W. B. DARTON.

AUTOMATIC GUN.

APPLICATION FILED NOV. 1, 1918.

1,335,487. **Patented Mar. 30, 1920.**

Fig. 1

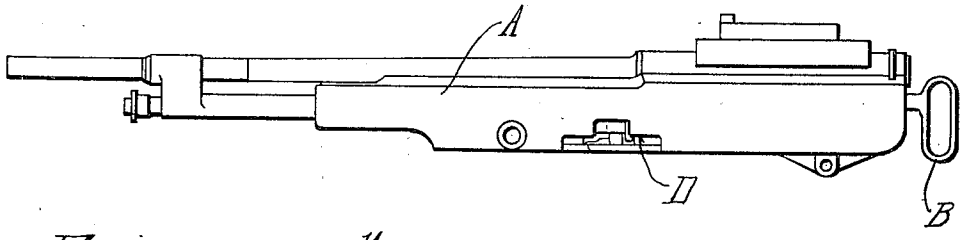


Fig. 2

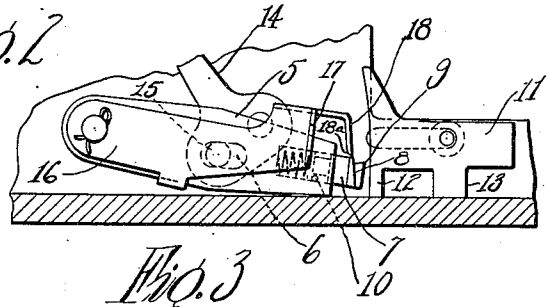


Fig. 8

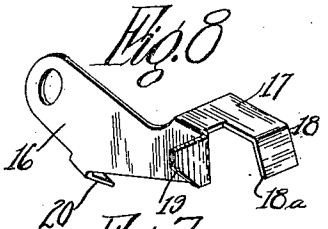


Fig. 3

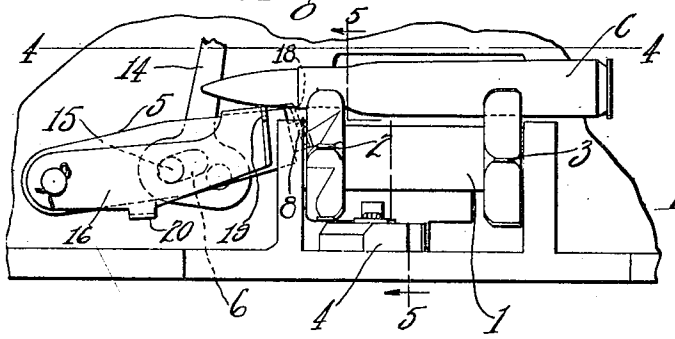


Fig. 7

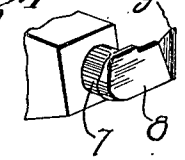


Fig. 6

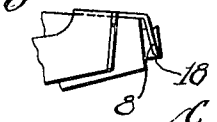


Fig. 4

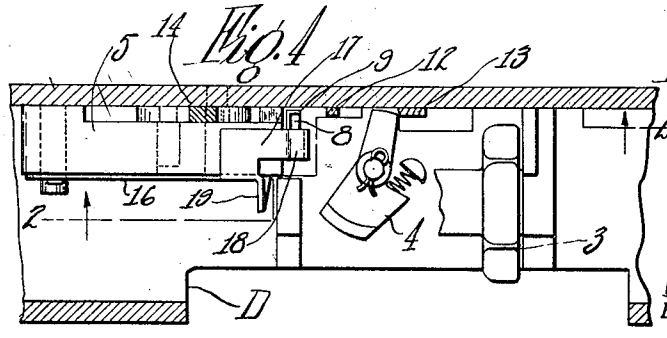
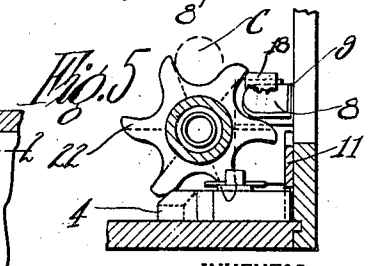


Fig. 5



INVENTOR.

Willard B. Darton.

BY

Lewis O Hutchinson

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLARD B. DARTON, OF PORTLAND, MAINE, ASSIGNOR TO MARLIN-ROCKWELL CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

AUTOMATIC GUN.

1,335,487. Specification of Letters Patent. Patented Mar. 30, 1920.

Application filed November 1, 1918. Serial No. 260,653.

To all whom it may concern:

Be it known that I, WILLARD B. DARTON, a citizen of the United States, residing in the city of Portland, county of Cumberland, and State of Maine, have invented a certain new and useful Improvement in Automatic Guns, of which the following specification is such a clear, full, and exact description as to enable one skilled in the art to which it appertains to make and use the same.

My invention has to do more particularly with automatic guns of the gas operated, rotary feed wheel type, such for example as the Colt and the Marlin. Automatic guns of these types are provided with the gas cylinder in communication with the front end of the gun barrel. Within the gas cylinder is the piston the rear end of which is known as the slide and which extends into the body of the gun and operates the bolt and incidentally the shell extractor and cartridge extractor. A spring is interposed between the front end of the piston and a shoulder on the body portion of the gun to return the various parts to firing position. In the body portion of the gun in front of the receiver is the feed wheel provided with teeth between which may be held a cartridge. The feed wheel is caused to rotate step by step in a clockwise direction by means of the spring-pressed ratchet lever pawl carried by the pivoted ratchet lever which in turn is oscillated by virtue of the pin and slot connection between it and the feed lever which is operated by engagement with suitable lugs on the slide. The wheel is normally prevented from moving counterclockwise by means of the feed wheel dog. The cartridges are carried in a belt which passes through the gun by way of the feed wheel. In operation the feed wheel presents a cartridge in proper place to be seized by the cartridge extractor. The bolt is moved to the rear and at the same time the cartridge extractor moves rearwardly carrying the cartridge therewith. At the same time one of the lugs on the slide moves the feed lever rearwardly which in turn raises the ratchet lever. The ratchet lever pawl recedes into the ratchet lever and slides over the tooth of the feed wheel. When the ratchet lever has reached its uppermost position, the pawl is projected from the lever sufficiently to engage with a tooth of the feed wheel. As the bolt moves forward, the cartridge is thrown up in front of it and chambered, and the other lug of the slide moves the feed lever forwardly, forcing down the ratchet lever. As the ratchet lever pawl is now in engagement with a tooth of the feed wheel, the feed wheel is advanced a single step thus bringing another cartridge into place to be grasped by the cartridge extractor when the bolt is in place.

It sometimes happens that the bolt has been prevented from returning to its locked position, although the slide has returned sufficiently to throw forward the feed lever which brings about an advancement of the feed wheel and presents a cartridge in proper position to be extracted, as previously described. When this happens the cartridge extractor is prevented from moving forwardly far enough to engage with the groove of the cartridge. The gun will not fire as the sear has not been disengaged from the hammer. The bolt may have been prevented from assuming its locked position for any one of several reasons. A cartridge may not have been perfectly round and when it was inserted in the chamber did not go in far enough to allow the bolt to assume its locked position, or it may not have been inserted to its full depth because of some residue or foreign matter in the chamber. Since the bolt is prevented from assuming firing position, the cartridge extractor is also prevented from engaging with the groove of the cartridge. Under these conditions the gun cannot fire as the sear has not been disengaged from the hammer. It is then necessary to put the various parts through their cycle of operations by means of the charging slide. This will cause an ejection of the defective cartridge but will not remove the cartridge at the top of the feed wheel and when the bolt goes forward the cartridge will prevent rotation of the feed wheel and consequently prevent locking of the bolt due to the fact that the ratchet lever pawl of the ratchet lever, being in engagement with a tooth of the feed wheel, cannot move downwardly and as the feed lever is in engagement with the ratchet lever it is prevented from going forward and holds back the slide which operates the bolt. Sometimes it happens that the explosion of the cartridge did not develop sufficient energy to throw the bolt and the shell extrac-

tor back far enough to eject the shell and take the next cartridge off the carrier and place it in position to be chambered. The bolt will move forwardly under the action of the slide spring and tend to force the exploded shell back into the chamber at least part way. The cartridge that should have been chambered is still held by the cartridge extractor and is returned to the feed wheel where the forward part engages a tooth of the feed wheel and prevents rotation thereof. This cartridge will be distorted by being pinched by the feed wheel as it attempts to rotate. By operating the charging slide the exploded shell can be ejected and the distorted cartridge brought into position to be chambered. Because of its distortion, it cannot be completely chambered and the bolt is prevented from assuming firing position. Now if the charging slide is again operated by the gunner, the distorted cartridge will be ejected but the cartridge at the top of the feed wheel will remain there as the cartridge extractor has had no opportunity to grasp it. Then when the bolt moves forward again, it will be prevented from assuming its locked position as previously described.

Whenever a cartridge is left in the feed wheel after it should have been removed and prevents a locking of the gun, a feed jam has resulted. To reduce this jam it has been necessary in the past to release the feed wheel through the medium of the feed throw-off and allow it to rotate counter clockwise somewhat and then start the belt and the cartridges through the gun again. This amounts to practically reloading the gun and is a very clumsy and inconvenient way of reducing the jam.

The object of my invention is the provision of a means whereby the jam of this character can be prevented simply and effectively thereby doing away with the necessity of releasing the feed wheel and running the belt back. To accomplish this I provide a means for preventing the ratchet lever pawl from operating when a cartridge is in the feed wheel after it should have been extracted. The action of this means in making the ratchet lever pawl inoperative, prevents the engagement of the same with a tooth of the feed wheel. Consequently the slide and the bolt can return to the firing position. Of course no cartridge has been chambered and so it is impossible to fire the gun, but it can be quickly and easily manipulated so as to cause a cartridge to be chambered through the medium of the charging slide and thus allow the firing of the gun to be quickly resumed.

My device will always prevent a jam and almost instantly allow the gun to be put in operation again without trouble attendant upon the other ways of reducing the jam.

As automatic guns are being used on airplanes, it is highly desirable to have means to prevent a jam and allow a quick and easy means for starting the operation of the gun should it stop firing through conditions above described.

Referring now to the drawings:

Figure 1 is a side elevation of the gun itself;

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

Fig. 3 is a side elevation of the feed wheel and ratchet lever pawl with the jam preventer applied;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a section on the line 5—5 of Fig. 3;

Figs. 6 and 7 are details; and

Fig. 8 is a perspective view of the jam preventer.

In Fig. 1 A represents the gun proper and B the charging slide handle; D is the opening in the side of the gun to allow the belt and cartridges to be fed into the gun.

With reference more particularly to Fig. 3, 1 designates the feed wheel suitably supported and provided with the teeth 2 and 3 forming between them cradles for the reception of the cartridges. Mounted on the bottom of the body portion of the gun is the spring pressed feed wheel dog 4, which engages with the teeth 2 of the feed wheel in such a way as to normally allow the wheel to be rotated clockwise and prevent counter clockwise rotation thereof.

Pivotally mounted on the side of the gun in advance of the feed wheel is the ratchet lever 5 having an elongated slot 6 therein. The end of the lever 5 extending toward the feed wheel, carries the spring pressed ratchet lever pawl 7 having the cam surface 8 and the projection 9. The pawl 7 extends far enough in advance to engage with the teeth 2 of the feed wheel, and is limited in its outward movement by the stop 10. The feed throw-off 11 having the legs 12 and 13, is reciprocatively mounted on the side of the gun in such a way that it can be operated from the exterior of the gun. The fore part of this slide is adapted to engage with the projection 9 and the leg 13 with the feed wheel dog 4 to release the feed wheel to allow counter clockwise rotation thereof.

The lever 5 is cut out on the side near the wall of the gun to accomodate the feed lever 14 pivotally mounted on the wall and provided with a pin 15 which engages the slot 6.

All the elements heretofore described are old and well known in guns of this type. My invention resides in the element 16, the jam preventer and its use. The jam preventer has the same general shape as the ratchet lever and is pivotally mounted on the ratchet lever pin. It can be applied to

any gun of the types for which it is adapted by simply removing the washer from the ratchet lever pin and putting on the preventer which is of the same thickness as the washer, in place thereof. It has a top portion 17 having an arm 18 extending obliquely downward therefrom provided with a cam face 18ª, and a lug 19 extending at right angles toward the center of the gun. It also has an arm 20 which extends under the ratchet lever 5 to cause the jam preventer to move downwardly with the lever. Under certain conditions the two surfaces 18ª and 8 engage, resulting in the pawl being forced into the lever 5 destroying the engagement between the pawl and the teeth 2 of the feed wheel.

The operation of the device is as follows: Starting with the various parts of the gun in firing position and the feed belt in place with a cartridge C at the top of the feed wheel, the gun is fired and the reloading commences. The bolt goes back, the cartridge extractor moving rearwardly takes with it the cartridge; at the same time the slide rod moves rearwardly and a lug thereon throws the feed lever 14 from the position shown in Fig. 2 to the position shown in Fig. 3, causing the ratchet lever 5 to rise. The cam surface 8 engages with a tooth 2 but the pawl recedes into the lever 5 and passes over it. The bolt and slide return, the cartridge is chambered and the levers 14 and 5 are brought back to the position shown in Fig. 2. Meanwhile the lower edge of the pawl 7 is in engagement with the top of a tooth 2 and causes the advancement of the feed wheel one step bringing another cartridge into position to be extracted. This is the normal operation and the jam preventer has not been brought into operation. Suppose now, however, that for some reason the cartridge has not been properly extracted from the belt. The cycle of operations would be the same until the bolt started on its return path. If the preventer was not present, the gun would jam due to the fact that the cartridge would prevent the rotation of the feed wheel which would prevent the operation of the levers 5 and 14 holding up the return of the slide due to the engagement of the lug on the slide with the lever 14. With the preventer in place the jam is prevented, since the lug 19 strikes against the cartridge and forces the preventer down. The surface 18ª and 8 contact and the pawl 7 is pushed into the lever 5. The pawl is now out of engagement with the tooth 2, and the lever 5 can swing down. This allows the slide and the bolt to proceed and assume their proper position. As soon as the lever 5 has gone down far enough the contact between the preventer and pawl is broken but the dog will not engage the tooth 2. The gun can not now be fired as no cartridge has been chambered, but the extractor has been allowed to move forwardly far enough to grasp the cartridge. If the cycle of operations is now repeated by manipulating the charging slide, the cartridge will be chambered and the gun will be ready for firing again.

Thus it is seen that I have provided a device which will absolutely prevent a feed jam and will allow the gun to be quickly put back into operation if it has been stopped because of some defect in a cartridge.

I claim as my invention:

1. In an automatic gun, a feed wheel, means to rotate the same a predetermined amount at each opening and closing of the breech and means to render said first means inoperative upon failure of the extractor to remove the cartridge from the feed wheel.

2. In an automatic gun, a rotary member, means including a pawl to advance said feed member a predetermined distance at each opening and closing of the breech, and means to retain said pawl out of operating position when a cartridge remains in the feed member after it should normally have been removed.

3. In an automatic gun, a rotary feed member, a lever carrying a pawl adapted to engage with the feed member and advance it a predetermined amount at each complete operation of the bolt, and means carried by the said lever to render the pawl inoperative in case a cartridge has not been removed from the feed member after being brought into position for removal.

4. In an automatic gun, a rotary feed member, a lever carrying a pawl adapted to engage with the feed member and impart to it a step by step rotation at each complete operation of the bolt, and means including an arm to engage with and render the pawl inoperative and a lug to engage with a cartridge in the feed member.

5. A feeding mechanism including a toothed wheel, a pivotally mounted lever having at its free end a pawl adapted to engage with the said wheel to impart to it a step by step rotation, and means carried by said lever to render the said pawl inoperative.

6. An operating mechanism for a feed member comprising a lever provided with a pawl to engage with said member, and means carried by said lever to render said pawl inoperative.

7. An operating mechanism for a feed member comprising a lever provided with a pawl adapted to engage with said feed member, and means carried by said lever to render said pawl inoperative including a plate with an arm having a cam surface and a lug extending from said plate.

8. An operating mechanism for a rotary

feed member comprising a lever pivotally mounted at one end, a pawl in the other end adapted to engage with said rotary feed member and a plate carried by said lever including an arm adapted to engage with the pawl to maintain it in inoperative position.

9. An operating mechanism for a rotary feed member comprising a lever pivotally mounted at one end, a pawl in the other end adapted to engage with said rotary feed member and a plate carried by said lever including an arm adapted to engage with said pawl to render it inoperative and a lug projecting from said plate.

10. In an automatic gun, a rotary feed wheel, operating mechanism therefor including a lever pivotally mounted at one end and carrying a pawl at the other end adapted to impart to the feed wheel a step by step rotation, a member associated with said lever and mounted to oscillate therewith, said member being provided with a projection extending beneath and a plate extending over said lever, an arm on said plate adapted to engage with and render said pawl inoperative and a lug projecting at right angles from said plate.

WILLARD B. DARTON.