

Aug. 3, 1965

E. M. STONER

3,198,076

CONVERTIBLE GUN

Filed March 22, 1963

6 Sheets-Sheet 1

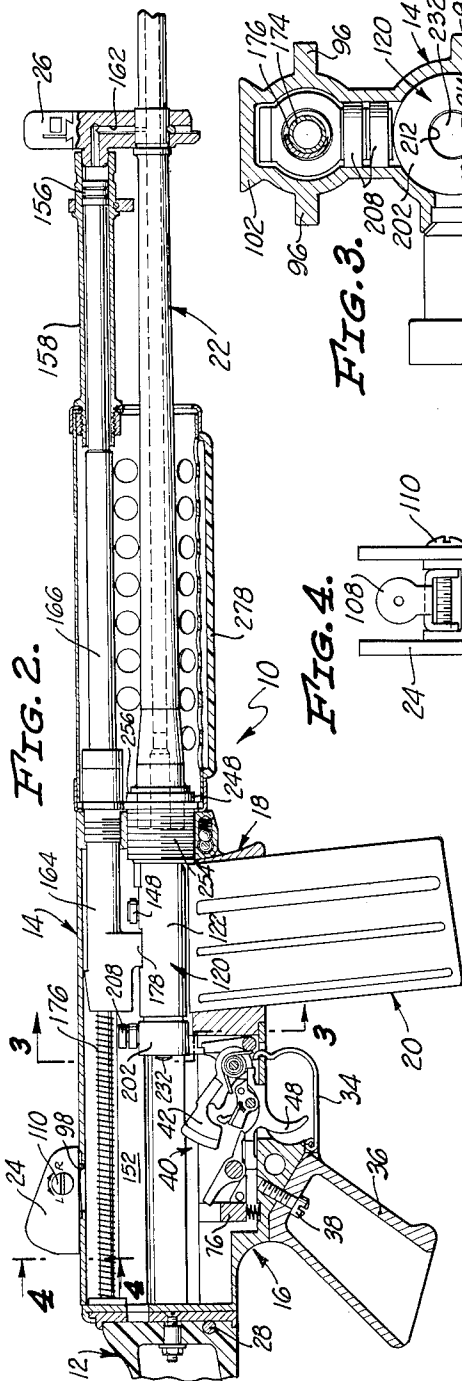


FIG. 2.

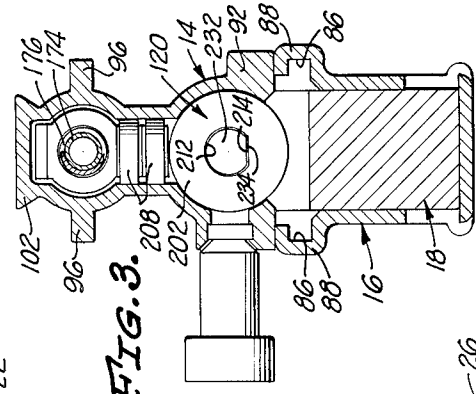


FIG. 3.

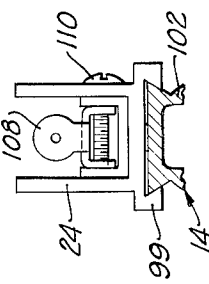


FIG. 4.

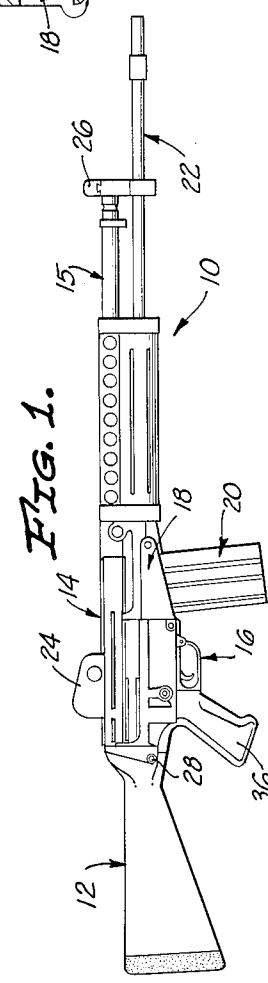


FIG. 1.

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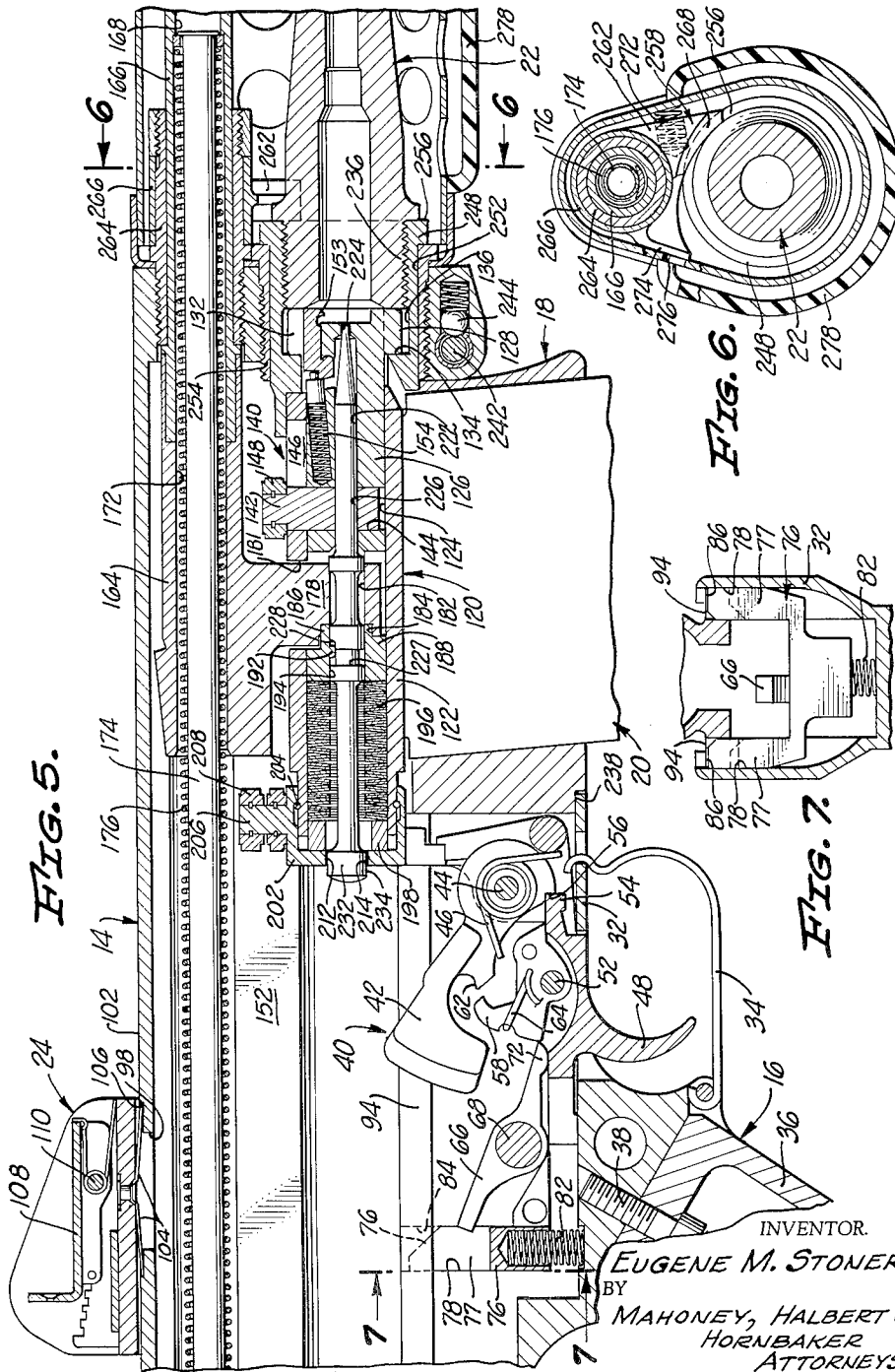
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6 Sheets-Sheet 2



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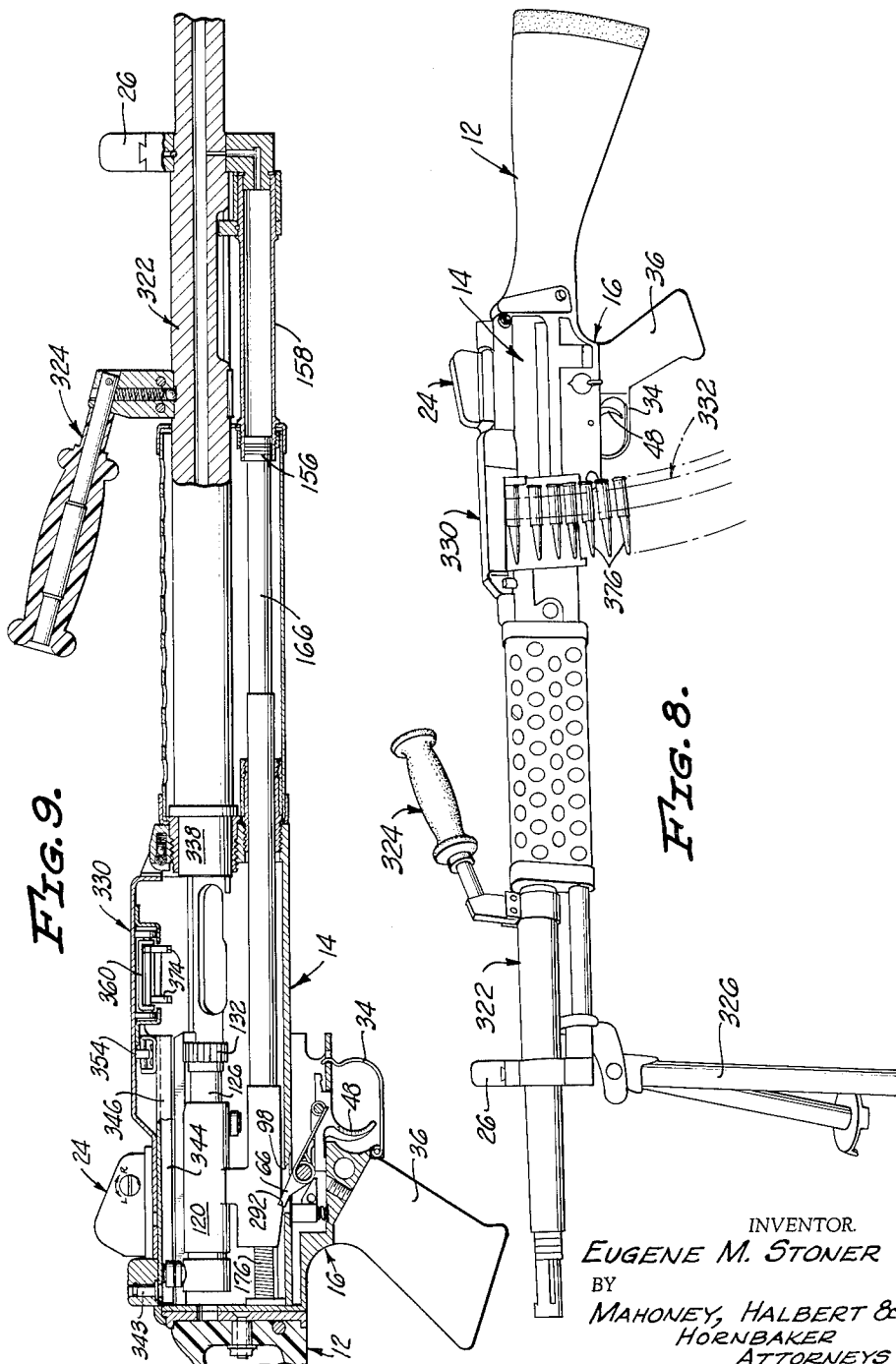
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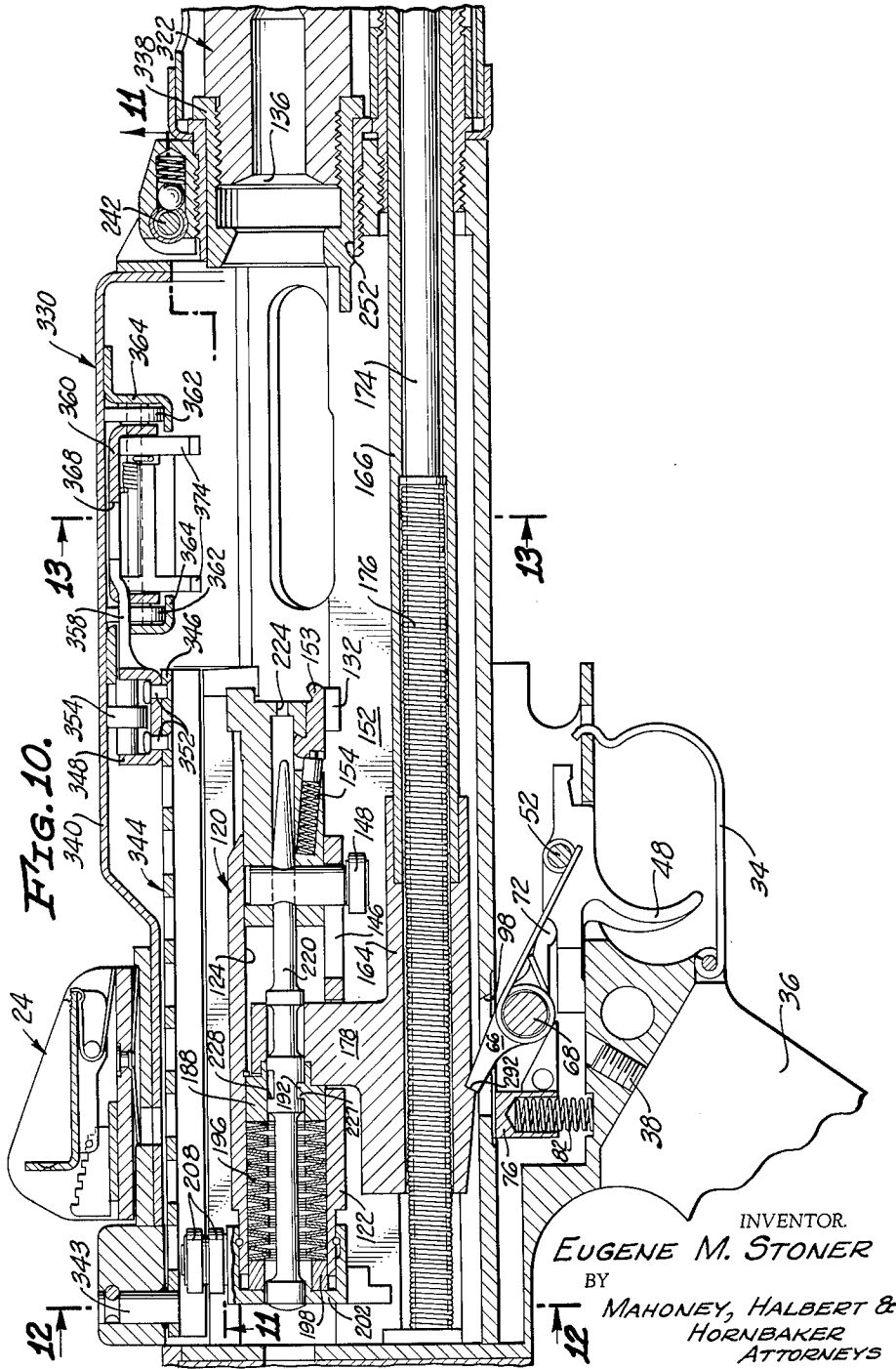
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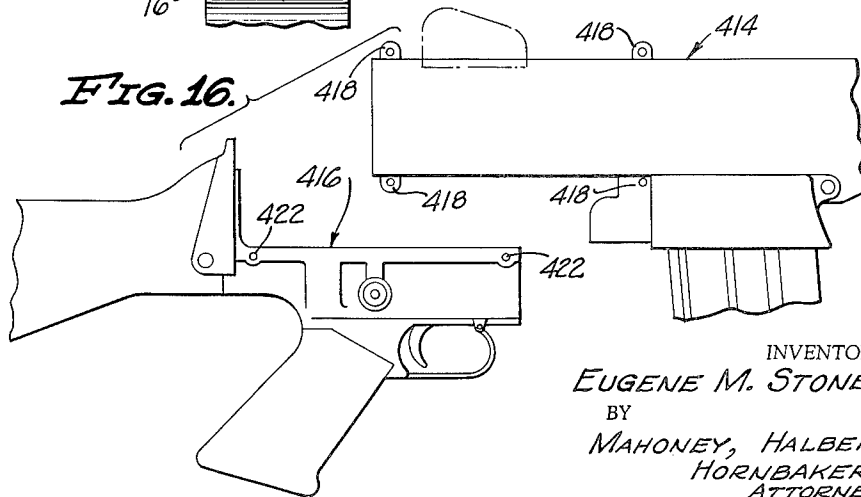
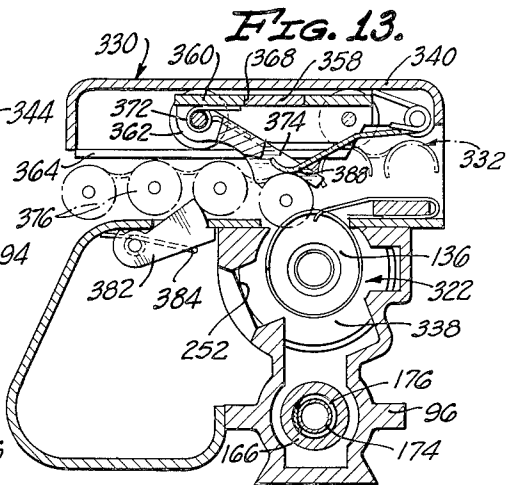
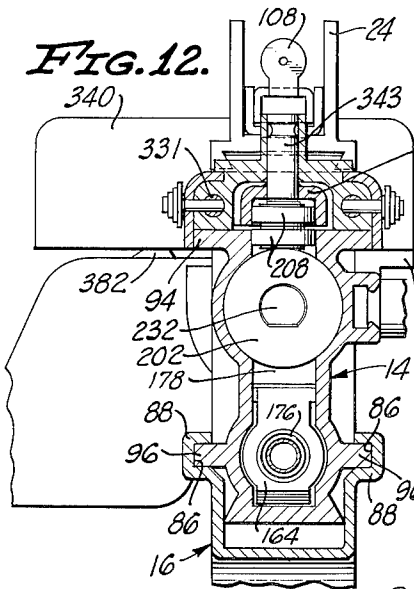
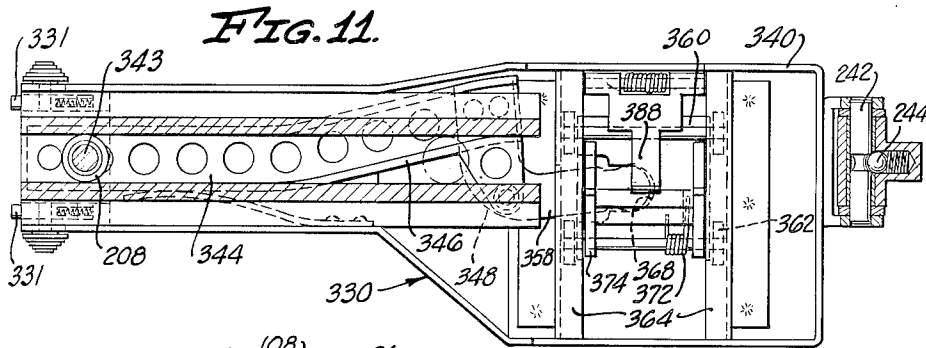
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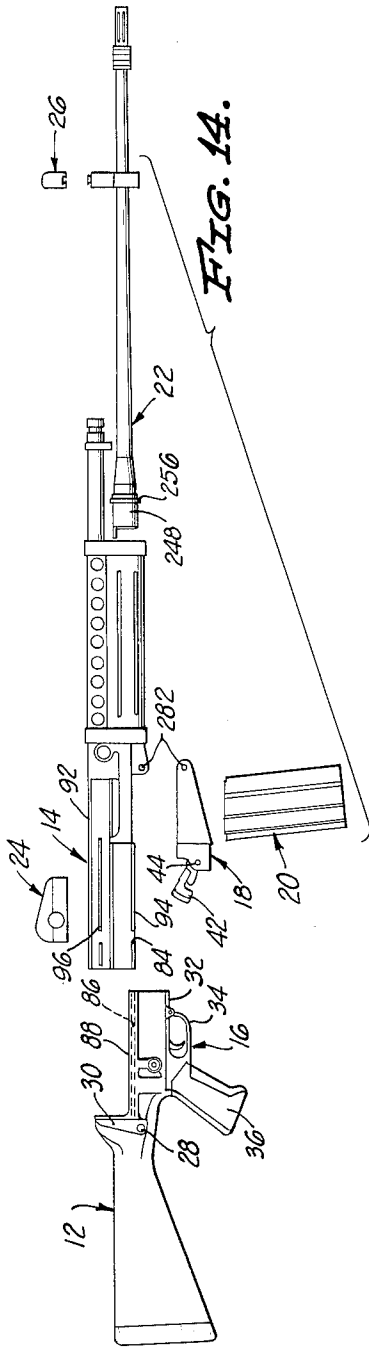


FIG. 14.

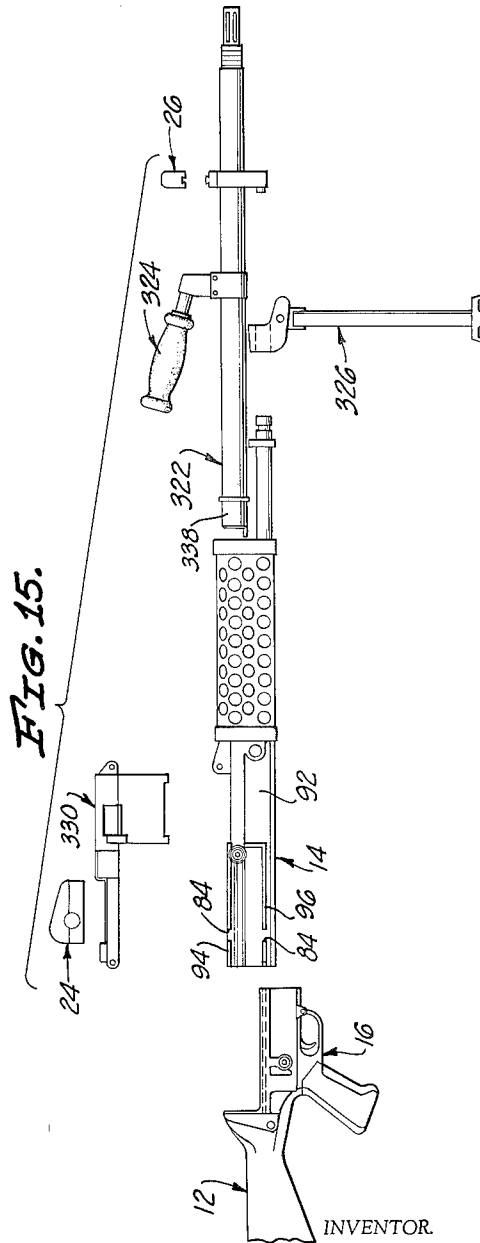


FIG. 15.

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CONVERTIBLE GUN

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15 Claims. (Cl. 89—128)

This invention relates to a convertible gun and, more particularly, to a convertible gun characterized by the fact that it may be utilized with various components as a rifle, light machine gun or a fixedly mounted gun.

A great deal of needless duplication in armament arises from the fact that conventional weapons are designed and constructed to perform only one function. Therefore, a typical tactical unit finds it necessary to equip itself with both conventional rifles and light machine guns although these weapons may not be utilized simultaneously and, frequently, are essentially duplicatory of each other in function.

It is, therefore, an object of my invention to provide a convertible gun which includes, as a nuclear component, a receiver which incorporates a bolt carrier adapted to be utilized in all of the various applications of the gun and which is provided with demountable barrels adapted to be substituted for each other when the gun is utilized alternatively as a rifle or light machine gun.

Also adapted to be demountably associated with the receiver is a trigger group housing incorporating a trigger group and a magazine adapted for use with the receiver when the gun is utilized in the rifle configuration.

Another object of my invention is the provision of a convertible gun which includes a receiver characterized by the incorporation of fastener means adapted to permit the demountable association therewith of various components which alternatively permit the use of the gun as either a rifle or a light machine gun.

In the rifle configuration, the receiver has demountably associated therewith a rifle barrel, the aforementioned trigger group housing and a magazine adapter and magazine. The trigger group housing and magazine adapter and magazine are disposed in juxtaposition to each other and in proximity to an opening provided in the underside of the receiver and are demountably maintained in operative relationship with said receiver by fastening means adapted to facilitate the expeditious dismounting of the components from the receiver and the mounting thereof thereupon.

In the light machine gun configuration, the receiver is inverted from the position in which it is disposed in the rifle configuration. Prior to inverting the receiver, the trigger group housing and magazine adapter and magazine are dismounted from operative relationship with the receiver by disengagement of the fastening means. Subsequently, the trigger group housing is operatively connected by said fastening means to the lower portion of the receiver in juxtaposition to the smaller opening in said receiver while an automatic cartridge feed mechanism is operatively connected to the upper portion of the receiver in overlying relationship with the opening therein.

Another object of my invention is the provision, in a convertible gun of the aforementioned character, of a bolt carrier which includes a reversible drive and guide means adapted, alternatively, to guide the bolt carrier during its utilization in the rifle configuration of the gun and to drive the aforementioned cartridge feed mechanism during the utilization of the gun in the light machine gun configuration.

Another object of my invention is the provision of a convertible gun of the aforementioned character wherein the aforesaid bolt carrier includes a firing pin longitudinally movable therein and means for alternatively lock-

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ing said pin against movement or releasing it for movement in said bolt carrier. Therefore, when the convertible gun is utilized in the rifle configuration in which a closed battery condition is desirable, the pin is released for longitudinal movement with respect to the bolt carrier. Conversely, when the gun is utilized as a light machine gun wherein the open battery position of the bolt carrier is desired, the firing pin is locked against movement with respect to the bolt carrier.

As previously indicated, the receiver is adapted to have rifle or light machine gun barrels demountably associated therewith. An associated object of my invention is the provision of securement means between the receiver and the associated barrel adapted to facilitate the mounting or dismounting of the barrel from operative relationship with the receiver.

Another object of my invention is the provision of a bolt carrier adapted to be actuated by a gas operated piston, said bolt carrier including shock absorbing means constituting a portion of the operative connection to said piston whereby shock loads imposed upon said receiver through said operative connection are absorbed by said shock absorbing means.

An associated object of the invention is the provision of shock absorbing means of the aforementioned character which is utilized as a means of maintaining the operative components of the carrier in co-operative relationship with one another and which serve to eliminate excessive play and lost motion between said components. Therefore, the close tolerances between the components of the bolt carrier which are characteristic of prior art constructions are eliminated because the shock absorbing means accommodates tolerance variations between the parts.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawings, which are for the purpose of illustration only and in which:

FIG. 1 is a side elevational view showing the convertible gun of the invention in its rifle configuration;

FIG. 2 is an enlarged, fragmentary, sectional view showing the convertible gun components in the orientation established for said components when the gun is utilized in the rifle configuration;

FIG. 3 is an enlarged, fragmentary, vertical, sectional view taken along the broken line 3—3 of FIG. 2;

FIG. 4 is an enlarged, fragmentary, vertical, sectional view taken along the broken line 4—4 of FIG. 2;

FIG. 5 is an enlarged, fragmentary, sectional view showing the details of the bolt carrier, trigger group, and magazine adapter in the orientation assumed thereby when the gun is utilized in the rifle configuration;

FIG. 6 is a vertical, sectional view taken along the broken line 6—6 of FIG. 5;

FIG. 7 is an enlarged, fragmentary, sectional view taken along the broken line 7—7 of FIG. 6 and showing a latching mechanism utilized to maintain the receiver in operative relationship with the trigger housing;

FIG. 8 is a side elevational view showing the components of the gun assembled in the orientation assumed thereby when said gun is utilized in the light machine gun configuration;

FIG. 9 is an enlarged, fragmentary, sectional view showing the various internal components of the gun in the orientation assumed thereby when they are disposed in the light machine gun attitude;

FIG. 10 is an enlarged, fragmentary, sectional view of the receiver portion of the gun showing the various components thereof in the orientation assumed thereby when the gun is utilized in the light machine gun configuration;

FIG. 11 is a longitudinal, sectional view taken from the broken line 11—11 of FIG. 10;

FIG. 12 is a vertical, sectional view taken from the broken line 12—12 of FIG. 10;

FIG. 13 is a vertical, sectional view taken from the broken line 13—13 of FIG. 10;

FIG. 14 is an exploded view showing the various components utilized in the rifle configuration of the gun of the invention;

FIG. 15 is an exploded view showing the various components utilized in the light machine gun configuration of the gun of the invention; and

FIG. 16 is an exploded view showing an alternative fastening means utilized to maintain the receiver in operative relationship with the trigger housing of the gun.

Referring to the drawings, and particularly to FIGS. 1 through 7 and 14, I show the convertible gun 10 of my invention with the components thereof disposed in the orientation which is imparted thereto when said gun is adapted to be utilized in a rifle configuration. In the rifle configuration the gun, as best shown in FIGS. 1 and 14 includes a stock 12, a receiver 14, a trigger group housing 16 demountably secured to the stock 12, a magazine adapted 18 and a magazine 20 adapted to be inserted into operative relationship with said magazine adapter. In addition, the components of the gun 10 in the rifle configuration include a barrel 22 demountably associated with the receiver 14, a rear sight 24, and a front sight 26.

The stock 12 has its forward extremity secured to the rear extremity of the trigger group housing 16 by means of a pin 28 which passes through the stock 12, as best shown in FIGS. 1, 2, and 14 of the drawings, and has its opposite extremities located in corresponding openings in the rear portion 30 of the trigger group housing 16. Removal of the pin 28 will permit the stock 12 to be dismounted from operative relationship with the trigger group housing 16.

The trigger group housing 16, as best shown in FIGS. 1—2, 5 and 14 of the drawings, includes an elongated, substantially rectangular body 32 which has a trigger guard 34 pivotally mounted thereupon and which has a handgrip 36 mounted thereupon by means of a screw 38. Located in the trigger group housing 16 is a trigger group 40. A hammer 42 is mounted as best shown in FIG. 5 of the drawings, for rotation on a pivot pin 44 by means of a torsion spring 46. The hammer 42 is actually mounted in the magazine adapter 18, as best shown in FIG. 14 of the drawings. The trigger group 40 includes a trigger 48 which is mounted for rotation about a pivot pin 52 and has its forward extremity constitute a sear 54 engageable with a corresponding land 56 on the hammer 42 to maintain said hammer in the inoperative position shown in FIG. 5 of the drawings.

Mounted for rotation upon the pivot pin 52 is a sear 58 engageable with a corresponding detent 62 on the hammer 42 and rotatable by a torsion spring 64. A bolt carrier sear 66 is mounted for rotation about a pivot pin 68 and has a portion 72 thereof engageable by the trigger 48. Also mounted in the trigger group housing 16 is a U-shaped latch 76, FIG. 7, whose legs 77 are movable in slots 78 in said housing and which is biased upwardly by a compression spring 82, as best shown in FIG. 5 of the drawings, into engagement with corresponding slots 84 in the receiver 14 to maintain said receiver and said trigger group housing in operative relationship with each other.

The trigger group 40 is susceptible of being associated with the gun 10 in first and second configurations corresponding to first and second configurations of the gun 10, namely, the rifle and machine gun configurations. In the rifle configuration of the gun 10, the trigger group 40 is disclosed as being associated with the gun 10 in the first configuration wherein it includes the trigger 48, the sear 54 and the sear 58 which are associated with the sear 65 in order that, as is well known in the art, the various sears may be utilized to safety the gun or permit it to operate in the semi-automatic or automatic conditions.

Formed in the trigger group housing 16 is a pair of grooves 86, FIG. 12, which are constituted by longitudi-

nally oriented ribs 88 in the trigger group housing 16 and which constitute a part of the fastening means adapted to maintain the trigger group housing 16 and the receiver 14 in demountable relationship with each other.

The receiver 14, as best shown in FIG. 14 of the drawings, includes a substantially rectangular body 92 which is open at its lower extremity and which includes a pair of oppositely directed flanges 94 adapted to be slidably engaged in the corresponding grooves 86 of the trigger group housing 16 to demountably connect the receiver 14 in operative relationship with the trigger group housing 16, said flanges constituting the co-operating portion of the fastening means of the receiver 14 and trigger group housing 16. Therefore, in order to mount the receiver 14 in operative relationship with the trigger group housing 16, it is merely necessary to align the flanges 94 of the receiver 14 with the corresponding grooves 86 of the trigger group housing 16 and to slide said flanges into the trigger group housing grooves 86 until the rear extremity of the receiver 14 abuts on the rear extremity of the trigger group housing 16.

Also incorporated in the upper extremity of the receiver 14, as best shown in FIG. 3 of the drawings, are additional flanges or ribs 96, for a purpose which will be described in greater detail below. An opening 98 is formed in the upper portion of the receiver 14 and the rear sight 24 is mounted in overlying relationship therewith, as best shown in FIGS. 2, 4, and 5 of the drawings, by means of a dovetail connection 99 between the base of the sight and the corresponding upper extremity 102 of the receiver 14. The rear sight 24 incorporates latch springs 104 which engage in corresponding lands 106 in the upper portion 102 of the receiver 14 to maintain the sight 24 in overlying relationship with the opening 98. The springs 104 can be disengaged by a suitable implement inserted through the opening 98 in the receiver 14. The eyepiece 108 of the sight is mounted upon a windage adjustment screw 110.

Located in the receiver 14 is a bolt carrier 120, said bolt carrier being constituted by an elongated, cylindrical body 122 having an axial bore 124 therein, as best shown in FIG. 5 of the drawings. A bolt 126 is mounted for rotation in the forward extremity of the bore 124 and has its head 128 protruding beyond the forward extremity of the body 122 so that the dogs 132 thereupon may engage against corresponding surfaces 134 of the firing chamber 136.

A bolt actuator 140 is mounted in the bolt carrier 120 and includes an elongated pin 142 which, as best shown in FIG. 5 of the drawings, is positioned in a transverse bore 144 in the bolt 126 and which extends into an inclined slot 146 formed in the wall of the bolt carrier 120. The pin 142 has a roller 148 mounted upon the outer extremity thereof and engageable with a corresponding surface 152 in the interior of the receiver 14. A shell ejector 153 is mounted in the bolt 126 and is biased outwardly by a compression spring 154.

An operative connection with a gas energizable piston 156, FIG. 2, located in a cylinder 158 maintained in communication with the barrel 22 by a passage 162 is constituted by a link 164 connected to the rear extremity of a piston rod 166. The piston rod 166 and link 164 are, as best shown in FIG. 5 of the drawings, provided with communicating axial bores 168 and 172. The bores 168 and 172 receive a guide rod 174 and a compression spring 176 adapted to return the link 164 and the associated piston rod 166 to a position in which the link 164 will locate the bolt carrier 120 in battery position.

The link 164, as best shown in FIG. 5 of the drawings, has a depending arm 178 which is engaged in a corresponding slot 181 in the wall of the body 122 of the bolt carrier 120. The arm 178 includes a bore 182 and a counterbore 184 which is adapted to receive the reduced forward extremity 186 of a spacer collar 188, said spacer collar having a locking lug 192 thereupon, for a purpose which will be described in greater detail below. The lock-

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ing lug or detent 192 projects radially into the bore 194 of the spacer collar 188. A bank 196 of Belleville washers is located in the bore 124 of the body 122 of the bolt carrier 120 and the rear extremity of said bank is engaged by a spacer collar 198. Therefore, the bank 196 of Belleville washers normally biases the spacer collar 188 into operative engagement with the counterbore 184, but, as best shown in FIGS. 5 and 10, is movable in the bore 124 of the bolt carrier body 122 relative to the link 178 against the compressive effect of the bank 196 of Belleville washers, in a manner to be described in greater detail below.

Mounted upon the rear extremity of the body 122 of the bolt carrier 120 is a rotatable cap 202 which is maintained in operative relationship with said body by means of a spring ring 204. Formed integrally with the rotatable cap 202 is an upwardly directed arm 206 upon which are mounted guide rollers 208 adapted to engage the guide surfaces 152 in the interior of the receiver 14. When the gun 10 is used in the rifle configuration, the function of the guide rollers 208 is limited to maintaining and guiding the associated rotatable cap 202 in its predetermined orientation on the bolt carrier 120, so that the orientation of the cap 202, by being thus maintained, may maintain the components of the bolt carrier 120 associated with the cap 202 in the desired orientation for use of the gun 10 in the rifle configuration. The cap 202 is provided with a centrally located opening 212 which, as best shown in FIG. 3 of the drawings, incorporates a flat 214 for a purpose which will be described in greater detail below.

Carried in the bolt carrier 120 is a firing pin 220, as best shown in FIG. 5 of the drawings. The forward extremity of the firing pin 220 is located in a bore 222 in the bolt 126 and its forward extremity is adapted to be extended or driven through an opening 224 in said bolt for engagement with a cartridge, not shown, located in the firing chamber 136. The firing pin 220 also extends through a corresponding bore 226 in the pin 142 of the bolt actuator 140.

The intermediate portion of the firing pin 220 is located in the bore 182 of the arm 178 of the link 164 and is provided with an annular groove 227 which is enlarged at 228, FIG. 5, for a purpose which will be described in greater detail below. As will be readily apparent from a study of FIG. 5 of the drawings, the locking detent 192 is of the same size as the annular groove 227, while it is substantially smaller than the enlarged portion 228 of said groove.

Therefore, relative movement of the firing pin 220 in the bolt carrier 120 can occur when the locking lug 192 is located in the enlarged portion 228 of the groove 227.

The rearward extremity of the firing pin 220 extends through corresponding openings in the bank 196 of Belleville washers and is provided with a head 232 thereupon, said head incorporating a flat 234 which corresponds with and engages the flat 214 of the opening 212 in the cap 202. The bolt carrier 120, the bolt 126 and the firing pin 220, together with the various components associated therewith are referred to hereinafter as the bolt carrier group.

The magazine adapter 18 is mounted at its rear extremity upon the forward extremity of the trigger group housing 16 by means of a land 238 whereupon which overlies the corresponding forward extremity of the trigger group housing 16, as best shown in FIG. 5 of the drawings. The forward extremity of the magazine adapter 18 is mounted in the lower portion of the receiver 14, as best shown in FIG. 5 of the drawings, by means of a pin 242 which is maintained in operative relationship with a corresponding bore in the receiver 14 by means of a spring biased ball detent 244. The magazine 20 is adapted to be shoved upwardly into the magazine adapter 18 and to be frictionally retained in operative relationship therewith so that cartridges, not shown, can be fed into the firing chamber 136.

The barrel 22 is, as best shown in FIGS. 5 and 6 of the

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drawings, demountably associated with the forward extremity of the receiver housing 14. The barrel 22 has a threaded rear extremity 246 which has a correspondingly threaded collar 248 thereupon adapted to be slidably engaged in a corresponding bore 252 provided in a fitting 254 in the forward extremity of the receiver 14. The rear extremity of the barrel 22 and the associated collar 248 co-operate to define the firing chamber 136 for the reception and firing of a cartridge inserted therein. The barrel collar 248 is provided with a flange 256 which, as best shown in FIGS. 5 and 6 of the drawings, is engageable by a latch 258 including a pivotally mounted latch dog 262 which is mounted for rotation on a piston bearing 264 by an integral ring 266. The latch dog 262 is chamfered, as at 268, so that it will be biased outwardly against the action of an associated compression spring 272 when it is engaged by the flange 256 on the barrel collar 248 during the insertion of the barrel 22 into operative relationship with the fitting 254 at the forward extremity of the receiver 14.

Therefore, the barrel 22 can be assembled in operative relationship with the forward extremity of the receiver 14 by merely sliding the collar 248 at the rear extremity thereof into operative engagement with the corresponding bore 252 in the fitting 254. As the collar 248 is inserted in the bore 252, the flange 256 will engage the chamfered portion 268 of the latch dog 262 to urge said latch dog outwardly against the bias of the compression spring 272. As soon as the flange 256 of the barrel collar 248 has passed the chamfered portion 268 of the latch dog 262, the spring 272 will urge said chamfered portion against the face of the flange 256 and lock the barrel 22 in operative relationship with the receiver 14.

The latch dog 262 is provided, as best shown in FIG. 6 of the drawings, with a leg 274 which is engageable through a corresponding opening 276 in a handgrip 278 which encompasses the barrel 22. Therefore, by the insertion of a suitable instrument of reduced cross section, such as a pin, or the like, the leg 274 can be rotated in a counterclockwise direction, as viewed in FIG. 6, to bias the latch dog 262 out of engagement with the flange 256 of the barrel collar 248 to permit the barrel 22 to be released from operative engagement with the forward extremity of the receiver 14.

The manner in which the operative components of the gun 10 adapted for utilization in the rifle configuration can be assembled is best illustrated by reference to FIGS. 1-7 and 14 of the drawings. Normally, the trigger group housing 16 is maintained in operative relationship with the stock 12 by means of the associated pin 28, and the magazine adapter 18 is inserted into operative position within the forward extremity of the trigger housing 16 to locate the hammer 42 pivotally mounted thereupon in operative relationship with the remainder of the trigger group 40.

Subsequently, the receiver 14 is mounted in operative relationship with the trigger group housing 16 and the magazine adapter 18 by sliding the flanges 94 thereupon into the grooves 86 of the trigger group housing 16 until the rear extremity of the receiver 14 engages the corresponding rear extremity of the trigger group housing 16, as best shown in FIG. 2 of the drawings. When the gun 10 is utilized in the rifle configuration, the rotatable cap 202 on the bolt carrier 120 is rotated into a position wherein the rollers 208 thereupon will engage the corresponding guide surfaces 152 on the interior of the receiver 14 and into a position in which the mutually engaging flats 214 and 234 upon the collar 248 and firing pin 220, respectively, will cause said firing pin to be rotated within the bolt carrier 120 into the position in which the detent lug 192 will be located in the elongated or enlarged portion 228 of the annular groove 227 in the firing pin 220. Therefore, relative movement between the firing pin 220 and the bolt carrier 120 may be accomplished by the impingement of the hammer 42 upon the head 232 of the firing pin 220 causing a car-

tridge, not shown, in the firing chamber 136, to be fired.

After the assembly of the receiver 14 in operative relationship with the trigger group housing 16 and magazine adapter 18, the pin 242 is driven through corresponding openings 282, FIG. 14, in the forward extremities of the magazine adapter 18 and receiver 14, to lock said receiver and said magazine adapter in operative relationship with each other. The barrel 22 is then inserted into the bore 252 in the fitting 254 in the forward extremity of the receiver 14. The latch dog 262 engages the corresponding flange 256 on the barrel collar 248 and locks the barrel 22 in operative relationship with the receiver 14. After a magazine 20 has been inserted in operative relationship with the magazine adapter 18, the gun 10 is ready to be fired in its rifle configuration. The assembly of the handgrip and other components of the gun such as the rear and front sights, has not been described because it will be obvious to those skilled in the art.

The dismounting of the various components of the gun 10 utilized in the rifle configuration, illustrated in FIGS. 1-5 of the drawings, is accomplished, initially, by the insertion of a pin or similar elongated, slender member through the opening 276 of the handgrip 278. The extremity of the pin engages the leg 274 of the latch dog 262 and urges said latch dog in a counterclockwise direction, as viewed in FIG. 6 of the drawings, against the bias of the spring 272 to release the flange 256 on the barrel collar 248 and to permit the barrel 22 to be released from operative engagement with the forward extremity of the receiver 14.

The pin 242 can then be released from operative engagement with the openings 282 in the receiver 14 and the corresponding portion of the magazine adapter 18. Before the receiver 14 can be dismounted from operative relationship with the trigger group housing 16, the latch 76 must be disengaged from operative engagement with the corresponding slots 84 in the flanges 94 on the receiver 14. Such disengagement is accomplished by moving the trigger 43 forwardly or counterclockwise, as viewed in FIG. 5 of the drawings, to cause the sear 66 to engage the intermediate portion of the latch 76 between the legs 77 thereof and force it downwardly against the bias of the spring 82. The receiver 14 can then be slid from operative engagement with the trigger group housing 16 and the magazine adapter 18 can be removed from operative engagement with the trigger group housing 16 leaving said trigger group housing in operative engagement with the stock 12.

When the gun 10 is to be utilized in the light machine gun configuration illustrated in FIGS. 8-13 and 15 of the drawings, the stock 12 and trigger group housing 16 are retained in the orientation assumed thereby when the gun is utilized in the previously discussed rifle configuration. However, the receiver 14 is inverted to locate the open portion thereof in an upward orientation. When the orientation of the receiver 14 is reversed in this manner, the opening 98 is disposed in juxtaposition to the bolt carrier sear 66 in order that said sear may engage a corresponding land 292 on the bolt carrier 120, as best shown in FIG. 10 of the drawings.

Prior to locating the receiver 14 in operative relationship with the trigger group housing 16, the bolt carrier 120 is removed from the receiver 14 to permit the cap 202 thereupon to be rotated to orient the rollers 208 mounted upon said cap in an upward orientation, as best shown in FIG. 10 of the drawings. If such rotation of the cap 202 were not accomplished, the rollers 208 would, naturally, be oriented in a downward position because of the inversion of the receiver 14 in which the bolt carrier 120 is located. The rotation of the cap 202 in this manner causes corresponding rotation of the firing pin 220 because of the engagement of the flats 214 and 234 provided on the cap 202 and the firing pin 220, respectively. When such rotation of the firing pin 220 occurs, the annular groove 227 is correspondingly rotated to cause it to engage the detent lug 192. When the

detent lug 192 is located in the annular groove 227, the firing pin 220 is locked against movement with respect to the bolt carrier 120 except for such movement as may occur between the relative bolt parts of the bolt carrier 120 which is attributable to the provision of the bank 196 of Belleville washers in the bore 124 of the bolt carrier 120.

Of course, the receiver 14 is, as best shown in FIG. 12 of the drawings, mounted in operative relationship with the trigger group housing 16 by the engagement of the flanges 96 thereupon with the corresponding grooves 86 in the trigger group housing 16, as best shown in FIG. 12 of the drawings.

In addition to the utilization of the stock 12, the receiver 14, and the trigger group housing 16, the light machine gun configuration of the gun 10 includes a heavy barrel 322 which is mounted in the forward extremity of the receiver 14, in a manner to be described in greater detail below. In addition, a handgrip 324 is provided which facilitates the carrying of the machine gun, and there is also provided a bipod 326 which can be utilized to support the machine gun during the firing thereof.

Furthermore, an automatic cartridge belt feed mechanism 330 is adapted to be mounted upon the upper portion of the receiver 14 in overlying relationship with the opening therein in order that a belt 332 of cartridges may be fed into the receiver 14, as best shown in FIG. 8 of the drawings. The rear sight 24 is, as best shown in FIG. 10 of the drawings, mounted in operative relationship with the belt feed mechanism 330.

Naturally, the inversion of the receiver 14 entails the inversion of the cylinder 158 with the piston 156 disposed therein. However, the operation of the piston 156 and associated piston rod 166 and link 164 is identical with the operation of the mechanism in the rifle configuration of the gun so far as the movement of the bolt carrier 120 by gases generated by the firing of a cartridge in the firing chamber 136 is concerned. However, there is one essential difference in the operation of the bolt carrier 120 in its utilization in the machine gun configuration of the gun as distinguished from its utilization in the rifle configuration.

In the rifle configuration, the bolt carrier 120 and the bolt 126 are disposed in the closed battery position prior to the firing of the gun, and the firing pin 220 is adapted to be driven by the action of the associated hammer 42 against a cartridge located in the firing chamber 136. The spring 176 associated with the guide rod 174 serves to drive the bolt carrier 120 into the closed battery position, as best shown in FIG. 5 of the drawings, after the gun has been fired.

In the machine gun configuration of the gun 10, the bolt carrier 120 is maintained, as best shown in FIG. 10 of the drawings, in an open battery position wherein the sear 66 engages the land 292 on the link 164 to maintain the bolt carrier 120 in the open battery position against the force of the spring 176. Moreover, the firing pin 220 is dogged against movement in the bolt carrier 120 by the engagement of the detent 192 in the corresponding annular groove 227.

It will be noted that the trigger group 40 is now associated with the receiver 14 in its second configuration, there being mounted in the trigger group housing 16 the trigger 43 and the associated bolt carrier sear 66. All of the other components of the trigger group 40 utilized in its first configuration, namely, the sear 58 and the associated torsion spring 64 have been removed. The removal of these trigger group components is accomplished by removing the pivot pin 52 to dismount them from operative association with the trigger 43. Of course, since the magazine adapter 18 is not utilized in the machine gun configuration of the gun 10, the hammer 42 is eliminated from its cooperative relationship with the components of the trigger group 40, as established in the first configuration of said trigger group.

Therefore, when the trigger 48 releases the sear 66 to release the corresponding land 292 on the link 164, the compressed spring 176 will urge the bolt carrier 120 to the right, as veiwed in FIG. 10 of the drawings, to cause the bolt carrier to move into battery position. As the bolt 126 approaches battery position, it is retracted into the bore 124 of the bolt carrier 120 to cause the pin 220 to protrude from the forward extremity of the bolt 126 and be driven into engagement with a cartridge located in the firing chamber 136.

It will be noted that the barrel 322 is mounted in operative relationship with the corresponding bore 252 at the forward extremity of the receiver by means of a sliding fit with a barrel collar 338 mounted thereupon. The latch construction 258 described in the rifle configuration is utilized to maintain the barrel 322 in operative engagement with the receiver 14.

The belt feed mechanism 330, as best shown in FIG. 11 of the drawings, includes a cover 340 which is mounted on a pin 242 and secured in closed position by the pins 331 at the rear extremity of the receiver 14. Mounted upon the underside of the cover 340 by means of a pivot pin 343 is a lever 344 which, as best shown in FIG. 10 of the drawings, is engaged by the uppermost roller 208 of the cap 202 and which includes an angularly bent forward extremity 346.

The forward extremity 346 of the lever 344 has an actuating arm and bracket 348 secured thereto by means of rivets 352. A guide roller 354 engages the underside of the cover 340 as the forward extremity 346 of the lever 344 is moved on the pivot pin 343 by the action of the drive roller 208. The arm portion 358 of the bracket and arm 348 extends laterally into engagement with a carriage 360 mounted, as best shown in FIGS. 10 and 12 of the drawings, on rollers 362 for movement on tracks 364 secured to the underside of the cover 340.

The forward extremity of the arm 358 is circular and fits within a corresponding recess 368 in the carriage 360. Mounted on the carriage 360 and biased downwardly by a torsion spring 372 are cartridge advancing dogs 374, said dogs being adapted to be reciprocated by movement of the carriage 360 and to advance the cartridges 376 successively, as best shown in FIGS. 13 of the drawings. A detent dog 382 is urged upwardly by a torsion spring 384 into engagement with an associated cartridge 376 to prevent reverse movement of the cartridge belt 332. Also mounted upon the carriage 360 is a spring biased tongue 388 adapted, as best shown in FIG. 13 of the drawings, to force the cartridges 376 downwardly into a position within the receiver in which they may be urged into the firing chamber 136.

Therefore, when the gun 10 in the machine gun configuration is fired, the gun 10 will fire so long as the trigger 48 is depressed to move the sear 66 downwardly out of engagement with the land 292 on the link 164. The firing action entails return movement of the bolt carrier 120 in the receiver 14 by the action of the gases in the barrel 322 upon the piston 156. Therefore, after the weapon is fired, the bolt carrier 120 is moved into the open battery position of FIG. 10 of the drawings and will be returned by the spring 176 into the firing position described hereinabove so long as the trigger 48 is depressed. If the trigger 48 is released, the sear 66 will engage the corresponding land 292 upon the link 164 and will maintain the bolt carrier 120 in the open battery position of FIG. 10 of the drawings.

When the spring 176 urges the bolt carrier 120 into firing position, the guide roller 354 moves within the channel shape of the lever 344 and, as it approaches the angularly bent extremity 346 of said lever, causes the lever to be shifted from one side of the cover 340 to the other side of said cover to cause the arm 358 to be correspondingly shifted. Movement of the arm 358 in this manner induces movement of the carriage 360 upon the rollers 362 in the tracks 364 causing the dogs 374 to engage an

adjacent cartridge 376 and move it into a position in which it will be driven into the firing chamber 136, as best shown in FIG. 13 of the drawings.

When the gases generated by firing of the cartridge 376 cause rearward movement of the bolt carrier 120 against the bias of the spring 176, the guide roller 208 traverses the channel provided in the lever 344 to the left-hand position, shown in FIG. 11 of the drawings, wherein the carriage 360 is returned to the inoperative position wherein it is ready to have the dogs 374 thereupon urged into engagement with a cartridge 376 to be fed into the firing chamber 136. Therefore, the entire cartridge feeding mechanism 330 is mounted in the cover 340 and the guide roller 208 which serves to drive the cartridge feeding mechanism 330.

The provision of the bank 196 of Belleville washers within the bore 124 of the bolt carrier 120 facilitates both the assembly of components with the bolt carrier 120 and the elimination of shock loads upon said components. Normally, as is well known to those skilled in the art, it is necessary to manufacture the components assembled in the bolt carrier with extreme accuracy to prevent relative movement therebetween which would result in damage to or inoperativeness of said components. However, by the provision of the bank 196 of Belleville washers, tolerances can be permitted between the various components carried by the bolt carrier 120 such as the link 164, the collar 188 and the collar 198. This is due to the fact that the expansion of the bank 196 of Belleville washers accommodates any tolerances which might exist between such component parts.

Moreover, during the firing of the gun, the return force imposed upon the bolt carrier 120, and the shock loads incident thereto, are absorbed by the bank 196 of Belleville washers since a slight, relative movement of the link 164 with respect to the bolt carrier 120 is permitted due to the fact that the bank 196 of the Belleville washers will compress slightly as the arm 178 of the link 164 urges the collar 188 to the left, as best shown in FIG. 10 of the drawings.

Another important advance of the relationship between the firing pin 220, the spacer collar 188 and the bank of Belleville washers 196 becomes most apparent during the operation of the gun 10 in its machine gun configuration when, as previously indicated, the firing pin 220 is held against free relative movement with respect to the bolt carrier 120 by the engagement of the detent lug 192 in the annular groove 227. As previously explained, the locking of the firing pin 220 in this manner causes the bolt carrier 120 to drive the firing pin 220 against the cartridge or shell in the chamber 136 since the bolt is operated from the open battery position.

When this occurs, the firing pin 220 is subjected to high axial loads which would ordinarily tend to cause crystallization of the metal of the firing pin and subsequent shattering thereof. However, because of the fact that the firing pin 220 is locked to the spacer collar 188 and the spacer collar 188 is subject to deflection against the bank 196 of the Belleville washers, the firing pin 220 may be urged rearwardly for limited movement in the bore 124 of the bolt carrier 120, thus preventing the imposition of undue axial loads upon the firing pin 220 which would occur if it were rigidly secured in the bolt carrier 120.

Alternative fastening means adapted to secure a receiver 414 in operative relationship with a trigger group housing 416 is illustrated in FIG. 16 of the drawings. Instead of providing grooves 86 in the trigger group housing 416 and flanges 94 and 96 engageable selectively therewith, the receiver is provided with fastening lugs 418 which are adapted to mate with corresponding openings 422 in the trigger group housing 416. When so mated, pins, not shown, may be driven through the corresponding openings 422 in the trigger group housing 416 and the lugs 418 to demountably secure the receiver 414 in operative relationship with the trigger group housing 416.

I thus provide by my invention a convertible gun which is adapted for use in a variety of configurations including rifle and light machine gun configurations. In addition, the convertible gun incorporates unique operating components, among them being the bolt carrier and components assembled therein, the cartridge belt feeding mechanism and the demountable components such as the trigger group housing, magazine adapter and receiver itself. Since all of the various components of the gun are interchangeable, the conversion from one configuration to the other can be made in the field and the versatility of the gun will be readily apparent to those skilled in the art.

I claim:

1. In a convertible gun, the combination of: a receiver; a bolt carrier in said receiver; a reversible mount secured to said bolt carrier; reversible guide and drive means secured to said mount; a belt feed mechanism demountably secured to said receiver for engagement by said reversible guide and drive means; a firing pin in said bolt carrier; and detent means on said bolt carrier for holding said firing pin against movement with respect to said bolt carrier when said reversible guide and drive means is engaged with said belt feed mechanism, said firing pin being operatively connected to said mount to engage said detent means with said firing pin and prevent relative movement between said bolt carrier and said firing pin.

2. In a convertible gun, the combination of: a receiver having openings in its top and bottom portions and mounting means thereupon adjacent said openings; a barrel demountably secured to the forward extremity of said receiver; a trigger group demountably securable to said receiver adjacent one of said openings by said mounting means; a cartridge belt feed means demountably secured by said mounting means in overlying relationship with the other of said openings; a bolt carrier in said receiver; and reversible guide and drive means on said bolt carrier engageable with said cartridge belt feed means to actuate the same.

3. In a gun, the combination of: a receiver; a barrel on said receiver; a bolt carrier mounted in said receiver for reciprocable movement therein; a firing pin in said bolt carrier; and detent means in said bolt carrier engageable with said firing pin for alternatively holding said firing pin against free longitudinal movement in said bolt carrier so that the forward extremity of said firing pin will automatically engage a round when said bolt carrier is operated from open battery position and for permitting free relative movement between said firing pin and bolt carrier when said gun is operated from closed battery position.

4. In a gun, the combination of: a receiver; a barrel on said receiver; a bolt carrier mounted in said receiver for reciprocable movement therein; a firing pin in said bolt carrier; a reversible mount on said bolt carrier; and reversible guide and drive means on said mount for, alternatively, guiding said mount when said bolt carrier is utilized in a rifle configuration of said gun and guiding said mount and driving a cartridge belt feed means when said bolt carrier is utilized in a machine gun configuration of said gun.

5. In a gun, the combination of: a receiver; a barrel on said receiver; a bolt carrier mounted in said receiver for reciprocable movement therein; a firing pin in said bolt carrier; detent means in said bolt carrier engageable with said firing pin for alternatively preventing or permitting relative movement between said firing pin and said bolt carrier; a reversible mount on said bolt carrier; and reversible guide and drive means on said mount for, alternatively, guiding said mount when said bolt carrier is utilized in a rifle configuration of said gun and guiding said mount and driving a cartridge belt feed means when said bolt carrier is utilized in a machine gun configuration of said gun.

6. In a gun, the combination of: a receiver; a barrel

on said receiver; a bolt carrier mounted in said receiver for reciprocable movement therein; a firing pin in said bolt carrier; detent means in said bolt carrier engageable with said firing pin for alternatively preventing or permitting relative movement between said firing pin and said bolt carrier; a mount on said bolt carrier; reversible guide and drive means on said mount for, alternatively, guiding said bolt carrier when said bolt carrier is utilized in a rifle configuration of said gun and guiding said bolt carrier and driving automatic cartridge feed means when said bolt carrier is utilized in the machine gun configuration of said gun; and an operative connection between said firing pin and said reversible guide and drive means for freeing said firing pin from said detent means when said guide and drive means is guiding said mount and for engaging said firing pin with said detent means when said guide and drive means is engaged in driving relationship with said cartridge belt feed means.

7. In a convertible gun, the combination of: a receiver having trigger group receiving openings in opposite surfaces thereof; a bolt carrier group movable within the receiver for chambering, firing and ejecting rounds of ammunition; and a trigger group mountable in contiguity to one of said receiving openings in a first configuration and in contiguity to the other of said receiving openings in a second configuration, said trigger group and said receiver having co-operating fastening means for mounting said trigger group at either opening.

8. In a convertible gun, the combination of: a receiver having openings in the top and bottom thereof and being adapted to receive ammunition from said bottom opening; a bolt carrier group movable within the said receiver for chambering, firing and ejecting rounds of ammunition; and a trigger group mountable adjacent said top or bottom openings, said trigger group having a first configuration when located adjacent said bottom opening and a second configuration when located adjacent said top opening after said receiver has been inverted, said trigger group and receiver having co-operating fastening means for demountably securing said trigger group adjacent said top or bottom openings, to facilitate the inversion of said receiver and bolt carrier group relative to said trigger group and conversion of said gun from a bottom fed rifle to a top fed machine gun.

9. In a convertible gun, the combination of: an invertible receiver having top and bottom openings therein, said bottom opening, in a first configuration of said gun, serving as a bottom rifle feed and, in a second configuration of said gun, serving as a top machine gun feed; a bolt carrier group movable within the receiver including means for chambering, firing and ejecting rounds of ammunition; and a trigger group mountable in a first configuration adjacent said bottom opening of said receiver when said gun is disposed in its first configuration and, when said receiver has been inverted to place said gun in said second configuration, disposable adjacent said top opening in a second configuration, whereby said gun may function in its first configuration as a bottom fed rifle and in its second configuration as a top fed machine gun.

10. In a convertible gun, the combination of: a receiver having oppositely disposed openings therein and adapted to receive ammunition through one of said openings; a bolt carrier group mounted in said receiver for movement therein to chamber, fire and eject rounds of ammunition; and a trigger group mountable adjacent one of said openings of said receiver in a first configuration corresponding to a first configuration of said gun, and when said receiver has been inverted, mountable in a second configuration corresponding to a second configuration of said gun adjacent said other opening, said trigger group and said receiver having co-operative fastener means thereupon demountably securing said trigger group adjacent either of said openings.

11. In a convertible gun, the combination of: a receiver

er having oppositely disposed openings therein and adapted to receive ammunition through one of said openings; and a bolt carrier group including a bolt carrier movable within said receiver for chambering, firing and ejecting rounds of ammunition, said bolt carrier group including a firing pin which is freely movable in said bolt carrier when said gun is operated in the closed battery condition and which is held against free relative movement when said gun is operated in open battery condition, said bolt carrier incorporating a detent for holding said pin against free relative movement and shock absorbing means interposed between said bolt carrier and said firing pin for shock absorbing movement of said firing pin when said firing pin is held against free relative movement in said bolt carrier by said detent.

12. In a bolt carrier group, the combination of: a bolt carrier having a bore therein; a firing pin mounted in said bore; detent means in said bolt carrier engageable with said firing pin for preventing free relative movement between said bolt carrier and said firing pin; and shock absorbing means operatively connected with said firing pin for restricted shock absorbing movement of said firing pin when said firing pin is held by said detent means against free relative movement in said bolt carrier.

13. In a convertible gun, the combination of: a bolt carrier; a firing pin mounted in said bolt carrier for free relative longitudinal movement in said bolt carrier when said bolt carrier is operated in a closed battery condition; detent means in said bolt carrier engageable with said firing pin for preventing said free relative movement between said bolt carrier and said firing pin; and shock absorbing means interposed between said firing pin and said bolt carrier for limited shock absorbing movement of said firing pin when said firing pin is held by said detent means against free relative movement in said bolt carrier and said bolt carrier is operated from an open battery position.

14. In a convertible gun, the combination of: a receiver having openings in opposite portions thereof, one of said openings serving as a bottom ammunition feed in a first, rifle configuration of said gun and as a top ammunition

feed in a second, machine gun configuration of said gun; a bolt carrier group mounted for longitudinal movement in said receiver and adapted to chamber, fire and eject rounds of ammunition; a trigger group operatively mounted adjacent said one opening in a first configuration when said gun is disposed in its first configuration and adjacent said other opening in a second configuration when said gun is disposed in its second configuration; and a demountable automatic belt feed mechanism securable in operative relationship with said one opening when said gun and said trigger group are disposed in said second configurations by the inversion of said receiver.

15. In a convertible gun, the combination of: a receiver having oppositely disposed openings therein and adapted to receive ammunition through one of said openings; a bolt carrier group mounted in said receiver for movement therein to chamber, fire and eject rounds of ammunition, said bolt carrier group including a bolt carrier and a firing pin which is mounted for free longitudinal movement in said bolt carrier when said bolt carrier is operated in a closed condition and detent means in said bolt carrier group engageable with said firing pin for preventing said free relative longitudinal movement in said bolt carrier and shock absorbing means interposed between said firing pin and said bolt carrier for permitting limited shock absorbing movement of said firing pin when said firing pin is held by said detent means against said free relative movement in said bolt carrier and said bolt carrier is operated from an open battery position.

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