C. C. BLACKMORE.

AUTOMATIC GUN.

APPLICATION FILED NOV. 7, 1918.

1,351,017.

Patented Aug. 31, 1920.

4 SHEETS—SHEET 1.

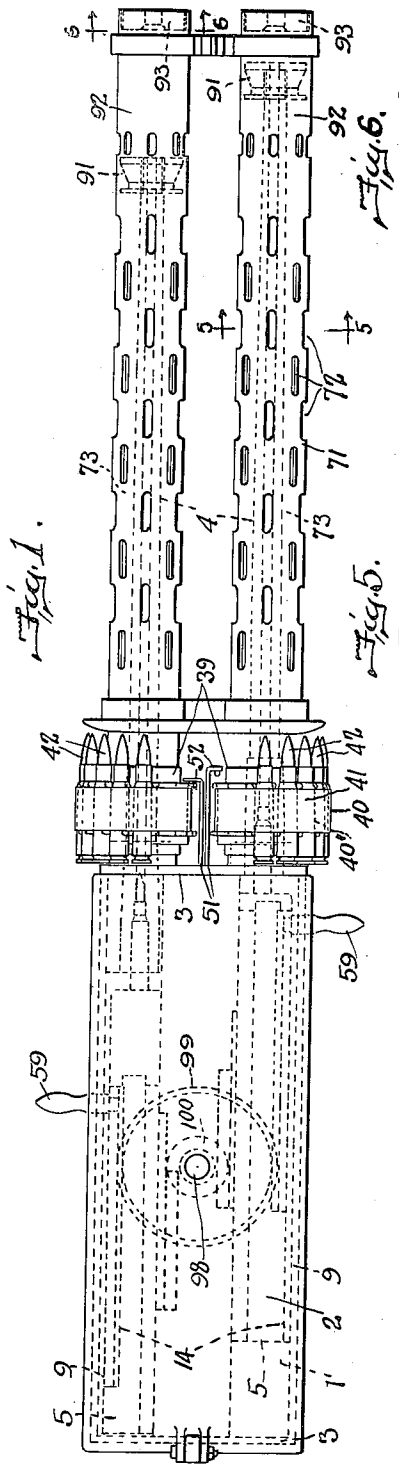

Fig. 1.

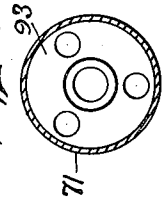

Fig. 6.

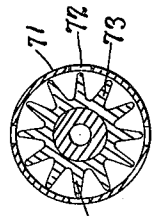

Fig. 5.

Fig. 4.

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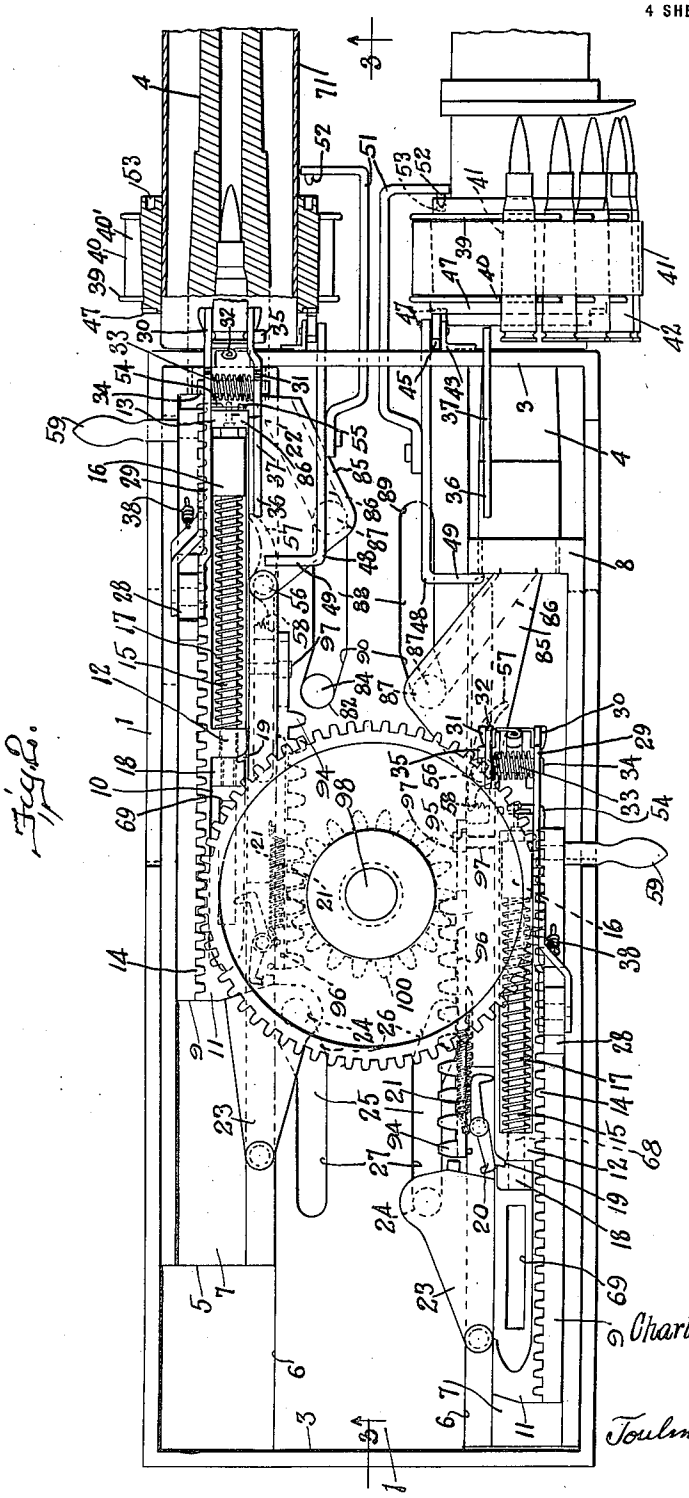
4 SHEETS—SHEET 2.

Fig. 2.



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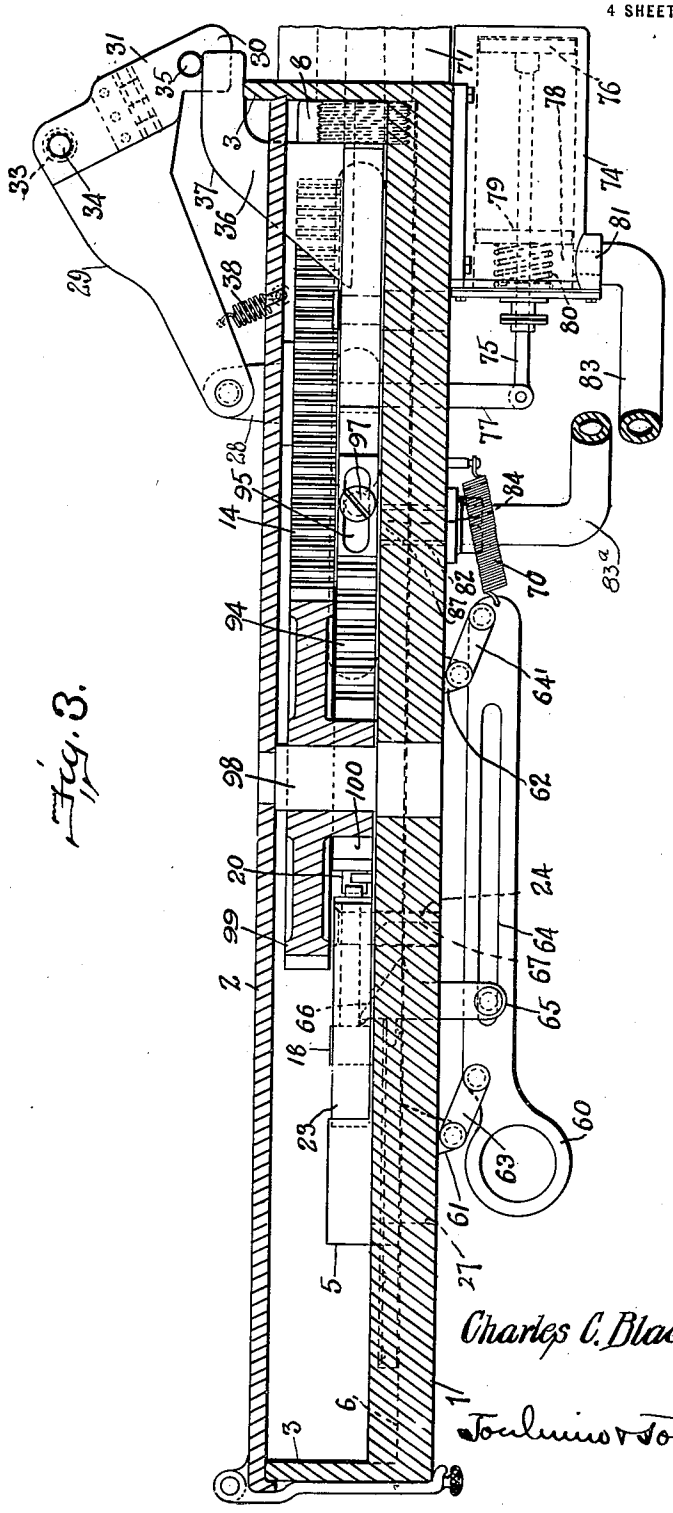

Fig. 3.

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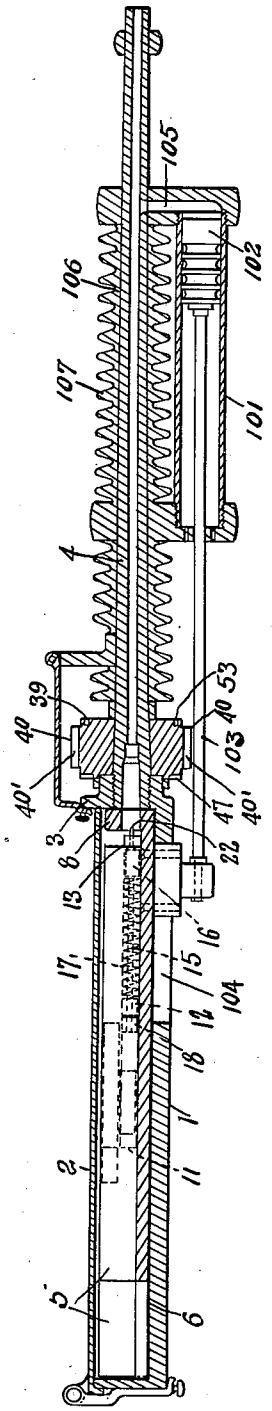
4 SHEETS—SHEET 4.

Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES C. BLACKMORE, OF DAYTON, OHIO.

AUTOMATIC GUN.

1,351,017. Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed November 7, 1918. Serial No. 261,446.

To all whom it may concern:

Be it known that I, CHARLES C. BLACKMORE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Automatic Guns, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in automatic guns.

These improvements consist in a novel arrangement of twin guns, or two duplicate gun mechanisms, in such a manner as that the reacting force of discharge of one of the guns may be utilized to load and fire the other gun.

By such an arrangement of twin guns and utilization of the reacting force resultant from the discharge thereof, the rapidity of firing may be greatly increased as each single gun is capable of being fired as rapidly as it would be if used independently.

Combining two guns in this manner with the same operating mechanism results in effect in increasing the rapidity of firing to approximately twice that of a single automatic gun.

The twin guns are associated and operated in a manner that permits of small compact proportions of the mechanism, the minimum in size and weight being maintained. The construction consists of simple, but highly efficient mechanism, only the minimum of parts being used. Practically all operable parts have positive movements, the use of springs being limited to parts where breakage is not likely to occur.

The entire mechanism is designed and organized in a manner to provide for easy dismantling and reassembling of the parts so that an ordinary mechanic or soldier instructed in the use of the gun will experience no trouble in keeping it in normal working condition.

In size and weight the combined guns compare favorably with the latest improved automatic guns of like caliber and therefore have the same advantages with respect to portability and general adaptability to conditions of use.

The advantages of such an arrangement of two guns with loading and firing mechanism common to both guns will readily be apparent when it is understood that aside from dependability and durability, the prime requisite for an automatic gun, is the rapidity with which it may be fired.

It is obvious, therefore, that duplicate guns so arranged will fire twice as rapidly as a single gun, all other conditions being equal, and will be twice as effective as the single gun with the added advantage of being operable by one man instead of two.

The twin guns are also peculiarly adaptable for special uses such as in armored cars or tanks and aeroplanes where it is desirable to equip with guns heavier than rifle size, the construction being such as is readily adaptable to all sizes of guns using fixed ammunition.

An important feature of my invention consists of improved means for air cooling the guns in addition to the usual means employed for cooling the barrels externally in guns of this character. I have evolved an arrangement whereby a current of air is forced into each barrel and through the barrel each time the barrel is fired, thus aiding materially to prevent excessive heating of the mechanism during severe usage and contributing to the effectiveness with which the guns may be operated and also to the prolongation of the life of the mechanism.

In view of the double capacity of the guns it is obvious, of course, that to obtain the maximum rapidity of firing of a single automatic gun, it is necessary only to fire each barrel half as rapidly as the single gun to attain to an equal effectiveness. Thus, the twin guns will discharge projectiles as rapidly as the maximum speed of a single barrel gun with a greatly reduced tendency of the barrels to become heated.

Upon this equal basis of firing the advantages are decidedly in favor of the duplicate guns because the tendency to overheat the barrels and mechanism is minimized. The rapidity of firing the duplicate guns may be increased, of course, until each barrel is firing at the maximum speed of a single automatic gun,—the two barrels firing at twice the speed of a single gun without any relative disadvantage with respect to heating.

However, the improved methods I have discovered in the evolution of my invention for cooling the gun barrels by forcing air into each barrel after it is fired serves to further aid in preventing overheating thereof, so that at the maximum speed of firing

the tendency of the guns to overheat is materially reduced.

In the accompanying drawings I have illustrated the preferred form of construction of my invention, wherein the recoil of each barrel is directly employed to clear itself each time after firing and to load and fire the other barrel. To this end I utilize the gases which result from the discharge of the explosives to increase the force of the recoil in order that there may be ample force to actuate the loading and firing mechanism. The two forms of construction shown in the drawings are known as recoil operated guns and gas operated guns.

The normal arrangement of the gun barrels of my invention is to arrange the barrels longitudinally of each other, but the general construction and operation of the mechanism is such as may be readily adapted to an arrangement of the barrels at any angular relation to each other or to barrels capable of angular adjustment independent of each other.

Also as far as I am aware I am the first to employ means for forcibly discharging air into the gun barrel after each discharge thereof to cool the barrel. This feature, however, is not essential to the main purpose of my invention above stated, but is important in that it contributes materially to the effectiveness with which the guns may be continuously operated at high speed of firing.

While I have described the gun as a twin gun, it is obvious that a greater number of gun mechanisms may be associated in the same way, the arrangement of the mechanism being such that the firing of one gun will act to clear itself after each discharge thereof and to load and fire another gun in a fixed sequence of operation.

It is also obvious that my invention is not limited to guns for rifle firing. The principle of the invention is equally applicable to all kinds and sizes of breech loading guns in which cartridges or shells are used for loading.

Referring to the drawings, Figure 1 is a plan view of the gun, showing in dotted lines the limits of movement of the gun barrels; Fig. 2 is a plan view of the loading and firing mechanism with the top plate of the frame removed; Fig. 3 is a longitudinal sectional view of the mechanism taken on the line 3—3 of Fig. 2; Fig. 4 is a detail of part of the air cooling system; Fig. 5 is a sectional view through one of the gun barrels; Fig. 6 is a sectional view of the gas pressure chamber, gun barrel and tube; Fig. 7 is a longitudinal, sectional view of a modified form of construction wherein the gas resulting from firing the guns is utilized by direct connections to actuate the loading and firing mechanism.

In the drawings, 1 is a horizontal frame member in which the loading and firing mechanism is mounted. The frame is of such a construction as is readily adaptable to either the mounted or portable type of gun. The flat horizontal frame is preferably made with the bottom and sides thereof integral, the top plate 2 and ends 3 being secured thereto in any suitable manner. The mechanism within the frame is placed upon the bottom thereof. When the top plate is removed all the mechanism is fully exposed and any part thereof may be readily adjusted or removed.

Special attention has been given in the design of the frame and the mechanism contained therein to simplicity of construction, ease of adjustment and reassembly, all the parts being readily accessible, so that an ordinary layman instructed in the use of the gun will experience no difficulty in dismantling and reassembling the mechanism.

The guns are of equal caliber and comprise duplicate mechanisms throughout. In describing their construction and operation therefore, only one gun unit will be described, it being understood that the description applies equally to the construction and operation of each gun.

Supported by the frame between the top and bottom thereof is the gun barrel 4 which, in the preferred form of construction, is provided with an extension 5 which forms part of the receiving mechanism of the gun and is movably supported on the bottom of the frame. The extension 5 is fixed to the gun barrel and is movable therefore with the longitudinal recoil of the barrel when the gun is fired and also movable with the barrel when the same is returned to firing position after each recoil thereof.

The expansion 5 slides in guideways 6 formed in the bottom of the frame 1 and extending substantially the entire length of the frame. The member 5 is provided with guideways 7 extending substantially the entire length of said member and terminating at its forward end in a head or cross wall 8 to which the barrel 4 is rigidly secured.

Operable in the guideways 7 is a breech bolt 9 provided with a guideway 10 extending substantially the entire length thereof and terminating in transverse end walls 11 and 13 and having a central transverse wall 12. Rigidly secured to the breech bolt is a rack 14 extending substantially the entire length of the breech bolt along the upper edge thereof; the purpose of which will presently be explained.

Movable in the guideway 10 is a firing pin 15 which is slidably supported in an aperture extending through the central wall 12 of the breech bolt 9 and by an enlarged end portion 16 which has a sliding fit in the guideway. Between the end 16 and the wall

12 and surrounding the firing pin is a spring 17 which is compressed against the wall 12 and exerts pressure against the enlarged end 16 when the firing bolt is set in operative position.

Secured to the rear end of the firing pin outside of the wall 12 is a head 18 having a notch or shoulder 19 adapted to be engaged by a latch 20 pivotally secured to the sliding member 5 and drawn toward the notch 19 by a spring 21 which acts to prevent forward movement of the firing pin during the interval when the mechanism is being closed ready for firing. The forward end of the enlarged portion 16 of the firing pin is provided with a point 22 which projects through the end wall 13 of the breech bolt 9 and strikes the firing cap of the cartridge when the firing pin is released.

Also pivotally mounted upon the member 5 adjacent to and to the rear of the latch 20 is a sear or locking device 23 for the breech bolt which also acts to trip the latch 20 to release the firing pin when the mechanism is closed ready for firing. Attached to the sear 23 on the under side thereof is a stud 24 coacting with a slot 25 in the bottom of the frame 1. The slot consists of an angular portion 26 and a longitudinal portion 27 which act, respectively, through the stud 24 to move the sear into and out of locking engagement with the breech bolt and tripping relation with the latch 20; also to hold the sear out of operative relation during an interval of the firing operation.

Explanation will now be made of the mechanism which serves to combine the twin guns and to control them in fixed sequence of automatic operation.

To this end the breech bolts 9 are each provided with the racks 14 to which reference has been made. The extensions 5 of the receiver mechanism are also each provided with racks 94 loosely secured to the members 5 by slots 95 and 96 and retaining studs 97, the rack and slide thus being provided with a limited amount of longitudinal movement relative to each other, the longitudinal movement of the racks 94 permitted by the slots 95 and 96 provides a slight pause in the mechanism at the beginning and end of each firing action, thus permitting a novel arrangement to cool the barrels which will be described herein in detail, to function properly, and also serves to retain the racks constantly in full mesh with the gear 100 and acts further to prevent jamming of the mechanism.

Secured to a vertical shaft 98 having bearings in the upper and lower walls of the frame 1 are gears 99 and 100 meshing, respectively, with racks 14 and 94 and serving therefore to unite the gun mechanisms in the reciprocal action and in fixed sequence of automatic operation. The mechanisms are so arranged that the respective functions of operation occur at opposite intervals of time, the firing of one barrel, as stated, acting to clear itself for the next firing charge by ejecting the exploded cartridge and to load and fire the other barrel and vice versa in continuous operation.

Secured to the top edge of the rack 14 is the loader mechanism consisting of a bracket 28 which has pivoted thereto an angular shaped arm 29 having its free end shaped, as at 30, to engage one side and the rim of a cartridge. Hinged to the inside of the arm 29 in any suitable manner, as at 32, is a plate 31 corresponding to the end 30 of the arm 29 to engage the opposite side and rim of the cartridge; the end of the plate 31 being pressed toward the end 30 of the arm by a spring 33 positioned on a stud 34 rigidly secured in the arm 29 and freely projecting through the plate 31. Adjacent the free ends of the arm and plate is a second stud 35 rigidly secured in the arm 29 and also freely projecting through the plate 31, the two studs acting as guides for the plate 31 in its pivotal relation with the forward arm 29.

Secured in the end wall of the member 3 is a vertically disposed plate 36 having an angular surface 37 upon which the projecting end of the stud 35 rides as the breech bolt is moved back and forth in the guideways 10, the arm 29 and parts carried thereby being drawn downward by a spring 38, the angular surface 37 acting to prevent excessive downward movement thereof and to lift the arm to present the loading mechanism in proper relation to the cartridge reels.

The cartridge supplying devices are positioned adjacent the forward end of the frame 1 above the gun barrels and may be of any well known construction either of the belt type, rotating magazine or any form of cartridge device adapted to be used in connection with automatic guns. The particular device shown is more or less conventional and is not claimed in its specific form as an essential feature of the invention. The essential condition to be met is that the device must be adapted to present the cartridges in the rapid order required to serve the guns.

The cartridge supplying device shown in the drawings comprises rotatable reels or drums 39 having radial extensions 40 and recessed portions 40′ in which the cartridges are supported. Traveling over the drum is the cartridge belt 41. The ends of the cartridges 42 therein extend beyond the projections 40 and coact therewith to draw the belt forward step by step to present the cartridges in a position to be engaged by the loading mechanism.

The drum 39 is actuated in the direction

of the forward travel of the belt each time the gun is fired by mechanism connecting the drum with the slide member 5. This connection may be of any suitable form. The construction shown consists of a bracket 43 attached to the frame 1 and having a slot in which is slidably pivoted a pawl 45 normally drawn toward the frame 1 by a suitable spring, the slot and spring being of any suitable construction. One end of the pawl 45 is adapted to engage teeth 47 secured to the inner face of the drum 39. The other end of the pawl is connected to a link 48 which extends within the frame 1 and has a portion 49 which extends into the path of the end wall 8 of the slide member 5. The link 48 is provided with an arm 51 extending beyond the drum 39 and having secured thereto a tapered pin 52 adapted to be drawn into holes 53 in the outer end wall of the drum 39, the holes being spaced apart equally with the teeth 40.

Thus, when the slide 5 moves back and forth in the frame the drum will be actuated to advance the cartridge belt step by step to present the shells in position to be withdrawn therefrom and delivered to the gun barrel, the tapered pin 52 being drawn into one of the holes 53 to properly aline the drum and the shells thereon with the loader mechanism. As shown in Fig. 2 of the drawings, the parts 30 and 31 of the loader mechanism engage the cartridge and upon the return movement of the mechanism withdraw the cartridge from the belt 41 and with the descending movement of the arm 29 present the cartridge to the firing mechanism in the position shown in dotted lines in Fig. 1, from whence it is inserted into the barrel, fired, and the shell ejected as described.

The operation of the loading mechanism is as follows: With the forward movement of the mechanism the pin 35 of the cartridge gripping member 31 rides upon the edge 37 of the plate 36, thus raising the cartridge engaging device and causing the ends of the grippers 30 and 31 to contact with the rim of the cartridge and to rise thereover and grip the sides of the cartridge, the ends of the grippers being drawn downwardly on opposite sides of the cartridge by tension of the spring 39, and the grippers held in contact with the cartridge by the pressure thereon of the spring 33.

Upon the return movement of the loader mechanism the cartridge engaged by the grippers will be withdrawn from the cartridge belt and moved to a position in the slide member 5 to be entered in the breech of the gun barrel.

With the closing movement of the firing mechanism the end of the cartridge enters the barrel before the pin 35 contacts with the arm 36, thus when the pin engages the arm and rides up on the edge 37 thereof the grippers 30 and 31 are forced to release the cartridge which is then fully entered in the barrel by the continued forward movement of the breech bolt.

Attached to the forward end of the breech bolt 9 is a spring jaw 54 concentric of the firing pin 22. On the opposite side of the firing pin also concentric therewith and secured in the end wall of the breech bolt are bevel pins 55, the spring jaw and pins being adapted to engage the rim of the cartridge when the firing pin is released to discharge the gun and the breech bolt recedes to withdraw the empty cartridge preparatory to reloading of the barrel.

Pivoted to the member 5 by means of a stud 56 is a cartridge ejecting arm having an expanding finger 57 normally pressing against the side of the breech bolt. When the breech bolt recedes after each firing operation carrying the discharged cartridge with it, the finger 57 is released from contact with the side thereof, and, actuated by a spring 58, strikes the cartridge a sharp blow on the side thereof and ejects it through apertures in the outer wall of the member 5 and frame 1, which at the moment of ejectment of the cartridge are in alinement, thereby presenting an opening in both walls through which the cartridge is ejected.

The gun is also provided with a setting mechanism, whereby the loading and firing mechanism may be manually operated. To this end the breech bolt 9 is provided with a handle 59 extending through a slot of the frame 1. By moving the handle 59 to the rear of the slot the head 18 of the firing pin will be engaged by the pawl 20 and the gun will be set for firing.

A trigger mechanism is also provided whereby the guns when set as above described, may be started in automatic sequence of firing operation and each barrel may also be fired singly independent of the other barrel. The trigger mechanism comprises a finger bar 60 suspended from brackets 61 and 62, secured to the bottom of the frame 1, by links 63 and 64. Coöperating with the slot 64 in the finger bar by means of a stud 65 is a vertically extending tripping member 66 which extends through a slot 67 in the bottom of the frame 1 and slots 68 and 69, respectively, registering therewith in the bottom of the slide member 5 and breech bar 9. The member 66 contacts with the head 18 of the firing pin in a manner to release the firing pin when the finger bolt is drawn to the rear and to prevent the accidental release of the firing pin when the finger bolt is in forward position. The mechanism is normally held in forward or raised position by tension exerted thereon by a spring 70. When the guns are to be fired continuously the trigger mechanism is

held by the operator in the lower or inoperative position in which it has no relation whatever with the firing pin and the guns are therefore free to fire automatically as long as the trigger is drawn back.

The operation of the latch 20, firing pin 15 and trigger member 66 is so timed that in setting the gun for firing the member 66 engages the head of the firing pin slightly in advance of the latch 20 with the result that in the firing operation, as when the gun is set for firing the first shot, in a sequence of automatic operation, or when a single shot is to be fired, the latch 20 releases, but the firing pin will still be retained in firing position by the member 66 until the finger bar 60 is drawn to the rear which will then release the firing pin to discharge the gun.

An important feature of my invention is the improved means for cooling the barrels. To this end each barrel is provided with a tube 71 attached at one end in any suitable manner to the frame 1 and extending slightly beyond the gun barrel. The tube is provided with apertures 72 for the free introduction of air to the inner space of the tube surrounding the barrel. Secured to and surrounding the barrel is a cooling member 73 having fins or radially extending portions 73′ whereby the maximum surface exposure to the air is obtained.

With the firing of the gun the barrel due to the recoil thereof is rapidly actuated back and forth in the tube 71 and continuous suction and discharge of air takes place through the apertures 72, the whole purpose and arrangement being such as that the maximum exposure of the barrel cooling surfaces and rapid circulation of cool air are obtained, the tendency of the barrels to excessive heating being thus minimized.

In addition to the method of cooling the gun barrels above described which is substantially similar to the method employed on other types of automatic guns, I employ a novel arrangement for forcing air into the breech end of each barrel each time it is fired. For this purpose I provide each barrel with an air compression cylinder 74 secured to the under side of the frame 1 in any suitable manner. The piston rod 75 and piston head 76 of each cylinder are connected to the slide members 5 by vertically extending arms 77 rigidly secured to the slides and operating through slots 77′ in the bottom of the frame.

One end of the cylinder is also provided with a chamber 78 having a piston head 79 movable therein. A spring 80 acts to move the piston head 79 toward the opposite piston head 76. When the piston head 76 is actuated the air pressure between the piston heads acts to force the head 79 against the spring 80 and across an aperture or port 81 opening into the chamber 78. Communicating with the port 81 of each cylinder and connecting the same with apertures 82 in the bottom of the frame 1 are tubes 83 and 83ª. Thus, the compressed air discharged from the cylinders will be delivered under pressure at points 84 in the side frame 1, as shown in Fig. 2 of the drawings.

Pivoted on each receiver or slide member 5 by studs 56 and having one edge thereof riding against the inner side of the breech bolts 9 is a reciprocating arm 85 having an air duct 86 extending therethrough. One end of this air duct is formed by a short tube 87 secured in the arm 85 and extending vertically through slots 88 in the frame 1 and adapted to register with the discharge opening 84 of the tubes 83 and 83ª when the respective barrels have reached their limit of movement from recoil action. The other end which may be designated as nozzle end 89 of the air duct 86 opens into the extreme forward end of the arm 85 and is immediately adjacent to the breech end of the barrel when the barrel is in its rearmost position, an extension 90 of the slots 88 acting to rotate the arm 85 about its pivotal center, properly timed, to present the nozzle immediately adjacent the open end of the gun barrel and serving to force a current of air therethrough from the cylinder 74. Thus, a discharge of air from the cylinder is forced through each barrel after each firing thereof. It will be observed, however, that the air in the cylinder is under pressure only during the recoil of the gun barrel.

To increase the force of recoil of the gun barrels in order that there may be ample power for automatic operation of the loading and firing mechanisms I provide the end of the gun barrel with an enlarged portion 91 which acts as a piston head movable in a gas pressure chamber 92 in the front end of the cooling tube 71. For this purpose the tube extends beyond the end of the barrel and is provided with an end wall 93. The resulting gas, when the gun is discharged, gathers in the chamber 92 and exercises pressure against the end wall 93 and piston head 91 of the gun barrel, the latter being movable with the gun barrel in the recoil thereof. The force of the gas pressure acts to increase the force of recoil and thereby supplies the required power to operate the guns automatically.

The form of construction above described relates to a type of gun known as recoil operated guns, as illustrated in the main Figs. 1, 2 and 3 of the drawings.

In Fig. 7 of the drawings I have shown my invention applied to a type of guns known as gas operated guns. In this form of construction the gun barrel is secured rigidly in the frame 1 and a cylinder 101 is secured to the under side of the barrel in any suitable manner. The cylinder is pro-

vided with a piston head 102 and piston rod 103 which is connected at its opposite end through a slot 104 in the bottom of the frame 1 to the receiver member 5 which is free to slide in the frame. Adjacent the front end of the cylinder the gun barrel is provided with an aperture 105 opening into the cylinder. Thus, the gas resultant from the discharge of the gun escapes into the front end of the cylinder 101 and exerts sufficient force upon the piston head to actuate, through the piston connection with the member 5, the loading and firing mechanism.

It will be seen that the gas pressure in the cylinder 101 will be exerted immediately the projectile passes the aperture 105 before the projectile leaves the barrel. When the force of the reaction has been spent the cylinder is free to exhaust through the aperture 105 and the end of the gun barrel.

It will be understood that with the twin gun arrangement the pistons of the respective gas cylinders are properly timed with the loading and firing mechanism so that one piston moves idly on its return movement after each firing action, while the other piston is being actuated.

In this form of gas operated gun a sleeve member 106 having annular fin portions 107 is preferably used as part of the cooling system for the gun barrels. My improved system for injecting air into the breech end of the barrel will be equally adaptable, of course, to both forms of gun construction.

An important result is realized in both the recoil and gas operated guns in that the excessive force of the recoil is practically absorbed in the balanced relation of the mechanisms. The firing action is smooth and even and the guns, therefore, may be aimed and otherwise handled more effectually than is possible in single automatic guns in which the recoil cannot be so controlled.

From the foregoing detail description of my invention it will be apparent that the underlying principle consists in associating two or more automatic gun mechanisms in such a manner that the resultant force of discharging each of the guns will act respectively to load and fire another gun and to clear itself for reloading; that this force may be transmitted to the loading and firing mechanism by the recoil of the gun barrel, as is the principle in all recoil operated guns, or by separate mechanism actuated in any suitable manner by the gases resultant from the firing of the guns; and that the firing of the guns when started will be automatic and in continuous sequence of operation.

As stated, as far as I am aware, I am the first to employ this principle and the first, therefore, to realize in any form of gun construction the greatly increased speed in firing a gun controlled by a single operation, as well as the general increase in effectiveness of the guns due to the incidental advantages of reduced heating of the mechanism.

I desire it to be understood, therefore, that the construction herein disclosed is but one form of approved application of the basic principle of my invention and that various changes may readily be made in the specific organization of the invention without departing from the principle or spirit thereof. I do not wish to be limited, therefore, to the general form of construction disclosed except as embodied and broadly set forth in the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels each having a receiver slide secured thereto and operable in said frame, a breech bolt operable in each of the receiver slides, a firing pin operable in each breech bolt, a rack and gear interposed between the opposite receiver slides and breech bolts, respectively, said gears operating in unison and said racks being operable independently of each other, and loading mechanism whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel.

2. In an automatic gun, the combination, a frame, a plurality of barrels longitudinally operable in said frame, receiver mechanisms secured to each of said barrels, breech bolts and firing pins slidably superposed in each of the receiver mechanisms, a rack and gear interposed between the opposite receiver slides and breech bolts, respectively, said gears operating in unison and said racks being operable independently of each other, and loading mechanism whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel.

3. In an automatic gun, the combination, a frame, a plurality of barrels longitudinally operable in said frame, receiver mechanisms secured to said barrels, breech bolts and firing pins slidably superposed in the receiver mechanisms, racks secured to and having limited longitudinal movement on the opposite receiver mechanisms relative to the movement of said mechanisms, racks secured to the opposite breech bolts, gears disposed between said racks, and loading mechanism whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel.

4. In an automatic gun, the combination, a frame, a plurality of barrels longitudinally operable in said frame, receiver mechanisms secured to each of said barrels, a breech bolt and firing pin slidably superposed in each of the receiver mechanisms, racks and gears of different diameters inter-

posed between the opposite receiver mechanisms and breech bolts, respectively, whereby said mechanisms and the breech bolts have limited relative movement, and loading mechanism whereby the firing and recoil of one barrel will actuate said mechanism in sequence to load and fire another barrel.

5. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels each having a receiver slide secured thereto and operable in said frame, a breech bolt operable in each of the receiver slides, a firing pin operable in the breech bolts, racks and gears interposed between the opposite receiver slides and breech bolts, respectively, a member to lock the breech bolt to the receiver, and a latch movable with said receiver slide whereby the firing pin is rendered operative and inoperative, respectively, and loading mechanism whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel.

6. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels each having a receiver slide secured thereto and operable in said frame, a breech bolt operable in each of the receiver slides, a firing pin operable in the breech bolts, racks and gears interposed between the opposite receiver slides and breech bolts, respectively, a member to lock the breech bolt to the receiver and a latch pivoted on the receiver slide, trigger mechanism coöperating therewith whereby the firing pin is rendered operative and inoperative, respectively, and loading mechanism whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel.

7. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels each having a receiver slide secured thereto and operable in said frame, a breech bolt operable in each of the receiver slides, a firing pin operable in the breech bolts, racks and gears interposed between the opposite receiver slides and breech bolts, respectively, loading mechanisms whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel, and air compression cylinders coöperating with said mechanisms whereby a charge of air is forced into each barrel after the firing thereof.

8. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels having receiver slides secured thereto operable in said frame, loading and firing mechanisms comprising said receiver slides, breech bolts and firing pins, coöperating parts interposed between the opposite sets thereof whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel, and air compression cylinders coöperating with said receiver slides whereby a charge of air is forced into each barrel after the firing thereof.

9. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels having receiver slides secured thereto operable in said frame, loading and firing mechanism comprising said receiver slides, breech bolts and firing pins, coöperating parts interposed between the opposite sets thereof whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel, and air compression cylinders coöperating with said receiver slides whereby the firing of the barrels will cause a charge of air to be delivered therethrough.

10. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels having receiver slides secured thereto operable in said frame, loading and firing mechanism comprising said receiver slides, breech bolts and firing pins, coöperating parts interposed between the opposite sets thereof whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel, and air compression cylinders, and air passages movable with the receiver slides, whereby a charge of air is forced into each barrel after the firing thereof.

11. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels, loading and firing mechanism comprising receiver slides, breech bolts and firing pins, coöperating parts interposed between the opposite sets thereof whereby the firing and recoil of one barrel will actuate said mechanism in sequence to load and fire another barrel, and cylinders communicating with said barrels intermediate the loading and discharging ends thereof and having gas actuated pistons therein coöperating with said mechanisms whereby the force of recoil thereon will be increased.

12. In an automatic gun, the combination, a frame, a plurality of longitudinally operable barrels having receiver slides secured thereto operable in said frame, loading and firing mechanism comprising said receiver slides, breech bolts and firing pins, coöperating parts interposed between the opposite sets thereof whereby the firing and recoil of one barrel will actuate said mechanisms in sequence to load and fire another barrel, and sleeves having a plurality of outwardly extending circumferential fins formed in the periphery thereof telescoping said barrels, and an apertured air chamber telescoping each of said sleeves whereby said barrels are cooled after the firing thereof.

In testimony whereof, I affix my signature.

CHARLES C. BLACKMORE.