

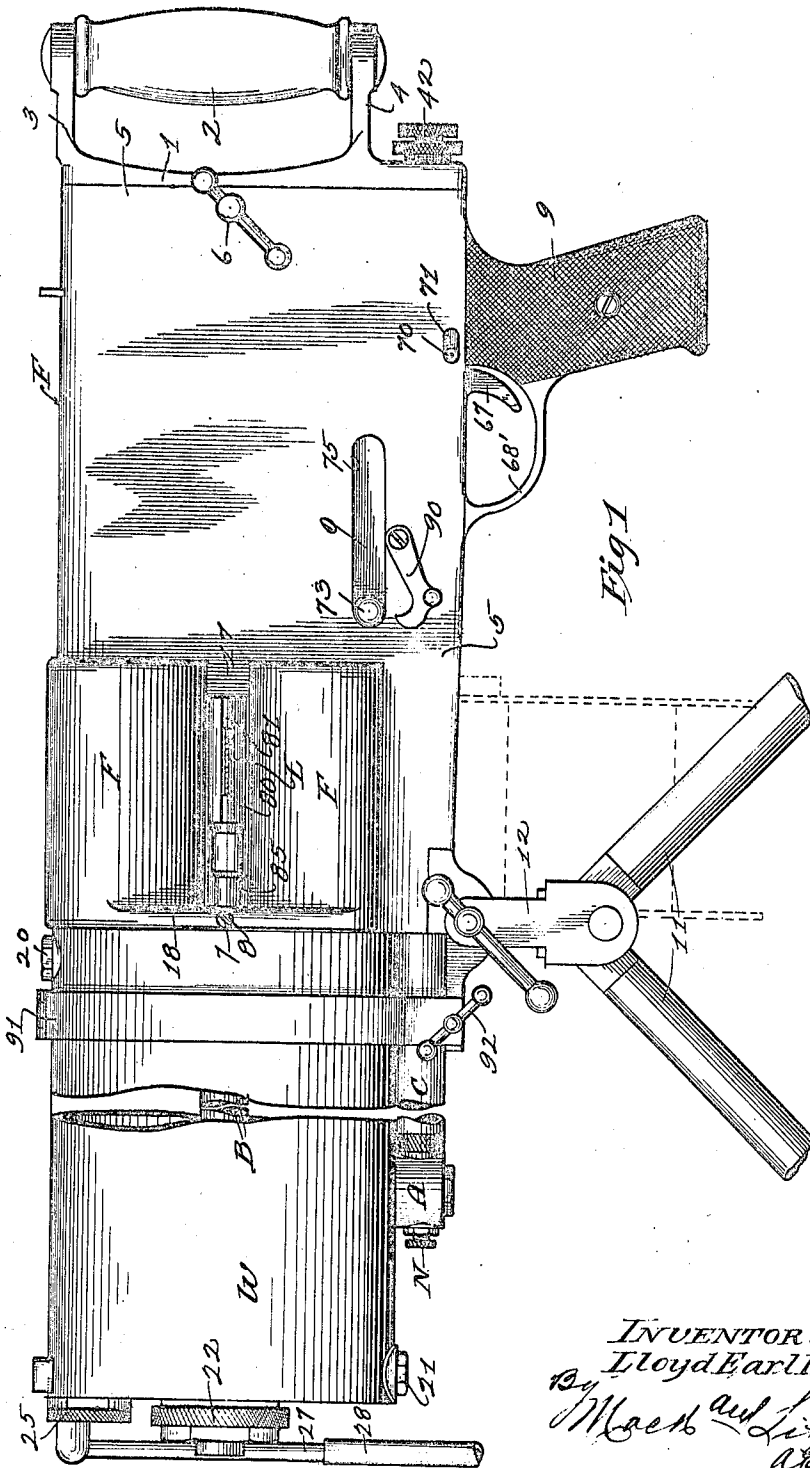
L. E. HODGES.
MACHINE GUN.

APPLICATION FILED SEPT. 25, 1919.

Patented Dec. 6, 1921.

5 SHEETS—SHEET 1.

1,399,119.



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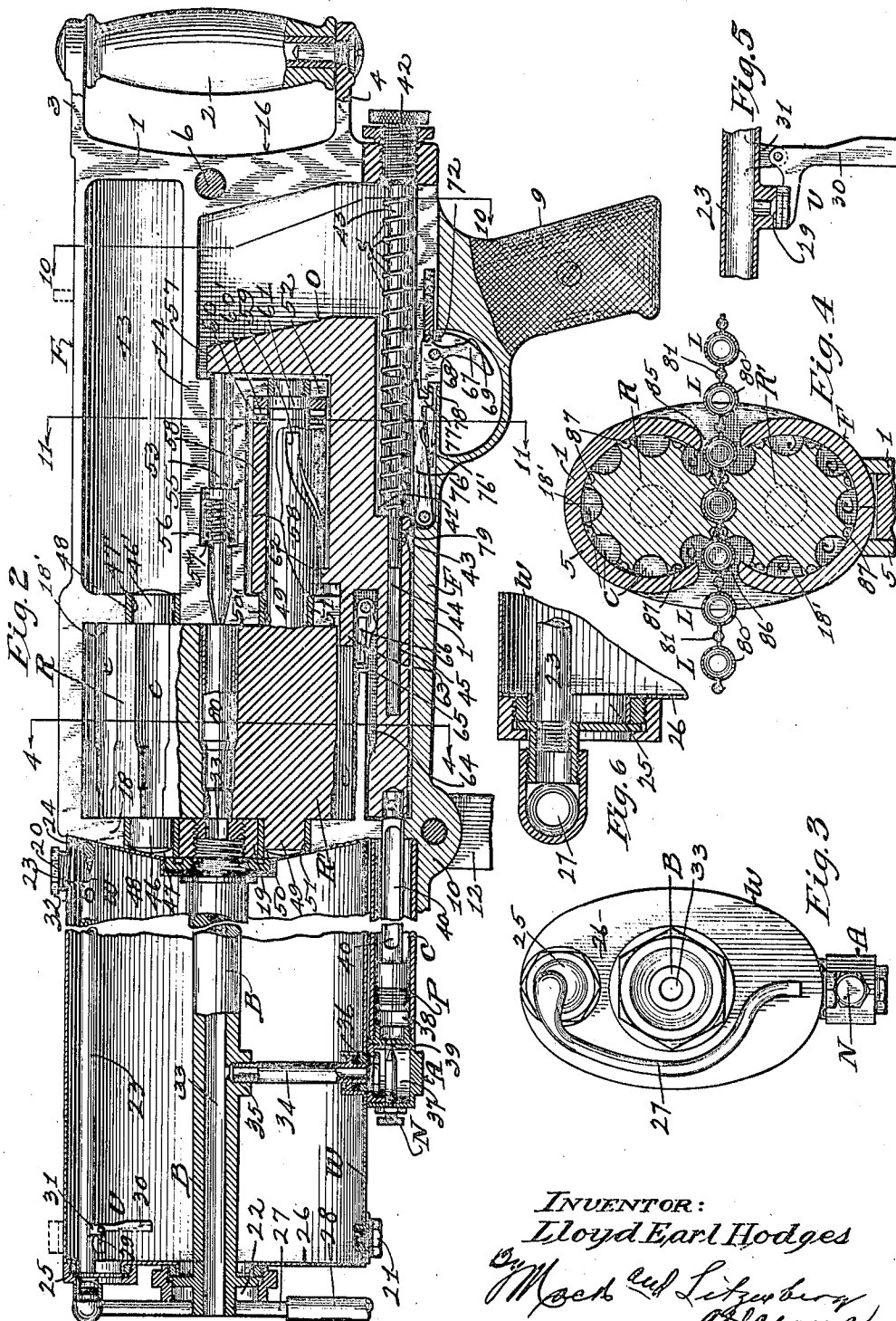
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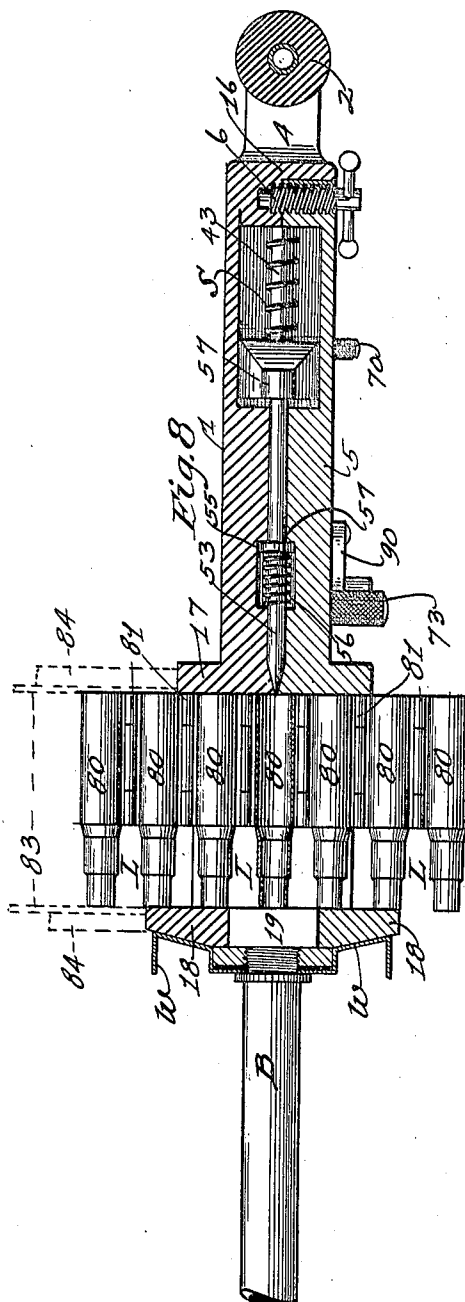
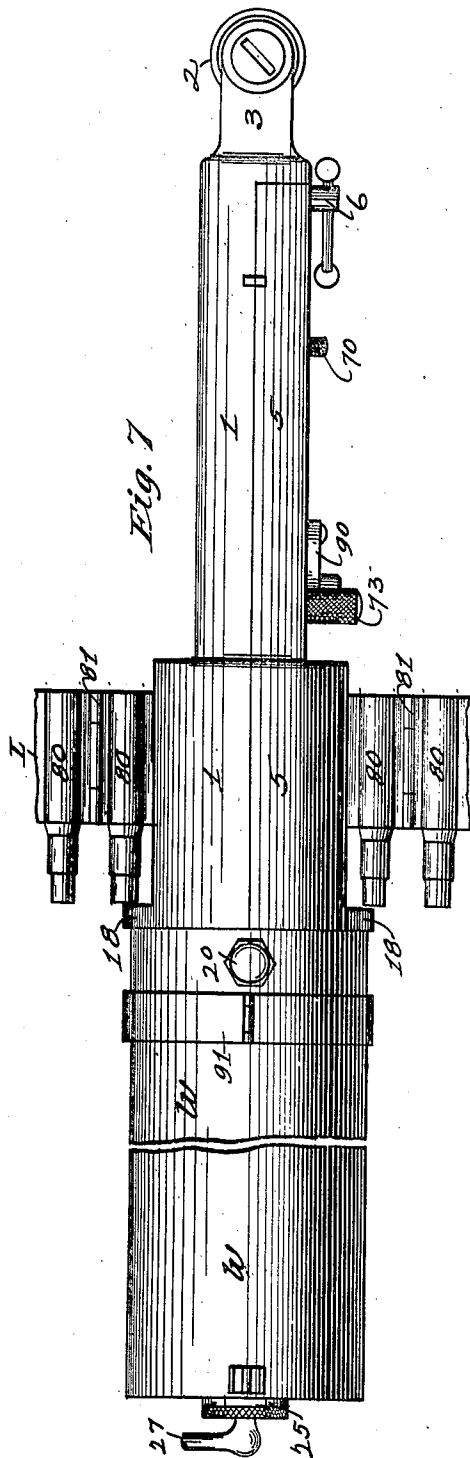


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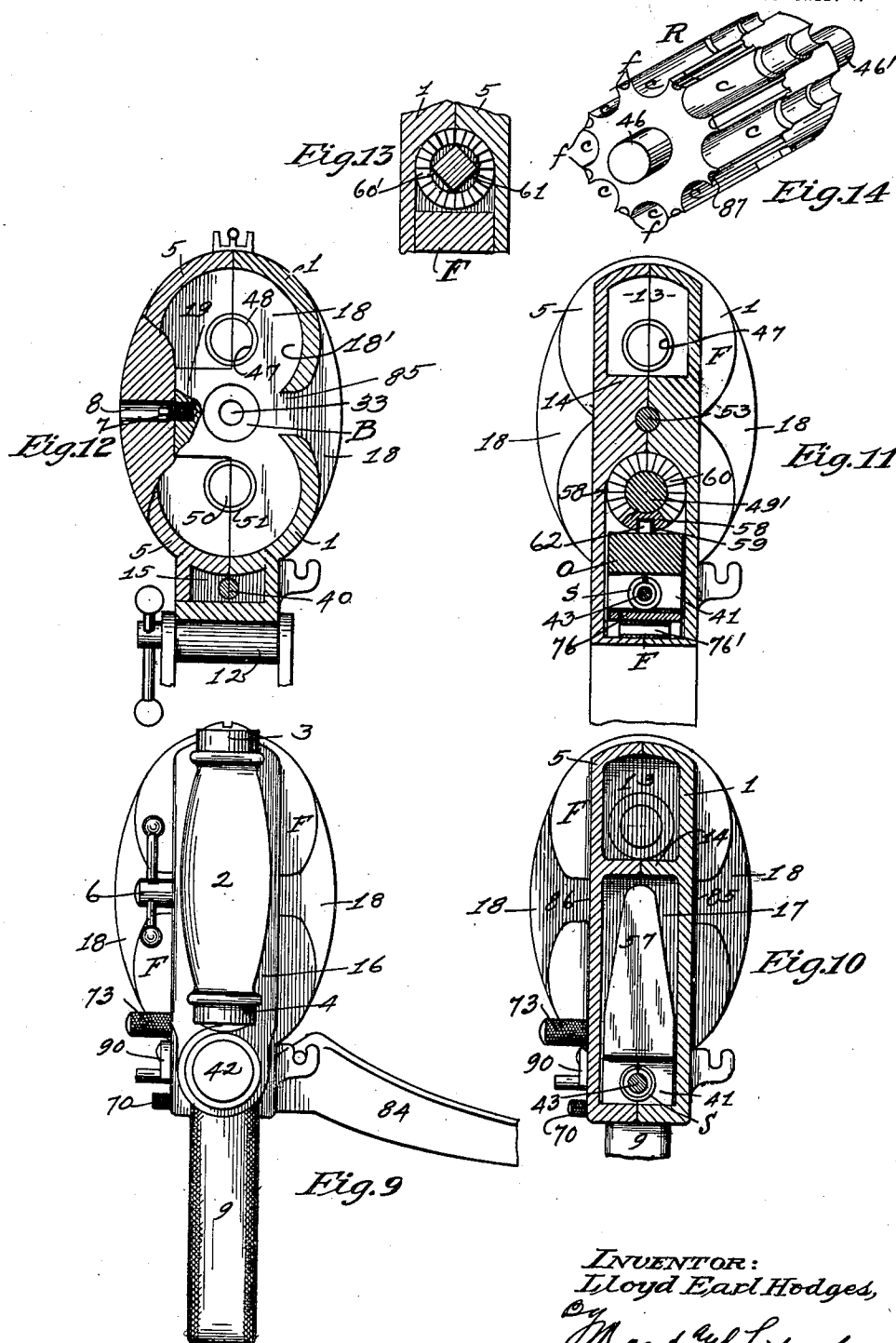
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5 SHEETS—SHEET 4.



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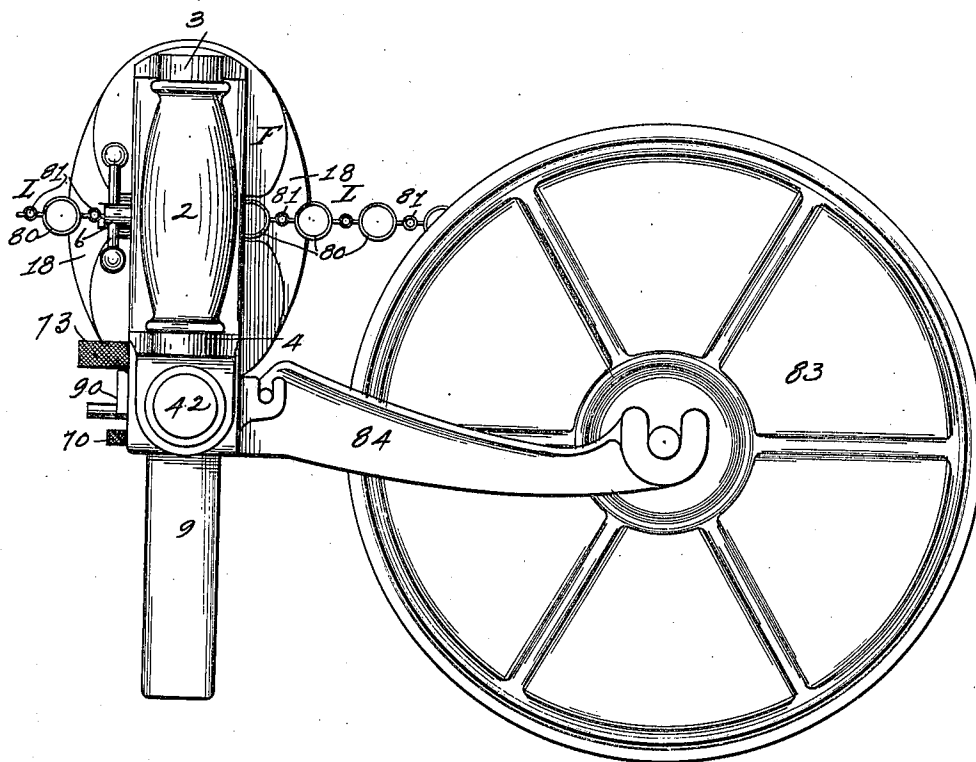


Fig. 15

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UNITED STATES PATENT OFFICE.

LLOYD EARL HODGES, OF GLENDORA, CALIFORNIA.

MACHINE-GUN.

1,399,119.

Specification of Letters Patent.

Patented Dec. 6, 1921.

Application filed September 25, 1919. Serial No. 328,612.

To all whom it may concern:

Be it known that I, LLOYD EARL HODGES, a subject of the King of England, and a resident of Glendora, in the county of Los Angeles and State of California, have invented new and useful Improvements in Machine-Guns, of which the following is a specification.

My invention relates to and has for its object the provision of a machine gun having means whereby a succession of cartridge containers, or holders, may be fed through the gun, *i. e.* to and from firing position, together with means for holding the cartridges and their containers stationary while the gun is fired and ejecting the shells with the containers thereafter.

Another object is to provide in a machine gun of the character stated, a pair of opposed rotors having chambers formed therein for holding and centering the cartridges before the barrel of the gun, one of said rotors being positively driven as the gun is cocked for moving the cartridges into firing position and the other rotor being operated by the movement of the cartridge containers.

A further object is to provide in the usual gas and spring actuated gun, means for moving cartridges in rapid succession through the gun and for holding said cartridges in stationary positions while the gun is being fired, whereby the usual shell ejecting mechanism may be dispensed with and a more simple mechanism provided. Other objects will appear in the detailed description hereinafter following.

Referring now particularly to the drawings forming a part of this application and appended hereto:

Figure 1 is a side elevation of my improved gun, assembled for use;

Fig. 2 is a longitudinal sectional elevation of the same;

Fig. 3 is a muzzle end elevation of the same;

Fig. 4 is a section of the gun on line 4—4 of Fig. 2;

Fig. 5 is a detail of the steam vent of the water jacket;

Fig. 6 is a fragmentary section of the water jacket showing the steam vent connections;

Fig. 7 is a plan view;

Fig. 8 is a sectional plan;

Fig. 9 is a rear end elevation;

Fig. 10 is a section on line 10—10 of Fig. 2;

Fig. 11 is a section on line 11—11 of Fig. 2;

Fig. 12 is a section on line 4—4 of Fig. 2 with the internal mechanism omitted, parts being broken away to show the connection between the frame members;

Fig. 13 is a section showing a face view of one of the rotor clutch members;

Fig. 14 is a perspective view of one of the rotors;

Fig. 15 is a rear end elevation of the gun and cartridge reel attached thereto.

Similar characters of reference are employed throughout the specifications and the several views of the drawings for indicating the same and like parts.

Briefly described, this invention includes a separable frame to which is attached a barrel and water jacket or other suitable cooling device, the usual method of cocking the gun by means of the gases generated in the bore of the gun and spring means for firing the gun, together with my improved means for feeding the cartridges to and ejecting the empty shells from the gun, as hereinafter more clearly set forth, together with new and novel arrangements and details.

The frame F is composed of a main member 1 which forms one side for the gun and to which a handle 2 is attached at the rear end between extensions 3 and 4, and a removable side plate 5. Member 5 may be removably held at the rear end on member 1 by means of a hand screw 6 adapted to be carried in member 5 and to be threaded for a short distance into member 1, while the front end may be held on member 1 by means of the short screw 7 carried in a bore 8, as shown.

It will be observed that the cross section of the main part of the frame is rectangular while the front portion thereof is elliptical, preferably, members 1 and 5 being joined on the center line where possible so that all bores and recesses and chambers formed in the frame may be halved when the frame members are separated, thus affording access to such places for the purpose of cleaning or other purposes.

Member 5 has a pistol grip 9 formed integral therewith or attached thereto on the lower side of the frame and forward of said pistol grip and on the bottom side of

member 1, I provide a lug 10 to which may be attached by suitable means a tripod or other supporting structure for the gun while in operation. A tripod 11 is indicated in the drawings for this purpose and a bracket 12 is used on the tripod for attachment to the lug 10.

An elongated chamber 13 is formed in the rear frame portion of members 1 and 5, in which may be carried any necessary tools, oil cans, or other devices and at the bottom of said chamber a horizontal partition 14 is provided which separates chamber 13 from the lower chamber. An end 16 closes the rear ends of both of said chambers and a central, or intermediate partition, or wall, 17 separates the rear chambers from a rotor chamber 18' in which a pair of rotors R and R' are rotatably mounted for operation. Frame members 1 and 5 have a front wall 18, and, as shown in Fig. 12, member 1 has a boss 19, which fits into a corresponding recess in member 5 so that the barrel B, which is adapted to be screwed into said boss, may be firmly held therein.

Now, it will be noted that all of the chambers formed in the frame and hereinbefore mentioned are halved so that when the frame members are separated access may be had thereto for any purpose.

The barrel B is positioned in the exact center of the gun preferably and should be so attached to the frame member 5 as to insure a water proof joint at the partition 18. A water jacket W, or other cooling device may be attached to the front end 18 of the frame F, so as to encompass the barrel B throughout the major portion of its length. I have shown a water jacket as a cooling device, as this form of device is perhaps best known in the art, and the upper portion of the jacket may have a filling cap 20, while the lower portion thereof should have a drain cap 21, as shown. The barrel B extends entirely through the water jacket and projects slightly therebeyond, a suitable packing gland 22 being provided at the front end of the jacket so that water may not escape from the jacket at this point.

The action of the gun serves to heat the water carried in the jacket W, and steam is thus generated which may escape through a tube 23 supported at its rear end on a conical projection 24 and at its forward end in a packing gland 25 attached to the water jacket end 26. A vent tube 27 leads from the gland 25 to the atmosphere and a hose 28 may be attached to said tube for carrying the steam to any desired point.

A valve V is provided in steam tube 23 near its front end and includes a valve proper 29, attached to a lever 30, said lever being pivotally attached to lugs 31 on the sides of said tube. Thus, when the gun

is inclined so that the front end is lower than the rear end, the valve V will be closed and prevent the leakage of water there-through, the steam being discharged through an orifice 32 in the rear end of the tube 23. When the gun is elevated so that the front end is higher than the rear end, then the valve V will open and steam may escape therethrough.

A receptacle A is removably attached to the lower portion of the water jacket W and communicates with the bore 33 of the barrel B by means of a tube 34, one end of said tube being threaded into a boss 35 on said barrel and the other end having an adjusting nut 36 by means of which the tube may be attached to the receptacle A. Thus the gas from bore 33 may be conveyed to the chamber 37 in the receptacle A. A cylinder C connects with the rear end of the receptacle A at one end and with the front end of frame member 5 at the other, between which members cylinder C is stationarily supported. A piston P is slidably held in the bore 38 of said cylinder and is adapted to be moved rearwardly in said bore by means of the gases generated in bore 33 of the barrel B and admitted to cylinder C through an aperture 39 in receptacle A controlled by a needle valve N adjustably held on said receptacle.

Piston P has a connecting rod 40 connected therewith which extends rearwardly in cylinder C and through front wall 18 of frame F where the rear end is connected with a main operating member O slidably contained in the lower chamber 15 of frame F, so that as piston P is moved rearwardly in cylinder C, the operating member O will also be moved rearwardly for a like distance. A main spring S which is adjustably held between a shoulder 41 on member O and an adjusting screw 42, carried in the rear end of member 5 serves to restore the member O to normal position shown in Fig. 1. Adjusting screw 42 may have an extended stem 43 suitably reduced for centering the spring S and slidably held in a bore 44 in the portion 45 of member O.

Rotor R is rotatably held in the upper portion of the chamber 18' on trunnions 46, 46', carried in bores 47 and 47', respectively, in partitions 18 and 17, said bores being suitably bushed with bearing metal, as at 48, 48. Rotor R' is similarly held in the lower portion of chamber 18' on trunnions 49 and 49' carried in bores 50 and 50', respectively, and has bearings 51, 51', the trunnions 49' being extended substantially to the rear of partition 17 and carried in a lug 52 on member 5. The rotors R and R', as shown in Fig. 14, have a plurality of regularly spaced, semi-circular peripheral chambers c, c, etc., formed therein, the contour of which substantially conform to the cartridge

containers hereinafter described and adapted to be used in the gun and the length of said chambers is slightly greater than the extreme length of the containers.

5 The rotors R and R' are spaced so that their arcs almost touch the central point therebetween on the center line of the barrel B, *i. e.* the axes of the rotors are equally spaced on opposite sides of the axis of the barrel. In order that the cartridges may be 10 closely held in the chambers *c, c* of the rotors raised facets *f, f*, etc., are provided at the edges of the chambers for the reason that such chambers when cut on a circle fall 15 slightly short of a perfect half circle and it is desirable that the cartridges should be held firmly in position before the bore 33 of the barrel B when fired. It is understood that a cartridge is held between the two ro- 20 tors in the opposite chambers *c, c*.

A firing pin 53 is provided in a bore in members 1 and 5, an enlargement 55 being provided thereon which slides in a recess 56 in which a spring 57 is held, said spring being adapted to compress between portion 55 25 of the pin and the front end of recess 56 for retracting the pin 53. The rear end of pin 53 is adapted to be engaged by a vertical extension 57 on operating member O, as indicated in Fig. 2. 30

The trunnion 49' of rotor R' carries a cylinder 58 which is loose and adapted to slide longitudinally and rotate thereon, the periphery of said cylinder having a spiral 35 groove 59 formed therein and the rear end thereof having ratchet teeth 60 thereon which are adapted to alternately engage and disengage similar teeth 60' on a flange member 61 carried on a squared or flattened portion 61' of trunnion 49'. Groove 59 is ex- 40 tended slightly at the end parallel with the axis of trunnion 49' and is adapted to be constantly engaged by a lug 62 on operating member O, so that as member O is reciprocated the cylinder 58 will be rotated and also 45 slightly reciprocated at the ends of each stroke. With the initial rearward stroke of the member O, the lug 62 will slide rearwardly in groove 59 until the spiral portion 50 of said groove is attained, whereupon the friction thereagainst will be sufficient to move the cylinder 58 rearwardly until the clutch teeth 60 and 60' are engaged, and the further rearward movement of the member 55 O will cause the lug 62 to turn the cylinder 58 and clutch member 61, also trunnion 49'. The turning of the trunnion serves to rotate the rotor R', a distance equal to the pitch of the chambers on the periphery 60 thereof at each operation of member O. When the end of each stroke is reached, the spring S will restore the mechanism to normal positions and force the portion 57 of member O with sufficient power against the 65 firing pin 53, the forward movement of

member O in such case serving to disengage the clutch teeth 60 and 60' and to rotate the cylinder C in a reverse direction in readiness for another operation.

The chambers *c, c*, etc., of rotor R' are 70 adapted to be engaged at the bottom of the circle of movement by a tongue 63 on member O which projects forwardly into recess 18', so that when the member O is in normal or forward position the rotors R and R' may 75 not be turned. Likewise, when member O has been moved rearwardly into cocked position and the tongue 63 is disengaged from the chamber *c*, the rear inclined portion of member O will engage and raise a detent 65 80 into engagement with the chamber *c* subsequent to the rotation of rotor R' and the movement of another chamber *c* into position before the firing pin 53. Detent 65 will remain positioned at either extreme of action 85 by means of a flat spring 66 attached to one side thereof and adapted to frictionally engage the side of frame member 1. When member O is restored the tongue 63 engages detent 65 and depresses the same into the 90 position shown in Fig. 2.

The trigger 67 is pivoted at 68 within the usual guard 68' and has a safety latch 69 slidably carried in member 5 of the frame with a projection 70 extended through a slot 95 71 in member 5. Latch 69 is adapted to slide backward and forward for the purpose of latching and unlatching the trigger for action. A portion of said latch may engage a notch 72 in the trigger and the movement 100 thereof may be effected by means of the thumb or finger piece 70.

In operation, the gun must be cocked by hand, a cocking thumb piece 73 being attached to member O and extended through a slot 75 in member 5 for this purpose. Mem- 105 ber O is locked at its rearward extreme of action by means of a dog 76 having a bifurcated end 77, and held upwardly by a spring 76', the lower furcation of which engages a projection 78 on the trigger and the upper furcation being adapted to engage a shoulder, or bent, 79, on the bottom of member O. 110 When the safety latch is released from the trigger, the trigger may be pulled and the member O will be released from the dog 76 115 and caused to strike forcibly the firing pin 53, through the agency of the spring S.

I have shown a practical form of cartridge belt which is composed of a convenient number of cartridge containers, or holders, 80, 80, etc., either formed integral with or at- 120 tached to a series of links L, L, etc., hinged together at 81, 81, etc. These containers are adapted to fit closely the contour of the car- 125 tridges and to completely inclose the same except at the ends, the outer peripheries thereof similarly fitting closely the peripheral chambers *c, c*, etc., of the rotors R and R'. A suitable and convenient number of 130

such containers and links may be provided in a reel 83 carried on a bracket 84 removably attachable to the frame F of the gun, so that one reel may be substituted for another. The belt like cartridge holder must first be fed into the gun through an orifice 85 in member 1, so that the first of the containers 80 will register with the chambers *c, c*, of the rotors, the pitch or spacing of the containers being the same as that of the chambers. The further action of the gun will rotate the rotors R and R' in the same manner described and serve to draw other of the containers in regular succession into firing position from whence, the empty shells still remaining in the containers, said containers will be ejected from the gun through an orifice 86 in the member 5 of the frame.

Peripheral cuts 87, 87, etc., are also formed in the rotors R and R' to permit the hinges of the links L, L, to pass between and over the rotors during the movement of the cartridge belt through the gun.

The gun may be cleared by moving the member O rearwardly for a short distance and then retracting the same sufficiently to disengage the clutch teeth 60 and 60', member O being then latched against operation by means of a latch 90 on the exterior of the plate 5, as shown in Fig. 1. This latch will hold the tongue 63 out of engagement with rotor chambers *c* and permit the turning of the rotors R and R'. This also serves as an auxiliary safety latch.

The water jacket W may be attached to the frame F by any suitable means, but I have shown a hinged clamp 91 extended around the jacket near the rear end and attached to the lower portion of the frame F by means of a hand screw 92, as indicated particularly in Fig. 1.

It will be observed that my gun may be readily assembled and disassembled practically without tools of any kind, the number of parts being reduced to a minimum by the omission of the usual injecting and ejecting mechanism for the cartridges; whereas I have provided cartridge carriers whereby the cartridges will be held therein at all times during and after the passage of the carrier through the gun, thus eliminating the usual ejecting mechanism.

It is designed that the water jacket and barrel may be placed in position on the frame F by giving a quarter turn thereto and subsequently clamping the same in position by means of the clamp 91 as shown and described. Frame members 1 and 5 are separated quickly by the turning of hand screw 6 and screw 7, thus exposing all of the internal chambers of the gun, together with the mechanism which is held therein.

It is conceived to be possible to substantially modify and alter the construction details shown and described herein without de-

parting from the spirit of my invention or enlarging the scope thereof beyond the limits of the appended claims.

What I claim is:

1. In a machine gun, a frame, a barrel attached thereto, a firing pin held therein, an operating member for said pin, rotatable cartridge injecting and ejecting means intermediate said pin and said barrel, and normally spaced clutch means for operably connecting said operating member with said injecting and ejecting means.

2. A machine gun having a frame, a barrel attached thereto, a firing pin slidably held in the frame, a reciprocable operating member mounted in said frame, a pair of rotors positioned intermediate the barrel and firing pin for injecting and ejecting the cartridges, normally spaced clutch means for operably connecting said rotors with and for operation by said operating member, and means for locking said rotors against action during the firing operation.

3. A machine gun having a reciprocable operating member, a pair of opposed rotors having chambers therein adapted to register at the firing position for holding the cartridges during the firing thereof, said operating member being temporarily connected therewith previous to the firing operation and normally disconnected therefrom and means thereon engaging one of said chambers for locking said rotatable elements during the firing operation.

4. A machine gun having an operating member, a pair of opposed rotors having chambers therein adapted to register at the firing position for holding the cartridges during the firing thereof, said operating member being connected therewith, and means thereon engaging one of said chambers for locking said rotatable elements during the firing operation, and means supported independently of said operating member and actuated thereby for engaging one of said rotor chambers for locking said elements when said operating member is retracted.

5. A machine gun including a pair of synchronous rotors with peripheral chambers therein adapted to register at the firing position for positioning the cartridges, a reciprocable operating member, and an extension on one of said rotors, means on said operating member engaging said extension for rotating said rotors, means also on said member for locking said rotors against rotation during the firing operation, and means supported independently of and actuated by said member for locking said rotors when said member is retracted.

6. A machine gun including a pair of synchronous rotors with peripheral chambers therein adapted to register at the firing position for positioning the cartridges, a re-

ciprocable operating member, an extension means for manually cocking said gun for on one of said rotors, a sleeve on said extension, means on said member for engaging said sleeve to effect the rotation of said rotor, means on said operating member for rotating said rotors, means also on said member for locking said rotors against rotation during the firing operation, and means supported independently of said member for locking said rotors when said member is retracted and means on said operating member for operating and restoring said independent locking means.

7. A machine gun having a reciprocable operating member, a pair of coöperating rotors for holding the successive cartridges at firing position, co-acting means on said member and on one of said rotors for actuating said rotors when said operating member is retracted for cocking the gun, means for limiting the action of said rotors and means operated by said operating member at opposite extremes of its movement for locking said rotors against action for separate intervals previous to and during the firing operation.

8. A machine gun having a reciprocable operating member, a spring normally holding said member in firing position, means for retracting said member against the tension of said spring for cocking the gun, rotatable cartridge holding means having peripheral chambers therein, for receiving the cartridges at the firing position, a firing pin intermediate the operating member and cartridge holding means, trigger means for releasing said operating member and means on said operating member for operating said cartridge holding means and said firing pin, and locking means on said operating means adapted to engage one of said chambers for locking said rotatable cartridge holding means during the firing operation.

9. A machine gun having opposed synchronous rotors for holding successive cartridges at the firing position, a reciprocable operating member therefor, means for advancing and retracting said operating member, a trigger for releasing said member for operation, and separate means controlled by and on said operating member for locking said rotors against action at different positions of said operating member.

10. A machine gun having a stock, a pair of coöperating cartridge holding rotors, a reciprocable operating member therefor, means for advancing and retracting said member for moving successive cartridges into firing position, means controlled by the movement of said operating member for locking said rotors against rotation during the firing period, a trigger for releasing said operating member at will, a lever pivoted on said stock and releasable by said trigger for locking said member in cocked position, and

means for manually cocking said gun for starting the operation of the gun.

11. A machine gun having a pair of cartridge feeding rotors provided with peripheral cartridge chambers therein, an operating member slidable therein, rotatable means connected with one of said rotors and operable by said member for operating said rotors, means on said member adapted to be intermittently connected with and for operating said rotatable means, and means controlled by the movement of said operating member adapted to engage one of said chambers for locking said cartridge feeding means against action.

12. A machine gun having a pair of rotatable cartridge feeding cylinders, a reciprocable operating member therefor, an extension on one of said cylinders, an independently rotatable member on said extension intermediate said cartridge feeding means and said operating member, normally separated means for intermittently connecting said elements together for regulating the movement of the cartridges to and from said firing position, and means controlled by the movement of said operating member for locking said cylinders against action during the firing operation.

13. A machine gun having a pair of rotors for feeding cartridges to the gun, a reciprocable operating member, clutch means interposed between said operating member and one of said rotors, and automatic means for regulating the engagement and disengagement of said clutch, as set forth.

14. A machine gun having a driving rotor and a driven rotor adapted to coöperate for injecting and ejecting the cartridges, a reciprocable operating member connected with said driving rotor, means for advancing and retracting said operating member, locking means on said operating member for said driving rotor during the firing operation, and auxiliary locking means therefor capable of operation by and when said operating member is retracted for cocking the gun.

15. In a machine gun, the combination with a frame, a barrel attached thereto, and a pair of co-acting rotors for holding the cartridges in firing position, of a firing pin slidably held in said frame in alinement with said barrel, an operating member slidably disposed in said frame, and having an upwardly extended lug for engagement with said pin, an extension on one of said rotors, a clutch member on said extension, a sleeve loosely held on said extension, having a spiral slot therein, and a tooth on said operating member, adapted to engage said slot for rotating said sleeve, said sleeve having a clutch member on the end thereof for engagement with said first mentioned clutch member, for rotating said rotors, as described.

16. In a machine gun, the combination with a frame, and a pair of cooperating rotors having peripheral grooves therein for receiving the cartridges, of a firing pin, an operating member slidable in said frame and having an extension for engagement with said pin, means for operably connecting said operating member and one of said rotors for moving the cartridges into and from firing position, and a locking means supported on said operating member and adapted to engage the grooves of one of said rotors for preventing the rotation thereof during the firing operation.

17. In a machine gun, the combination with a frame, and a pair of cooperating rotors having peripheral grooves therein for receiving the cartridges, of a firing pin alined with said grooves, an operating member slidable in said frame and having an extension for engagement with said pin, means for operably connecting said operating member and one of said rotors for moving the cartridges into and from firing position, and a locking means supported on said operating member and adapted to engage the grooves of one of said rotors for preventing the rotation thereof during the firing operation, a cylinder alined with a portion of said operating member, and a piston slidable in said cylinder and connected with said operating member whereby the gases formed in the barrel of the gun may be utilized for retracting said operating member.

18. In a machine gun the combination with a frame, and a pair of cooperating rotors having peripheral grooves therein for receiving the cartridges, of a firing pin alined with said grooves, an operating member slidable in said frame and having an extension for engagement with said pin, means for operably connecting said operating member, and one of said rotors for moving the cartridges into and from firing position, a locking means supported on said operating member and adapted to engage the grooves of one of said rotors for preventing the rotation thereof during the firing operation, a cylinder alined with a portion of said operating member, a piston slidable in said cylinder and connected with said operating member whereby the gases formed in the barrel of the gun may be utilized for retracting said operating member.

19. In a machine gun the combination with a frame, and a pair of cooperating rotors having peripheral grooves therein for receiving the cartridges, of a firing pin alined with said grooves, an operating mem-

ber slidable in said frame and having an extension for engagement with said pin, means for operably connecting said operating member and one of said rotors for moving the cartridges into and from firing position, a locking means supported on said operating member and adapted to engage the grooves of one of said rotors for preventing the rotation thereof during the firing operation, a cylinder alined with a portion of said operating member, a piston slidable in said cylinder and connected with said operating member whereby the gases formed in the barrel of the gun may be utilized for retracting said operating member, a pivoted latch for holding said operating member in retracted position, and adapted to be released by manual effort for firing the gun.

20. In a machine gun the combination with a frame, and a pair of cooperating rotors having peripheral grooves therein for receiving the cartridges, of a firing pin alined with said grooves, an operating member slidable in said frame and having an extension for engagement with said pin, means for operably connecting said operating member, and one of said rotors for moving the cartridges into and from firing position, a locking means supported on said operating member and adapted to engage the grooves of one of said rotors for preventing the rotation thereof during the firing operation, a cylinder alined with a portion of said operating member, a piston slidable in said cylinder and connected with said operating member whereby the gases formed in the barrel of the gun may be utilized for retracting said operating member, a pivoted latch for holding said operating member in retracted position, and adapted to be released by manual effort for firing the gun, and a trigger for releasing said latch.

21. A machine gun having a pair of cooperating rotors mounted in the body thereof, in spaced relation, and provided with a series of longitudinal grooves adapted to form cartridge chambers when moved into registration at the firing position, one of said rotors having an extension thereon, means on said extension for rotating said rotors at each operation, and means engaging said grooves for holding the rotors stationary during a firing operation.

Signed at Los Angeles, county of Los Angeles, and State of California, this 5th day of September, 1919.

LLOYD EARL HODGES.

In presence of—

LUTHER L. MACK,
H. M. BRUNDAGE.