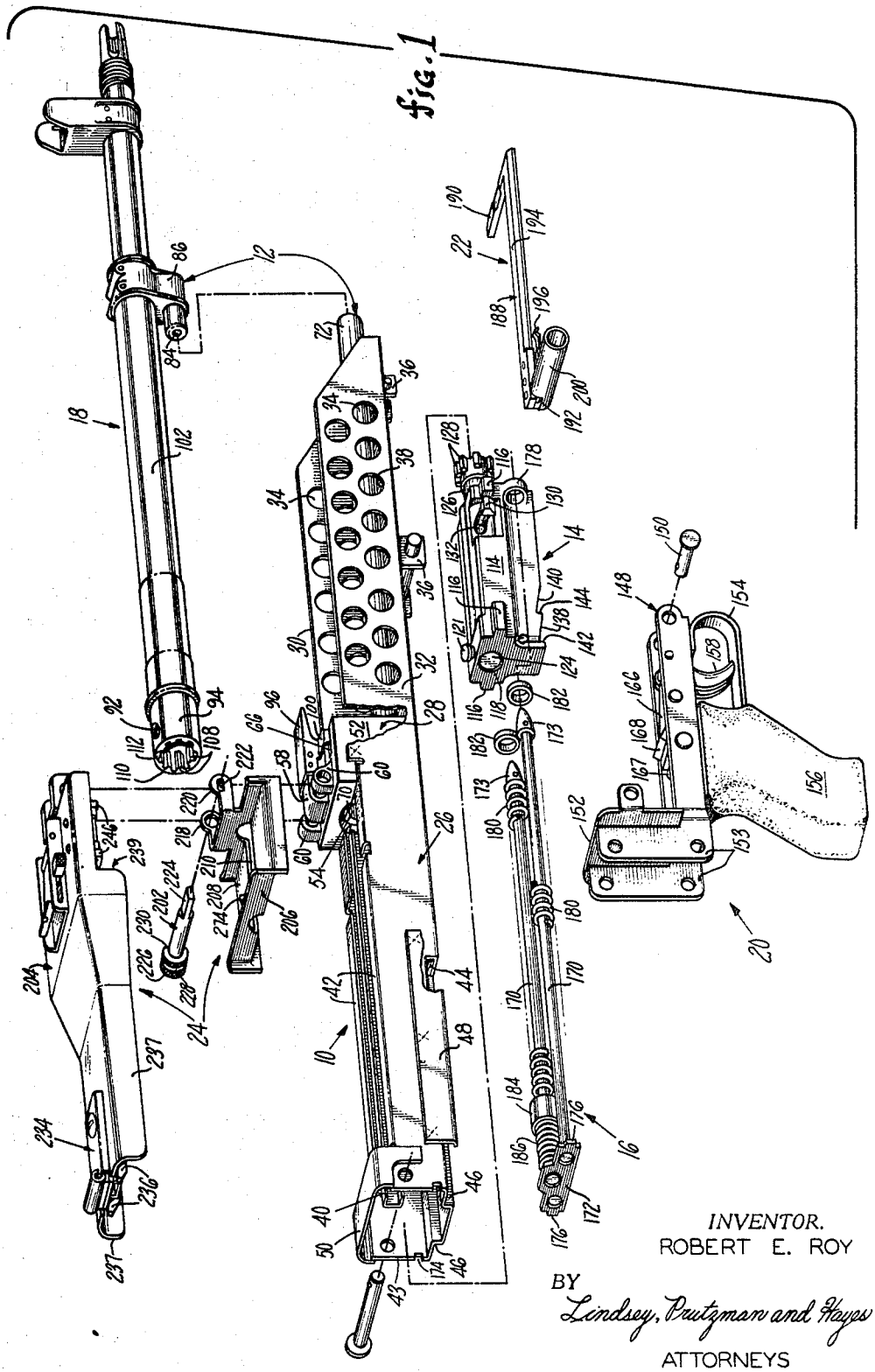
June 4, 1968 R. E. ROY 3,386,336

CONVERTIBLE MACHINE GUN FOR RIGHT-AND LEFT-HAND CARTRIDGE FEED AND OPERATION

Filed March 30, 1966 3 Sheets-Sheet 1

Fig. 1



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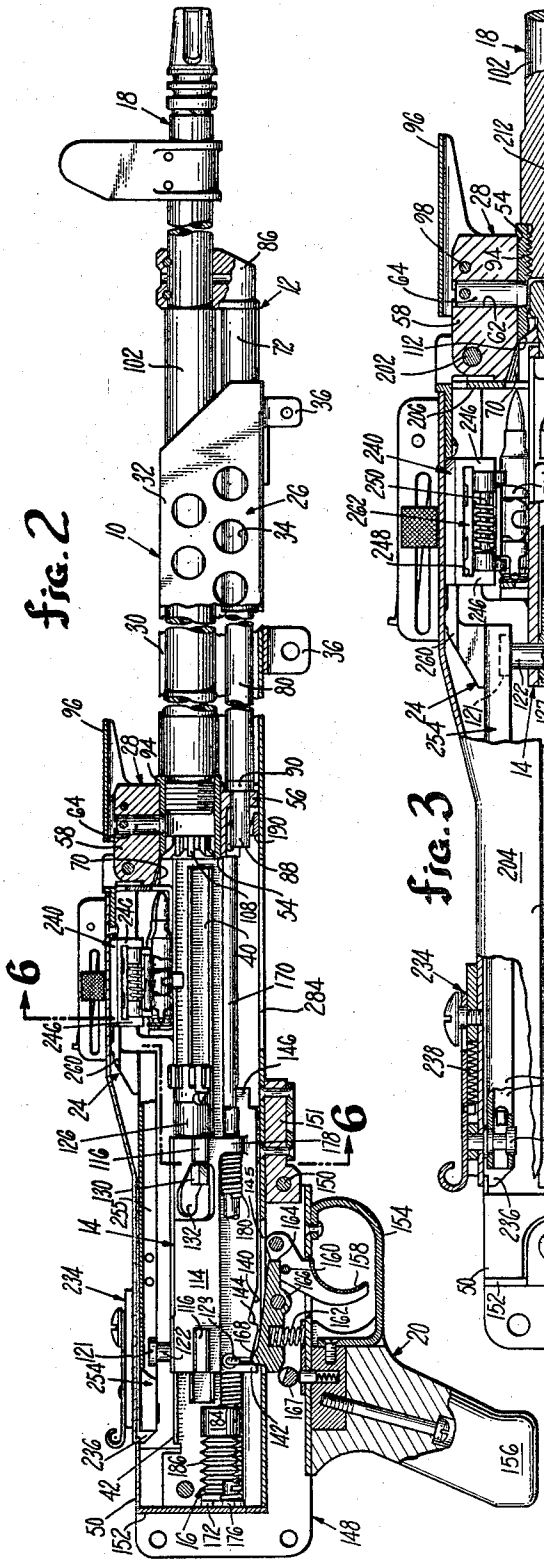

Fig. 2

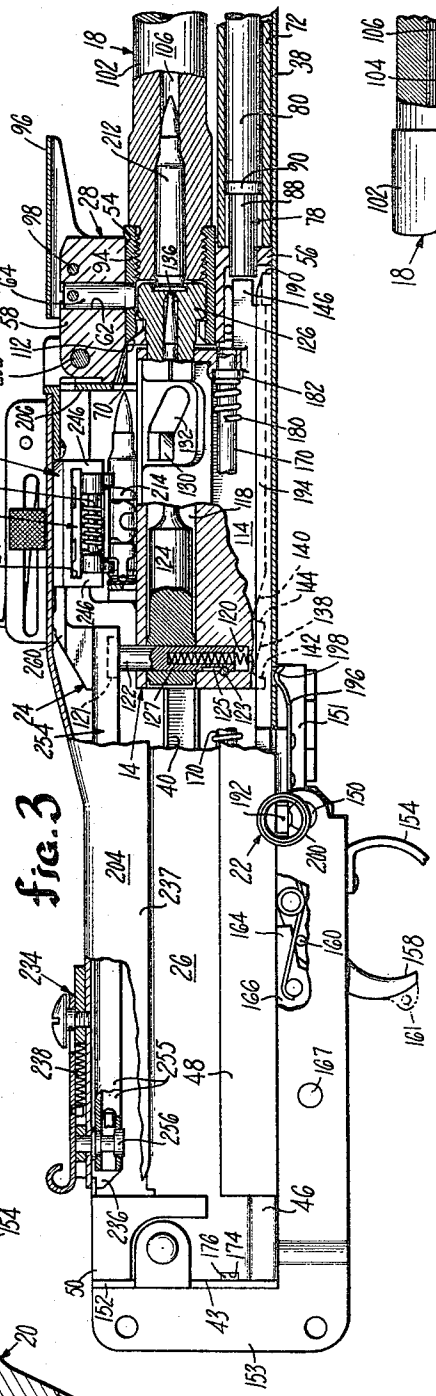

Fig. 3

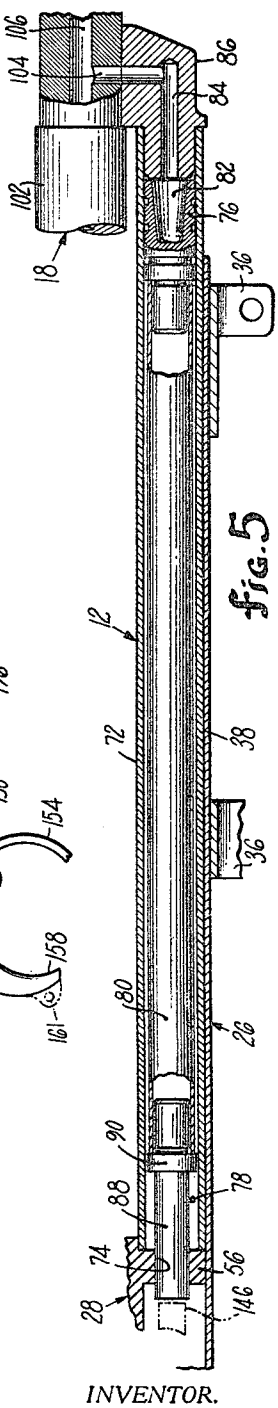

Fig. 5

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CONVERTIBLE MACHINE GUN FOR RIGHT-AND LEFT-HAND CARTRIDGE FEED AND OPERATION

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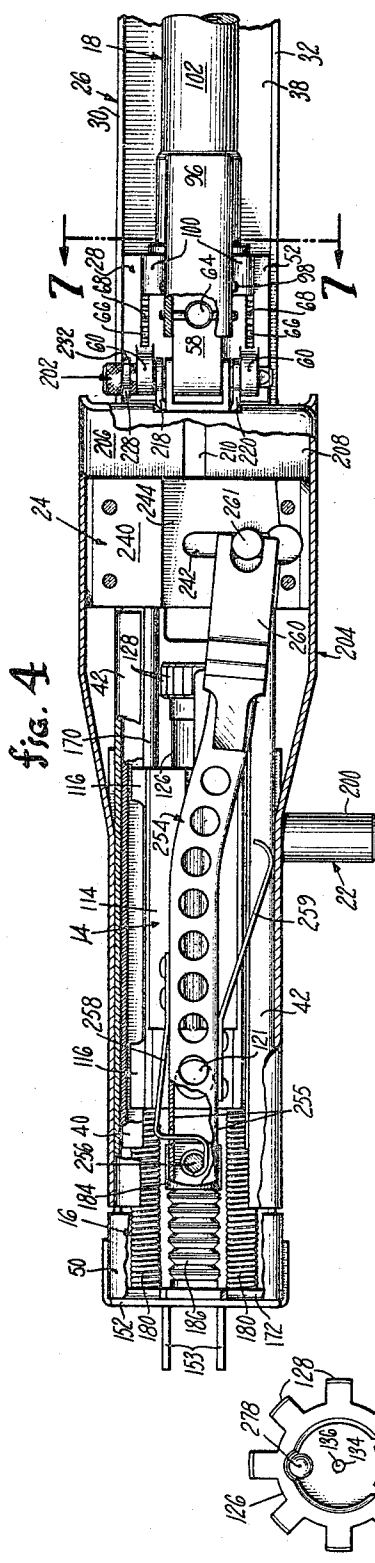

Fig. 4

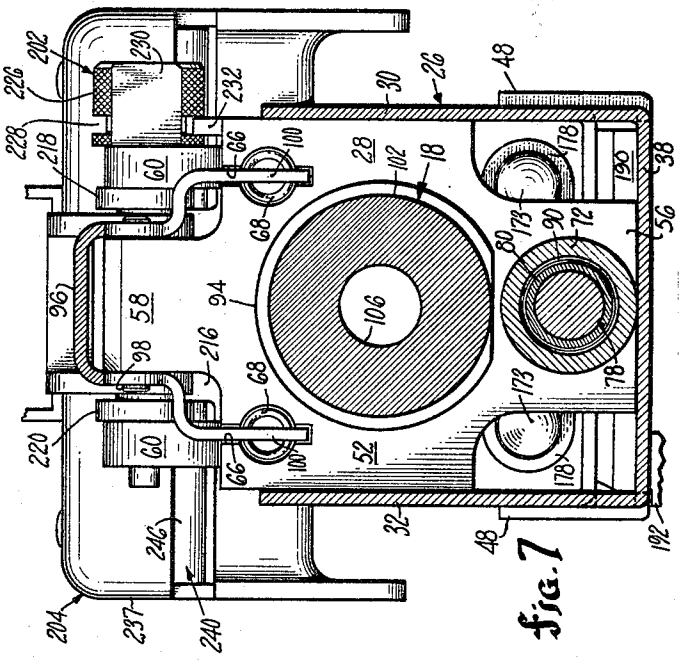

Fig. 7

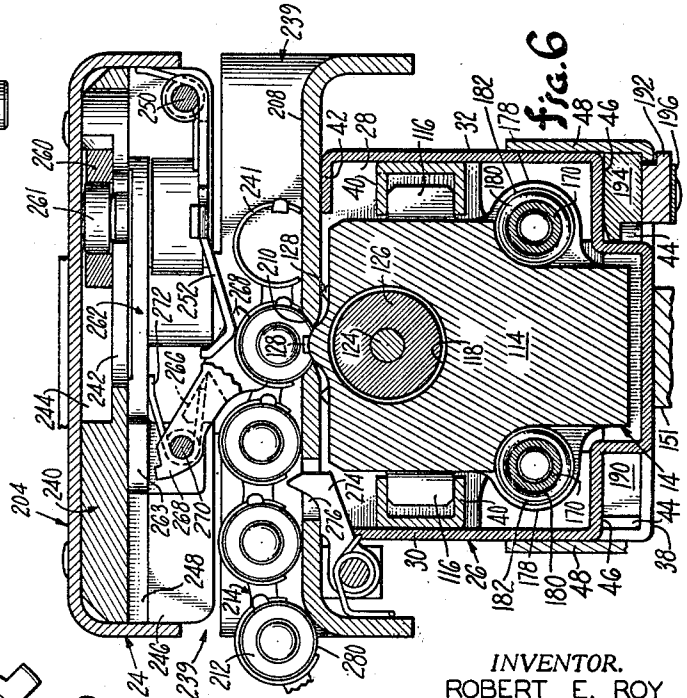

Fig. 6

Fig. 8

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CONVERTIBLE MACHINE GUN FOR RIGHT- AND LEFT-HAND CARTRIDGE FEED AND OPERATION

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Filed Mar. 30, 1966, Ser. No. 538,701
12 Claims. (Cl. 89—191)

ABSTRACT OF THE DISCLOSURE

A lightweight gas operated machine gun readily convertible under field conditions for different applications and installations includes a basic modular unit comprising a U-shaped sheet metal receiver and a solid receiver block fixedly positioned between the sides of the receiver about midway along its length for aligning and receiving replaceable auxiliary components including different size barrels, manual and remote fire control systems, and right- and left-hand cartridge belt feed mechanisms and right- and left-hand manual charging members. The gun employs a reciprocating bolt carrier assembly slidable within the receiver rearwardly of the block and a gas piston operable almost entirely forwardly of the block.

The present invention relates to guns adapted for rapid continuous firing and is more particularly concerned with a new and improved lightweight machine gun or the like.

An object of the present invention is to provide a new and improved machine gun which is readily field convertible for different applications and installations. Included in this object is the provision of a machine gun of the type described having a basic modular unit which provides for quick and facile modification of the gun by addition or substraction of associated components which may be assembled in varying arrangements required for different and varied end uses.

Another object of the present invention is to provide a new and improved gas operated machine gun of lightweight and simple, yet sturdy and durable construction which is adaptable to manual or remote operation and is suitable for rapid assembly and disassembly thereby rendering it easily serviceable and highly mobile.

Still another object of the present invention is to provide a new and improved gas operated machine gun of lightweight construction having a basic modular unit wherein the bolt assembly is not part of the gas system and the firing or charging mechanism does not extend into the buttstock area of the gun, the modular unit being adaptable to either right or left hand operation.

An additional object of the present invention is to provide a feed system actuator which permits latching of the feed cover irrespective of the bolt position while at the same time assuring proper firing pin protrusion and facilitating quick disassembly and assembly of the bolt group under field conditions.

A further object of the present invention is to provide a new and improved machine gun suitable for use with barrels of different size as well as different types of fire control systems, which gun permits rapid and complete loading irrespective of the bolt position, is easily transported and assembled, and is lightweight yet capable of absorbing the shock loads associated with rapid, continuous firing.

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

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction

hereafter set forth and the scope of the application which will be indicated in the appended claims.

In the drawings:

FIG. 1 is an exploded isometric view, partially broken away, of a machine gun embodying the present invention;

FIG. 2 is an elevational view of the gun of FIG. 1, partially broken away and partially in section, showing the gun in a cocked position;

FIG. 3 is an enlarged fragmentary elevational view, partially broken away and partially in section, showing the gun in a battery or firing position;

FIG. 4 is an enlarged fragmentary top view, partially broken away and partially in section, of the gun as illustrated in FIG. 2;

FIG. 5 is an enlarged fragmentary elevational view, partially broken away and partially in section illustrating the gas system of the machine gun of FIG. 3;

FIG. 6 is an enlarged sectional view taken along the line 6—6 of FIG. 2;

FIG. 7 is an enlarged sectional view taken along the line 7—7 of FIG. 4; and

FIG. 8 is a front elevational view of the bolt and firing pin used in the gun of the present invention.

Referring now to the drawings in greater detail, wherein like referenced characters indicate like parts throughout the several figures, there is shown a machine gun comprising a basic modular unit to which is affixed substitutable members such as different size barrels, right or left-hand cartridge feed and charging mechanisms and manual or remote fire control systems. The gun is adapted to mount a buttstock and various support installations such as tripods, pintles, aircraft and pod mounts. In accordance with the present invention the basic modular unit includes an elongated receiver assembly **10** fixedly supporting a gas system **12** on the forward end thereof, a recoil buffer and bolt drive assembly **16** adjacent the rearward end, and a slidable bolt carrier assembly **14** intermediate the gas system and the buffer. For purposes of illustration and so that the invention may be more readily understood, the machine gun will be described as employing barrel assembly **18**, a manual fire control assembly **20**, a right-hand charging handle **22** and a left-hand cartridge feed system **24**. However, as mentioned hereinbefore, these substitutable members may be replaced to adapt the gun to a specific purpose, e.g., a right-hand cartridge feed mechanism and/or left-hand charging handle may be used or the gun may be provided with a solenoid actuated fire control system permitting remote operation thereof.

As shown in FIG. 1, the receiver assembly **10** of the basic modular unit comprises an elongated upwardly directed U-shaped, sheet metal receiver **26** and a sturdy, generally rectangular receiver block **28** fixedly secured to the receiver. The block is positioned between the longitudinally extending side walls **30**, **32** of the receiver at a point approximately midway along its length. The side walls, which contain a plurality of venting or cooling apertures **34** forwardly of the block **28**, are integrally connected by a flat, generally rectangular base **38** supporting a pair of mounting connections **36** for mounting the gun on various support installations such as tripods or aircraft mounts. Those portions of the side walls which extend rearwardly of the block **28** each carry an affixed, inwardly facing, U-shaped channel member **40** adapted to slidably receive the bolt carrier assembly **14**. Additionally, integral flanges **42** extend inwardly from the top edges of each side for supporting the cartridge feed system **24**. At approximately the midpoint between the block and the rearward edge **43** of the receiver there is provided side apertures **44** communicating with the interior of the receiver and adapted to accommodate the

charging handle 22. Extending rearwardly from the apertures 44 so as to permit complete and uninterrupted rearward movement of the charging handle are the longitudinal depressions 46 of generally rectangular cross section. Guide panels 48 affixed to the side walls adjacent the depressions assist in the smooth travel of the charging handle while a canopy strip 50 joining the rear side walls of the receiver is provided to cooperate with the cartridge feed system for locking the system onto the receiver.

The receiver block 28 comprises a generally rectangular, solid body portion 52 secured to the side walls of the receiver and having a central bore 54 extending therethrough for receiving a portion of the barrel assembly 18. An integral support plate 56 which acts as a stop for a portion of the gas system 12 extends downwardly from the front of the body portion and rests against the base 38 of the receiver. Upstanding from the body is a central lug 58 extending along the length of the block above the bore 54. The lug is bordered adjacent its rearward end by a pair of apertured hinge lugs 60 which facilitate the pivotal connection of the feed system 24 to the receiver assembly. Passing through the central lug 58 and communicating with the bore 54 is a passage 62 adapted to receive the barrel lock pin 64 for holding the demountable barrel assembly 18 in alignment within the bore. Extending downwardly into the block body on each side of the central lug forwardly of the hinge lugs 60 are a pair of thin front slots 66, best shown in FIG. 7, whose sides are bored to enclosably receive the horizontally disposed compression springs 68. Adjacent the rearward exit of the central 54 of the block there is provided an outwardly and upwardly tapered cam surface 70 for assisting the travel of a cartridge from the feed system 24 into the barrel assembly mounted within the bore.

As mentioned hereinbefore, the gas system 12 of the gun is supported by the forward portion of the receiver and, as shown, rests on the flat base 38 thereof. The system 12 includes, as best seen in FIG. 5, an elongated tubular gas cylinder 72 which extends forwardly from the support plate 56 to a point beyond the front end of the receiver. Reciprocally slidable within the cylinder is a gas piston assembly comprising a piston head 76 to which is connected a drive stem 78 through the elongated gas piston tube 80 extending therebetween. The piston head 76 is provided with a forwardly facing cavity 82 communicating with the gas conduit 84 within a gas inlet block 86 affixed to the forward end of the cylinder 72, the cavity and conduit being adapted for receiving the compressed gases developed upon firing the gun. The drive stem 78 includes a cylindrical drive ram 88 which extends through the aperture 74 in the support plate and an annular stop ring 90 integral with the ram at the forward end thereof whereby upon rearward movement of the piston assembly, the drive ram contacts the bolt carrier assembly 14 driving it rearwardly against the bias of the bolt drive assembly 16, the rearward stroke of the gas piston being limited by contact between the ring 90 and the plate 56.

The barrel assembly 18 is removably secured within the central bore 54 of the receiver block by the cooperative engagement between the lock pin 64 and a pin receiving aperture 92 with the top of the barrel extension 94. The pin 64 is mounted for reciprocal movement within the passage 62 of the block and is pivotally connected to the barrel latch 96 adjacent the rearward end thereof. The latch, in turn, is pivotally mounted on the lug 58 by the pivot pin 98 and is provided with a pair of bowed side legs 100 which extend into the narrow slots 66 of the receiver block and compressively engage the springs 68. Accordingly, the action of the springs against the legs tends to depress the barrel retaining pin 64 and maintain it in a locked position within the aperture 92 of the barrel extension.

In accordance with the preferred embodiment, the barrel extension 94 is of sufficient length to slidably fit into and extend through the entire length of central bore 54 of block 28 so as to protrude rearwardly therefrom for contacting the bolt carrier assembly as it moves forward under the bias of the buffer and drive assembly 16. Additionally, the barrel extension 94 is provided with a plurality of inwardly extending locking lugs 108 adjacent its rearward edge 110 and a tapered cam surface 112 adjacent the surface 70 of the block for insuring positive feed of the cartridges with minimum deformation of the ammunition. The barrel 102 of the barrel assembly 18 is threadably received within the extension 94 and projects forwardly therefrom above the gas cylinder 72 so that its bore 106 is in coaxial alignment with the bore 54 of the block. The barrel 102 is provided about midway along its length with a gas outlet port 104 communicating with the longitudinal bore 106 of the barrel and the conduit 84 of the L-shaped gas block 86.

The bolt carrier assembly, generally designated 14, comprises a slidable bolt carrier 114 provided with aligned front and rear lugs 116 projecting from both sides of the carrier. The lugs 116 are slidably received within the channels 40 of the receiver and maintain the longitudinally extending central bore 118 of the carrier in axial alignment with the bore 54 of the receiver block. Intersecting the bore 118 near the rear of the carrier is a vertical aperture 120 for receiving the rod 122 which fixedly positions the firing pin 124 within the bore of the carrier. The rod 122, provided with the annular top crown 121 for driving the feed mechanisms, is reciprocally retained within the aperture 120 through the cooperative engagement of the retaining pin 123 and the sides of the rod notch 125, a spring 127 urging the rod upwardly out of the aperture 120. Slidably positioned within the forward extremity of the bore 118 is the bolt 126 having on the front thereof a plurality of radially extending lugs 128, best shown in FIG. 8. The bolt lugs 128 are complementary to the lugs 108 of the barrel extension and adapted to cooperate therewith for locking the bolt within the barrel extension when the bolt carrier assembly is in a battery position. A cam pin 130 secured to the bolt etxends outwardly through the tapered side slot 132 of the bolt carrier and cooperates with the sides of the slot to drive the bolt longitudinally and rotationally relative to the bolt carrier during the reciprocal longitudinal movement of the carrier. The firing pin 124, being fixedly positioned within the carrier by the rod 122, extends forwardly through a central aperture 134 within the bolt 126 whereby the tip 136 of the firing pin protrudes from the forward end of the bolt when the bolt assembly is locked in the battery position. The bottom of the bolt carrier is preferably provided with a pair of longitudinally displaced notches 138, 140, defining shoulders 142, 144 which are adapted to cooperate with the fire control assembly 20 protruding through the bottom aperture 145 in the base 38 of the receiver for holding the bolt carrier assembly in a cocked position, the forwardmost shoulder 144 being normally used while the second shoulder 142 serves as a safety feature which will avoid inadvertent firing from a short recoil. As best shown in FIGS. 2 and 3, the carrier is further provided with a forwardly extending lug 146 which is integral with and protrudes forwardly from the body of the bolt carrier below the central bore 118. The lug 146 facilitates operative contact with the drive ram 88 of the gas system whereby the recoil driving force of the ram is transferred to the bolt carrier assembly causing it to recoil or move rearwardly against the bias of the recoil buffer and bolt drive assembly 16.

As mentioned hereinbefore the fire control assembly suitable for use with the basic modular unit of the present invention may be of the manual or remote operation type thereby facilitating the utilization of the gun not only by an individual operator in the field but also

mounted on movable units including aircraft. The fire control assembly illustrated is of the manual type and comprises a generally L-shaped fire control housing 148 adapted to be pivotally mounted by the pivot pin 150 on the lug 151 affixed below the receiver 26. During assembly the housing will swing upwardly whereby the flat rear plate 152 supported by the upstanding legs 153 of the housing abuts the end of the receiver and forms a closure therefor. The legs 153 protruding rearwardly from the plate 152 also advantageously facilitate the attachment of a buttstock to the gun, if desired. In addition to the trigger guard 154 and pistol grip 156 depending from the housing, the fire control assembly 20 includes a pivotally mounted trigger 158 biased counterclockwise into a forward rest position and having a sear operating cross pin 160 extending therethrough. As indicated by the phantom line portion of FIG. 3, the trigger of a remote operating assembly may be provided with an apertured free end 161 to facilitate linkage with an actuator, such as a solenoid, Biased against the cross pin by the spring 162 is a front shoulder 164 of the pivotally mounted sear 166. As illustrated in FIG. 2, the sear is adapted to rotate clockwise to a rest position whereby the protruding sear tip 168 can cooperatively engage the shoulders 142 or 144 located on the bottom of the bolt carrier thus holding the carrier assembly in a cocked position. The safety 167 is, of course, operative to secure or permit release of this cooperative interengagement. As the trigger is moved rearwardly out of its rest position the sear is actuated by the cooperative engagement of its forward shoulder 164 with the trigger cross pin 160, causing the sear to rotate against the bias of the compression spring 162 out of contact with the shoulder on the carrier, thereby releasing the bolt carrier assembly from its cocked position.

The release of the bolt carrier permits the forward movement of the bolt assembly under the driving force of the buffer and drive assembly 16. The assembly 16 comprises a pair of guide rods 170 supported by and extending forwardly from a flat retaining plate 172, the free ends of the rods terminating in the tapered rod tips 173. A pair of notches 174 within the rear edge 43 of the receiver 26 mount the side extensions 176 of the retaining plate, the cooperative engagement therebetween being maintained by back plate 152 of the fire control housing. The rods 170 extend forwardly through the guide rings 178 on the bolt carrier, terminating adjacent the receiver block 28. Carried by each rod is a drive spring 180 and retaining washer 182, the washers abutting the guide rings 178 and the springs 180 to thereby facilitate the compressive loading of the springs during the recoil of the carrier assembly. Located between the rods 170 and also carried by the plate 172 is the buffer of assembly 16 including a buffer head 184 and Belleville washers 186 against which the bolt carrier 114 acts during its rearward recoil movement.

In order to initially move the bolt carrier assembly 14 to a cocked position the operator may draw the manual charging handle 22 rearwardly along the depression 46 in the receiver until the sear tip 168 snaps into the notch 138 or 140. The charging handle 22 comprises a thin elongated Z-shaped member 188 having an integral front leg 190 positioned adjacent the forward end of the bolt carrier below a portion of the lug 146 and a second rear leg 192 extending outwardly from the side of the gun. The legs 190, 192 are interconnected by a substantially straight elongated intermediate portion 194 which is positioned adjacent the side of the receiver and extends through the side aperture 44 so as to permit reciprocal longitudinal movement along the enclosed depression 46. The handle 22 is further provided with a leaf spring retainer 196 which cooperates with the aperture 198 in the bottom of the receiver for holding the charging handle forwardly during automatic operation of the gun. Where desired a cylindrical hand grip 200 may be affixed to the outward projecting leg 192 to facilitate the manual charging operation.

As mentioned hereinbefore the top of receiver block 28 is provided with the integral, apertured lugs 58, 60 to which is connected the cartridge feed system 24 by means of the feed hinge pin 202. The feed system is adapted to successively advance cartridges to a stripping station for subsequent chambering and firing and includes the top cover 204 which carries the cartridge feed mechanism and the cartridge feed tray 206 associated therewith. As best shown in FIGS. 1 and 6, the feed tray 206 includes a thin flat body portion 208 of generally rectangular configuration and somewhat greater width than the width of the receiver 26 whereby the tray rests on the top side flanges 42 of the receiver. The body portion 208 is provided with a substantially straight central aperture or slot 210 along its longitudinal center line, which slot is narrower than a cartridge yet wide enough to permit passage therethrough of a radial locking lug 128 on the front of the bolt. Thus the feed tray provides a cartridge stripping station at the slot 210 adapted to receive and position a cartridge 212 within the linked cartridge belt, generally designated 214. Upstanding from the front edge of the tray body 208 is a flange 216 provided with a pair of forwardly extending arms 218, 220 which interfit between the central lug 58 and the bordering lugs 60. The arms are each provided with apertures alinged with the apertures of the lugs; however, the aperture 222 within the arm 220 is, unlike the other apertures, of rectangular cross section. As best shown in FIG. 1 the feed hinge pin 202 is provided on one end with a generally rectangular extension 224 adapted to pass through the apertures in the feed cover and feed tray as well as those in the upstanding lugs affixed to the receiver block, and into the rectangular aperture 222 in the arm 220 of the tray. The opposite end of the pin 202 is provided with a knurled handle 226 having a peripheral slot 228 and a flattened side portion 230 which permits insertion of the pin into the apertures despite the presence of the upstanding pin locking lug 232. Accordingly, the feed hinge pin is oriented during assembly so that the flattened side portion 230 faces the locking lug 232 and the feed tray is oriented so that the rectangular aperture 222 registers with the extension 224 of the pin. Rotational movement of the pin and tray will bring the tray to rest on the sides of the receiver while the lug 232 passes into the peripheral aperture 228 of the knurled handle thus locking the feed assembly on the receiver block.

The cover 204 of the cartridge feed system 24, pivotally mounted by the hinge pin 202, is of substantially the same width as the feed tray 206 at the cartridge feed station and extends rearwardly therefrom in a tapering mannr so that its rearward end has narrowed to approximately the width of the receiver. Mounted on the cover 204 at its rearward extremity is a clasp or latch 234 including a pair of retaining bars 236 biased by the spring 238 into cooperative engagement with the canopy strip 50 of the receiver. The sides 237 of the cover 204 are cut away above the feed tray to provide a generally rectangular aperture or feed way designated 239 for feeding the cartridge belt 214 toward the stripping station and permitting ejection of the empty push-through links 241 of the belt. Secured to the underside of the cover and adapted for positioning above the feed tray is, as seen in FIG. 4, a generally rectangular feed housing 240 having a transverse aperture 242 within the recess 244 which covers approximately one half of the housing and is offset from the center thereof. Depending from the front and back edges of the housing are side portions 246 having slide tracks 248 therein. A retaining pin 250 extends between the side portions and has wound thereon the leaf spring cartridge guide 252 which acts against a cartridge 212 to maintain it in position within the stripping station.

A generally U-shaped feed arm or track 254 is pivotally

connected to the cover adjacent its rearward extremity by the pin **256**, the U-shaped track facing downwardly from the cover whereby the opening defined by the sides **255** of the track communicates with the interior of the receiver and receives the crown **121** of the feed drive rod **122** located on the bolt carrier. The interconnection between the track and pivot pin **256** is preferably enhanced by a retaining spring **258** secured to the side of the track and connected to the pin **256**. The spring **258** also assists the pivotal movement of the track toward the right as viewed in FIG. 4 while leaf spring **259** urges the return movement of the track. As best seen in FIG. 4, the track **254** is a thin elongated member which extends forwardly from the pivot pin in a substantially straight line and then is provided with a lateral bend at about its longitudinal midpoint.

The forward end of the feed arm is provided with an elevated hand portion **260** which extends into the recess **244** of the feed housing and terminates in a bifurcation adapted for operative interengagement with the connecting pin **261** of the pawl carrier **262**. Accordingly, pivotal movement of the track causes the pin **261** to travel along the transverse slot **242** in the housing causing the side supports **263** of the pawl carrier **262** to slide within the side tracks **248** of the feed housing. Projecting below the pawl carrier is an integral lug **266** for supporting through the pivot pin **270** a pair of feed pawls **268** which are biased downwardly into contact with a cartridge **212** by the spring **272**. Additionally a holding pawl **274** supported by the feed tray **206** is biased upwardly through the aperture **276** within the feed tray for preventing reverse movement of the cartridge belt **214** when the feed pawls **268** are moved to pick up the next succeeding cartridge in the belt for advancement to the stripping station.

As will be appreciated the feed cover **204** and its associated feed mechanism may be opened for inspection, loading or servicing. During the loading operation the cartridge belt **214** is merely placed on the feed tray with one cartridge resting in the stripping station or slot **210** so that upon closing and latching the cover **204** a cartridge is ready for firing regardless of the position of the bolt assembly during loading. Initial cocking of the gun is effectuated, as mentioned hereinbefore, by pulling the manual charging handle **22** rearwardly, causing the rearward movement of the bolt carrier against a bias of the bolt drive springs **180** until the sear tip **168** moves into the notch **138** or **140** and cooperates with the coorresponding shoulder **142** or **144** to hold the bolt carrier assembly in a cocked position. If the feed track is positioned so that it does not receive the crown **121** of the rod **122** when the cover is closed, the track will push the rod downwardly into the carrier against the bias of its spring **127**. Then, as the bolt assembly moves rearwardly, the crown will eventually register with the opening defined by the sides **255** of the track thus permitting the rod to move upwardly and remain within the track for driving it during the reciprocal movement of the carrier.

As the trigger is pulled, the sear is moved out of contact with the bolt carrier thus permitting the carrier to move forwardly under the driving force of the springs **180**. As the bolt reaches the cartridge stripping station, the uppermost front lug **128** of the bolt passes into the longitudinal aperture **210** in the feed tray, contacting the cartridge **212** and pushing it forwardly out of the cartridge belt **214** against camming surface **70** of the receiver block and into the firing chamber of the barrel. As soon as the bolt has stripped a cartridge from the cartridge belt during its forward movement, the crown **121** traveling within the feed track, reaches the bend or elbow of the feed arm and drives the feed arm in a counterclockwise direction as viewed in FIG. 4, imparting transverse movement to the feed pawl carrier. As the pawl carrier moves to the left the feed pawls pass over the next succeeding cartridge in the belt **214** which are held against rearward movement by the holding pawl **274**. Thus, as the bolt carrier approaches its forward battery position, the jaws of the feed pawls are positioned on the succeeding cartridge and are ready to advance it to the stripping station.

During the forward movement of the bolt carrier assembly the cam pin **130** is held within the U-shaped side channels **40** of the receiver whereby the bolt **126** is prevented from rotating as it forces the cartridge from the belt. However, as the bolt reaches the forward battery position the cam pin passes out of the U-shaped side channel and the lugs **128** on the bolt mesh with the inwardly projecting lugs **108** on the barrel extension. Due to the continued forward motion of the bolt carrier, the cam pin is driven along the tapered side aperture **132** of the carrier causing the bolt to rotate thereby locking the bolt within the barrel extension. During this cartridge chambering operation the rear of the cartridge **212** pushes the forwardly biased ejector button **278** into the bolt while the peripheral ridge **280** on the rear of the cartridge snaps it onto the extractor **276**, the downwardly pivotable trapdoorlike extractor **276** being constantly urged into the cartridge holding position shown in FIG. 8. While the bolt is being rotatably locked the firing pin **124** slides forwardly through the central aperture of the bolt so that when the bolt and carrier reach full battery position the tip **136** of the pin will contact and fire the cartridge.

Upon firing, the projectile or bullet passes outwardly through the barrel followed by the exhaust gases developed at firing. These compressed trailing gases partially exit through the gas port **104** and proceed through the conduit **84** into the cavity **82** of the gas piston. The force of the gas is transmitted to the piston causing it to move rearwardly within the gas cylinder, resulting in a driving contact between the ram **88** of the piston and the forwardly projecting lug **145** of the bolt carrier. It will be appreciated that as the bolt assembly moves rearwardly under the force imparted to it by the gas piston the bolt is initially rotated and then moved rearwardly carrying with it the empty casing of the cartridge. However, as the bolt clears the receiver block the forwardly biased ejector button **278** forces the empty casing away from the bolt causing it to press against the extractor portion of the bolt and to fall downwardly through the ejection slot **284** in the bottom of the receiver. Additionally, as the bolt carrier moves rearwardly, the crown **121** travels rearwardly within the track of the feed arm causing the feed pawl to be drawn to the right as viewed in FIG. 6 for advancing the succeeding cartridge into the longitudinal aperture or stripping station of the feed tray. The bolt carrier continues its rearward movement against the bias of the bolt drive springs **180** until it reaches and is stopped by the buffer assembly. If the trigger **158** has not been released the sear will not contact the bolt carrier and the bolt assembly will again be driven forwardly by springs **180** to repeat the operation of chambering and firing a cartridge thus effectuating a continuous burst of fire until the trigger is released.

As can be seen from the foregoing detailed description, the present invention provides a highly versatile gas operated machine gun ideally suitable for a variety of uses. It facilitates manual or remote operation, portable or fixed mounting and, when the guns are used in pairs, ammunition feed from either the right or the left side of the weapon thereby enabling identical or symmetrical cartridge feeding. As will be clear from the disclosed structure together with the description contained in the specification a left-hand charging member would be substantially identical to the right-hand charging member except that it would be located on the opposite side of the gun and in view of its position, would be a mirror image of the charging member clearly illustrated in FIG. 1. The same is true with respect to the right-hand feed system. The system shown in FIG. 6 feeds from the left

whereas a system adapted to feed from the opposite side would be symmetrical thereto, being a mirror image of the structure illustrated in FIG. 6. Additionally, the bolt assembly is not an integral part of the gas system thereby facilitating its removal from the gun for servicing with a minimum of effort and time. This also results in a bolt assembly which is compact in size, making spare bolts less susceptible to damage and more easily transported in the field. Further, all of these features are coupled with lightweight, sturdy construction and dependable operation.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above-described will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

I claim:

1. A basic modular unit for a gas piston operated machine gun suitable for mounting different size barrels, right and left-hand cartridge feed systems, manual and remote fire control systems and right and left-hand manual charging members comprising an elongated, U-shaped sheet metal receiver and a solid receiver block fixedly secured between the side walls of said receiver intermediate the ends thereof; said block having mounting means for mounting a cartridge feed mechanism, a central bore for receiving a barrel, means for locking the barrel within the bore and an apertured portion adjacent the central bore for slidably receiving and limiting rearward movement of the gas piston; said receiver providing mounting means for mounting a fire control system adjacent one end thereof and a bottom aperture juxtaposed said mounting means facilitating communication between the interior of the receiver and the fire control system; the receiver being further provided with side apertures intermediate said block and said one end and elongated channels extending from the side apertures toward said one end for slidably receiving a manual charging member.

2. The modular unit of claim 1 wherein the U-shaped receiver is provided with elongated inwardly opening tracks extending along the side walls of the receiver rearwardly of the block for slidably receiving a bolt assembly and preventing rotation thereof.

3. A gas operated machine gun readily field convertible for a wide variety of end uses comprising a receiver block for receiving a barrel, a barrel removably secured within the block and having a firing chamber at the end thereof received by the block, a fire control system including a trigger sear; a gas recoil system provided with a piston adapted for actuation upon the firing of a cartridge, said barrel being provided with a gas outlet port spaced forwardly of the receiver block and providing communication between the barrel and the gas piston; a reciprocating bolt assembly responsive to the operation of the gas piston including cartridge feed drive means and at least one shoulder adapted to cooperate with the trigger sear for maintaining the assembly in a cocked position, the bolt assembly being movable independent of the gas recoil system and disengaged therefrom throughout a substantial portion of its reciprocating motion; a recoil buffer assembly in alignment with and operative directly on the bolt assembly for driving the bolt assembly into a firing position; and a cartridge feed system including a cartridge belt stripping station adapted to cooperate with the bolt assembly for chambering a cartridge and means for advancing the belt to the station including a movable feed arm responsive to the cartridge feed drive means during the reciprocating movement of the bolt assembly.

4. The machine gun of claim 3 including a receiver assembly comprising an elongated receiver, said receiver block secured to the receiver at about midway along its length and adapted to removably receive the barrel; the gas recoil system including an elongated gas cylinder supported by the receiver with one end thereof received within the receiver block adjacent the barrel, said piston being operable within said cylinder and having a drive ram extending through a portion of the block for driving the bolt assembly against the bias of the buffer assembly, said block portion limiting rearward movement of the drive ram to prevent its extension rearwardly of the barrel receiving portion of the block, said gas outlet port connected to the gas cylinder for actuation of the piston upon firing a cartridge.

5. The machine gun of claim 3 including a receiver assembly comprising an elongated, generally U-shaped, sheet metal receiver, said receiver block secured between the side walls of said receiver intermediate the ends thereof, said block having a central bore for receiving the barrel and means for locking it within the bore, the gas system including an elongated gas cylinder supported by the receiver and extending forwardly from one end thereof received within the block, said reciprocating gas piston being operable within said cylinder for limited reciprocable movement and having a drive ram extending outwardly of the cylinder through a portion of the block for driving the bolt assembly rearwardly a greater distance than the piston against the bias of the buffer assembly, said block portion limiting the rearward movement of the ram to prevent its extension rearwardly of the central bore, the barrel being provided adjacent one end with a plurality of inwardly projecting lugs adapted to receive and lock the bolt assembly in a firing position, said gas outlet port being connected to the gas cylinder for actuation of the piston upon firing of a cartridge.

6. The machine gun of claim 3 wherein the reciprocating bolt assembly includes a bolt carrier, and the feed drive means is slidably secured to the carrier and biased outwardly therefrom for closure of the cartridge feed system irrespective of the position of the bolt carrier and cooperative driving engagement with the cartridge feed arm.

7. The machine gun of claim 3 wherein the reciprocating bolt assembly includes a bolt carrier; a bolt adapted for limited longitudinal and rotational movement relative to the carrier and a firing pin positioned in the carrier and extending through the bolt, said firing pin being fixedly positioned within the carrier by the cartridge feed drive means, said carrier having a forwardly projecting lug adapted to cooperate with the gas piston for receiving a driving force therefrom, said piston's rearward extremity being prevented by the block from extending rearwardly thereof.

8. The machine gun of claim 3 including a receiver assembly and a bolt assembly mounted thereon, said receiver assembly supporting the gas system, said receiver block having a central bore for receiving said barrel, said bolt assembly including a bolt carrier mounted for movement toward and away from the barrel, the carrier housing a firing pin extending forwardly thereof, said feed drive means limiting the forward and rearward movement of the firing pin relative to the carrier.

9. The machine gun of claim 8 including manual charging means slidable along the receiver.

10. The machine gun of claim 3 including a receiver assembly comprising an elongated sheet metal receiver for slidably receiving the bolt assembly, the cartridge feed system being supported by the receiver juxtaposed the bolt assembly, the arm of the feed assembly comprising a curved track mounted for pivotal movement coincident with the sliding reciprocation of the bolt assembly, said stripping station being adapted to receive a portion of the bolt assembly for stripping a cartridge from the belt and driving it into the firing chamber.

11. The machine gun of claim 3 wherein the reciprocating bolt assembly includes a bolt carrier with the outwardly biased feed drive means secured thereto, the feed arm comprising a pivotal track adapted for receiving and retaining the feed drive means in operative relationship whereby the reciprocable movement of the bolt assembly imparts to the feed arm pivotal motion which

actuates the means for advancing the continuous belt of spaced cartridges to the stripping station, said bolt carrier assembly including cartridge stripping means for driving a cartridge from the belt into the firing chamber of the gun.

12. The machine gun of claim 3 wherein the movable feed arm is a curved, longitudinally extending track having one end pivotally fixed for oscillatory rotational movement, the means for advancing the continuous belt of aligned spaced cartridges to the stripping station including a pawl carrier connected to the free end of the movable arm for limited transverse motion responsive to the rotational movement of the feed arm and a spring loaded feed pawl depending from the pawl carrier, said stripping station including a feed tray for supporting the cartridge belt having a central aperture provided with a forward opening of sufficient size to permit the passage of a cartridge therethrough, said aperture being adapted to receive a portion of the bolt assembly for stripping a cartridge from the belt and driving it into the firing chamber.

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