L. I. PETTYS.

RIFLE.

APPLICATION FILED JULY 11, 1917.

1,357,513.

Patented Nov. 2, 1920.

10 SHEETS—SHEET 1.

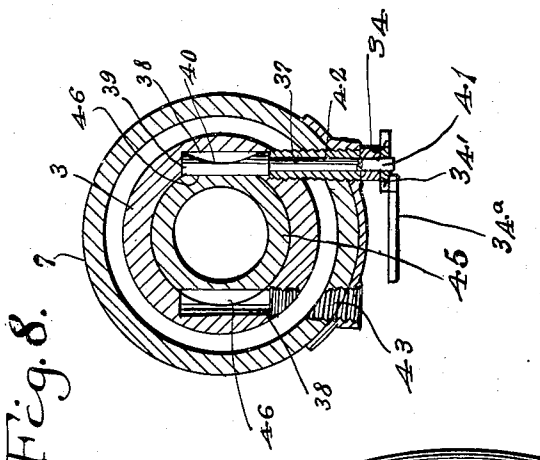


Fig. 8.

Fig. 1.

Fig. 18.

Witnesses

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10 SHEETS—SHEET 2.

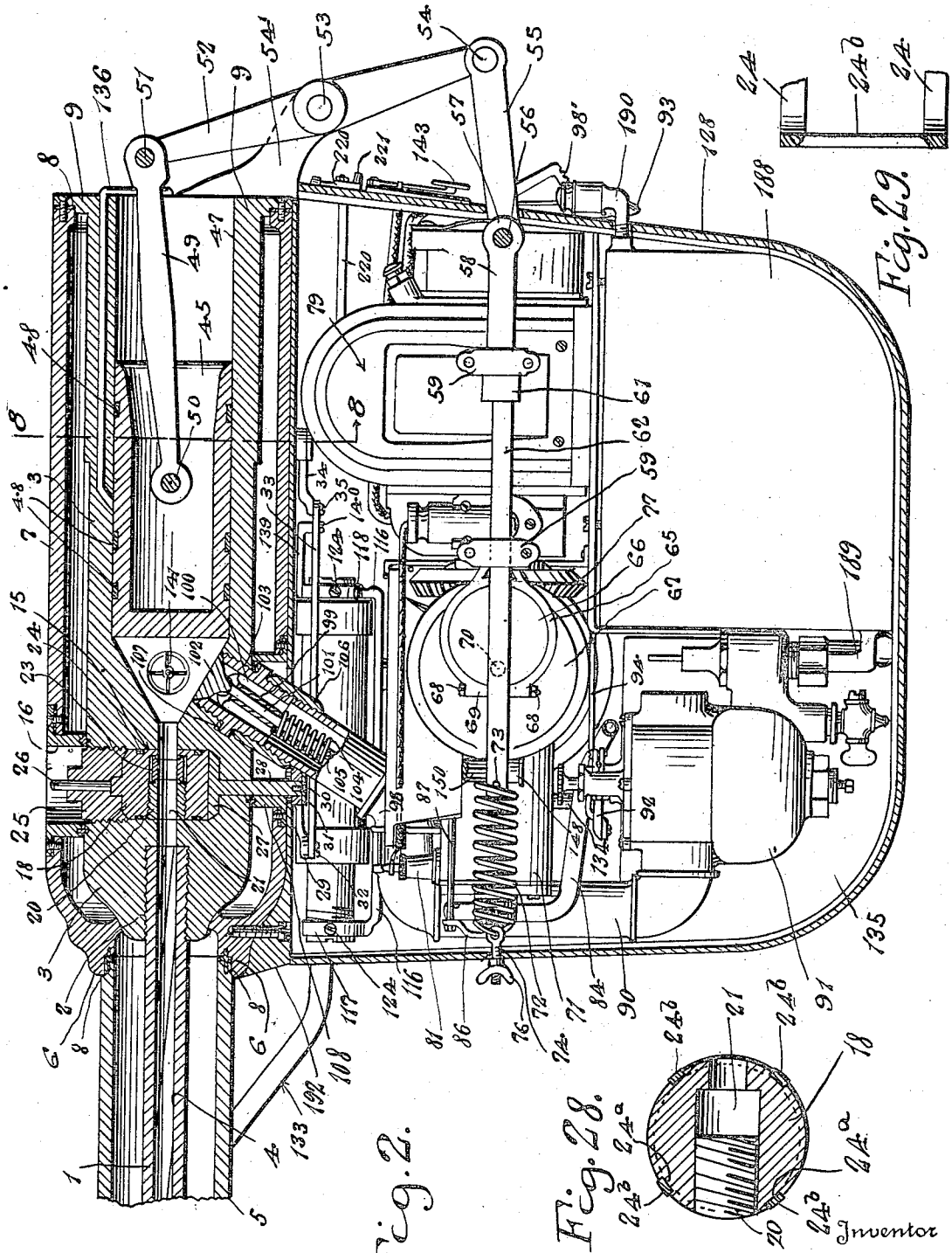


Fig. 2.

Fig. 2a.

Fig. 2b.

Witnesses

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10 SHEETS—SHEET 3.

Fig. 3.

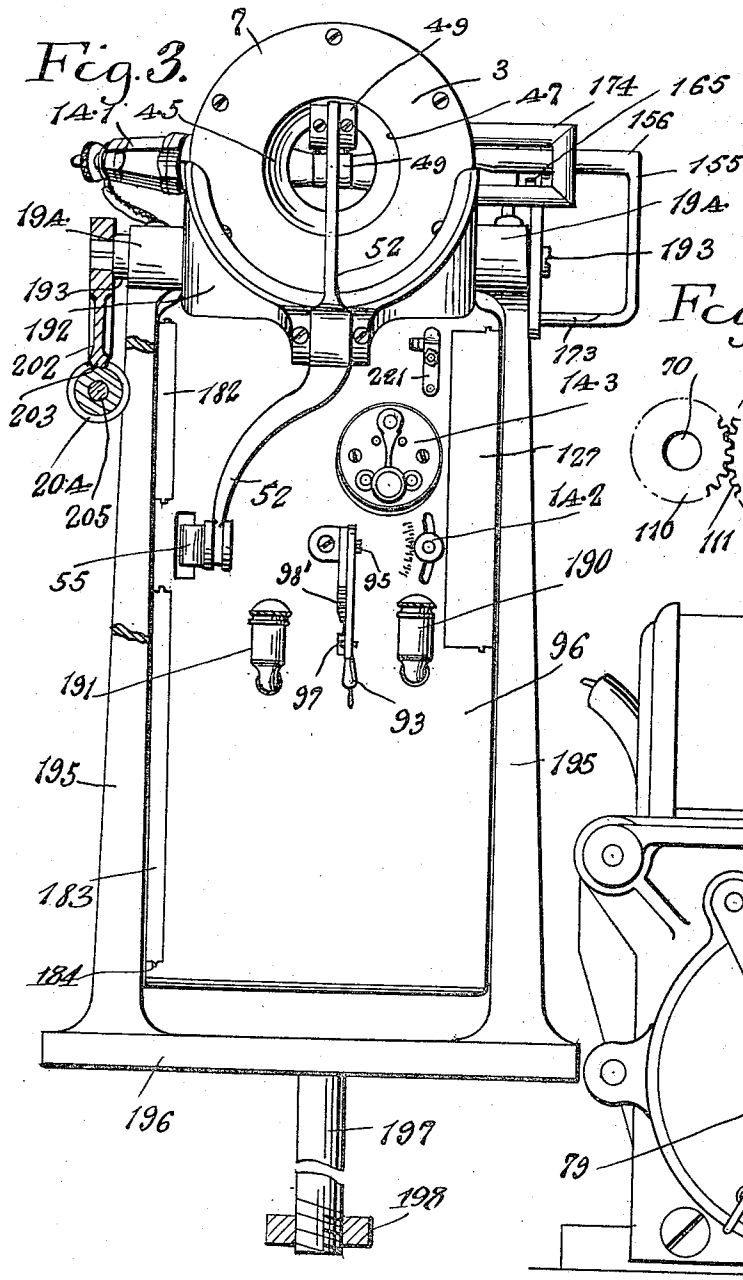


Fig. 17.



Fig. 25.A

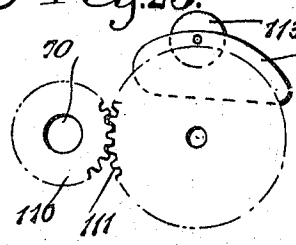
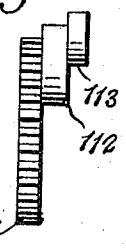


Fig. 26.A



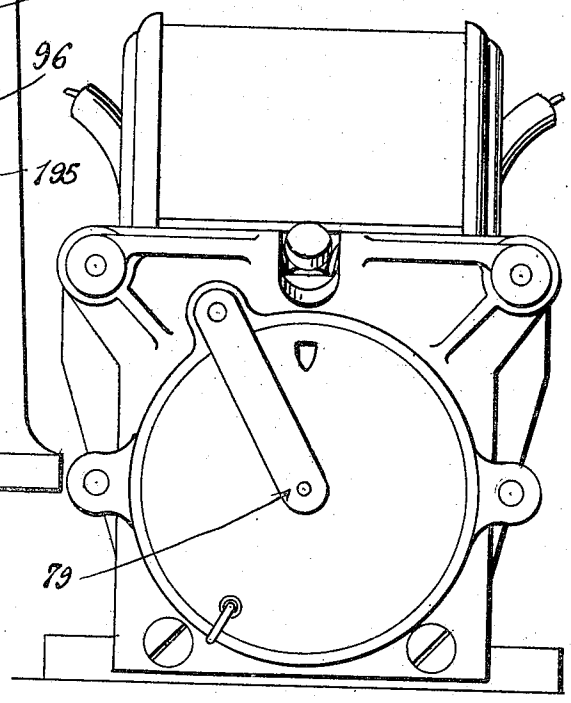


Fig. 16.

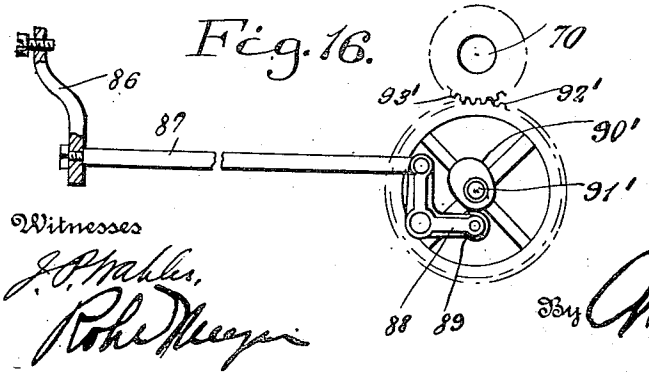


Fig. 21.

Witnesses

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10 SHEETS—SHEET 4.

Fig. 4.

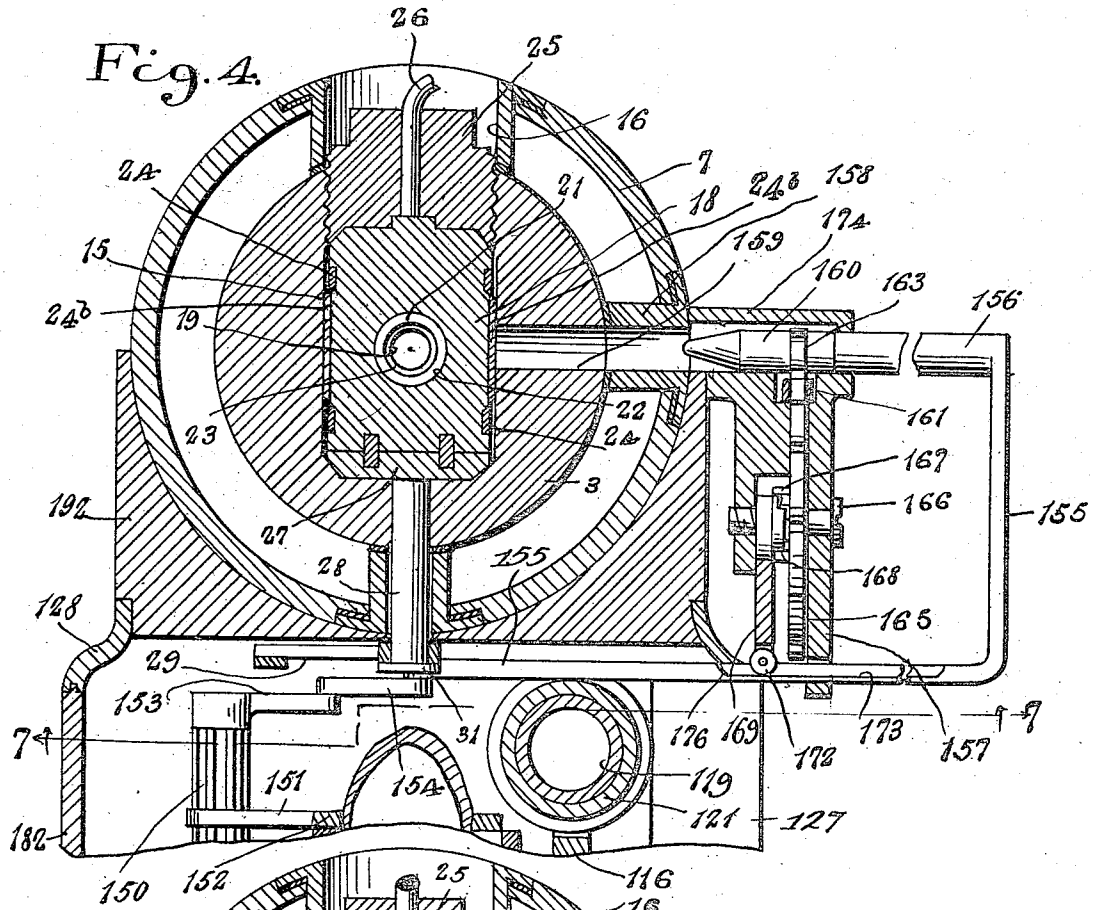
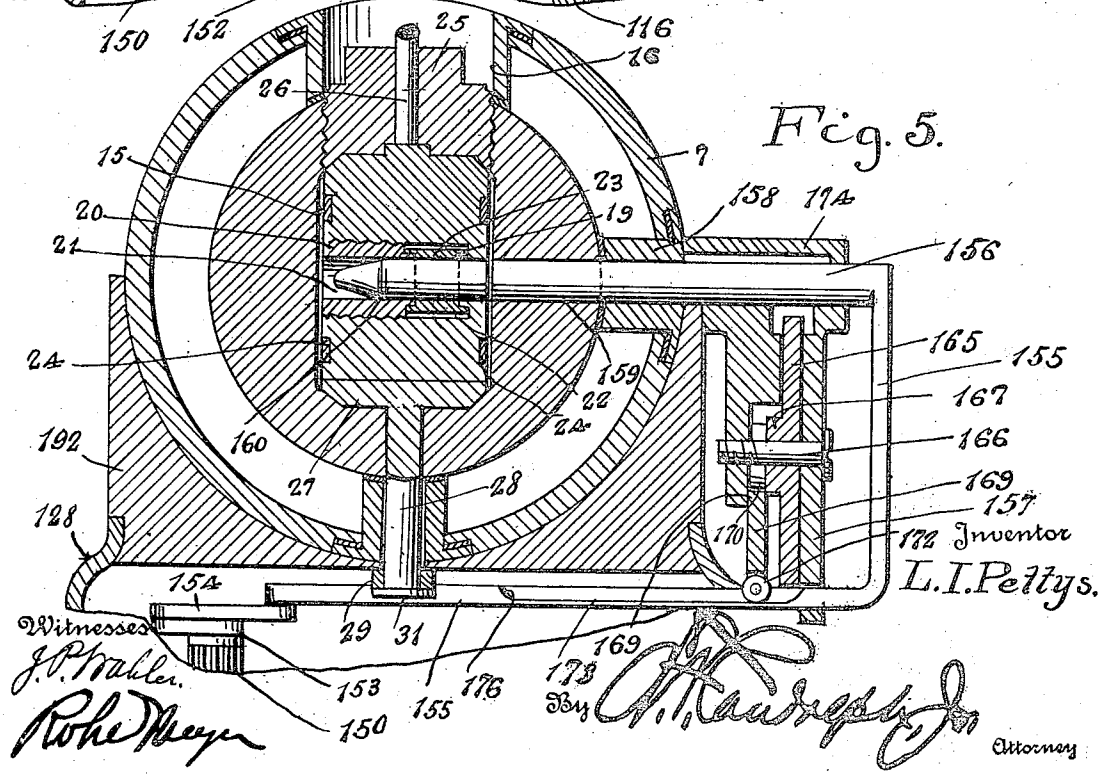


Fig. 5.



Witnesses

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RIFLE.

APPLICATION FILED JULY 11, 1917.

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Patented Nov. 2, 1920.

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Fig. 6

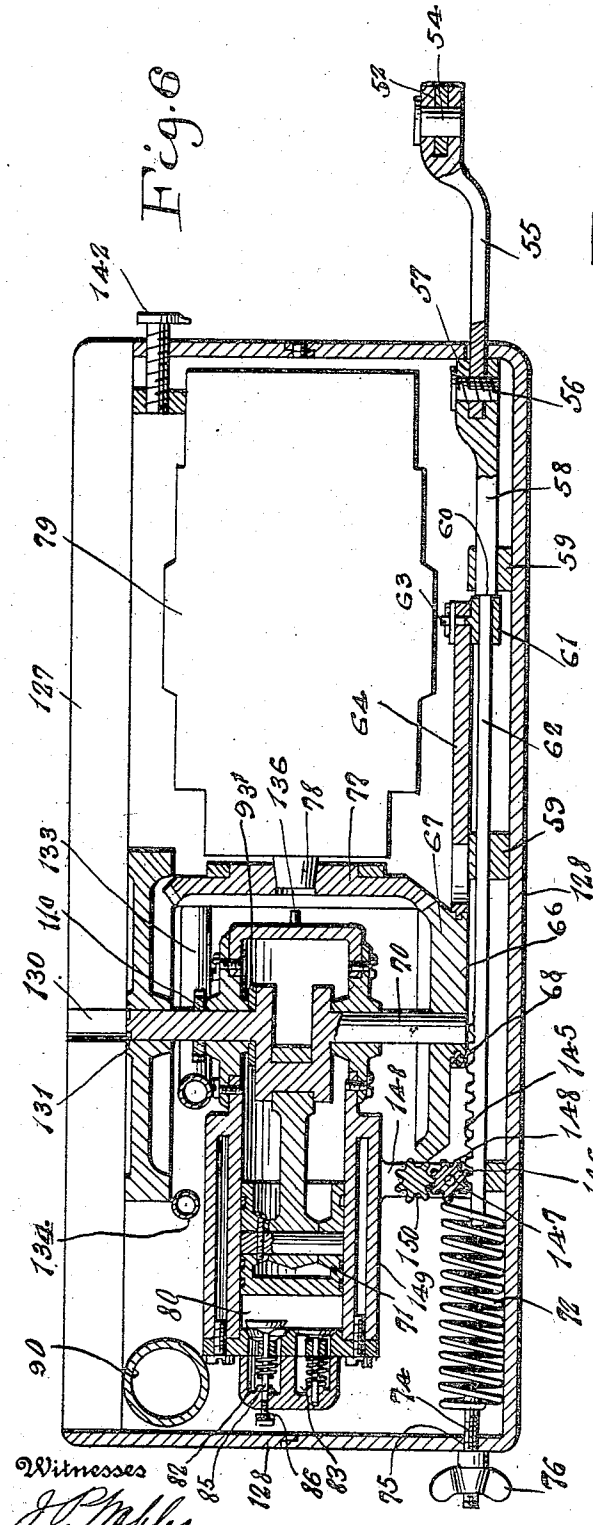


Fig. 9.

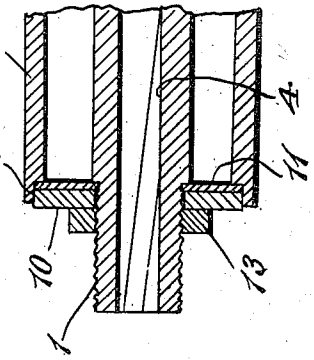
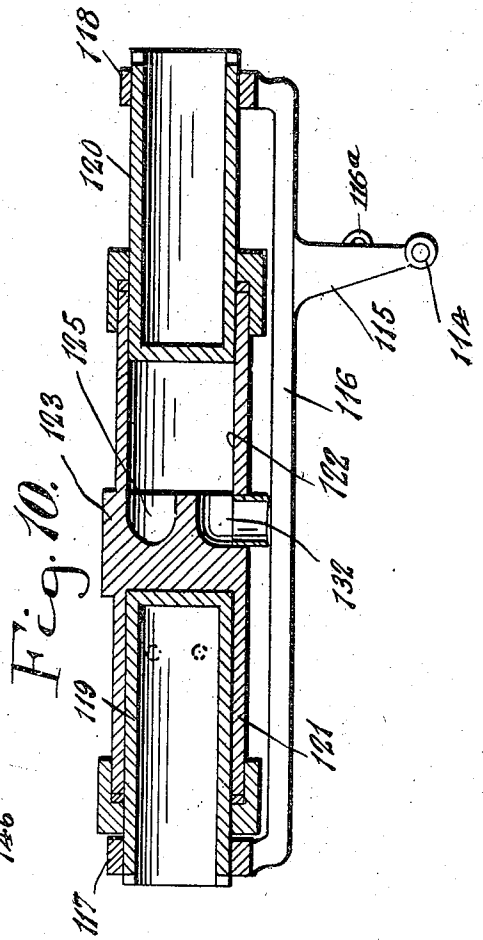


Fig. 10.



Witnesses

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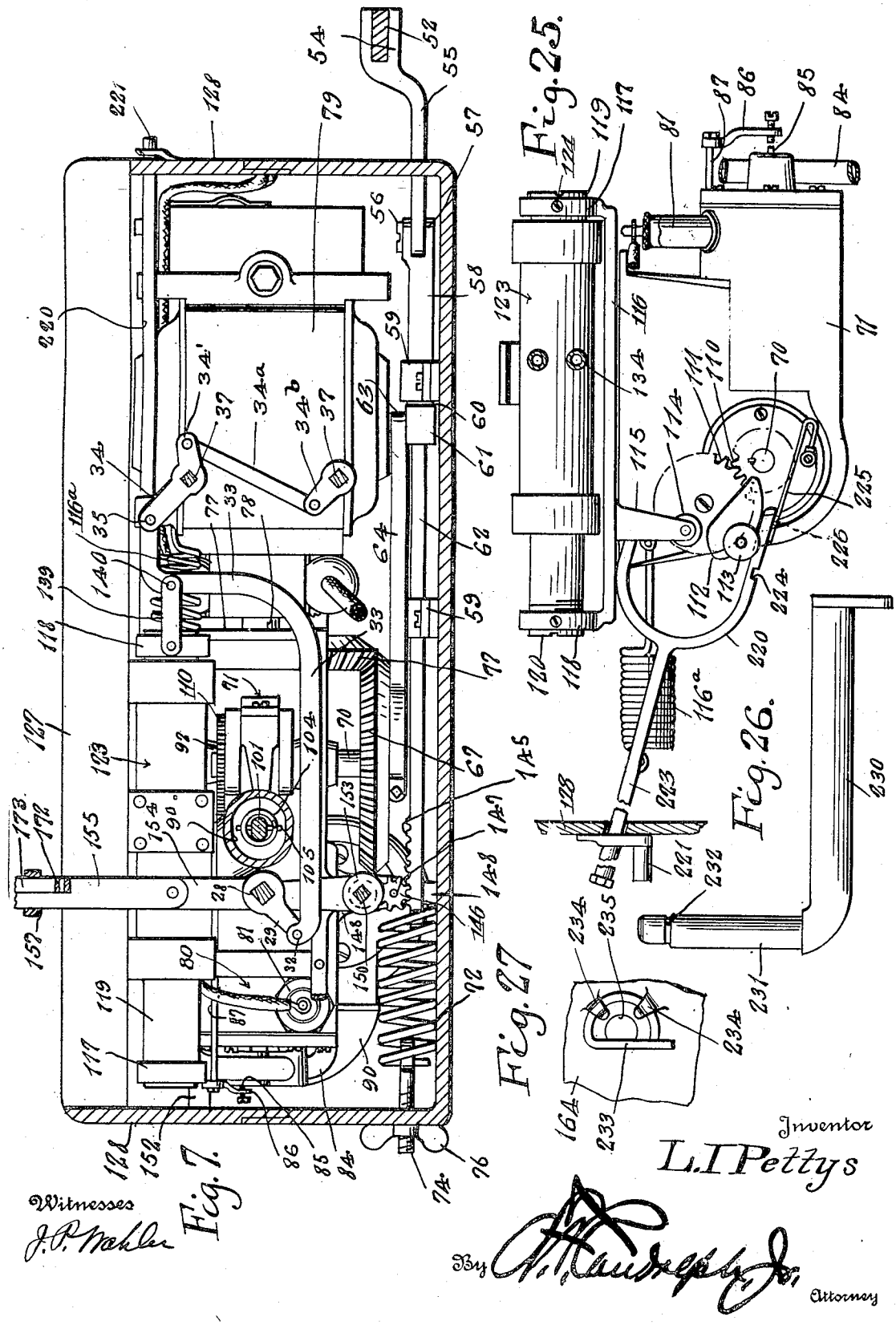
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10 SHEETS—SHEET 6.



Witnesses

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APPLICATION FILED JULY 11, 1917.

1,357,513.

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10 SHEETS—SHEET 7.

Fig. 11.

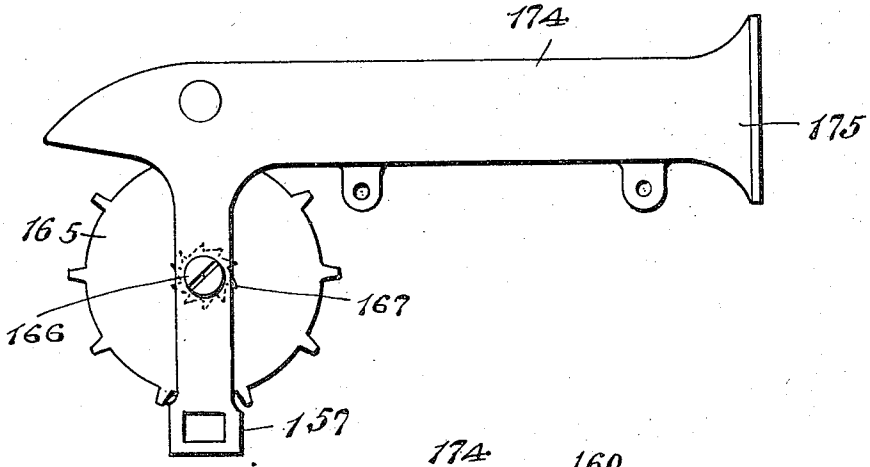


Fig. 12.

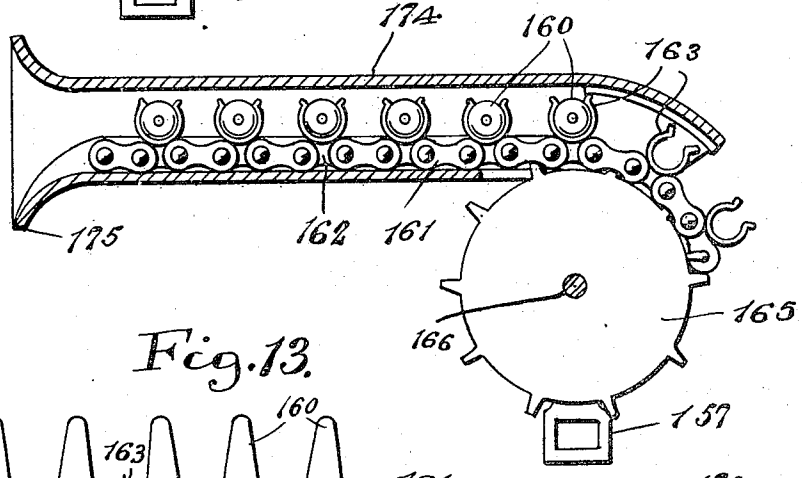


Fig. 13.

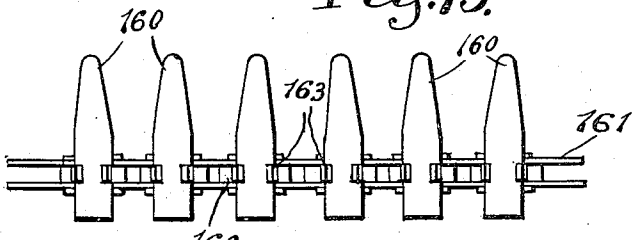


Fig. 14.

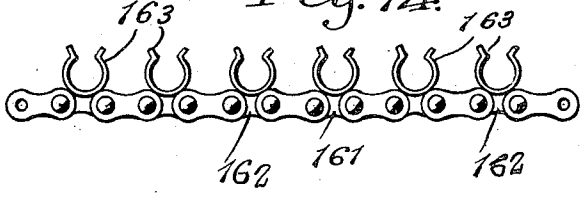
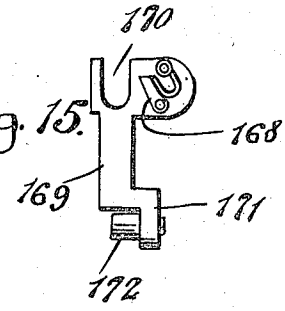


Fig. 15.



Witnesses

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RIFLE.

APPLICATION FILED JULY 11, 1917.

1,357,513.

Patented Nov. 2, 1920.

10 SHEETS—SHEET 8.

Fig. 19.

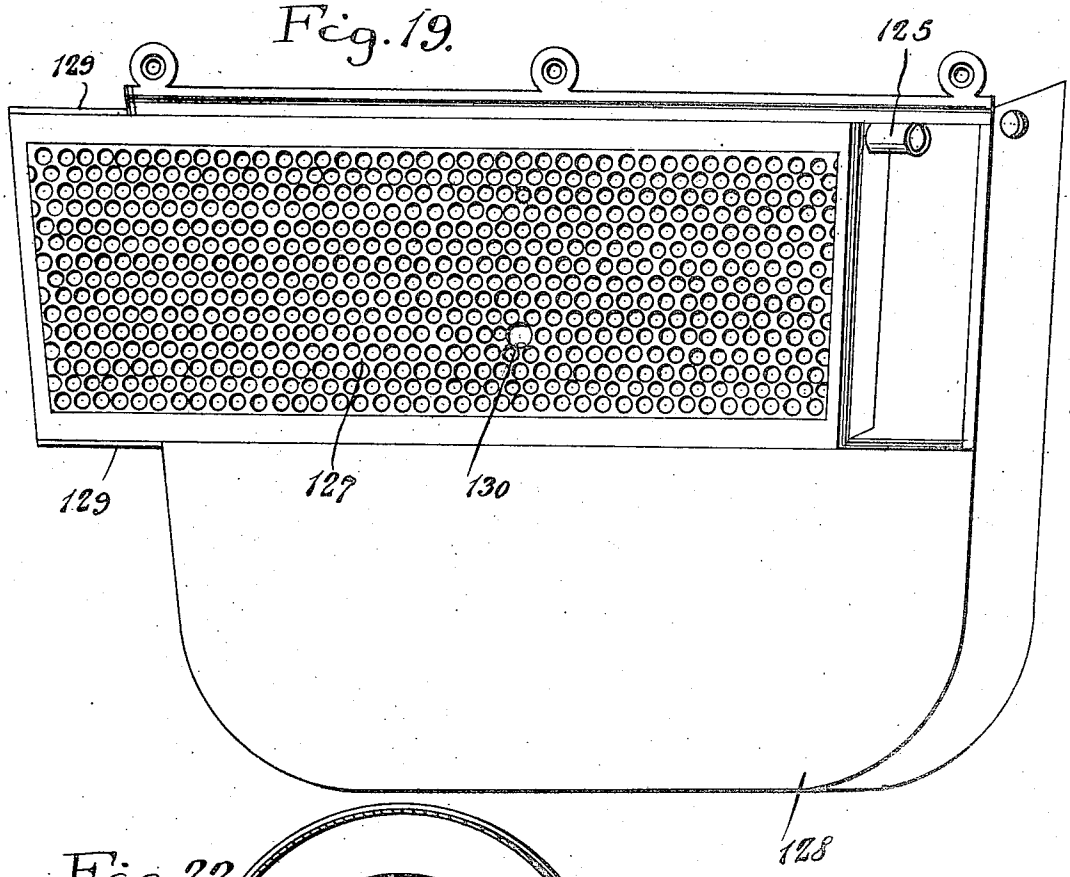
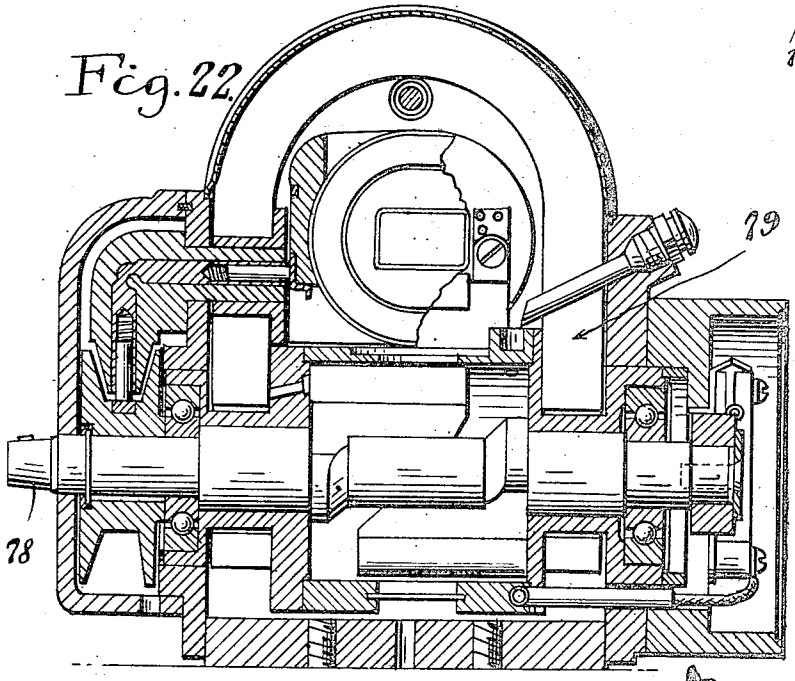


Fig. 22.



Witnesses

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APPLICATION FILED JULY 11, 1917.

1,357,513. **Patented Nov. 2, 1920.**

10 SHEETS—SHEET 9.

Fig. 20.

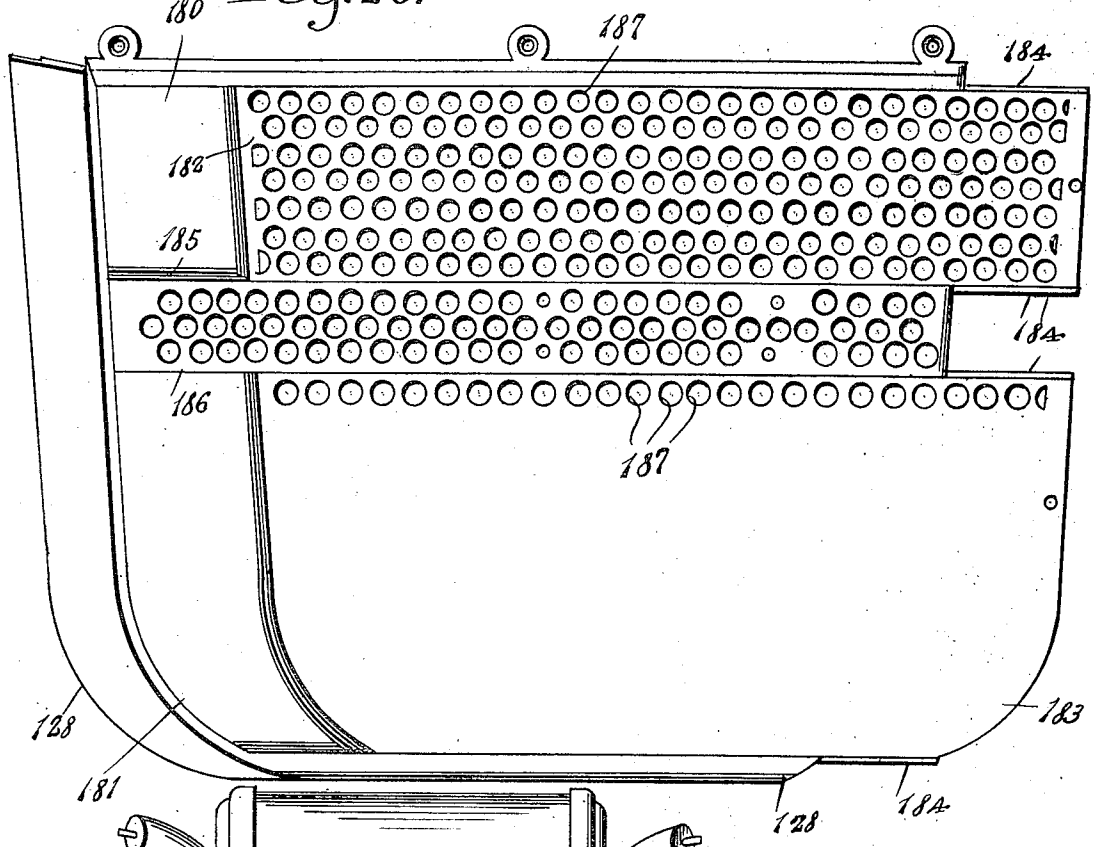


Fig. 23.

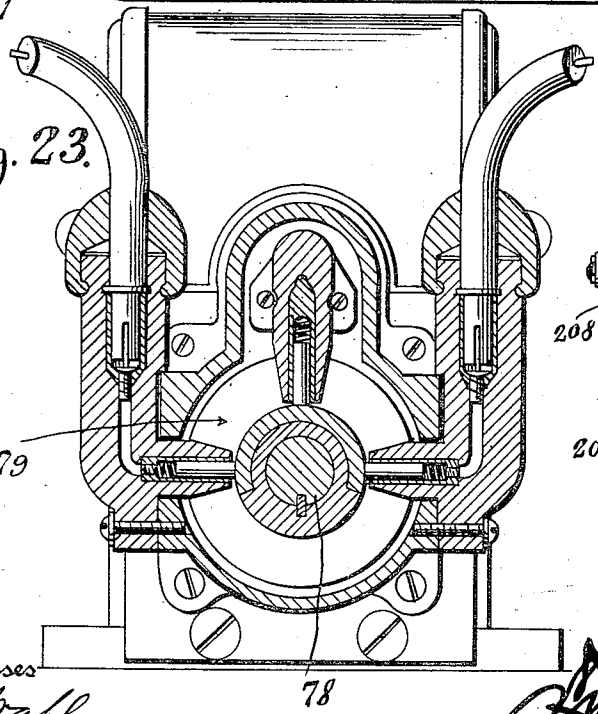
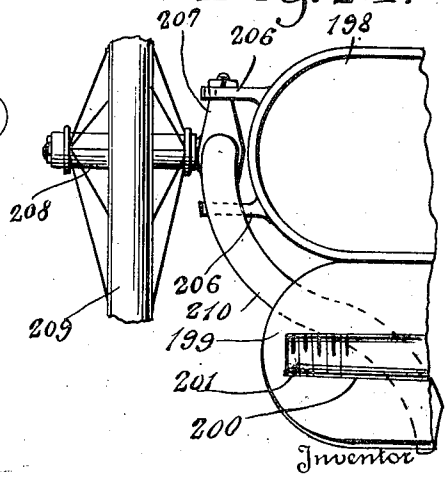


Fig. 24.



Witnesses

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1,357,513.

Patented Nov. 2, 1920.

10 SHEETS—SHEET 10.

Fig. 30

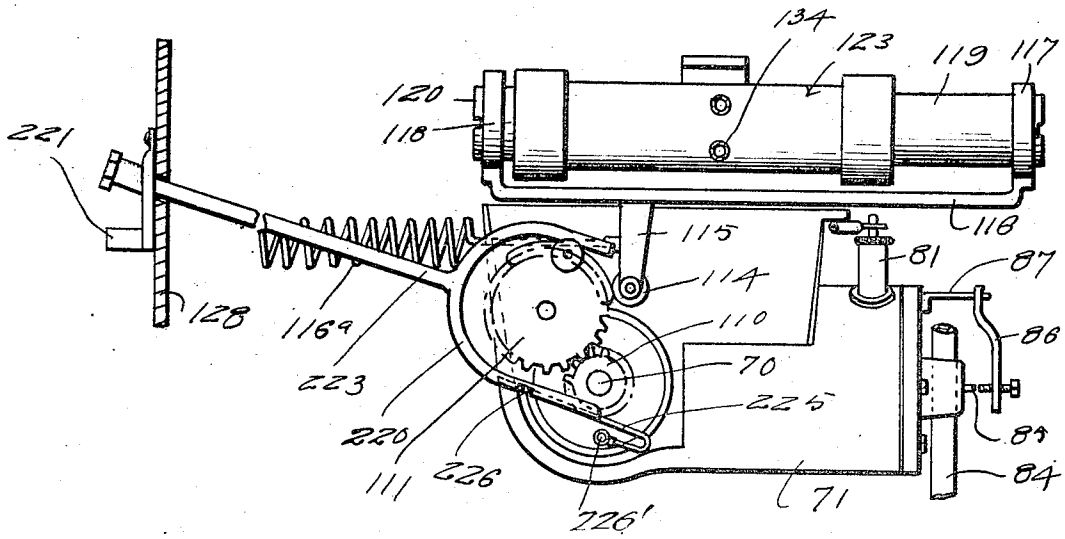


Fig. 31.

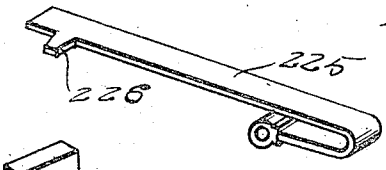
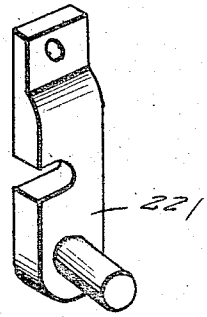


Fig. 32.



Witnesses

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UNITED STATES PATENT OFFICE.

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1,357,513. Specification of Letters Patent. Patented Nov. 2, 1920.

Application filed July 11, 1917. Serial No. 179,904.

To all whom it may concern:

Be it known that I, LINDEN IVAN PETTYS, a citizen of the United States, residing at Chase Mills, in the county of St. Lawrence and State of New York, have invented certain new and useful Improvements in Rifles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to motor or machine rifles or guns and the primary object of the invention is to provide a rapid fire gun from which the projectiles are discharged by the explosion of a volatile gas which has previously been compressed in a suitable compressing chamber carried at the breech of the gun.

Another object of this invention is to provide a gun as specified, which includes a barrel, that is detachably connected at its breech to a suitable cylinder structure into which the volatile gas, such as gas formed from gasolene or analogous liquid, is drawn, through a suitable intake valve from a carbureter of the ordinary type used in internal combustion engines and in which cylinder the gas is compressed by the action of a piston which piston is in turn forced into a compression action by the operation of an ordinary internal combustion engine motor operated by gas generated by the same carbureter which supplies the gas to the gun cylinder and further to provide suitable electrical means employing an ordinary spark plug for exploding the gas in the gun cylinder to force the projectiles out of the barrel.

A further object of this invention is to provide a water jacket for the gun barrel and gun cylinder, into which water jacket water is forced from a radiator structure by a pump construction at intermittent intervals for cooling the gun barrel and also the gun cylinder.

A further object of the invention is to provide a novel construction for loading the gun which includes a rotary bullet receiving chamber having a compression ring mounted therein, which ring grips the bullets or projectiles and prevents them from being forced out of the bullet receiving chamber upon the compressing action of the gas within the gun cylinder and further to rotatably mount the bullet receiving chamber for rotation through a quarter circle, so that after one projectile has been discharged from the bullet receiving chamber the same will be automatically rotated through the operation of the previously mentioned internal combustion engine, a quarter turn at which time a projectile is automatically forced into the bore of the bullet receiving chamber and it is automatically rotated in a reverse direction for positioning its bore in alinement with the bore of the rifle barrel and also for positioning the projectile for projection out of the rifle barrel.

A still further object of the invention is to provide a novel clip structure for retaining the projectiles or bullets and feeding them to the rotary bullet receiving chamber, which clip structure includes a chain composed of a plurality of links having spring or resilient projectile gripping clips carried thereby at regular intervals which chain is fed in a step by step movement by a ratchet structure automatically to the bullet receiving chamber loading means, at which point the projectiles are forced out of the spring clips one at a time, into the bullet receiving chamber.

A still further object of the invention is to provide a pump structure which is operated by the operation of the internal combustion engine carried by the gun structure for forcing water through the water jacket upon one stroke of the pump and for forcing oil to the necessary parts of the gun upon the opposite stroke and means operable by the operation of the pump for automatically locking the piston of the gun cylinder against movement so that the backward action of the piston will be prevented upon the explosion of a charge of compressed gas within the cylinder and which means further act to release the piston locking means for allowing the piston to be operated by the internal combustion engine through the medium of a pivoted lever and a longitudinally movable bar which is eccentrically connected to the internal combustion engine and carries means for controlling the operation of the rotary breech block, all of which means are operated automatically for preventing accidental operation of any one of the parts at the improper time.

With the foregoing and other objects in view, this invention consists in such novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and claimed.

In describing the invention in detail reference will be had to the accompanying drawings wherein like characters designate like and corresponding parts throughout the several views, and in which:

Figure 1 is a side elevation of the improved gun mounted,

Fig. 2 is a fragmentary sectional view through the gun having parts broken away,

Fig. 3 is a rear elevation of the gun and a part of its supporting carriage,

Fig. 4 is a transverse section through the breech of the gun showing the bullet receiving chamber in a firing position,

Fig. 5 is a view similar to Fig. 4 showing the bullet receiving chamber in a bullet receiving position,

Fig. 6 is a horizontal section through a part of the gun structure showing the internal combustion engine in section,

Fig. 7 is a horizontal section through a part of the gun structure taken on a plane above the section illustrated in Fig. 6,

Fig. 8 is a vertical section taken on the line 8—8 of Fig. 2,

Fig. 9 is a sectional view through the muzzle end of the gun,

Fig. 10 is a detail sectional view through a part of the pump structure,

Fig. 11 is a side elevation of the guide for guiding the bullet carrying chain,

Fig. 12 is a vertical section through the guide illustrated in Fig. 11 showing the manner of guiding the chain which carries the projectiles or bullets,

Fig. 13 is a plan view of a fragment of the bullet carrying chain showing the bullets carried thereby,

Fig. 14 is a side elevation of a part of the bullet carrying chain,

Fig. 15 is a detail view of a pawl employed for operating the sprocket which feeds the bullets to the loading means,

Fig. 16 is a detail view showing a part of the mechanism for controlling the operation of the valve structure of the engine of the gun,

Fig. 17 is a detail view of the contracting projectile gripping collar,

Fig. 18 is a view illustrating a reel upon which the projectile carrying chain is wound,

Fig. 19 is a view of a part of the inclosing housing for the gun operating mechanism showing the radiator carried thereby,

Fig. 20 is a side elevation of a part of the gun housing,

Fig. 21 is an end view of the magneto, connected with the gun,

Fig. 22 is a longitudinal section through the magneto,

Fig. 23 is a transverse vertical section through the magneto,

Fig. 24 is a fragmentary view of the gun mount showing the carrying casing open,

Fig. 25 is a fragmentary vertical section through the machine illustrating the gun locking means which permits the motor to operate independently of the gun piston and pump,

Fig. 26 is a detail of the reel support,

Fig. 25[A] is a detail elevation of the gun timing gears,

Fig. 26[A] is an edge elevation of one of the gun timing gears,

Fig. 27 is a fragmentary side elevation of the projectile carrying reel,

Fig. 28 is a horizontal section through the bullet receiving chamber, and

Fig. 29 is a detail of the compression upright and piston ring.

Fig. 30 is a view illustrating the gun locking mechanism shown in a different position to that illustrated in Fig. 25.

Fig. 31 is a detail perspective of a spring used in the gun locking mechanism,

Fig. 32 is a detail perspective view of the latch used in connection with the gun locking mechanism.

Referring more particularly to the drawings, 1 designates the gun barrel which has its breech end screw threadably mounted in the recess 2 formed in the head end of the gun cylinder 3. The gun barrel 1 is provided with the usual rifled bore 4 of any desired caliber and it is inclosed in a water jacket 5 which is connected as shown at 6 to the water jacket 7 which surrounds the cylinder 3. Suitable gaskets 8 are provided at the joint between the barrel water jacket 5 and the cylinder water jacket 7 and also between the points of connection of the water jacket 7 to the flange 9 of the cylinder 3. The muzzle end of the barrel 1 is externally screw threaded, and it has a collar 10 mounted thereon which rests against a gasket 11. The gasket 11 and the collar 10 extend into the recess end 12 of the water jacket 5 of the gun barrel 1 and are held in place by a nut 13 which is mounted upon the screw threaded portion of the barrel 1.

The cylinder head 3 is provided with an enlarged bore 15 which extends transversely through the cylinder head 3 and communicates with the interior of a collar 16 which extends inwardly through the water circulating space within the water jacket 7, as clearly shown in Fig. 2 of the drawings. The bore 15 has a rotary bullet receiving chamber 18 mounted therein which is provided with a bore 19, a portion of which is enlarged and internally screw threaded for receiving a rotary bullet receiving chamber caliber screw 20 which is in turn provided

with a bore 21. The rotary bullet receiving chamber 18 also has a portion of the bore 19 enlarged to form a bore 22 which receives the contracting ring 23. The contracting ring 23 is provided for the bullets to hold them within the bore 19 against accidental discharge out of the rotary bullet receiving chamber 18, the bore of which alines with the bore 4 of the barrel 1 when in a firing position. Suitable piston rings 24 are mounted within the surface of the rotary chamber 18.

The rotary bullet receiving chamber 18 is provided with a plurality of vertically extending peripheral recesses 24^a which communicate with the piston ring receiving recesses. Compression uprights or blocks 24^b are mounted in the recesses and have their upper ends beveled and extending into corresponding recesses formed in the piston rings. The piston rings 24 and the compression uprights 24^b are provided to compensate for expansion and contraction of the shot or bullet receiving chamber during the operation of the gun so as to form a gas tight joint at all times to prevent compressed gas from escaping about the bullet receiving chamber. Owing to the intense heat generated by the rapid firing of the gun, it is necessary to make the bullet receiving chamber 18 smaller than the bore 15 so as to allow free rotation of the bullet receiving chamber when expanded by heat created by the rapid firing of the gun, and the compression uprights 24^b which are moved outwardly by the piston rings 24, together with the piston rings, form a gas tight joint about the bullet receiving chamber when it is in its contracted state.

The bore 15 in which the bullet receiving chamber 18 rotates has a plug 25 removably seated therein and engaging the upper surface of the rotary chamber 18, as clearly shown in Fig. 2 of the drawings for preventing vertical movement of the rotary chamber. The plug 25 has a lubricating tube 26 extending therethrough for lubricating the bearing surfaces between the rotary chamber and the plug.

The chamber 18 rests upon a disk 27 which is formed upon the upper end of a stem 28. The stem 28 projects downwardly through the cylinder 3, then in the water jacket 7 and has an arm 29 connected to its lower end through the medium of a screw 30 and plate 31. The arm 29 is connected as shown at 32 to a bar 33 which extends longitudinally beneath the gun cylinder and is connected to an arm 34 as shown at 35. The arm 34 is mounted upon the lower rectangular end of the right locking pin 37 of a pair of piston locking pins, and it has a short arm 34′ formed thereon. A bar 34^a is connected to the short arm 34′, and to an arm 34^b which is mounted upon the lower end of the left hand locking pin 37 as clearly shown in Fig. 7 of the drawings. The piston locking pins 37 are rotatably seated in recesses 38 that are formed in the cylinder 3 directly opposite of each other. The locking pins 37 have enlarged heads 39 which are provided with arcuate cut out portions 40 and with shanks 41 which are rotatably seated in externally screw threaded collars 42. The collars 42 fit within the screw threaded lower portions 43 of the recesses 38. The charge compressing piston 45 is provided with a pair of cut out portions 46 which receive the locking pins 37 for locking the piston 45 against movement within the bore 47 of the cylinder 3, during the explosion of compressed gas within the cylinder for forcing the projectiles out of the barrel 1.

The piston 45 has the usual type of piston rings 48 carried thereby and a piston rod 49 is connected to the pin 50 which is carried by the piston.

The piston rod 49 is connected, through the medium of a pin 51 to a pivotally mounted bar 52. The arm or lever 52 is pivotally mounted upon a pin 53 which is carried by a bracket 54′ as clearly shown in Fig. 2 of the drawings. The lower end of the arm or lever 52 is connected through the medium of the pin 54 to an arm 55. The arm 55 is in turn connected, through the medium of a pin 56 to the forked end 57 of a sliding bar 58 which slides in suitable bearings 59. The bar 58 has a shoulder 60 formed thereon and a sliding block 61 is mounted upon the reduced portion 62 of the bar.

The block 61 has a pin 63 formed thereon which extends through the free end of an arm 64 which is carried by an eccentric strap 65 which is mounted upon an eccentric 66. The eccentric 66 is connected to or formed upon the rear face of a beveled gear 67 and which is rotatably connected to the encircling strap or ring 65 by means of a bolt 68 which extends through the bosses 69 formed upon each side of the split portion of the eccentric strap or ring 65.

The beveled gear 67 is mounted upon the crank shaft 70 of an ordinary internal combustion engine structure 71. The sliding block 61 engages the shoulder 60 for forcing the bars 58 and 55 outwardly to rock the lever 52 for moving the piston 45 into a compressing position and the bar 58 is drawn rearwardly for moving the piston 45 in a suction stroke by the contracting action of the coil spring 72 which is connected as shown at 73 to the end of the bar 58 and to a screw 74, which extends through the casing 128 and is held in adjusted position by a wing nut 76.

The beveled gear 67 meshes with a beveled gear 77, for rotating the beveled gear 77 by the rotation of the crank shaft 70 of the

motor or engine 71. The beveled gear 77 is mounted upon the shaft 78 of the magneto 79. The magneto structure 79, illustrated in Figs. 21, 22, and 23 is of the "Dixie" type and it supplies current for exploding the charges in the cylinder 80 of the motor 71 and also within the cylinder 3. The charge within the cylinder 80 is ignited through the medium of the spark plug 81 and the volatile fuel or gas enters the cylinder 80 through the intake valve 83 and exhausts therefrom through the valve 82 and through an exhaust pipe 84. The valve stem 85 of the motor exhaust is operated by a lifter arm 86 which is in turn connected to a valve lifting rod 87. The rod 87, is connected to a bell crank 88 which carries a roller 89 upon one end of the same. The roller 89 is engaged by the periphery of a cam 90′, carried by a shaft 91′ upon which shaft is mounted a gear 92′. The gear 92′ meshes with a gear 93′ which is mounted upon the crank shaft 70 and controls the operation of the exhaust valve 82 of the cylinder 80 which controls the operation of the intake valve 83 of the motor 71. The gas is supplied to the motor 71 from the manifold 90, which is connected to a carbureter 91 of the usual type. The throttle 92 of the carbureter 91 is controlled, by the operation of a throttle lever 93 which has a rod 94 connected thereto and to the throttle 92.

The lever 93 is pivotally connected as shown at 95 to the upper part 96 or the rear face of the housing 128, which incloses the operating mechanism of the gun and it has a dog mechanism 97 carried thereby which coacts with a quadrant 98′ for holding the throttle lever in adjusted position.

The manifold 90 also supplies the gas to the cylinder 3 through the inlet valve structure 98. The valve structure includes a slide 99 which is provided with a plurality of openings 100 to allow the gas to pass therethrough and which slidably supports the valve stem 101. The valve stem 101 has a valve 102 formed upon its inner upper end which is seated in a valve seat 103 for cutting off the passage of volatile gas into the interior or bore 47 of the cylinder 3. A spring 104 is coiled about the valve stem 101 and one end of the spring engages the lowermost end of the valve guide or slide 99 while the other end engages a pin 105 which extends diametrically through the valve stem. The valve guide 99 is connected, through the medium of the collar 106 to the manifold 90, as clearly shown in Fig. 2 of the drawings and suitable packing washers 107 are provided at the joint between the valve guide 99 and the cylinder 3, to prevent escapage of gas about the valve guide and also to prevent water from being forced into the cylinder out of the water jackets of the gun cylinder. A suitable sleeve 108 extends through the water jacket, and the manifold and valve guide or casing 99 extends through the sleeve 108.

The crank shaft 70 has a gear 110 mounted thereon which meshes with a gear 111, which, assuming the motor shaft 70 to perform anti-clockwise movement, is rotated in a clockwise direction, so as to be able to move the pump slide 116 against the action of the spring 116ª. The gear 111 has a cam 112 carried thereby to which cam is rotatably connected a roller 113. The cam 112 is adapted for engagement with a roller 114. The roller 114 is rotatably supported at the lower end of an arm 115 which arm is connected to the pump slide bar 116. The slide bar 116 has collars 117 and 118 carried at its ends, which collars are mounted about the ends of pistons 119 and 120 respectively, which reciprocate in opposite directions within the bores 121 and 122 of the pump cylinder 123. The collars 117 and 118 are secured to the outermost ends of the pistons by set screws 124. The bore 122 of the pump cylinder has a water inlet 125 communicating therewith, which communicates with a suitable radiator 127 which is carried by one side of the housing 128 of the gun structure. The radiator 127 may be of any well known desired or practical type, and it is provided with tongue extensions 129 formed upon its upper and lower edges which extend slidably in suitable grooves carried by the casing 128 for removably connecting the radiator to the housing 128 which incloses the gun operating mechanism. The radiator structure 127 is also provided with an opening 130 which is provided for receiving a crank handle of the ordinary type which is connected to the crank shaft 70 by the clutch end as indicated at 131 for cranking the engine or motor 71.

The bore 122 of the pump cylinder 123 has an outlet communication 132 through suitable pipes 133, for supplying the water to the water jackets 5 and 7 for cooling the gun barrel 1 and the cylinder 3 during the operation of the gun.

The bore 121 of the pump casing 123 has communication through a pipe 134 with an oil retaining tank 135 which is carried by the housing 128, and the pump cylinder 121 has a suitable outlet opening which communicates with the pipe 26 and with pipes 136, for supplying lubricating oil to the rotary and reciprocatory parts of the gun mechanism, of which lubrication is necessary during the operation of the gun.

The pump pistons 119 and 120 are moved in one direction by the operation of the motor 71 through the medium of the timing gears 110 and 111 which will reciprocate the pump pistons by the striking engagement of the cam 112 with the roller 114, and in the opposite direction by a spring 116ª which is connected to the arm 115 and to a suitable

support such as a screw carried by the magneto 79.

The collar 118 has an arm 139 connected thereto, which arm is connected as shown at 140 to the bar 33, for operating the pivoted arms 34 and 29 during the operation of the pump for properly timing the operation of the rotary chamber 18 and the unlocking operation of the locking means which holds the piston 45 against reciprocatory movement.

A compressed charge of volatile gas is exploded in the cylinder 3 by the sparking of an ordinary spark plug 141 to which the necessary sparking current is supplied by the magneto 79 and the sparking action of which is controlled by an ordinary spark control 142, and the usual type of switch 143 is employed for controlling the operation of the motor 71.

The piston operating bar 58 has a rack 145 formed thereon, which meshes with a pinion 146. The pinion 146 is supported by a suitable shaft 147 which in turn is carried by an arm 148 that is formed upon and projects outwardly from the water jacket 149 of the motor or engine 71.

The pinion 146 meshes with an elongated gear 150, which is supported by a suitable bearing 151 that is carried by the supports 152 of the motor 71.

The gear 150 has an arm 153 carried by the upper end of the same, which arm is in turn connected to a second arm 154.

The arm 154 is suitably connected to the arm 155 which reciprocates the bullet loading rod or piston 156. The bullet loading piston or rod 156 extends slidably through a suitable guide 157, a guide collar 158 which extends through the water jacket 7 and an opening or bore 159 which is formed in the cylinder 3 for forcing the bullet into the bore 19 of the rotary chamber 18.

The bullets 160 which are discharged by the improved rifle are carried by a clip structure or feeding mechanism which includes a sprocket chain 161 of the roller chain type, the solid links 162 of which have spring grips or clips 163 carried thereby which yieldably engage the bullets 160, so that they will be carried upwardly with the movement of the sprocket chain, off the reel or spool 164, by the step by step movement of a sprocket wheel 165. The sprocket 165 is rotatably mounted upon a suitable pin 166 which is carried by supporting structure 157. The sprocket 165 has a ratchet 167 formed upon one side of the same at its center which ratchet is engaged by a pawl 168. The pawl 168 is carried by an arm 169. The arm 169 is provided with an opening 170 which receives the pin 166. The lower end of the arm 169 is offset as shown at 171, and it has a roller 172 carried thereby. The roller 172 rides in a cut out portion 173 which is formed in the bar or arm 155 so as to cause the operation of the arm 169, for rotating the sprocket 165 in a step by step movement, or a distance equal to the space between the clips 163 upon each movement of the arm 155 and for moving the piston or pin 156 for properly moving the chain 161 to place a bullet in alinement with the piston or pin 156 and bore 159 so that when the bar 58 is returned by the action of the spring 72, the bar 155 will be operated, for forcing a bullet out of one of the spring clips 163, into the bore 19, through the bore 159. A suitable guiding structure or member 174 is provided which has a flared mouth 175 into which the chain 161 passes for guidance to the sprocket 165. The ends 176 of the guide 173 are arranged so that when the roller 172 engages them, they will force the roller outwardly for rocking the arm 169. The gun operating mechanism housing 128 has the side opposite to that which carries the radiator 127 provided with a pair of openings 180 and 181 which are provided to permit access to the interior of the housing and the mechanism positioned therein. The opening 180 is closed by a sliding panel 182 while the opening 181 is closed by a sliding panel 183. These panels are provided with suitable longitudinally extending tongues 184 which are formed upon their upper and lower edges and slide in suitable grooves 185 formed in the edges of the housing which they engage. The strip 186 which is positioned between the two openings 180 and 181, the panel 182 and the upper portion of the panel 183 are provided with a plurality of perforations 187 which are provided to permit air circulation within the housing.

The carbureter 91 obtains the volatile liquid from a suitable tank 188, through a pipe 189. The tank 188 is filled through a filling tube or nozzle 190 which projects out of the rear end of the casing 128 while the oil tank 135 is filled through a filling pipe or nozzle 191.

The gun cylinder 3, water jacket 7 and barrel are supported by a suitable trunnion block 192 which has trunnions 193 carried thereby. The trunnions 193 are rockably mounted in bearings 194 which are carried by the upper end of suitable supporting arms 195. The arms or brackets 195 have their lower ends connected by a plate 196. A pin 197 is attached to the center of the plate 196. The pin 197 extends downwardly through a casing 198 which rotatably supports the gun supporting brackets 195 and the plate 196 to allow the gun to be moved in a horizontal arc during firing. The casing 198 has a hinged door, and it is provided for carrying extra reels of bullets, and other material necessary for the oper-

ation of the gun such as surplus gasolene supply tanks, oil tanks or the like. The hinged door 199 of the casing has a groove 200 formed therein which provides a support for an extra barrel 201.

The trunnions 193 have a segment of a gear 202 carried thereby which has worm teeth 203 upon the periphery of the same. The teeth 203 mesh with a worm 204, that is mounted upon a shaft 205. The shaft 205 may extend rearwardly beyond the rear end of the casing of the gun and have a suitable hand wheel or the like mounted thereon for manually rotating the shaft 205 to regulate the elevation of the gun barrel.

The casing 198 has brackets 206 carried thereby which pivotally support the vertical portion 207 of a stub axle structure 208. The stub axle structure 208 has a supporting wheel 209 of the gun rotatably mounted thereon. The vertical portions 207 have arms or bars 210 connected thereto which may form handles for drawing the gun to the desired position and also form a tail for supporting the gun in position. The handle 210 is composed of a pair of bars that are connected to each of the stub axles and a substantially U-shaped connection 211 which connects the ends of the bars and may be disconnected by removing the U-shaped member 211 so that the wheels may be swung around and the bars 210 extend forwardly from the gun casing 198, for drawing the gun to position.

A locking mechanism 220 is provided for locking the rod 116 against movement and consequently locking the gun piston 45 against movement through the medium of the locking pin 37. The locking mechanism includes a forked bar 223 which slides in a bearing attached to the side of the magneto, the other bearing for the bar is formed by the housing 128 where the bar or lever passes through the housing. The notch 224 in the lever 220 engages a projecting pin 226 on the flat spring 225, which is secured by means of a pin 226′ to some stationary part of the motor engine structure 71. The planetary roller 113 engages and forces downwardly the flat spring 225, thereby moving the pin 226 out of engagement with the lower fork of the bar 223. This releases the bar 223, provided the button 221 is out of engagement therewith, and permits the pump slide 116 to be moved in one direction by the spring 116ª and in the reverse direction by the cam 112. The movement of the pump slide 116 by the spring 116ª will cause the arm 115, by reason of its engagement with the inner end of the upper fork of the bar 223, to move the bar outwardly, in which position it will not interfere with the movement of the pump slide 116. When it is desired to lock the pump slide 116 and the gun piston 45, the bar 223 is moved inwardly and secured in such position by the button 221. Should the safety lever 223 be buttoned or held in a locked position by the button 221, and the motor continued running, the roller 113 would disengage the spring 225 from the notch 224 upon every revolution of the gear 111 and would engage it again upon the roller 113 passing by the spring, but without operating the pump, inasmuch as the short leg of the forked bar 223 being in the same plane with arm 115, acts as a stop and engages with this arm which is held against backward movement by engagement with the locking button 221, and with some play owing to the action of the spring 225 and in view of its inclined position. When the operative parts of the pump are released as shown in Fig. 25, the same tongue of forked bar 223 limits the outward movement of the pump slide 116. The lever 220 is held in position by the button 221 during such time.

A bracket 230 is carried by the outer side of the radiator and it has a spindle or shank 231 formed thereon, which rotatably supports the reel 164 while the bullets are being fed therefrom, by movement of the chain 161. The spindle 231 is provided with a groove 232, which receives the straight portion of a resilient wire clip 233. The clip 233 is carried by the side of the reel 164 about the bore 235 of the same and is held attached to the reel by suitable clips or ears 234 which are carried by the surface of the reel. The straight portion of the spring latch, riding in the groove 232 will allow the reel to rotate freely upon the spindle but will prevent the reel from moving endwise off the spindle during its rotation.

Summing up, generically the operation of the improved motor gun is as follows: After the gun has been moved into the desired position, the safety catch structure is moved into locking position and secured in such position by the button 221. The safety catch structure when in locking position prevents the operation of the piston 45, the shot receiving chamber 18, and the shot feeding mechanism by the motor. It will thus be seen that the motor is free for use in starting without operating the piston 45, the shot receiving chamber 18, and shot feeding mechanism. The motor being free, the spark 142 of the magneto 79 is advanced, the motor controlling switch 143 is closed and the throttle 92 opened to proper notch, after which the motor is cranked through the opening 130 in the radiator 127 which will start the motor. After the motor has been properly started, the safety catch structure 220 is released through the manual operation of the button 221 so that when the roller 113 which is carried by the gear 111, reaches the proper position, it will disengage the safety device and allow the operation of the gun operating mechanisms by the operation

of the motor. The pump on its first stroke, forces a quantity of lubricating oil to all the working parts of the gun and draws from the bottom of the radiator 127 a pump chamber full of cold water. The pump slide or bar 116 on this stroke will move the arm 139, which will in turn move the arms 29 and 34 for rotating the piston pins 37 into an unlocking position to permit of reciprocatory movement of the piston and to rotate the shot or bullet receiving chamber 18 into a bullet receiving position as illustrated in Fig. 5 of the drawings. The gun piston 45 being free, it is drawn backward by the action of the spring 72 upon the bars 58, 55 and 52 upon which backward movement or stroke, the piston will draw in upon the intake valve 102 and draw a charge of volatile gas into the bore 47 of the cylinder 3. Upon the backward movement of the bar 58 under action of the spring 72, the rack 145 will engage the pinion 146 and rotate the elongated gear 150, causing the latter to rotate, which in its turn operates the bullet feeding piston or pin 156 for forcing one of the bullets 160 out of the spring clip 163 into the bore 19 of the rotary bullet receiving chamber 18 where the contracting caliber ring 23 is forced open to sufficient size to admit the bullet and the contracting action of this ring will hold the bullet tightly within the bullet receiving chamber against accidental discharge therefrom upon the compressing action of the piston 45.

By the time the bullet is positioned within the bore 19 the motor 71 will have drawn a fresh charge of gas from the manifold 90 and is now fired. The explosion of the gas within the motor, or, in other words, the operation of the motor, will rotate the eccentric 66, and operate the eccentric connecting bar 64 which pushes the drive bar 58 forwardly in its bearings 59. The forward pushing movement of the bars 58 and 55 will rock the lever or arm 52 and force the piston 45 inwardly and forwardly compressing the gas in the gun cylinder to about 150 pounds pressure to the square inch. At this time the rack 145 again engages and operates the pinion 146 and the gear 150 which rotates the gear in the reverse direction and consequently moves the bullet feed slide or piston 156 into its normal position. The bullet feeding piston or slide 156 on its backward movement causes the feed ratchet 168 to rise upon the incline or shoulder 176 which movement rotates or moves the sprocket 165 a distance sufficiently to move the next bullet 160 carried by the chain 161 into a position for being forced into the bore 19 upon the next feeding operation of the slide or piston 156. When the gun cylinder piston 45 reaches the limit of its compressing stroke, the gun timing gears 110 and 111 are at the proper position so that the cam 112 engages the roller 114 carried by the pump slide or bar 116, causing the bar to move forwardly. The forward stroke of the pump draws oil into the chamber or bore 121 and forces the water out of the bore or chamber 122, through the pipes 132 into the water jackets 5 and 7, at the same time forcing a like quantity of hot water from the muzzle of the water jacket 5 back into the radiator 127. The forward movement of the pump slide or bar 116 will operate the bar 33, through its connecting bar 139 which will in turn operate the arms 29 and 34, operating the latter arms for rotating the locking pins 37, so that their straight portions will move into the cut out portion 46 formed in the piston 45, thereby securely locking the piston against outward or backward movement. The movement of the arm 29 upon the forward stroke of the pump slide or bar 116 will rotate the breech block or chamber 18 into a firing position, after which the gas that is compressed in the bore 47 forwardly of the piston 45, and rearwardly of the bullet carried by the rotary chamber 18, is fired by a spark from the magneto 79 through the spark plug 141. The eccentric 66 draws back the eccentric drive bar 64 and slide block 61, and when the gun timing gears 110 and 111 rotate to the proper position they unlock the gun mechanism, when the above operation is performed over again.

The gear 110 is mounted upon the crank shaft 70 of the motor and it has to complete two revolutions to rotate the gear 111 once.

The motor fires, the power from this explosion in the motor compresses the gas in the gun cylinder, when the piston 45 has reached the end of its travel, the cam 112 on the gear 111 engages the roller 114 attached to the arm 115 and pump slide 116 causing it to move forward, thus locking the piston 45 and rotating the rotary bullet receiving chamber 18 to position for firing. The gun remains locked until the cam 112 passes by the roller 114, when the pump slide returns by the action of the coil spring 116^a, and so on through this operation, first the engine firing and then the gun firing, as in a two cylinder motor. When the safety lever 220 is pushed in and the button 221 caught, it holds the pump slide away from the cam 112 on the gear 111, allowing the gear to rotate free with the motor without operating the pump, inasmuch as the shorter leg or tongue of the forked bar 223 is in the same plane with the arm 115 and acts as a stop in the two positions of the arm 115 and of the pump slide 116 indicated in Figs. 25 and 30 respectively. The pump being held stationary causes the gun piston 45 to remain locked. The sliding block 61 at such time slides back and forth on the bar 62 with the operation of the motor. The last shot to enter the rifle is always fired.

What is claimed is:—

1. In a motor gun, in combination an internal combustion engine, a carbureter connected to said engine, a discharge barrel, rotatable shot receiving means at the rear of said barrel and adapted to aline therewith, a compression chamber at the rear of said receiving means and communicating therewith, and compressing means in said chamber and means to connect said chamber to said carbureter and means connecting said internal combustion engine with said compressing means, and separate igniting means in the internal combustion engine and in said compression chamber.

2. In a motor gun, in combination, a discharge barrel, rotatable shot receiving means at the rear of said barrel and adapted to aline therewith, a compression chamber at the rear of said receiving means and communicating therewith, fluid operated compression means in said chamber and gas igniting means in said compression chamber.

3. In a motor gun, the combination with a gun barrel and an explosion chamber opening into said gun barrel, of a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for locking said piston against reciprocatory movement at predetermined times, a shot or bullet receiving chamber rotatably mounted between said barrel and said explosion chamber, and means for feeding bullets into said receiving chamber prior to the compression of gas in the chamber.

4. In a motor gun, the combination with a gun barrel and an explosion chamber opening into said gun barrel, a shot or bullet receiving chamber rotatably mounted between said barrel and said explosion chamber, a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, an inlet valve for controlling the inlet of gas into said chamber, said valve operated by the suction created upon the outward stroke of said piston for admitting gas into the explosion chamber, means for igniting a compressed charge of gas in said chamber, means for locking said piston against reciprocatory movement during the explosion of a charge of gas in the chamber, and means for feeding bullets into said receiving chamber prior to the compression of gas in the chamber.

5. In a device of the kind set forth, a barrel, a bullet container in communication with the barrel, a cylinder in communication with the container, a piston longitudinally movable in the cylinder, the latter having an intake bore to admit an explosive charge into the cylinder, a piston rod connected with the piston, a base secured to the cylinder, a crank mounted for rocking movement on the base whereby reciprocating movement is imparted to the piston, means whereby the crank is moved through an arc of less than 180 degrees, and means for igniting an explosive charge admitted to the cylinder whereby a bullet held in the container is ejected therefrom and through the barrel.

6. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke and means operated by said engine for automatically feeding bullets to the breech of said barrel.

7. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for locking said piston against movement upon the termination of each compressing stroke, means for releasing said locking means after the explosion of a charge of gas in said explosion chamber, and means operated by said engine for automatically feeding bullets to the breech of said barrel.

8. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combusion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, an inlet valve for said chamber operated upon outward movement of said piston to admit gas into the chamber, means for locking said piston against movement upon the termination of each compressing stroke, and means for releasing said locking means after the explosion of a charge of gas in said explosion chamber, and means operated by said engine for automatically feeding bullets into the breech of said barrel.

9. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said barrel and chamber, a pump, and means operated by the operation of said engine for operating said pump to force water into said water jackets upon the compressing action of said piston.

10. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets upon the compressing action of said piston, and means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke.

11. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets upon the compressing action of said piston, means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke, and means for reversing the direction of operation of said pump for releasing said locking means.

12. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets upon the compressing action of said piston, and means for reversing the direction of operation of said pump for forcing a supply of lubricating oil to the working parts of the rifle.

13. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets, and means for controlling the operation of said engine for regulating the speed of operation of said piston.

14. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets, means for controlling the operation of said engine for regulating the speed of operation of said piston, and means for reversing the direction of operation of said pump for forcing a supply of lubricating oil to the working parts of the rifle.

15. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, and means operated by said engine for automatically feeding bullets to the breech of said barrel, and means for preventing the discharge of a bullet from said barrel upon the compressing stroke of said piston.

16. In a motor gun, the combination, with a gun barrel, an explosion chamber opening into said barrel, of a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for feeding bullets into a movable section of said barrel prior to the compression of gas in said chamber, and means for preventing the discharge of a bullet from said said section upon the compressing stroke of said piston.

17. In a motor gun, the combination, with a gun barrel, an explosion chamber opening into said barrel, of a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for feeding bullets into a movable section of said barrel prior to the compression of gas in said chamber, means engageable with said barrel section for preventing the discharge of a bullet from said barrel section upon the compressing stroke of said piston, an inlet valve for controlling the inlet of gas into said chamber, said valve operated by the suction created upon the outward stroke of said piston for admitting gas to the explosion chamber.

18. In a motor gun, the combination, with a gun barrel, an explosion chamber opening into said gun barrel, of a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for locking said piston against reciprocatory movement at predetermined times, means for feeding

bullets into said barrel including, a sprocket wheel, a chain, resilient clips carried by said chain, bullets carried by said resilient clips, means for rotating said sprocket in a step by step rotation for moving bullets into a loading position, a rotary bullet feeding chamber, means for rotating said chamber into a bullet receiving position, means for forcing bullets out of said clips into said chamber when the latter is in a bullet receiving position, and means for moving said chamber into a bullet discharging position.

19. In a motor gun, the combination, with a gun barrel, an explosion chamber opening into said gun barrel, of a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for feeding bullets into said barrel including, a sprocket wheel, a chain, resilient clips carried by said chain, bullets carried by said clips, means for rotating said sprocket in a step by step rotation for moving bullets into a loading position, means for forcing bullets out of said clips, and means for automatically operating said last named means.

20. In a motor gun, the combination, with a gun barrel, an explosion chamber opening into said gun barrel, of a movable barrel section adjoining the explosion chamber, a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for feeding bullets into said movable barrel section including, a sprocket wheel, a chain, resilient clips carried by said chain, bullets carried by said clips, means for rotating said sprocket in a step by step rotation for moving bullets into a loading position, means for forcing bullets out of said clips, means for automatically operating said last named means, and means for preventing the discharge of a bullet from said barrel section upon the compressing stroke of said piston.

21. In a motor gun, the combination, with a gun barrel, and an explosion chamber opening into said barrel, of a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for feeding bullets to said barrel including a sprocket wheel, a chain, resilient clips carried by said chain, bullets carried by said clips, means for rotating said sprocket in a step by step rotation for moving bullets into a loading position, said feeding means also including a bullet receiving chamber, means for moving said chamber into a bullet receiving position, means for forcing bullets out of said clips into said chamber, means for automatically operating said last named means, and means for moving said chamber into a bullet discharging position, a contractile ring mounted in said chamber for gripping a bullet to prevent accidental discharge of the bullet from the bullet receiving chamber upon the compressing stroke of said piston.

22. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a reciprocatory piston mounted in said chamber for compressing gas in the chamber, means for forcing said piston into an inward compressing stroke, means for moving said piston in an outward intake stroke, means for feeding bullets to said barrel, including a movable chamber, means operable by said means for moving said piston outwardly for forcing bullets into said chamber.

23. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a reciprocatory piston mounted in said chamber for compressing gas in the chamber, means for forcing said piston into an inward compressing stroke, means for moving said piston in an outward intake stroke, means for feeding bullets to said barrel, including a movable chamber, means, operable by said means for moving said piston outwardly, for forcing bullets into said chamber, and bullet gripping means carried by said chamber for preventing the accidental discharge of a bullet during the compressing stroke of said piston.

24. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a reciprocatory piston mounted in said chamber for compressing gas in the chamber, means for forcing said piston into an inward compressing stroke, means for moving said piston in an outward intake stroke, an inlet valve for controlling the inlet of gas into said chamber, said valve operated by the suction created upon the outward intake stroke of said piston for admitting gas to said chamber, means for feeding bullets to said barrel including a movable chamber, means, operable by said means for moving said piston outwardly, for forcing bullets into said chamber.

25. In a motor gun, the combination of a barrel, an explosion chamber opening into said barrel, a reciprocatory piston mounted in said chamber for compressing gas in the chamber, means for forcing said piston into an inward compressing stroke, means for moving said piston in an outward intake stroke, means for feeding bullets to said barrel including a movable chamber, means operable by said means for moving said piston outwardly for forcing bullets into said chamber, water jackets surrounding said barrel and chamber, a pump, and means for operating said pump to force water into said water jackets upon the compressing action of said piston.

26. In a motor gun, the combination of a barrel, an explosion chamber opening into said barrel, a reciprocatory piston mounted in said chamber for compressing gas in the chamber, means for forcing said piston into an inward compressing stroke, means for moving said piston in an outward intake stroke, means for feeding bullets to said barrel including a movable chamber, means operable by said means for moving said piston outwardly for forcing bullets into said chamber, water jackets surrounding said barrel and chamber, a pump, means for operating said pump to force water into said water jackets upon the compressing action of said piston, and means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke.

27. In a motor gun, the combination of a barrel, an explosion chamber opening into said barrel, a reciprocatory piston mounted in said chamber for compressing gas in the chamber, means for forcing said piston into an inward compressing stroke, means for moving said piston in an outward intake stroke, means for feeding bullets to said barrel including a movable chamber, means operable by said means for moving said piston outwardly for forcing bullets into said chamber, water jackets surrounding said barrel and chamber, a pump, means for operating said pump to force water into said water jackets upon the compressing action of said piston, means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke, and means for reversing the direction of operation of said pump for releasing said locking means.

28. In a motor gun, a bullet receiving chamber, means for moving said chamber into a bullet receiving position, means for moving said chamber into a bullet firing position, a contractile caliber ring mounted in said chamber for gripping a bullet to prevent accidental discharge of the bullet from said chamber.

29. In a motor gun, a discharge barrel, a shot receiving barrel section rotatable in the horizontal plane of the barrel, a shot feeder rotatable in a plane at right angles to the rotation of said barrel section, and laterally projecting delivering means transversely movable relatively to said feeder adapted to register with the opening of the shot receiving barrel section.

30. In a motor gun, a belt, rotatable feeding means for said belt, shot retaining means on said belt substantially at right angles to the plane of the rotation of said feeding means, a gun barrel section at one side of said feeding means and rotatable substantially at right angles thereto, reciprocating pushing means at the other side of said feeding means in alinement with the rotatable barrel section and with one of the shot retaining means in line with said barrel section, and means associated with said pushing means for rotating said feeding means.

31. In a motor gun, a belt, vertically rotatable belt feeding means, yieldable shot retaining means on said belt substantially at right angles to the plane of rotation of the feeding means, a horizontally rotatable gun barrel section at one side of said feeding means, shot receiving means on said barrel section in alinement with one of said shot retaining means, horizontally reciprocating pushing means at the other side of said feeding means, and instrumentalities on said pushing means for rotating said feeding means.

32. In a motor gun, a belt, rotatable feeding means for said belt, shot retaining means on said belt substantially at right angles to the plane of rotation of said feeding means, a transversely rotatable and transversely bored gun barrel section at one side of said feeding means and rotatable substantially at right angles thereto, a reciprocating pushing member on the other side of said feeding means and adapted to register with the transverse bore of the barrel section in one position of the same, a compression chamber adapted to register with the bore in the other position of the barrel section, and means on said pushing member adapted to operate said feeding means, and means for rotating said barrel section.

33. In a motor gun, a belt, rotatable feeding means for said belt, shot retaining means on said belt substantially at right angles to the plane of rotation of said feeding means, a barrel section transversely rotatable and transversely bored with relation to the plane of rotation of said feeding means and on one side of the same and rotatable substantially at right angles thereto, a reciprocating pushing and shot feeding member on the other side of said feeding means adapted to register with the transverse bore of the barrel section in one position of the same, a compression chamber adapted to register with said bore in the other position of the barrel section, means on said pushing and feeding member adapted to operate said belt feeding means, means for rotating said barrel section, a reciprocating piston in said chamber, means operating said piston, a prime mover, means on said prime mover for rotating said barrel section and for locking the piston in position, and a magneto operated by the prime mover.

34. In a motor gun, a discharge barrel, a rotatable transversely bored barrel section at the rear of said discharge barrel, a barrel

casing loosely surrounding said barrel section the bore of the barrel section adapted to aline with the bore of the discharge barrel, peripheral external compression rings surrounding said barrel section and longitudinally extending external compression bars connecting said compression rings.

35. In a motor gun, the combination, of a barrel, a cylinder having an explosion chamber formed therein and opening into said barrel, a shot receiving chamber rotatably carried by said cylinder, a gas compressing piston mounted in said cylinder, means for locking said piston against movement at predetermined times, means connected to said shot receiving chamber and said locking means for releasing said locking means and for moving said bullet receiving chamber into a bullet receiving position, and for moving said shot receiving chamber into a firing position and locking said locking means.

36. In a motor gun, a barrel, an explosion chamber opening into said barrel, a bullet receiving chamber provided with a bullet receving bore, means for rotating said chamber to position said bore transversely to the barrel, means for feeding the bullets into said bore, means for drawing a charge of gas into said chamber while said bullet receiving chamber is positioned for receiving bullets, means for rotating said chamber to aline said bore with said barrel, means for compressing a charge of gas in said chamber and means for igniting a compressed charge of gas in said chamber for forcing a bullet out of said barrel.

37. In a motor gun, a gas compressing piston having a groove formed therein, a rotary locking pin having one side cut away, and means for rotating said pin for positioning a portion thereof in said groove to lock said piston against movement.

38. In a motor gun, a gas compressing piston having a groove formed therein transversely to the direction of movement of the piston, a rotary locking pin having one side cut away, means for rotating said pin for positioning a portion thereof in said groove to lock said piston against movement, means for reversing the direction of said pin for positioning the cut away portion at said groove to permit movement of said piston.

39. In a motor gun, a barrel, an explosion chamber opening into said barrel, a piston for compressing gas into said chamber, a bar for operating said piston having a shoulder formed thereon, a slide block mounted upon said bar, a prime moyer, means connecting said slide to said prime mover for driving said slide against said shoulder to move said bar for moving said piston in an inward compressing stroke.

40. In a motor gun, a barrel, an explosion chamber opening into said barrel, a piston for compressing gas into said chamber, a bar for operating said piston having a shoulder formed thereon, a slide block mounted upon said bar, a prime mover, means connecting said slide to said prime mover for driving said slide against said shoulder to move said bar for moving said piston in an inward compressing stroke, a spring connected to said bar for returning it, after forced movement by said prime mover, to move said piston in an outward intake stroke.

41. In a motor gun, a barrel, an explosion chamber opening into said barrel, a piston for compressing gas into said chamber, a bar for operating said piston having a shoulder formed thereon, a slide block mounted upon said bar, a prime mover, means connecting said slide to said prime mover for driving said slide against said shoulder to move said bar for moving said piston in an inward compressing stroke, a spring connected to said bar for returning it, after forced movement by said prime mover, to move said piston in an outward intake stroke, a rack formed upon said bar, and means operated by said rack during movement of said bar to feed bullets to said barrel.

42. In a motor gun, a barrel, an explosion chamber opening into said barrel, a piston for compressing gas in said chamber, a bar for operating said piston having a shoulder formed thereon, a slide block mounted upon said bar, a prime mover, means connecting said slide to said prime mover for driving said slide against said shoulder and for moving said bar to move said piston in an inward compressing stroke, a spring connected to said bar for returning it, after forced movement by said prime mover, to move said piston in an outward intake stroke, said piston having a groove formed therein transversely to the direction of movement of the piston, a rotary locking pin having one side cut away, and means for rotating said pin for positioning a portion thereof in said groove to lock said piston against movement, means for reversing the rotation of said pin for positioning the cut away portion at said groove to permit movement of the piston.

43. In a motor gun, a barrel, an explosion chamber opening into said barrel, a piston for compressing gas in said chamber, a bar for operating said piston having a shoulder formed thereon, a slide block mounted upon said bar, a prime mover, means connecting said slide to said prime mover for driving said slide against said shoulder and for moving said bar to move said piston in an inward compressing stroke, a spring con-

nected to said bar for returning it, after forced movement by said prime mover, to move said piston in an outward intake stroke, said piston having a groove formed therein transversely to the direction of movement of the piston, a rotary locking pin having one side cut away, means for rotating said pin for positioning a portion thereof in said groove to lock said piston against movement, means for reversing the rotation of said pin for positioning the cut away portion at said groove to permit movement of the piston, and means operably connected to said locking pin rotating means for moving the pin into a piston locking position upon the completing of each compression stroke of the piston.

44. In a motor gun, a barrel, an explosion chamber opening into said barrel, a piston for compressing gas in said chamber, a bar for operating said piston having a shoulder formed thereon, a slide block mounted upon said bar, a prime mover, means connecting said slide to said prime mover for driving said slide against said shoulder and for moving said bar to move said piston in an inward compressing stroke, a spring connected to said bar for returning it, after forced movement by said prime mover, to move said piston in an outward intake stroke, said piston having a groove formed therein transversely to the direction of movement of the piston, a rotary locking pin having one side cut away, means for rotating said pin for positioning a portion thereof in said groove to lock said piston against movement, means for reversing the rotation of said pin for positioning the cut away portion at said groove to permit movement of the piston, means, operably connected to said locking pin rotating means for moving the pin into a piston locking position upon the completing of each compression stroke of the piston, means for exploding a charge of compressed gas within said explosion chamber, and means for regulating the speed of operation of said piston, and means for regulating the speed of operation of said igniting means.

45. In a motor gun, a barrel, a bullet receiving chamber provided with a bore, means for moving said bullet receiving chamber for positioning said bore in a bullet receiving position, means for moving said chamber in a bullet discharging position, said bullet receiving chamber provided with a pair of annular recesses and a plurality of longitudinally extending recesses communicating with said annular recesses, piston rings mounted in said annular recesses and compression blocks mounted in said longitudinally extending recesses.

46. In a motor gun, a barrel, a bullet receiving chamber provided with a bore, means for moving said bullet receiving chamber for positioning said bore in a bullet receiving position, means for moving said chamber into a bullet discharging position, said bullet receiving chamber provided with a pair of annular recesses, and a plurality of longitudinally extending recesses communicating with said annular recesses, piston rings mounted in said annular recesses, compression blocks mounted in said longitudinally extending recesses, said piston rings provided with recesses, the ends of said compression blocks seated in said piston ring recesses whereby the compression blocks will move in unison with movement of the piston rings.

47. In a motor gun, the combination, of a barrel, a cylinder having an explosion chamber formed therein and opening into said barrel, a bullet receiving chamber rotatably carried by said cylinder, a gas compressing piston mounted in said cylinder, means for locking said piston against movement at predetermined times, means connected to said bullet receiving chamber and said locking means for releasing said locking means and for moving said bullet receiving chamber into a bullet receiving position, and for moving said bullet receiving chamber into a firing position and locking said locking means, said bullet receiving chamber provided with a pair of annular recesses and a plurality of longitudinally extending recesses communicating with said annular recesses, piston rings mounted in said annular recesses, compression blocks mounted in said longitudinally extending recesses, said piston rings provided with recesses, the ends of said compression blocks seated in said piston ring recesses whereby the compression blocks will move in unison with the movement of the piston rings.

48. In a motor gun, a barrel, an explosion chamber opening into said barrel, a bullet receiving chamber provided with a bullet receiving bore, means for rotating said chamber to position said bore transversely to the barrel, means for feeding bullets into said bore, means for drawing a charge of gas into said chamber, while said bullet receiving chamber is positioned for receiving bullets, means for rotating the chamber to aline said bore with said barrel, means for compressing a charge of gas in said chamber, means for igniting a compressed charge of gas in said chamber for forcing a bullet out of said barrel, said bullet receiving chamber provided with a pair of annular recesses, and a plurality of longitudinally extending recesses communicating with said annular recesses, piston rings mounted in said annular recesses, compression blocks mounted in said longitudinally extending recesses, said piston rings provided with recesses, the ends of said compression blocks seated in

said piston ring recesses, whereby the compression blocks will move in unison with the movement of the piston rings to prevent the escape of compressed gas about said bullet receiving chamber.

49. In a motor gun, a barrel, an explosion chamber opening into said barrel, a bullet receiving chamber provided with a bullet receiving bore, means for rotating said chamber to position said bore transversely to the barrel, means for feeding bullets into said bore, means for drawing a charge of gas into said chamber while said bullet receiving chamber is positioned for receiving bullets, means for rotating said chamber to aline said bore with said barrel, means for compressing a charge of gas in said chamber, means for igniting a compressed charge of gas in the chamber for forcing a bullet out of said barrel, and means carried by said bullet receiving chamber to prevent the escape of compressed gas about the chamber.

50. In a motor gun, the combination, of a gun barrel, an explosion chamber opening into said gun barrel, a piston reciprocably mounted within said explosion chamber for compressing gas in the chamber, means for operating said piston, means for locking said piston against reciprocatory movement at predetermined times, means for feeding bullets into said barrel, including a sprocket wheel, a chain, resilient clips carried by said chain, bullets carried by said resilient clips, means for rotating said sprocket in a step by step rotation for moving bullets in a loading position, a rotary bullet feeding chamber, means for rotating said chamber into a bullet receiving position, means for forcing bullets out of said clips into said chamber when the latter is in a bullet receiving position, means for moving said chamber into a bullet discharging position, and means carried by said chamber to prevent the escape of compressed gas about the chamber.

51. In a motor gun, the combination of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine, to move said piston in a compressing stroke, means for controlling the operation of said engine, for regulating the speed of operation of said piston, and means for locking said engine operated means against operation to permit the engine to operate independently of operation of said compressing piston.

52. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, water jackets surrounding said chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets, means for controlling the operation of said engine for regulating the speed of operation of said piston, means for locking said engine operated means against operation to permit said engine to operate independently of the operation of said compressing piston.

53. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets upon the compressing action of said piston, means for reversing the direction of operation of said pump for forcing a supply of lubricating oil to the working parts of the rifle, and locking means for locking said pump against operation to permit said engine to operate independently of said pump and compressing piston.

54. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said barrel and chamber, a pump, means operated by the operation of said engine for operating said pump to force water into said water jackets upon the compressing stroke of said piston, means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke, means for reversing the direction of operation of said pump for releasing said locking means, and locking means for locking said pump against operation to permit said engine to operate independently of said pump and compressing piston.

55. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted in said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, water jackets surrounding said barrel and chamber, means for forcing a water circulation through said jackets, and means for locking said engine operated means against operation to permit

said engine to operate independently of the operation of said compressing piston.

56. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted in said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, and means for locking said engine operated means against operation to permit said engine to operate independently of the operation of said compressing piston.

57. In a motor gun, a barrel, a cylinder attached to the breech of said barrel, a volatile gas compressing piston reciprocably mounted in said cylinder, means for operating said piston, means for igniting a compressed charge of gas in said cylinder, means for locking said piston against reciprocatory movement during the explosion of gas within said cylinder, and means for locking said piston against movement to allow said piston operating means to run idly.

58. In a motor gun, a barrel, a cylinder attached to the breech of said barrel, a volatile gas compressing piston reciprocably mounted within said cylinder, means for operating said piston, means for igniting a compressed charge of gas in said cylinder, and means for locking said piston against movement to allow said piston operating means to run idly.

59. In a motor gun, the combination of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said barrel and chamber, a pump, a slide bar carried by said pump, an arm carried by said slide bar, a cam rotated by said engine and engaging said slide bar carried arm for moving said pump in one direction to force water into said water jackets upon the compressing stroke of said piston, means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke, and means for reversing the direction of operation of said pump for releasing said locking means.

60. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said chamber, a pump, a slide bar carried by said pump, an arm carried by said slide bar, a cam rotated by said engine and engaging said slide bar carried arm for moving said pump in one direction to force water into said water jackets upon the compressing action of said piston, means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke, a spring connected to said arm for reversing the direction of operation of said pump for releasing said locking means and forcing a supply of lubricating oil to the working parts of the rifle.

61. In a motor gun, the combination, of a barrel, an explosion chamber opening into said barrel, a gas compressing piston mounted within said explosion chamber, an internal combustion engine, means operated by the operation of said engine to move said piston in a compressing stroke, means for moving said piston outwardly from a compressing stroke, water jackets surrounding said barrel and chamber, a pump, a slide bar carried by said pump, an arm carried by said slide bar, a cam rotated by said engine and engaging said slide bar carried arm for moving said pump in one direction to force water into said water jackets upon the compressing action of said piston, means operated by said pump for locking said piston against movement when it reaches the terminal of its compressing stroke, a spring connected to said arm for reversing the direction of operation of said pump for releasing said locking means and to force a supply of lubricating oil to the working parts of the rifle, a locking arm for locking said slide bar and pump against movement, means for locking said locking arm in a locking position, and means operated by said engine for moving said locking arm into an inoperative position upon release from the arm locking means.

62. In a motor gun, in combination a relatively stationary discharge barrel, a rotating barrel section at the rear of and in line with said discharge barrel, a compression chamber at the rear of said barrel section and communicating therewith, a cooling jacket surrounding the barrel parts and the compression chamber, lubricating conduits in the surrounding walls of the rotating barrel section and of said compression chamber, a radiator and a lubricator receptacle, and a double chambered pump, one of whose chambers is connected to the lubricating conduit and to the receptacle the other pump chamber being connected to the radiator and to the water jacket.

63. In a motor gun, as specified in claim 62, a reciprocating piston in said compression chamber, a prime mover operating said

pump, and means on said pump for rotating said barrel section and for locking and unlocking said reciprocating piston.

64. In a motor gun, as specified in claim 62, a reciprocating piston in said compression chamber, a prime mover, regulating and timing means operated by said prime mover and engageable with said pump at predetermined times, and means on said pump for rotating said barrel section and for locking and unlocking said reciprocating piston.

65. In a motor gun, as specified in claim 62, a reciprocating piston in said compression chamber, a prime mover, a cam adapted to engage with said pump, and means on said prime mover for moving said cam in a planetary path, and means on said pump for rotating said barrel section and for locking and unlocking said reciprocating piston.

66. In a rifle, a barrel, an explosion chamber, a bullet holding chamber between the said barrel and said explosion chamber, means for charging the explosion chamber with an explosive gas, mechanism for compressing the gas, means for moving said bullet holding chamber into a bullet receiving position, means for moving said chamber into a bullet firing position, and means for exploding the charge.

67. In a motor gun, a gun barrel, a rotatable gun barrel section, a gas compressing piston, piston locking means, a pump, operably connected to said barrel section and to said compressing piston locking means, a motor engine, a timing gear, operably connected to said engine, a slidable forked bar, a locking spring engageable with one of the legs of said bar, means on said timing gear and engageable with said spring and with said pump, and spring acting motion-reversing means connected to said pump.

68. In a motor gun, a gun barrel, a rotatable gun barrel section, a gas compressing piston, piston locking means, a pump, operably connected to said locking means, a rotatable engine shaft, a rotatable cam operated by said shaft, projecting means on said cam, a locking spring engageable by said projecting means, a slidable forked bar engageable with said locking spring, and spring-acting motion-controlling means connected to said pump.

69. In a motor gun, a gun barrel, a rotatable gun barrel section, a gas compressing piston, piston locking means, a pump operably connected to said gun barrel section and to said locking means, a rotatable engine shaft, slidable projecting means on said pump, a timing gear operably connected to said shaft, a cam on said timing gear, engageable with said slidable pump-projecting means, a slidable forked bar, guiding means for said bar and locking means for said bar, one of the arms of said bar being arranged adjacent the pump-mounted projecting means, projecting means on said cam, a locking spring engageable with the other arm of said forked bar, said spring being also engageable with said cam-mounted projecting means.

70. In a motor gun, a gun barrel, a rotatable gun barrel section, a gas compressing piston, piston locking means, a pump operably connected to said barrel section and to said locking means, a rotatable engine shaft, a slidable projecting arm connected to said pump, a timing gear operably connected to said shaft, a cam eccentrically mounted on said timing gear and engageable with said slidable projecting arm, a slidable forked bar, guiding means for said bar and locking means engageable with said bar, one of the arms of said bar being arranged adjacent said slidable projecting arm, a roller mounted on and projecting from the outer surface of said cam, a locking spring engageable with the other arm of said forked bar, said spring being also engageable with said cam mounted roller.

71. In a motor gun as specified in claim 70, shot feeding means rotatable in a plane at right angles to the rotation of said barrel section, and shot delivering means transversely movable relatively to said feeding means.

72. In a motor gun a gun barrel, a rotatable gun barrel section, a gas compressing piston in line with said gun barrel, piston locking means, a pump operably connected to said barrel section and to said locking means, a rotatable engine shaft, a slidable projecting arm connected to said pump, a timing gear operably connected to said shaft, a cam eccentrically mounted on said timing gear and engageable with said slidable projecting arm, a slidable forked bar at an angle to said barrel and to said pump, guiding means for said bar and locking means engageable with said bar, the fork-arms of said bar being of unequal length, one of the arms of said bar being arranged adjacent said slidable projecting arm, a roller mounted on and projecting from the outer surface of said cam, a locking spring engageable with the other arm of said forked bar, said spring being also engageable with said cam-mounted roller.

73. In a motor gun as specified in claim 72, shaft feeding means rotatable in a plane at right angles to said barrel section and shot delivering means transversely movable relatively to said feeding means.

74. In a fire arm, the combination with the barrel thereof, of a rock-body having means for releasably holding a shot and bringing

it into alinement with said barrel, means for supplying the barrel with a charge of explosive gas, mechanism for compressing the charge, and means for exploding the charge.

75. A gun comprising a barrel, means to supply a combustible mixture under pressure at the breech of the gun, and projectile feeding instrumentalities coöperating with the barrel and said means, said instrumentalities including a loading sleeve having means to rotate the same at predetermined intervals to feed projectiles successively to the barrel.

In testimony whereof I affix my signature in presence of two witnesses.

LINDEN I. PETTYS.

Witnesses:

F. R. MALONEY,

L. EARL PETTYS.