

Feb. 18, 1936.

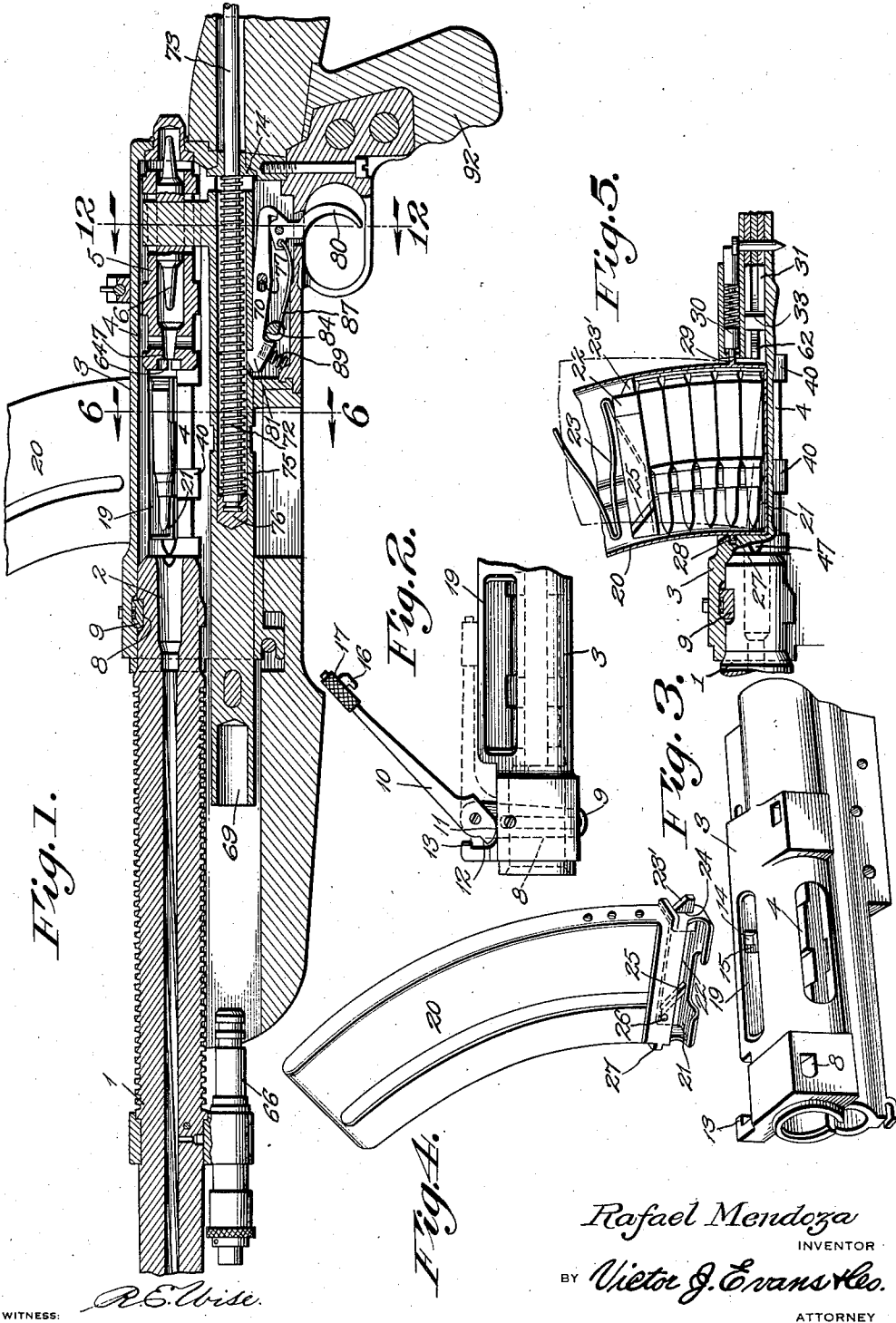
R. MENDOZA

2,031,383

MACHINE GUN BOLT MECHANISM

Filed Oct. 1, 1934

3 Sheets-Sheet 1



Feb. 18, 1936.

R. MENDOZA

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MACHINE GUN BOLT MECHANISM

Filed Oct. 1, 1934

3 Sheets-Sheet 2

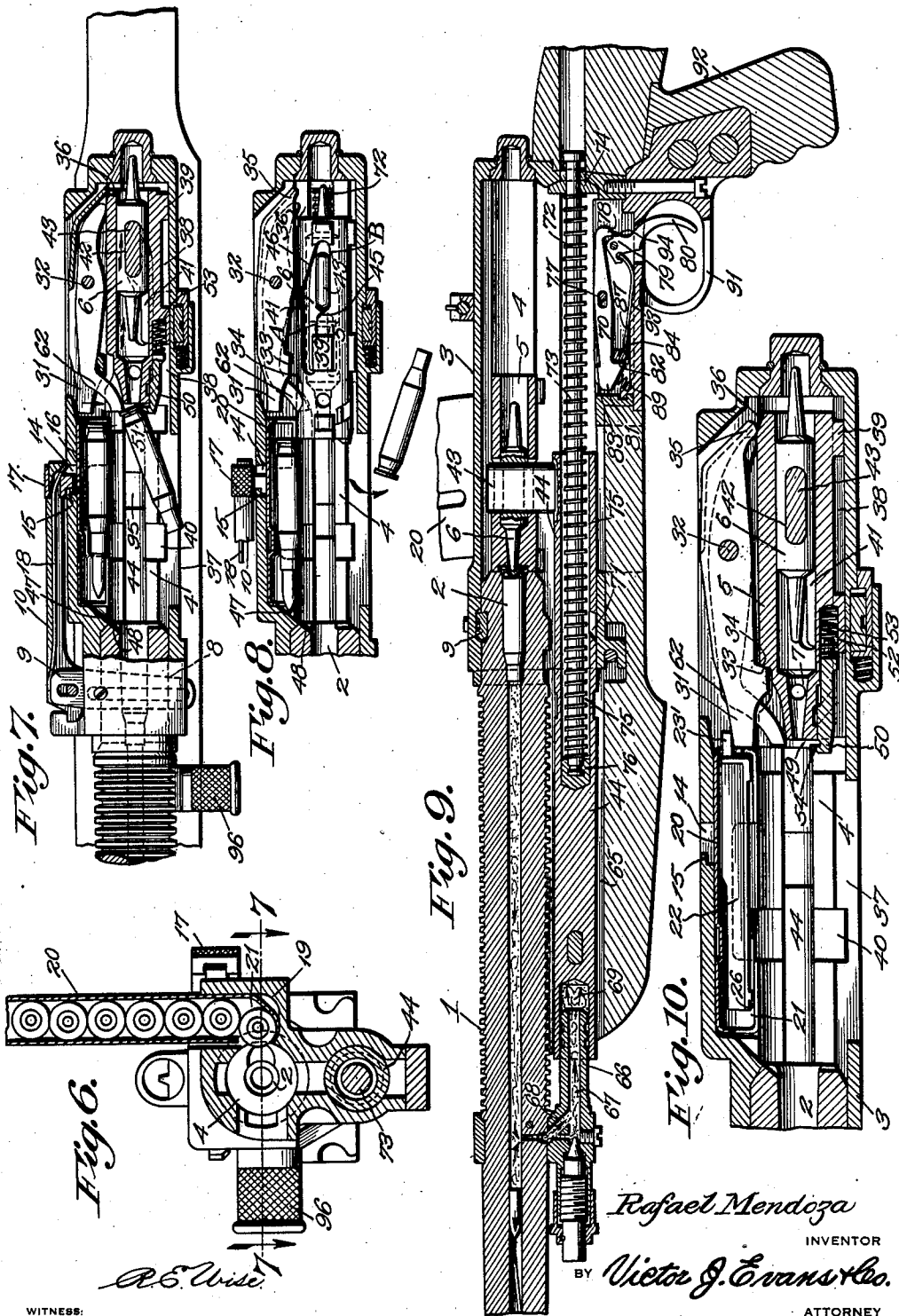


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

A. E. Wise

WITNESS:

Rafael Mendoza
INVENTOR
BY Victor J. Evans & Co.
ATTORNEY

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R. MENDOZA

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MACHINE GUN BOLT MECHANISM

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3 Sheets-Sheet 3

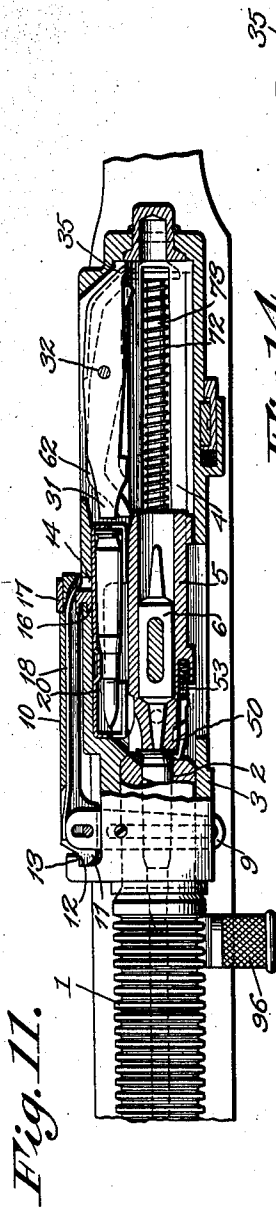


Fig. 11.

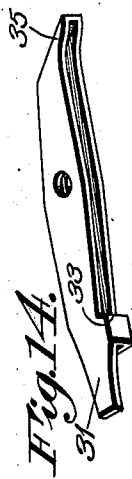


Fig. 14.

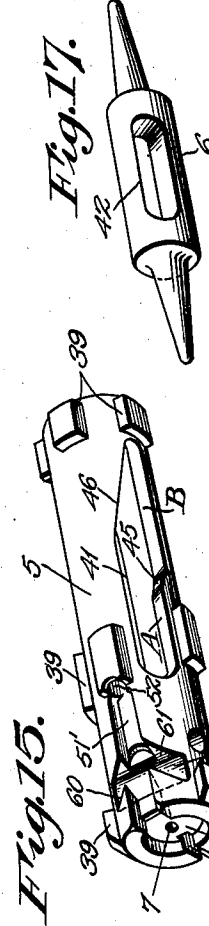


Fig. 15.

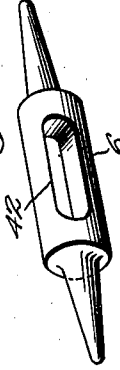


Fig. 17.

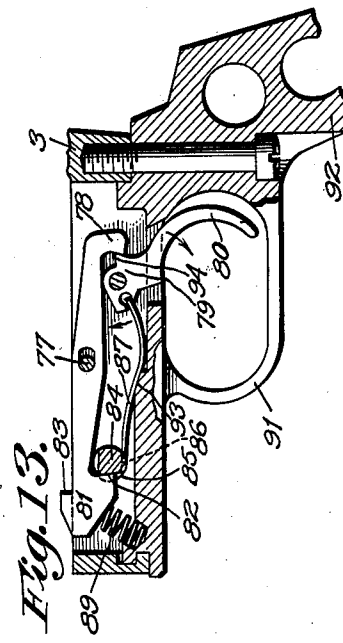


Fig. 13.

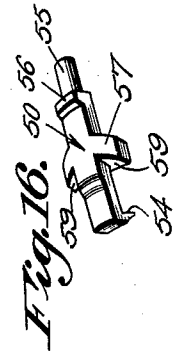


Fig. 16.

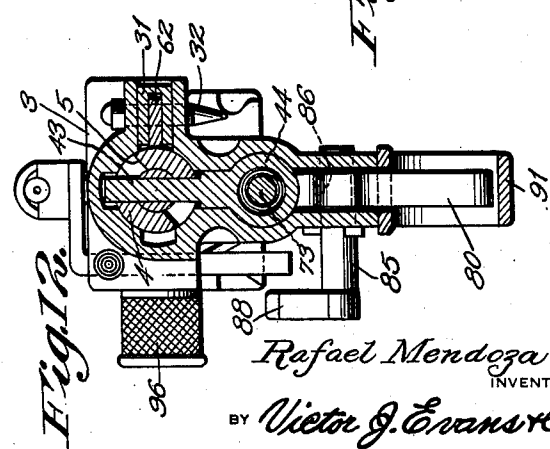


Fig. 12.

R. E. Wise

WITNESS:

Rafael Mendoza
INVENTOR
BY Victor J. Evans & Co.
ATTORNEY

UNITED STATES PATENT OFFICE

2,031,383

MACHINE GUN BOLT MECHANISM

Rafael Mendoza, Mexico, D. F., Mexico

Application October 1, 1934, Serial No. 746,445

5 Claims. (Cl. 89—3)

This invention relates to automatic firearms and more particularly an improved means for releasably securing the gun barrel to the case or frame of the gun and which, when in securing position, will effectively prevent relative movements between said parts.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a fragmentary longitudinal sectional view illustrating an automatic firearm constructed in accordance with my invention.

Figure 2 is a fragmentary detail view showing the securing means for effectively and removably securing the gun barrel to the gun frame or case.

Figure 3 is a perspective view illustrating a portion of the gun case or frame.

Figure 4 is a perspective view illustrating the magazine.

Figure 5 is a fragmentary vertical sectional view showing the connection between the magazine and the gun case or frame.

Figure 6 is a transverse sectional view taken on the line 6—6 of Figure 1.

Figure 7 is a horizontal sectional view showing the partial ejection of a fired shell from the gun.

Figure 8 is a similar view showing the complete ejection of the fired shell.

Figure 9 is a fragmentary vertical sectional view showing the firing of a shell and the utilization of the explosive charge to return the bolt and firing pin to cocked or firing position.

Figure 10 is a fragmentary horizontal sectional view illustrating automatic means for temporarily holding the bolt in firing position on the exhaustion of ammunition in the magazine and gun.

Figure 11 is an enlarged fragmentary horizontal sectional view showing the bolt and firing pin in firing position and also showing the locking means between the barrel and the gun frame or case.

Figure 12 is a transverse sectional view taken on the line 12—12 of Figure 1.

Figure 13 is a fragmentary view, partly in section, showing the trigger and sear of the gun set for semi-automatic firing.

Figure 14 is a perspective view illustrating the lever for temporarily holding the bolt in cocked

position after the exhaustion of ammunition from the gun and magazine.

Figure 15 is a perspective view illustrating the bolt.

Figure 16 is a perspective view illustrating an ejector dog carried by the bolt.

Figure 17 is a perspective view illustrating the firing pin.

Referring in detail to the drawings, the numeral 1 indicates a gun barrel equipped with a firing chamber 2 in one end thereof and which end is removably secured to a gun case or frame 3, the latter having a chamber 4 to slidably support a bolt 5 in which is slidably mounted a firing pin 6, either end of which may be employed for striking the cap of the shell by moving for a limited distance through an opening 7 provided in the end of the bolt. The end of the barrel which is releasably secured to the gun frame or case is provided with a tapered groove 8 to receive a tapered wedge 9 and the latter is pivotally and slidably connected to a lever 10. A pin and slot connection is provided between the wedge and the lever and the pivoted end of said lever has a cam face 11 and a shoulder 12 adapted to abut a shoulder 13 on the gun case or frame when the lever is in wedge securing position. A slot 14 is provided in the gun case or frame and presents an undercut shoulder 15 to be engaged by a catch 16 rigidly secured to a finger piece 17 mounted for a limited sliding movement on the lever 10. The catch 16 when in engagement with the shoulder 15 retains the lever against pivotal movement and with the shoulder 12 in abutting engagement with the shoulder 13. A leaf spring 18 is arranged in the lever 10, one end of which bears against the outer end of the wedge 9 and the opposite end is offset to act on the sleeve or finger piece 17 for retaining the catch 16 in engagement with the shoulder 15. The last-named end of the spring is capable of flexing so that when the finger piece 17 is moved rearwardly with respect to the gun to disengage the catch 16 from the shoulder 15, said end of the spring will flex outwardly from the gun and thereby free the lever for pivotal movement and as said lever is moved into the position, as shown in Figure 2, the cam face 11 riding against the gun case or frame will impart an endwise movement to the wedge to loosen the latter in the groove of the gun barrel so that said wedge may be easily drawn from the groove of the gun barrel and the groove provided in the gun case or frame whence the barrel may be detached from the gun case or frame. The parts as positioned in Figure 11, the spring 18 bearing

against the end of the wedge acts to urge said wedge tightly against the walls of the groove in the barrel and gun case or frame and thereby effectively secure the gun barrel and gun case or frame from having relative movement.

A magazine chamber 19 is formed in one side of the gun case or frame and at one end opens outwardly through the top face of the gun case or frame and the opposite end is communicative with the chamber 4. A magazine 20 is removably secured in the magazine chamber 19 with its outlet end 21 positioned to direct a shell partially into the chamber 4. The magazine is arcuately curved and extends upwardly and forwardly with respect to the gun, the mouth of the magazine being confined in the magazine chamber and formed by an arcuately curved flange aiding in directing the shell partially into the chamber 4. It is to be understood that the magazine is loaded with shells from the mouth and operating in the magazine is a follower 22, operating against the action of a spring 23 and equipped at one end with a projection 23' confined within the magazine as long as a shell remains in the magazine and on the exhaustion of the shells from the magazine the projection is adapted to extend through a slot 24 in the magazine adjacent the mouth. A rib 25 is formed on the follower and is disposed at an inclination to engage with a stop or pin 26 on the magazine as the follower aligns with the slot 24 to cause an endwise movement of the follower sufficient to extend the projection 23' a distance outwardly of the magazine. A shoulder 27 is provided on the opposite side of the magazine from the slot 24 and is adapted to fit under a shoulder 28 formed on a wall of the magazine chamber 19 adjacent to where said magazine chamber opens outwardly through the top face of the gun frame or case. A projection 29 is formed on the opposite side of the magazine from the projection 27 and when the magazine is inserted in the magazine chamber the projection 29 engages with a spring pressed plunger 30 carried by the gun case or frame. The plunger 30 acts to slide the magazine in the chamber endwise of the gun to bring the projection 27 under the shoulder 28, sufficient clearance being provided in the chamber for permitting a limited sliding movement of the magazine in the chamber endwise of the gun. To remove the magazine from the chamber, the latter is slid endwise of the gun, the plunger 30 yielding to permit the projection 27 to move from under the shoulder 28 and when in this position the magazine may be readily withdrawn from the magazine chamber. The purpose of the extension 23' on the follower 22 is to bring about positioning of a locking lever 31 to retain the bolt in firing position on the exhaustion of shells from the magazine. The lever is pivoted to the gun case or frame, as shown at 32, and adjacent one end is provided with a shoulder 33 adapted to be brought into engagement with a shoulder 34 formed on the bolt by an opposite end 35 of said lever riding upon an inclined face 36 located at the other end of the bolt. The end 35 of the lever is engaged by the face 36 on the bolt moving into cocked position consequently bringing the shoulder 33 in engagement with the face 34 but as the lever is pivotally mounted and the shoulder 33 and face 34 so shaped the bolt when driven or released from cocked position may move into firing position. However, as the last shell is fed into the barrel of the gun and the magazine is exhausted of shells the projection 23' engages

with the lever and prevents pivotal movement thereof so that the shoulder 33 engaging the face 34 will retain the bolt in cocked position until such time the magazine is removed from the magazine chamber 19. This arrangement is provided so that the bolt will not be released from firing position by the operator when the shells are exhausted from the magazine and gun keeping the bolt in cocked position ready to actuate on the introduction of another magazine filled with shells.

The gun case or frame is equipped with a shell discharge slot 37 in one side thereof and this slot communicates with the chamber 4 substantially opposite to the communication of the magazine chamber with said chamber 4. The walls of the chamber 4 are provided with longitudinally extending grooves 38 in which operate lugs 39 on the bolt 5 and which permit the bolt 5 to have free sliding movement in the chamber either from cocked to firing position or from the latter-named position to cocked position. Arranged at right angles to the grooves 38 are grooves 40 and are in communication with the grooves 38 to permit a limited rotation of the bolt as the latter reaches firing position, the lugs entering said grooves 40. Oppositely arranged slots 41 are provided in the bolt and the firing pin 6 has a slot 42 aligning with said slots 41. Extending through one of the slots 41 and through the slot 42 into the other slot 41 is a projection or arm 43 secured to a plunger 44 forming a part of a combined firing and cocking mechanism which will be hereinafter more fully described. Opposite walls of each slot 41 are cut away to form cam faces 45 and 46 and which provide to each slot portions A and B one disposed slightly laterally of the other. The bolt when in cocked position with the lugs 39 lying in the longitudinal grooves 38, the arm 43 bears against the cam faces 45 so that when the gun is fired and the arm 43 moves in the direction of the barrel or firing chamber thereof it drives both the bolt and firing pin in the direction of the barrel until the bolt abuts the end of the barrel with the lugs 39 aligning with the grooves 40. The arm bearing against the cam faces 45 during this movement of the bolt besides driving the bolt into firing position it has a tendency to turn or rotate the bolt and as the lugs align with the grooves 40 the bolt rotates a limited distance with the arm 43 and firing pin continuing a sliding movement in the direction of the barrel or firing chamber thereof so that the pointed end of the firing pin will pass through the aperture 7 and strike the cap of the shell with sufficient force to bring about the explosion of the cap for the purpose of igniting the powder of the shell. On the sliding movement of the arm 43 in a reverse direction or in a direction to cock the bolt and firing pin, said arm and firing pin first slide relative to the bolt until the cam faces 46 are engaged by the arm and the latter bearing with force against said cam faces rotates the bolt 5 in a reverse direction to bring the lugs 39 again into the longitudinal grooves 38 whence said bolt may return to a cocked position along with the firing pin by the influence of said arm 43.

As heretofore stated, the lowermost shell of the magazine partially extends into the chamber 4 so that the bolt on leaving a cocked position will engage with the shell and impart endwise movement thereto and during the initial endwise movement of the shell the bullet or projectile of

the shell engages with inclined faces 47 and 48 formed on the walls of the chamber and the end of the gun barrel which has the firing so that said shell will be guided into the firing chamber in advance of the bolt 5. The end of the bolt which engages with the shell is recessed or chambered to form a seat 49 for the cap end of the shell to engage in as said shell reaches home in the firing chamber and which seat permits said end of the bolt to contact firmly and evenly with the end of the barrel of the gun. As before stated, the bolt 5 reaches firing position in advance of the firing pin so that the shell will be properly positioned in the firing chamber before the firing pin passes through the opening 7 and strikes the cap of the shell. As the cap end of the shell moves into the seat 49 a yieldable ejector dog 50 carried by the bolt snaps into the usual annular groove 51 of the cap. The dog 50 operates in a groove 51' formed in the bolt 5, one end of this groove extending into the seat 49 while the other end of the groove communicates with a chamber 52 formed on the bolt in which is positioned a coil spring 53. The dog includes a body of elongated formation having one end shaped to form a tongue 54 to engage the groove of the cap of the shell while the opposite end is reduced to form a plunger 55 slidably received in the chamber 52 and also presents a shoulder 56 for the spring 53 to bear against. Lugs 57 are formed on the body of the dog and are received in a groove 58 formed in the bolt 5 and intersecting and arranged at right-angles to the groove 51'. The lugs 57 are provided with beveled faces 59 to contact with undercut faces 60 formed in walls of the grooves 58, the spring 53 acting to keep the faces 59 in engagement with the faces 60. The opposite wall of the groove 58 from the faces 60 is beveled, as shown at 61, which will permit the dog to have a limited sliding movement endwise of the bolt 5 against the action of the spring 53 and also permit the dog to move slightly out of the groove 51 for the purpose of permitting the end 54 to ride over the cap of the shell and enter the groove of said cap. The dog engaging the shell as described will extract the shell from the firing chamber as the bolt moves towards cocked position, it being understood that the extraction of the shell takes place after the firing thereof. After the bolt has completed a portion of its movement towards a cocked position an ejector lever 62 engages with the cap end of the shell and with the continued movement of the bolt towards a cocked position the shell is caused to swing and release itself from the dog and seat and disengage from the gun by way of the discharge slot 37 provided therefor, as clearly shown in Figures 7 and 8 of the drawings. The ejector lever is supported intermediate its ends by the pivot which supports the lever 31. One end of the ejector lever engages with the outer face of the bolt during the latter's movement towards cocked position causing the opposite end of the lever to move through a slot 64 in the bolt to engage with the cap end of the shell. The slot 64 communicates with the seat 49.

The plunger 44 of the combined firing and cocking mechanism slides in a chamber 65 provided in the gun case or frame. One end of this chamber is open to the atmosphere and has extending therein for a short distance a nipple 66, the passage 67 of which communicates with a passage 68 leading to the barrel of the gun in advance of the firing chamber so that a portion

of the firing charge may enter the nipple and exhaust into a cylinder 69 formed in one end of the plunger. The explosive force impinging against the inner end of the cylinder drives the plunger rearwardly with respect to the gun and as the arm 43 is carried by the plunger it will move the bolt and firing pin into cocked position and as the bolt and firing pin reach the cocked position a sear 70 engages in a notch 71 of the plunger. The plunger moving in the direction described compresses a firing spring 72 of the coil type. The spring 72 is mounted on a rod 73 between a wall 74 of the gun case or frame and the plunger. The plunger is chambered, as shown at 75, to permit a portion of the rod 73 and the spring to lie within the plunger, the rod at its inner end carrying a head 76 which abuts with the inner end of the chamber 75 being held in engagement therewith by the influence of the firing spring 72. The rod extends through the wall 74 of the gun case or frame so as to be slidably supported thereby and in turn aid in slidably supporting the plunger. It is to be understood that when the plunger is freed by the sear 70 it is driven forwardly of the gun carrying therewith the bolt 5 and firing pin by the firing spring 72.

The sear 70 is pivotally and slidably mounted, as shown at 77, and one end of the sear has a tongue or projection 78 to engage with a head 79 of a trigger 80. The opposite end of the sear has a head 81 shaped to provide oppositely arranged shoulders 82 and 83. The shoulder 83 engages in the notch of the plunger while the shoulder 82 rides upon a cam 84 carried by a shaft 85 journaled to the gun case or frame and which is provided with angularly related faces 86 engaged by one end of a leaf spring 87. The cam shaft extends outwardly of the gun case or frame and is equipped with a finger piece 88 whereby the cam 84 may be moved into different positions and retained in said positions against accidental movement by the end of the spring 87 bearing against the angularly related faces 86. A coil spring 89 bears against the head 81 of the sear and acts to position the shoulder 83 to engage in the notch of the plunger 44. A trigger guard 91 is secured to the gun case or frame and includes a hand grip 92 and is provided with a seat 93 for the spring 87, the latter having one end pivotally connected to the head 79 of the trigger 80. The trigger extends into the guard 91 in the usual manner and the head 79 thereof is provided with a shoulder 94. The spring 89 besides acting to position the shoulder 83 of the sear into the notch of the plunger 44 also imparts an endwise movement to the sear in a direction rearwardly with respect to the gun. The cam 84 when in one position will retain the shoulder 83 in the notch of the plunger and prevent pivotal movement of the sear by the trigger thereby providing a safety device to prevent the gun from accidentally firing. A second position of the gun, as shown in Figure 9, will position or slide the sear forwardly a limited distance so that the shoulder 78 will be disposed over the shoulder 94 of the trigger whereby upon moving the trigger into firing position the sear will be disengaged from the plunger and permit the firing of the gun to be automatic and which operation will continue as long as shells are received in the firing chamber. A third position of the cam, as shown in Figure 13, will permit the spring 89 to shift the sear endwise rearwardly of the gun so that the trigger must be pulled rearwardly and

released on the firing of each shell in the gun, thereby providing a semi-automatic firing feature to said gun.

By referring to Figure 13, it will be noted that the shoulder 94 rides past the shoulder 78 of the sear when the trigger reaches a full firing position consequently requiring the release and return of the trigger to a non-firing position before the shoulder 94 of the trigger will underlie the shoulder 78 of the sear.

A cutaway portion 95 is provided in the plunger and is adapted to align with the chamber 4 when said plunger moves into position for cocking the bolt and firing pin so that any particles of foreign matter which may accumulate within the chamber may escape therefrom by said cutaway portion 95 to obviate any possibility of foreign matter accumulating to an extent that it would interfere with the operation of the various parts operating in said chamber 4. These foreign particles may come from dirt on the shells or chip-pings from the shell casing.

Should for any reason the automatic recocking of the gun fail, a hand piece 96 is connected to the plunger and operates through a slot in the gun case or frame whereby the plunger may be moved rearwardly with respect to the gun to position the bolt and firing pin in cocked position.

Having described the invention, I claim:

1. A firearm including a gun frame and a barrel removably mounted thereto, said barrel and frame having tapering grooves to align when the barrel is mounted to the frame, a wedge to enter said groove, a shoulder on the frame, a lever pivotally and slidably secured to the wedge, a shoulder on the pivoted end of the lever to engage the first-named shoulder when said lever occupies one of its positions, and a cam face on the pivoted end of said lever to engage the frame by said lever moving from the stated position to a second position to urge the wedge out of the grooves.

2. A firearm including a gun frame and a barrel removably mounted thereto, said barrel and frame having tapering grooves to align when the barrel is mounted to the frame, a wedge to enter said grooves, a shoulder on the frame, a lever pivotally and slidably secured to the wedge, a shoulder on the pivoted end of the lever to engage the first-named shoulder when said lever occupies one of its positions, a cam face on the pivoted end of said lever to engage the frame by said lever moving from the stated position to a second position to urge the wedge out of the grooves, and a releasable securing means between said lever and the frame to hold the lever in the first-named position.

3. A firearm including a gun frame and a bar-

rel removably mounted thereto, said barrel and frame having tapering grooves to align when the barrel is mounted to the frame, a wedge to enter said grooves, a shoulder on the frame, a lever pivotally and slidably secured to the wedge, a shoulder on the pivoted end of the lever to engage the first-named shoulder when said lever occupies one of its positions, a cam face on the pivoted end of said lever to engage the frame by said lever moving from the stated position to a second position to urge the wedge out of the grooves, a keeper on the frame, and a latch movably mounted on the lever to engage with the keeper for holding said lever in the first-named position.

4. A firearm including a gun frame and a barrel removably mounted thereto, said barrel and frame having tapering grooves to align when the barrel is mounted to the frame, a wedge to enter said grooves, a shoulder on the frame, a lever pivotally and slidably secured to the wedge, a shoulder on the pivoted end of the lever to engage the first-named shoulder when said lever occupies one of its positions, a cam face on the pivoted end of said lever to engage the frame by said lever moving from the stated position to a second position to urge the wedge out of the grooves, a keeper on the frame, a latch movably mounted on the lever to engage with the keeper for holding said lever in the first-named position, a leaf spring carried by the lever and having one end bearing against the wedge to act to urge the wedge into the grooves during the time the lever is occupying the first-named position.

5. A firearm including a gun frame and a barrel removably mounted thereto, said barrel and frame having tapering grooves to align when the barrel is mounted to the frame, a wedge to enter said grooves, a shoulder on the frame, a lever pivotally and slidably secured to the wedge, a shoulder on the pivoted end of the lever to engage the first-named shoulder when said lever occupies one of its positions, a cam face on the pivoted end of said lever to engage the frame by said lever moving from the stated position to a second position to urge the wedge out of the grooves, a keeper on the frame, a latch movably mounted on the lever to engage with the keeper for holding said lever in the first-named position, a leaf spring carried by the lever and having one end bearing against the wedge to act to urge the wedge into the grooves during the time the lever is occupying the first-named position, said spring having one end offset to engage the latch acting to retain said latch in engagement with the keeper and capable of flexing to permit manual disengagement of the latch from the keeper.

RAFAEL MENDOZA.