the sear edge away from the striker to release the same responsive to continued movement of the traveling yoke beyond its said first position.

References Cited

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Date</th>
<th>Inventor</th>
<th>Classification</th>
</tr>
</thead>
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<tr>
<td>511,940</td>
<td>1/1894</td>
<td>Fairbanks</td>
<td>42—1</td>
</tr>
<tr>
<td>1,067,004</td>
<td>7/1913</td>
<td>Decker</td>
<td>42—69</td>
</tr>
<tr>
<td>1,316,803</td>
<td>9/1919</td>
<td>Pugsley</td>
<td>42—69</td>
</tr>
<tr>
<td>2,347,645</td>
<td>5/1944</td>
<td>Sherr et al.</td>
<td>42—69</td>
</tr>
<tr>
<td>2,397,572</td>
<td>4/1946</td>
<td>Weaver</td>
<td>42—10</td>
</tr>
<tr>
<td>2,888,768</td>
<td>6/1959</td>
<td>Taylor</td>
<td>42—1</td>
</tr>
<tr>
<td>3,279,114</td>
<td>10/1966</td>
<td>Lewis et al.</td>
<td>42—1.2</td>
</tr>
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FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Date</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>215,423</td>
<td>9/1941</td>
<td>Switzerland</td>
</tr>
</tbody>
</table>

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U.S. Cl. X.R.
42—1, 69, 70; 89—14