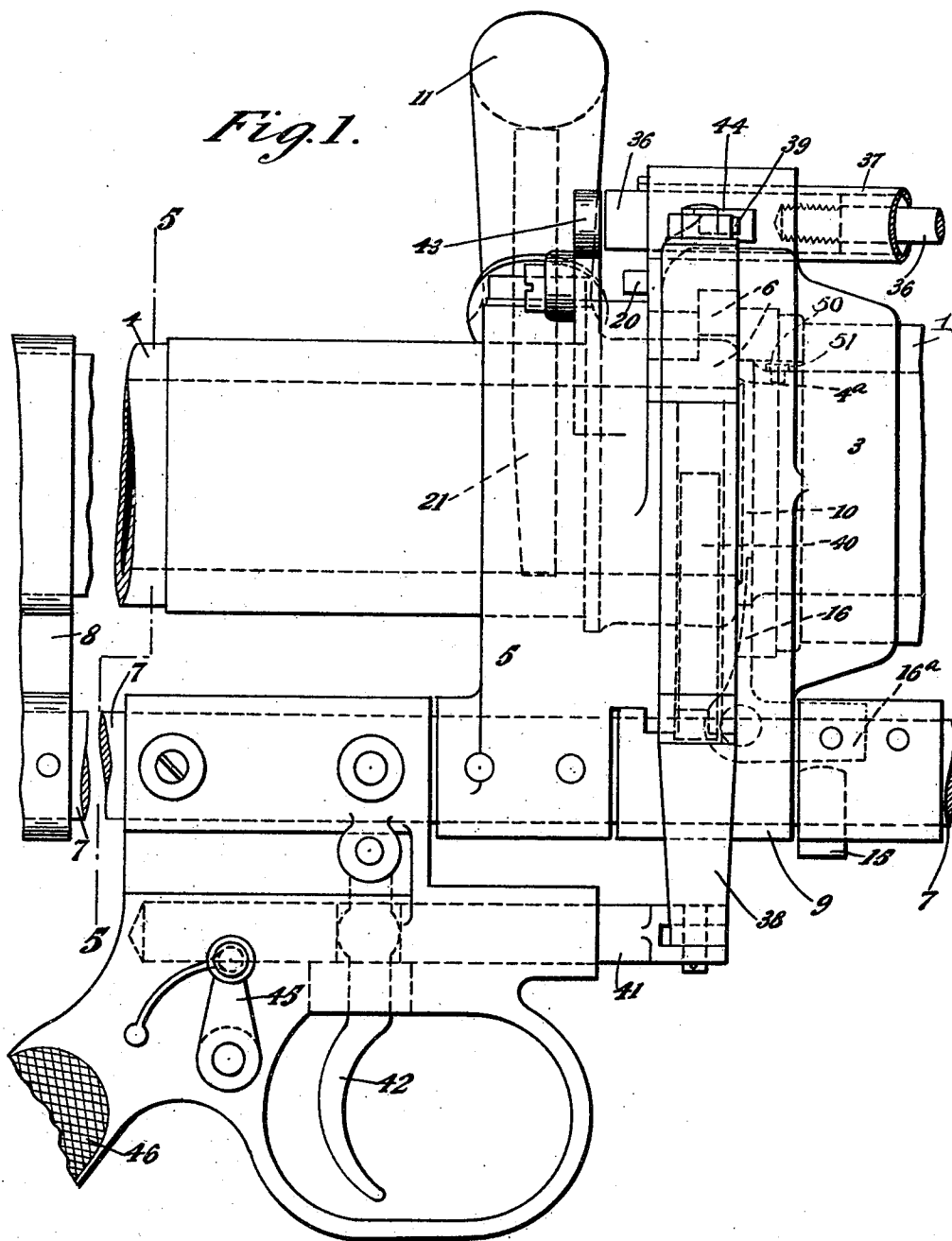


B. T. HAMILTON.
 MECHANISM FOR NON-RECOIL BREECH LOADING GUNS.
 APPLICATION FILED MAY 4, 1918.

1,397,418.

Patented Nov. 15, 1921.
 6 SHEETS—SHEET 1.



Witnesses:
 Norris L. Sumby
[Signature]

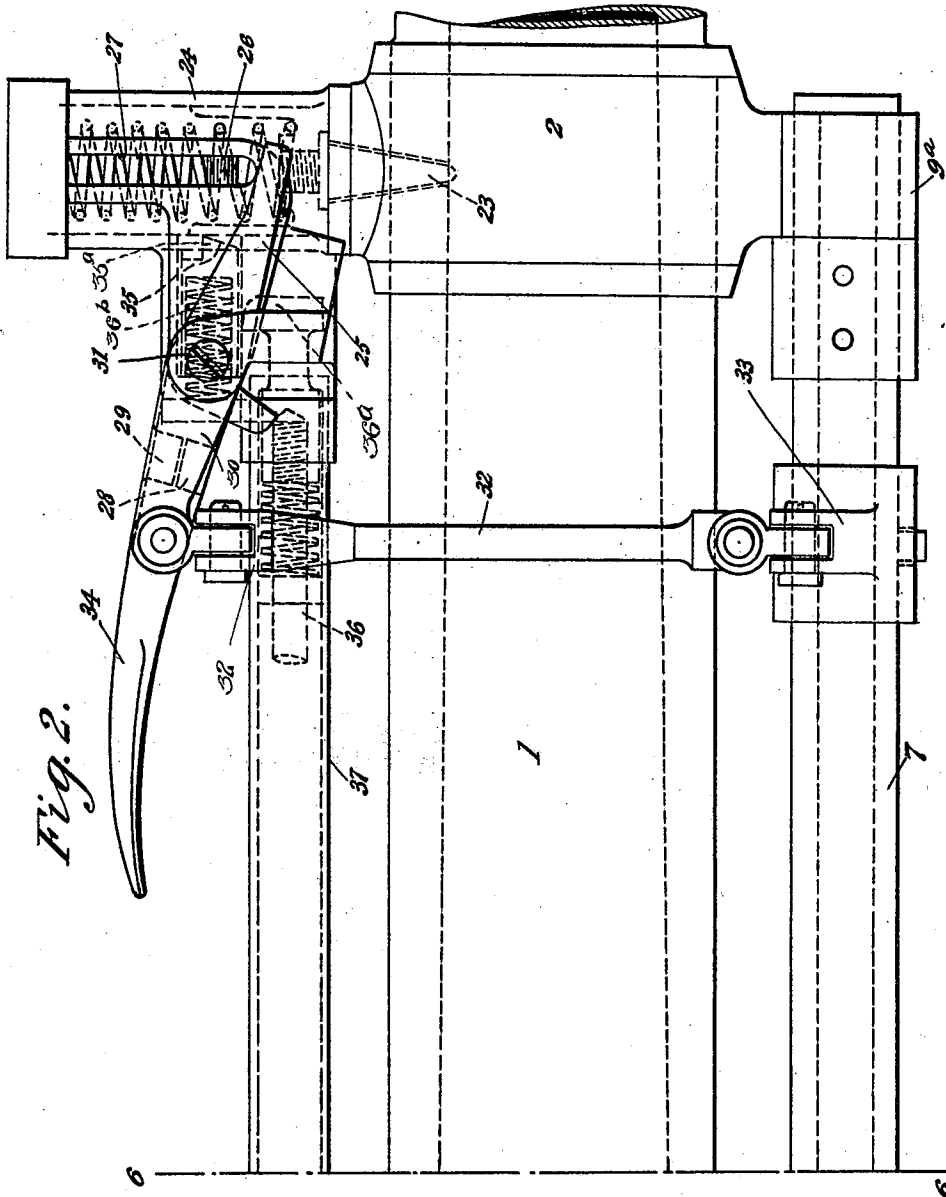
Inventor
 Belton T. Hamilton
 By *[Signature]*
 Attorney

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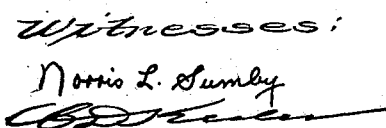


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6 SHEETS--SHEET 3.



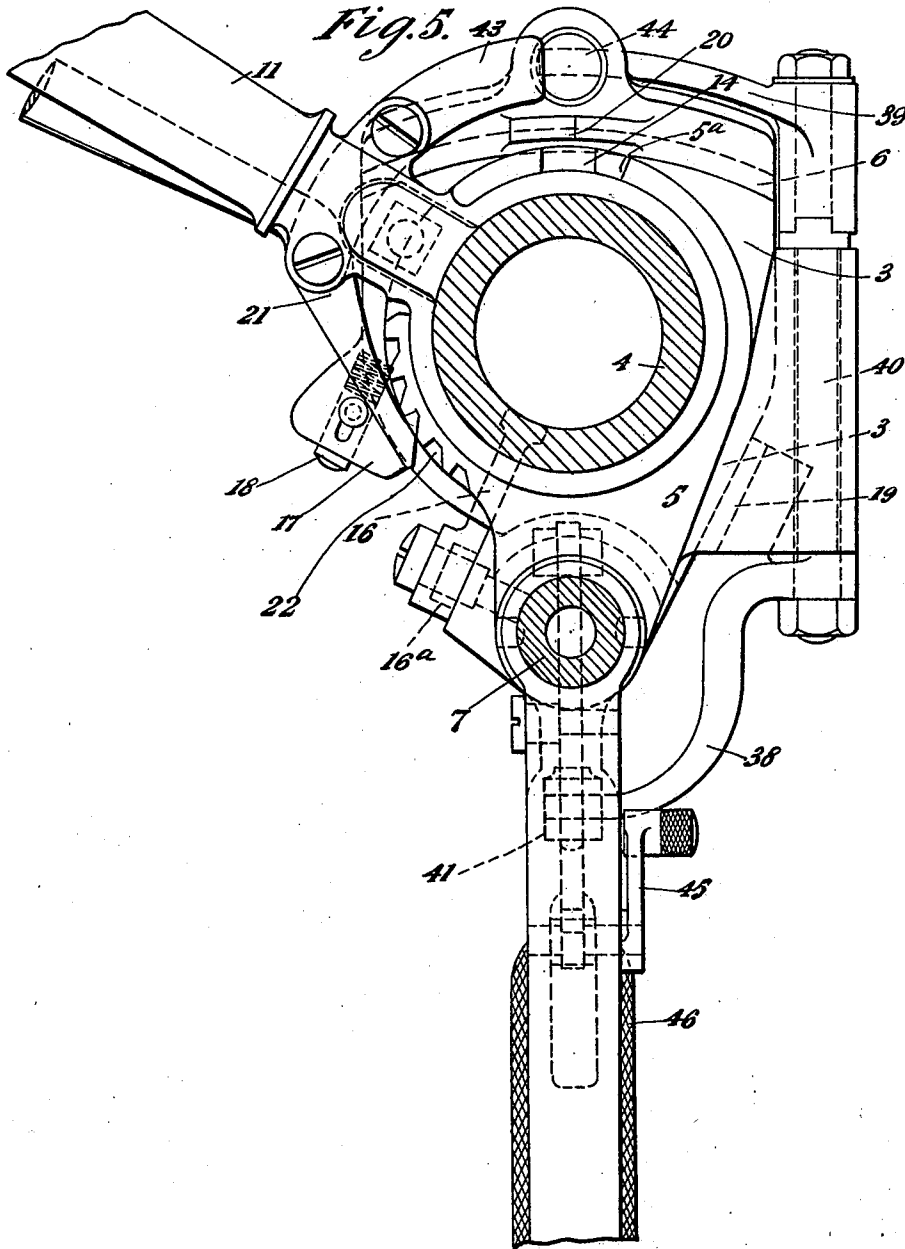
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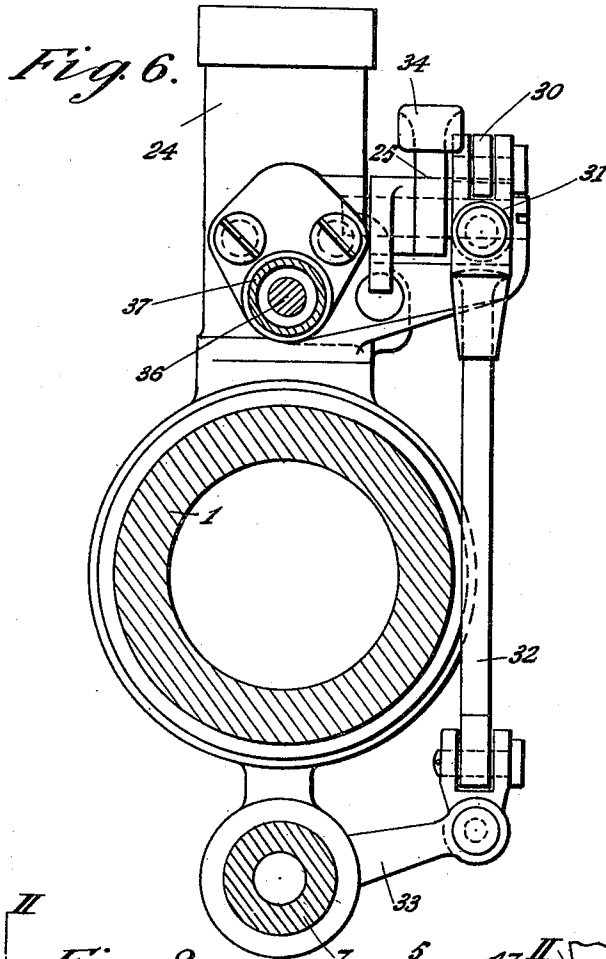
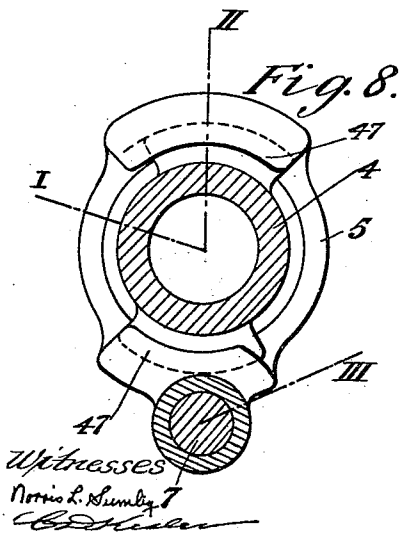
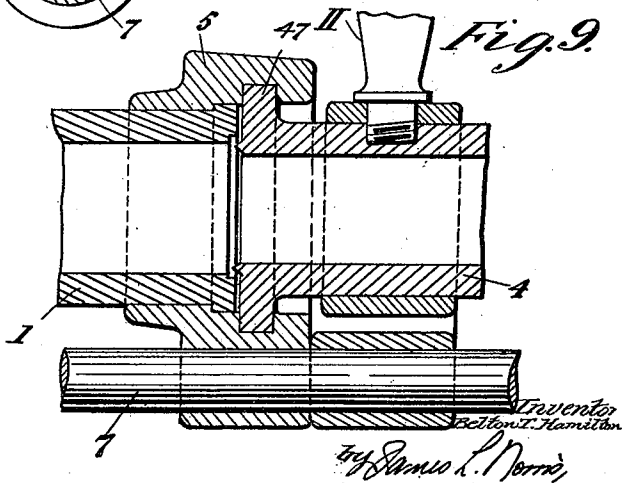
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6 SHEETS—SHEET 5.

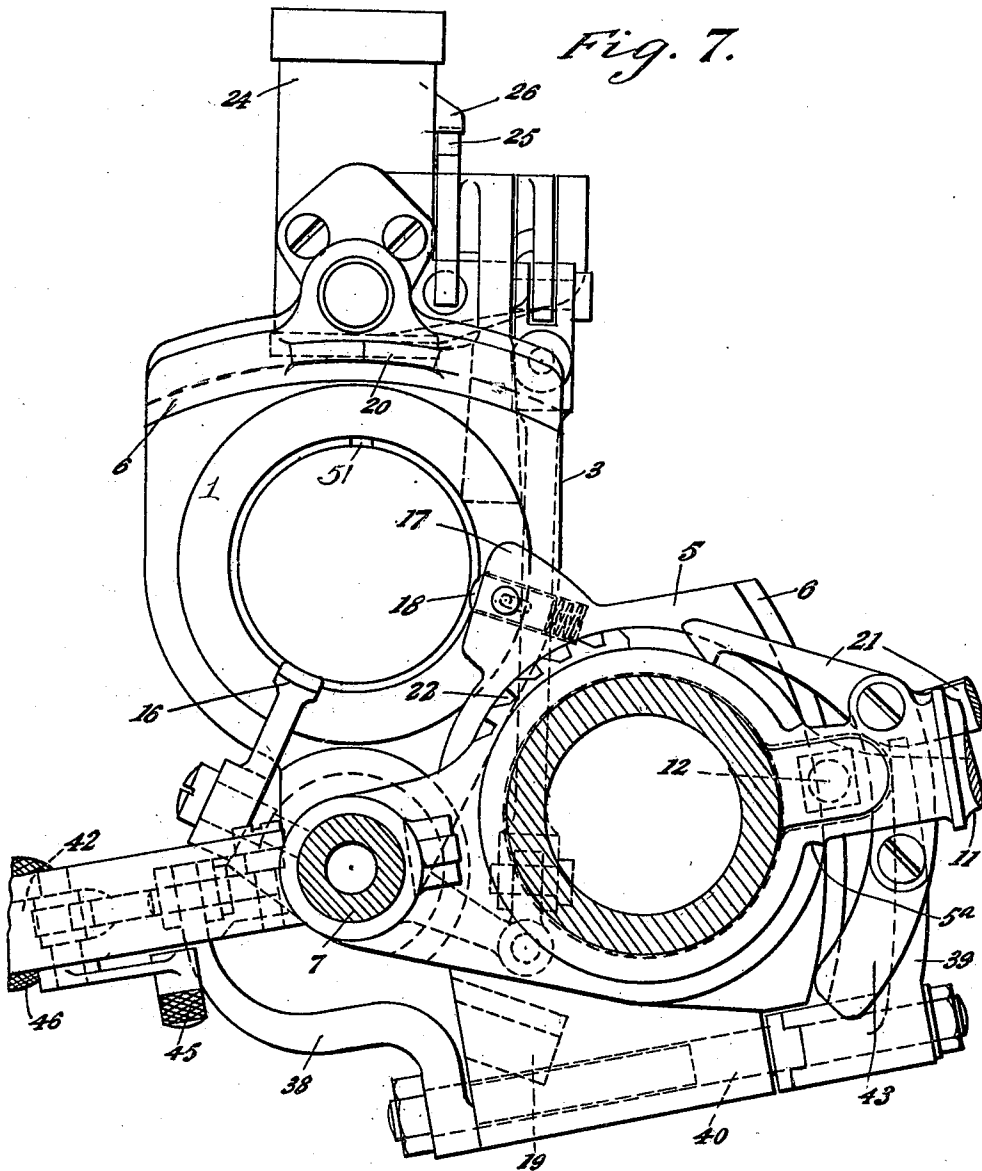


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6 SHEETS—SHEET 6.



Witnesses

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UNITED STATES PATENT OFFICE.

BELTON TATTNALL HAMILTON, OF LONDON, ENGLAND.

MECHANISM FOR NON-RECOIL BREECH-LOADING GUNS.

1,397,418.

Specification of Letters Patent.

Patented Nov. 15, 1921.

Application filed May 4, 1918. Serial No. 232,626.

To all whom it may concern:

Be it known that I, BELTON TATTNALL HAMILTON, a subject of the King of Great Britain, residing in London, England, have
5 invented certain new and useful Improvements in Mechanism for Non-Recoil Breech-Loading Guns, (for which I have filed application in Great Britain, No. 17810, dated
10 Dec 11, 1916,) of which the following is a specification.

This invention relates to breech mechanism for that class of gun, commonly called non-recoil guns, in which a single propulsive charge is utilized to discharge a projectile in
15 one direction and a given mass with equivalent momentum in the opposite direction, in such manner that no movement is communicated to the gun in either direction.

In such guns it is usual to have a forward
20 and a rear barrel with a cartridge chamber in the forward barrel, the rear barrel being connected to the forward barrel by interrupted screw threads or the like in such manner as to be easily removable for purposes of loading and extraction of the empty
25 cartridge case after firing.

In guns of this type using fixed ammunition the cartridge consists of a cartridge case open at both ends, the projectile being fixed
30 in and projecting from the front end, while the balancing mass is contained in the rear end, the propulsive charge being located between them. The cartridge case is provided with a rim at its rear end, in the usual manner, to facilitate extraction from the barrel
35 after firing, and in the rear face of the cartridge case, a V-shaped concentric groove is formed. A similar V-shaped projecting concentric ridge is formed on the face of the
40 rear barrel, which on locking the two barrels together in the action of closing the breech, is forced into the cannellure in the rear face of the cartridge case, thereby sealing the joint between the barrels.

The present invention consists in improved means for connecting or disconnecting the two barrels, in such manner that a single motion in a transverse plane of the actuating handle provided breaks the seal and
45 opens the breech, at the same time cocking the firing pin and extracting the fired car-

tridge case, a single return motion closing the breech and reestablishing the seal.

According to the invention a carrier block whose axis of rotation is eccentric to the
55 bore of the barrel, is rotatably mounted at the breech end of the fore barrel, the carrier block having formed conveniently on it or in it projecting ridges or abutments or grooves, concentric with its axis of rotation, engaging
60 with similar abutments or grooves, also concentric with the axis of rotation of the carrier block, formed on or in the fore-barrel, in such manner as to permit of rotation, or partial rotation, of the carrier block with
65 reference to the barrel but locking them together in a longitudinal direction.

The rear barrel is in turn rotatably mounted eccentrically in the carrier block engaging therewith by screw threads or the like
70 concentric with the bore of the barrel in such manner that as the barrel is rotated it is advanced or withdrawn, according to the direction of rotation, within the carrier block. The eccentricity of the mounting
75 of the rear barrel in the carrier is made equal to the eccentricity of the axis of rotation of the carrier block with reference to the axis of the bore barrel. It is, therefore, obvious that in one position of the carrier block with
80 reference to the fore barrel the axes of the two barrels will coincide, and the eccentricity is such, that a given angular movement of the carrier from this position will carry the rear barrel out of alinement with the
85 fore barrel to such an extent that extraction and loading may be performed. An actuating handle is provided fixed to the rear barrel and suitable stops arranged to limit the rotation during the opening of the breech
90 of the rear barrel in the carrier block.

Suitable stops are also arranged to limit the movement of rotation of the carrier block with reference to the fore barrel, in such manner that the carrier is stopped in one
95 position with the fore and rear barrels in alinement and in another position with the rear barrel displaced with reference to the fore barrel sufficiently to permit of extraction and loading.

A spring or automatic catch is provided
100 to lock the rear barrel in the carrier block

during the process of rotating the latter in opening or closing the breech.

When the breech is closed, the disposition of parts is as follows:—

5 The carrier block is stopped in position in the fore barrel so that the two barrels are in alinement, and the rear barrel is stopped from rotating or advancing in the carrier by the V-shaped ridge on its face engaging
10 tightly in the V-shaped groove in the cartridge case face.

During the first part of the motion of opening the breech, the actuating handle turns the rear barrel in the carrier block, at the same time, owing to the pitch of the threads or cam grooves, receding and withdrawing the V-shaped ridge out of engagement with the cartridge case face, until the rear barrel reaches the stop limiting its rotary movement in the carrier block. At this
20 moment, when the axis of the actuating handle should preferably cut the axis of rotation of the carrier block, the automatic catch engages with the carrier block, and continued movement of the actuating handle
25 rotates the carrier block, carrying the rear barrel with it, until the rear barrel is clear of the fore barrel and the breech is open. During the latter part of the movement the rotation of the axis of the carrier block may
30 through suitable levers and connections be utilized to cock the firing pin, and by suitable means, in known manner, extract the fired cartridge case.

35 To close the breech, the reverse action takes place, the first part of the movement revolving the carrier block about its axis until the two barrels are in alinement, at which moment the automatic catch disengages connection between the carrier block
40 and the rear barrel, and continued motion of the actuating handle revolves the rear barrel until the V-shaped ridge is tightly bedded in the V-shaped groove provided in the cartridge case base, thus sealing the joint.

In some cases a safety catch may be provided in known manner to lock the breech in the closed position.

As an alternative arrangement the projecting ridges, or abutments described as
50 formed on the carrier block, are formed on the rear barrel, which rotates in the carrier block.

The engaging faces of these abutments are
55 in the form of screw threads or inclined to the plane of rotation of the rear barrel so as during the opening of the breech to withdraw the rear barrel longitudinally a distance sufficient to break the seal between the
60 barrel faces.

In the accompanying drawing which shows an example of a construction according to the invention, Figures 1 and 2 represent the gun in side elevation, Figs. 3 and 4
65 in plan.

Figs. 5 and 6 are, respectively, sections on the lines 5—5 and 6—6 of Figs. 1 and 2.

Fig. 7 is a view showing the breech fully open.

Figs. 8 and 9 show on a smaller scale in
70 axial and transverse section respectively a modified construction for locking the barrels.

The gun consists essentially of two portions; the front portion comprises a fore
75 barrel 1 upon which is fixed a trunnion band 2 and a breech piece 3. The rear portion consists of a rear barrel 4 mounted by means of screw threads 4^b in a carrier block 5 which is adapted to engage with the breech piece 3
80 by means of ribs or grooves 6 formed in or on both the carrier block and the breech piece. These projecting ribs and grooves are formed transversely to the axis of the bore and are eccentric therewith, being struck
85 from and concentric with the axis of a connecting shaft 7. This shaft has fixed upon it the carrier block 5 and a rear barrel guide 8 and is mounted in bearings 9 and 9^a on the fore barrel, the axis of the shaft being parallel to the axis of the gun. The fore barrel
90 is chambered to receive the cartridge, the rim of the cartridge case taking into a recess 10 when in position in the gun. The face of the cartridge case rim has a V-sectioned circular groove formed in it and the forward
95 face of the rear barrel 4 has a similarly shaped projecting ridge 4^a formed on it, adapted when the breech is closed to engage in the V-groove in the cartridge case rim so
100 that, when the rear barrel is screwed home in the carrier block 5, the breech joint is sealed.

An actuating handle 11 fixed to the rear barrel 4 is disposed, when the breech is
105 closed, on the left hand side of the gun. To open the breech the handle is moved with a single motion transversely to the right; the first part of the movement turns the rear barrel in the carrier block through an angle
110 of about 60° and, owing to the screw-threaded engagement of these parts, the rear barrel is moved a short distance axially to the rear withdrawing the V-shaped ridge 4^a on the barrel face clear of the cartridge case rim.
115 At this moment the actuating handle comes into engagement with a stop 5^a provided on the carrier block and a hardened steel pawl 12 actuated by a spring 13 engages in a recess 14 cut in the carrier block, locking the rear barrel and actuating handle to the carrier block. A continued movement of the
120 actuating handle rotates the carrier block and rear barrel bodily around the axis of the connecting shaft 7 until the breech is
125 open, and toward the end of this movement a lever 15 fixed to the rotating shaft strikes the tail 16^a of a cartridge case ejector 16 which engaging with the rim of the cartridge case partially ejects it from the gun,
130

so that it can be freely removed by hand when desired. The carrier block is stopped in the open position by the tail 16^a of the lever 16 abutting against the breech piece 3.

5 In this gun, which is designed principally for aircraft use it is not considered desirable to completely eject the case.

A projecting lug 17 is formed on the left hand side of the carrier block which just 10 allows the cartridge rim to pass when the breech is fully open. A spring actuated plunger 18 projects in such manner that although it allows itself to be pushed to one side during loading or extraction, it is sufficiently powerful to retain the cartridge in 15 the chamber when loading the gun at high angle elevation. The forward face of the lug 17 is chamfered off in such a manner that when the cartridge rim, during loading, is pushed past the catch 18 the first movement 20 of closing the breech pushes the cartridge home in the chamber of the gun, and when the movement is continued the carrier block and rear barrel are brought back to axial alinement with the fore barrel, a stop 19 on 25 the carrier block coming into engagement with the side of breech piece 3. Previously to this the pawl 12 has come into engagement with a cam or incline 20 on the breech piece, 30 so arranged that at this moment, when the fore and rear barrels are in axial alinement, the pawl 12 is just withdrawn from the notch 14 in the carrier block 5, thus permitting the further movement of the actuating handle to turn the rear barrel in the carrier 35 block until the joint between the cartridge rim and the rear barrel face is sealed. A safety pawl 21 attached to the actuating handle is provided, adapted when the breech 40 is closed to engage with ratchet notches 22 cut in the carrier block and to be taken out of engagement therewith by the action of gripping the actuating handle when opening or closing the breech.

45 Owing to the special nature of the design of the ammunition for this gun, the percussion cap for firing the propulsive charge is situated in and some distance along the cylindrical wall of the cartridge case. A stud 50 is, therefore, provided fixed near the cartridge rim which during the process of loading is caused to enter a recess 51 provided in the mouth of the chamber so as to locate the percussion cap opposite the firing pin.

55 A firing pin 23 works in a cylindrical casing 24 screwed into the trunnion band 2 and is cocked during the opening of the breech by means of a lever 25 engaging a lug 26 formed on the firing pin body and projecting through a slot 27 in the wall of the 60 casing.

The two-armed lever 25 is mounted loosely on a pin 31 and has projecting from one arm a lug 28 which lies beneath a similar projecting lug 29 formed on the side of a second 65

lever 30 also mounted upon the pin 31. The lever 30 is connected by a rod 32 to a lever or crank 33 attached to the rotating shaft 7.

The movement given to the lever 30 during the opening of the breech, by means of 70 the shaft 7, the lever 33 and the connecting rod 32 is communicated to the lever 25 through the lugs 28 and 29.

The lever 25 has an extended handle 34 which can be operated without opening the 75 breech and is used as a recocking hand lever in case of misfires.

The nose 35^a of a sear 35 is pressed by a spring 36^b to engage below the head of the firing pin in the cocked position of the latter. 80 The sear is released by a pull rod 36, the head 36^a of which engages in a slot of the sear; the pull rod 36 slides in a tubular casing 37. A rocking lever 39 (Figs. 3 and 5) engaging with the pull rod 36 is mounted 85 on a shaft 40 and is operated by the trigger 42 through a rocking shaft 38 and connecting rod 41.

Safety when the breech is open or partially open is secured as follows:—

90 An arc-shaped extension 43 is fixed to the actuating handle, so situated as to pass in front of the end of the pull rod 36 when opening the breech. Normally, with the breech closed, this extension allows the pull 95 rod to be operated by the trigger, but on the first movement of opening the breech it comes in front of the pull rod, preventing it from being operated, and, as the breech is opened still farther, the rocking lever 39 is 100 withdrawn from engagement with a slot 44 in the pull rod 36 so that by the time the extension has passed from in front of the pull rod the rocking lever 39 is disengaged entirely. 105

A safety catch 45 is also provided mounted on the handle grip 46 to lock, at will, the trigger 42 in "safe" position.

In the modified construction shown in Figs. 8 and 9, projections 47 on the rear 110 barrel 4 inclined to the axis of the barrel engage in corresponding grooves in the carrier 5. The dot and dash line 1 represents the first position of the actuating handle in which the breech is fully closed, in the second 115 position 2 the seal between the fore and rear barrels has been broken, and in the third position 3 the breech is fully open.

Having thus described the nature of the said invention and the best means I know of 120 carrying the same into practical effect, I claim:—

1. In a non-recoil gun of the type described, a fore barrel and a rear barrel, the faces of the said barrels being locked together in axial alinement in the firing position, a carrier block rotatably mounted at 125 the breech end of the fore barrel and connected to the rear barrel by screw threads, a rotatable shaft disposed parallel to the axis 130

of the gun and on which the carrier block is fixed, a breech piece on the gun and ribs and grooves formed, respectively, on the carrier block and on the breech piece and concentric with the axis of said shaft, an actuating handle secured to the rear barrel and adapted to be moved transversely to the axis of the gun, and a continuous movement of the handle in the same direction first unlocking the seal between the faces of the barrels and then swinging the rear barrel out of axial alinement with the fore barrel and opening the breech.

2. In a non-recoil gun of the type described, a fore barrel and a rear barrel, the faces of the said barrels being locked together in axial alinement in the firing position, a carrier block rotatably mounted at the breech end of the fore barrel and carrying the rear barrel, a rotatable shaft disposed parallel to the axis of the gun, and on which the carrier block is fixed, a breech piece on the gun and ribs and grooves formed respectively on the carrier block and on the breech piece and concentric with the axis of the said shaft.

3. In a non-recoil gun of the type described a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun and a spring pawl engaging in a recess of the said block when the seal between the rear and fore barrels has been broken and an incline on the breech piece adapted to withdraw the said pawl during the closing of the breech.

4. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel movable transversely to the axis of the gun, and a mechanical impact firing mechanism, part of which is mounted on the fore barrel while the other part is mounted on the carrier block, so arranged that the said parts are disconnected when the breech is fully open.

5. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun, a cartridge in the breech piece, a lug on the said carrier block adapted to push the cartridge home in the breech piece, and a spring actuated plunger in the carrier block adapted to retain the cartridge in the chamber when the gun is elevated.

6. In a non-recoil gun of the type de-

scribed, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun, ratchet notches in the carrier block and a pawl attached to the said handle engaging with the said notches.

7. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel movable transversely to the axis of the gun, a firing pin, and means operated by the said shaft to cock the firing pin when the breech is open.

8. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun, a firing pin, a casing surrounding the firing pin, a lug on the firing pin and a lever actuated by mechanism connected to the said shaft engaging the said lug to cock the firing pin.

9. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun, a firing pin, a two-armed lever adapted to cock the firing pin, a lug on the said lever, a second lever, a crank on the said shaft, a rod connecting the said crank with the second lever and a lug on the said second lever engaging with a lug on the first lever.

10. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun, a trunnion band on the fore barrel, a casing on the trunnion band, a firing pin reciprocating in the same casing, a spring-actuated sear adapted to hold the firing pin in the cocked position, a trigger, a pull rod engaging the sear, a shaft on the carrier block, and rocking levers on the said shaft adapted to engage with the pull rod and actuated by the trigger.

11. In a non-recoil gun of the type described, a fore barrel and a rear barrel, a breech piece, a shaft disposed parallel to the axis of the gun, a carrier block carrying the rear barrel and fixed to the said shaft, a handle secured to the rear barrel moved manually transversely to the axis of the gun, a

trunnion band on the fore barrel, a casing
on the trunnion band, a firing pin reciprocating
in the same casing, a spring-actuated
sear adapted to hold the firing pin in the
5 cocked position, a trigger, a pull rod engaging
the sear, a shaft on the carrier block,
and an extension on the said handle adapted
to prevent the operation of the pull rod during
the initial opening of the breech, and
10 means for preventing the withdrawal of the
sear by the pull rod except when the breech
is closed.

12. In non-recoil ordnance, the combina-

tion with a forward barrel-portion and a
swinging rear barrel-portion of means for 15
forcing a cartridge home in the forward
barrel portion during the swinging movement
of the rear barrel-portion to its closed
position.

In witness whereof I have signed my name 20
to this specification in the presence of two
subscribing witnesses.

BELTON TATTNALL HAMILTON.

Witnesses:

B. H. DERHAM,
W. I. SKERTEN.