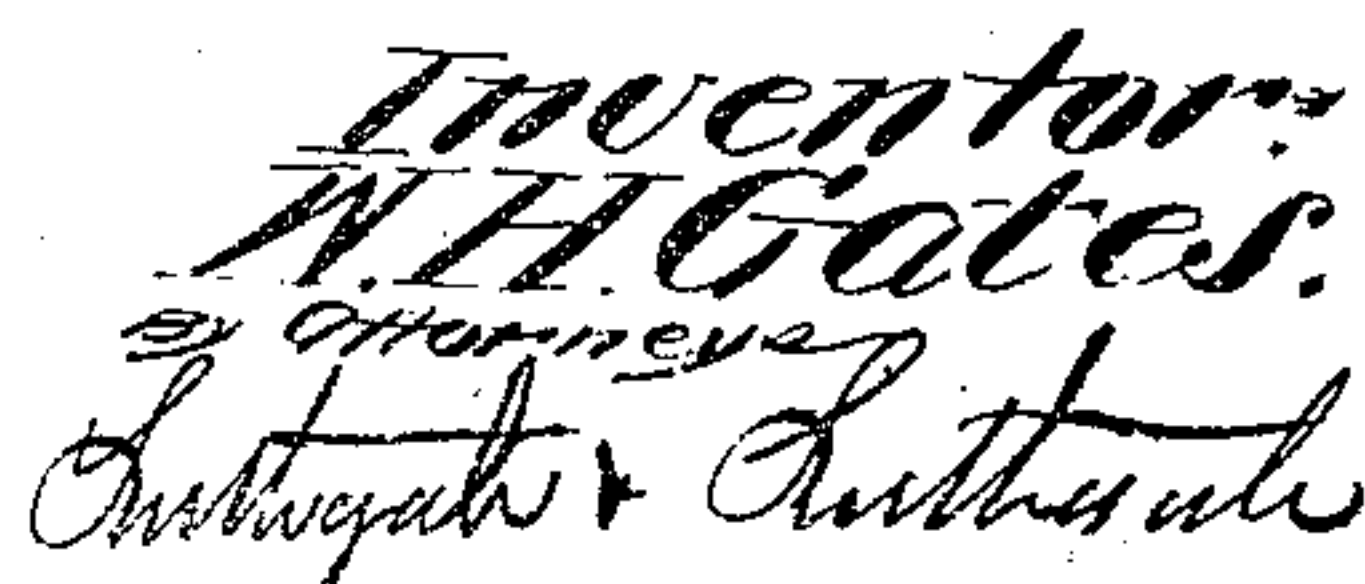
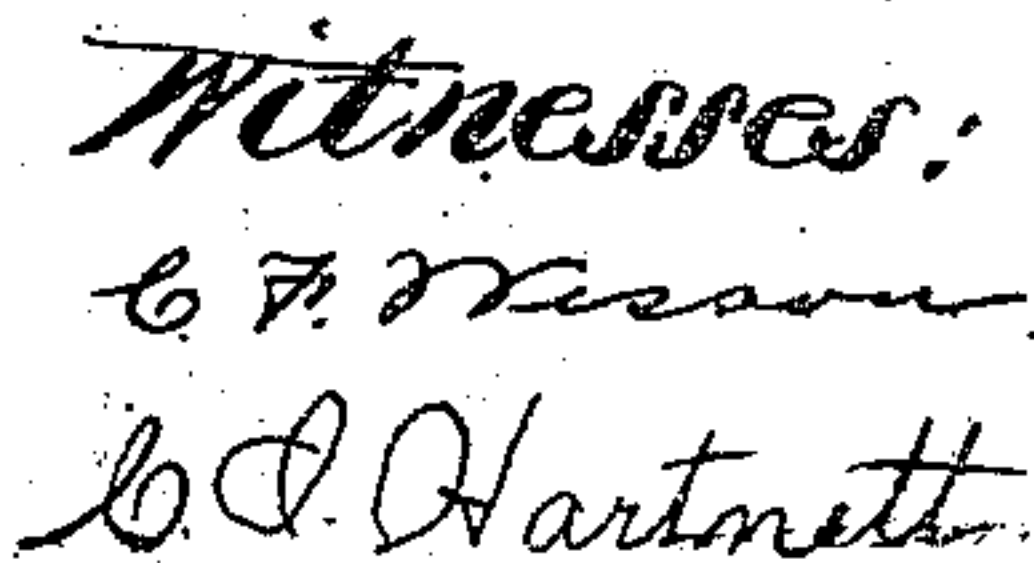


3 SHEETS—SHEET 1.



962,137.

3 SHEETS—SHEET 2.



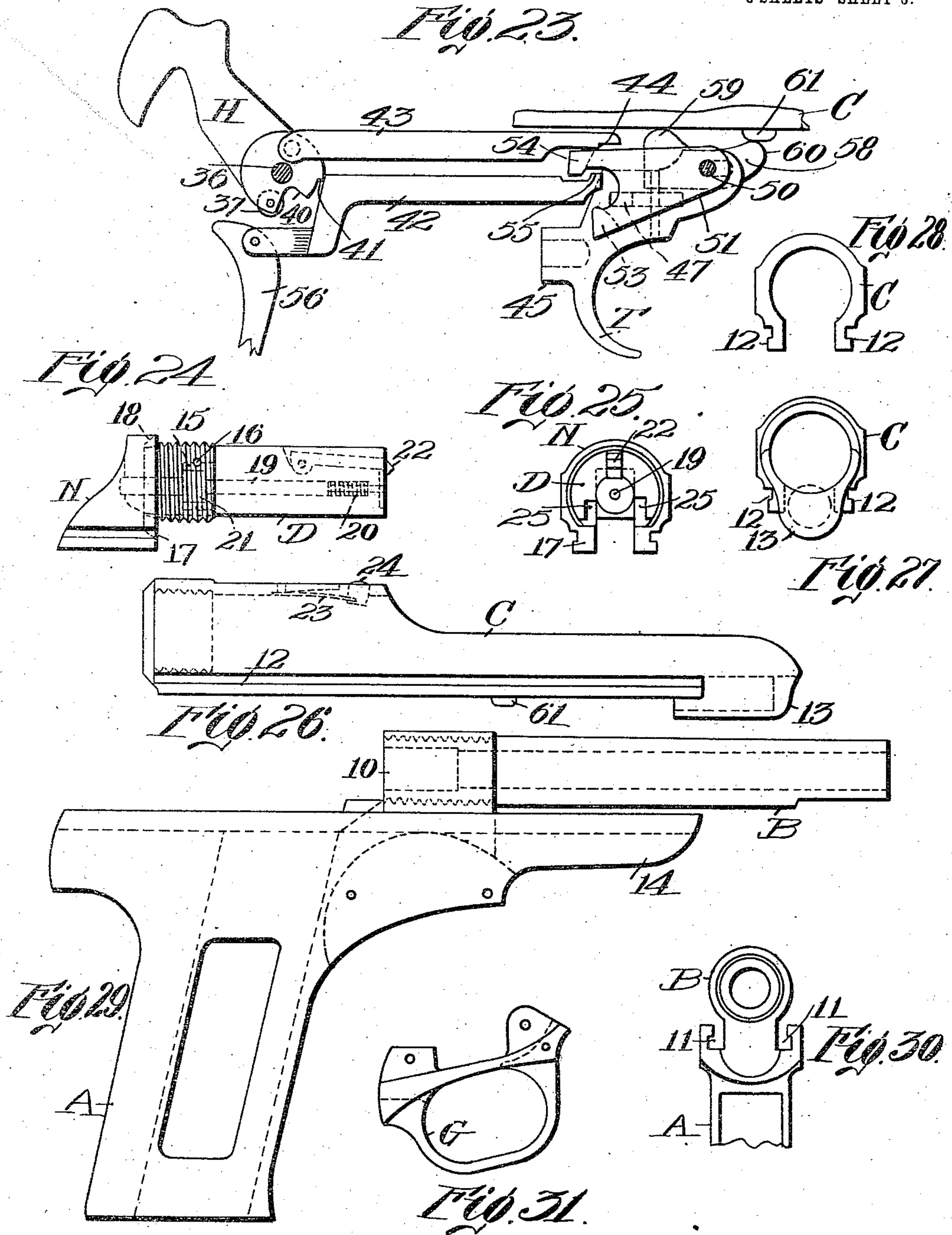
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W. H. GATES.
 AUTOMATIC FIREARM.
 APPLICATION FILED JULY 22, 1909.

962,137.

Patented June 21, 1910.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM H. GATES, OF NORWICH, CONNECTICUT.

AUTOMATIC FIREARM.

962,137.

Specification of Letters Patent. Patented June 21, 1910.

Application filed July 22, 1909. Serial No. 508,973.

To all whom it may concern:

Be it known that I, WILLIAM H. GATES, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented a new and useful Automatic Firearm, of which the following is a specification.

The object of this invention is to provide an improved fire-arm of that class in which the cartridge shell is ejected, a fresh cartridge inserted in position, and the hammer cocked by the energy of the explosion.

The particular purpose is to provide a fire-arm of this character which shall operate efficiently, which shall be safe against accidental firing and safe to carry, and which shall be simple in construction and easy to manufacture.

To these ends the invention consists of the parts and combinations of parts hereinafter particularly described and claimed.

The invention is illustrated in the accompanying drawings which show one preferred form of mechanism for carrying out my improvements.

Referring to the drawings and in detail, Figure 1 is a side elevation of an automatic pistol constructed to contain my improvements; Fig. 2 is a sectional elevation thereof on the line 2—2 of Fig. 3; Fig. 3 is a front view of the muzzle of the pistol; Fig. 4 is a partial sectional view similar to Fig. 2 illustrating the position of the hammer when it is in its lowered position; Figs. 5 and 6 are a rear and side elevation of the hammer; Figs. 7 and 8 are side and rear elevations of a part hereinafter termed the ejector; Fig. 9 is a view similar to Fig. 2 showing the fire-arm or the parts in a position at the extreme of the recoil; Fig. 10 is a side elevation of the timing lever; Figs. 11, 12 and 13 are a rear elevation, a side elevation, and a plan respectively of the sear; Fig. 14 is a plan, and Fig. 15 a side elevation of the trigger guard, the trigger, and sear, showing their respective mounting; Fig. 16 is a plan, and Fig. 17 a side elevation of the trigger; Fig. 18 is a side elevation of the magazine; Fig. 19 is a plan, and Fig. 20 a side elevation of the cartridge follower used in the magazine; Fig. 21 is a partial sectional plan view to illustrate the catch for the slide; Fig. 22 is a side elevation of the said catch; Fig. 23 is a side eleva-

tion on an enlarged scale to show my hammer, trigger, and sear, and the operating connections between the same; Fig. 24 is an elevation of the bolt and nut; Fig. 25 is a front elevation of said bolt and nut; Fig. 26 is a side elevation, Fig. 27 a rear elevation, and Fig. 28 a front elevation of the slide; Fig. 29 is a side elevation, Fig. 30 is a front elevation of the frame and barrel, and Fig. 31 is a side elevation of the trigger guard.

The operation of the firearm will be best understood by a detail description of the parts.

Referring to the drawings in detail, A designates the frame which is shaped to form the usual grip and also to form a support and housing for the various parts. Projecting up from the frame is an integral housing or hollow hub into which the barrel B is screwed. By this arrangement the barrel and frame constitute an integral and solid part, giving accuracy of aim and fire.

C designates the slide. The frame is provided with L-shaped slots 11—11 as shown in Fig. 30, and the slide C is provided with matching guides or ways 12—12, so that the said slide can be slid into the frame to engage the same, and so that the slide can have a horizontal movement in the frame. The slide is provided at its forward end with a housing 13 which comes under the barrel, in said housing 13 and in a forwardly projecting semi-cylindrical ear 14 of the frame is arranged a recoil or operating spring, the tendency of which is normally to force the slide forward. The housing 13 fits into the extension 14, and the rear edge of the housing 13 will contact with the frame at the inner end of the extension 14, and thus limit or stop the rearward movement of the slide as illustrated in Fig. 9.

The slide is cut away as shown in Fig. 1 at its forward end, so that the barrel B will be exposed or uncovered. This arrangement and construction of parts provides a very solid mounting for the barrel, gives a substantial housing to the recoil spring, and the parts as thus arranged present a very neat and attractive appearance. The top of the parts also presents an accurate surface for the aiming of the fire-arm and for the sights.

D designates the bolt or breech-block. The rear end of the same is turned down to

form a hub 15 which is fitted into a recess formed in the end of a locking nut N. The bolt D is connected to said nut N by a pin 16 driven through the nut N and fitting into a groove 160 in the hub 15 so that the bolt and nut can be separated when it is desired to get at the firing pin. This connection forms a swivel between the bolt and nut so that the nut can be turned without turning the bolt. The rear end of the slide is screw-threaded so that the nut N can engage into the same. The nut N is provided with a head or shoulder 17 so shaped that when the nut is screwed into the slide the nut forms an extension of the guides or ears 12 of the slide. The nut is also provided with an engaging beveled shoulder 18 which engages tightly with the rear beveled end of the slide, thus giving a tight joint at the rear of the slide, and holding the same from spreading.

Housed in the bolt D and nut N is a firing pin 19. The forward end of the firing pin is reduced, and a spring 20 is arranged around this part thereof so as normally to keep the firing pin in its rearward position. The firing pin is also provided with a portion 21 which works in an enlarged cavity in the hub 15, the movement of this portion determining the range of movement of the firing pin. The rear end of the firing pin projects slightly through the nut N.

The bolt D is slotted near its forward end on its top surface and arranged in this slot and pivoted on a pin passing laterally through the bolt is the extractor 22 which has a hooked forward end to engage the usual groove in the cartridge as shown in Fig. 2. The slide has a spring 23 secured thereto so that when the parts are in position the spring will normally force the extractor downward. The end of this spring is provided with an indicator or projection 24 which extends up through a hole in the slide. The spring 23 normally forces this indicator downwardly, but when a cartridge is in position the extractor bears up against the spring and forces the indicator up slightly above the surface of the slide as shown in Fig. 2. By this arrangement it can be easily seen whether the arm is loaded and a cartridge in proper position in the barrel. When the cartridge is in proper position, the indicator projects slightly above the surface of the slide. When there is no cartridge in position, the spring 23 forces the indicator down below the top surface of the slide. Thus by glancing at the indicator it can be seen whether the fire-arm is loaded or unloaded.

The bolt D has two slots on its underside as indicated at 25 in Fig. 25 which the ears *m* on the magazine enter. Arranged inside the frame so as to come into the deeper of said slots in bolt is an ejector 26 which is

mounted on a screw 27 as shown in Fig. 8. The inside of the frame is cut away as shown in Fig. 7 so as to receive the ejector. As the ejector stands in the position shown in Fig. 7 as the bolt moves backward and withdraws the shell, the shell will engage the end of the ejector and will be thrown upwardly and outwardly of the arm as shown in Fig. 9.

The parts are put together by screwing the barrel B into the hub 10 on the frame A, pushing the slide on to the frame from the front, inserting the bolt into the rear of the slide, and screwing the nut into the slide.

M designates the magazine which is made of sheet metal, and which is inserted up into the lower part of the grip of the frame. The magazine is slotted on its sides. A follower or cartridge presser 28 is arranged in the magazine and is normally forced upward by a spring 29. The follower is provided with an ear or lug 30 which projects through one of the slots in the side of the magazine and which comes in position to engage a catch 31 pivoted by a screw 32 to the rear of the inside of the frame. The catch is also provided with a button 33 so that the same can be operated by hand from outside of the frame. The slide C is provided with a notch 34 which the catch 31 can engage. The catch 31 is normally in its lowest position and clear of the notch but when the follower 28 is raised when all the cartridges are exhausted, the ear 30 engages the catch 31 and moves it up so that it will engage the notch and hold the gun in its open position as shown in Fig. 9, thus indicating that the magazine supply is exhausted.

The magazine is provided at its upper end with ears *m-m* which fit into the slots on the underside of the bolt, the upper ends of which ears are bent inwardly so that the cartridges have to be pushed forwardly out of the upper end of the magazine.

The magazine is held up in the frame by a spring-actuated catch 35 which is pivoted to the rear of the trigger guard C. By this arrangement the catch can be operated by the fore finger which usually goes to the trigger, when the magazine will drop out. This arrangement provides a simple and convenient location of the magazine retaining catch.

H designates the hammer which is mounted on a pivot or shaft 36 fitted in the frame. The hammer is provided with a rearwardly and downwardly extending wing *h* which closely fits the frame and which is of a length sufficient to cover the end of the slot in the frame in which the hammer works at all positions thus preventing the entrance of dirt or obstructions into the gun. The hammer is arranged in position so that the rearward movement of the slide will engage

and cock the same. The hammer is provided with a roll 37 engaging which is the hammer-actuating spring 38 which is mounted on a screw 39 and engages said roll 37.

The sides of the hammer are provided with two sets of notches 40 and 41, the notch 40 coöperating with a safety lever 42 when the hammer is cocked, as shown in Fig. 9, and the notch 41 coöperating with the safety lever 42 when the hammer is in its half-cocked position as shown in Fig. 4.

The hammer is released and controlled by hammer extension 43 which consists of a bar or rod pivoted to the hammer and extending forwardly at one side of the magazine as shown in Fig. 21 in position to be engaged and operated by the sear. The hammer extension 43 is provided with a notch 44.

The trigger and sear are assembled in the trigger guard. The trigger guard G is held in position in the frame by rivets or screws. The trigger T is fitted to slide in the trigger guard. The trigger T is provided with a rearwardly extending hub 45, fitting into which and pressing on the frame when the trigger guard is in position, is a spring 46 which normally tends to keep the trigger in its forward position. The trigger is slotted horizontally and pivoted on a pin extending across this slot is a pawl 47, which pawl is arranged so that one end projects side-wise out of the trigger on each side as shown in Fig. 16. A spring 48 normally keeps the pawl in the position shown in Fig. 16. The trigger is provided with a slot 49 at its forward end so that the trigger can be mounted on a pin 50 passing through the trigger guard.

51 designates the sear which is pivoted on said pin 50, a small spring 52 being employed normally to keep the sear in its raised condition. The sear 51 is provided with a cam face 53 at its lower rear end with which the trigger pawl 47 will engage when the trigger is pulled to the rear and will depress the sear and release the upper rearward edge of the same from the notch 44 in the hammer extension 43 when the gun is to be fired. The sear is also provided with a projection 54 under which the front point 55 of the safety lever or bar 42 will engage when the safety is on to prevent the sear releasing the hammer extension. The safety lever or bar 42 is pivoted to a grip lever 56 which is pivoted to the rear part of the grip of the frame to form part of the frame and which normally has its upper end forced to the rear by a spring 57 which may be mounted on the screw 39 which holds the hammer spring. By this arrangement it will be seen that both the hammer and sear are locked by the safety when the hammer is cocked and then when the hammer is lowered to

safety position the hammer is locked, as shown in Fig. 4.

To fire the gun the grip has to be squeezed so that the safety is forced forward to release both the hammer and the sear. This makes the gun very safe in operation.

To prevent the hammer being released when the gun is open or the slide moved backward a timing lever 58 is pivoted in the frame. This timing lever is set in position to engage the rear side of the trigger pawl 47 so as to move the trigger pawl whereby if the trigger should be pulled rearward the pawl will not engage the cam 53 on the sear. The timing lever 58 is formed with two cam projections 59 and 60 which are operated by a lug 61 formed on the under surface of the slide. When the slide is in forward position and the gun closed the lug 61 engages the part 60 of the time lever and lifts up the operative face or part 62 of the timing lever clear of the pawl 47. When the gun opens by the slide moving backward the lug 61 engages the rear part 59 of the timing lever and forces the operative face 62 of the same downward to engage the trigger pawl 47. A spring 63 is arranged to keep the timing lever normally in its operative position to engage the pawl 47. When the slide moves forward under the influence of the spring S, the lug 61 passes over the part 59 of the timing lever and engages the forward end 60 thereof, and then raises the operative part 62 thereof out of engagement with the pawl 47. By this arrangement it will be seen that the pawl in the trigger is held inoperative at all times, except when the slide is in its forward position and the gun closed. Thus it is impossible for the operator to snap the hammer at any other time except when the gun is closed.

The operation of the arm is as follows:— Starting with the hammer in its half-cocked position as shown in Fig. 4, a magazine filled with cartridges is inserted in the grip, the slide is then grasped by the hand and pulled to the rear, the follower in the magazine will then push a cartridge up in between the bolt and the end of the barrel and in line with the chamber in the barrel so that the forward movement of the slide will force the cartridge into the barrel, the rearward motion of the slide having cocked the hammer. The gun is now ready for firing. It is impossible however, for the gun to be fired improperly, as both the hammer and the sear are locked against operation by the safety lever or bar, as shown in Fig. 9. Now to fire the gun the operator squeezes the grip which throws the safety bar forward, releasing both the hammer and the sear, and then pulls the trigger. The rearward movement of the trigger causes the trigger pawl 47 to engage the cam 53 on the sear to depress the sear to release the same

from the firing notch 44 in the hammer extension 43. This will allow the hammer to descend, and strike the firing pin and discharge the fire-arm. As the explosion takes place the pressure will force the slide rearwardly. The lug 61 on the slide engages the timing lever at the point 59 and forces the timing lever down so that its lower left-hand end in Fig. 23 engages the pawl 47 on the trigger and forces it out of operative relation with the sear. In this way the trigger connection with the sear is entirely broken. The sear is then free to catch the cock notch when the slide forces the hammer back. The extractor will withdraw the shell from the barrel, the shell will strike on the ejector, and be ejected, and the follower in the magazine will raise another cartridge into position between the bolt and the barrel so that the forward movement of the slide will force the fresh cartridge out of the clip into place in the barrel. The lug 61 on the slide then engages with the point 60 of the timing lever and forces the end 62 out of engagement with the trigger pawl 47. The latter then snaps back into engagement with the sear and is forced back by the spring 48. This movement of the slide again cocks the hammer. Therefore the force of the explosion reloads the gun and cocks the hammer. This operation takes place almost instantly, and the operator can again fire the gun by squeezing the grip to release the safety, and by pulling the trigger. By this arrangement the gun can be fired extremely rapidly.

By reason of the fact that the lug on the slide throws the timing lever out of engagement with the pawl 47 when the slide is open, it is impossible for the operator to actuate the pawl to operate the sear by pulling the trigger except when the gun is in its closed or proper position.

If it is desired not to use the gun, the hammer is lowered to the position shown in Fig. 4. When in this position it will be seen that the safety lever or bar is in its rearward position and the hammer is held inoperative so that it is impossible to fire the gun accidentally by a pull on the trigger, such as would occur if the arm should be dropped or by hitting the hammer. Thus the arm is on safety both when cocked on or when the hammer is let down.

After the last cartridge in the magazine has been used the catch 31 will be operated by the ear 30 on the cartridge follower, and will engage the notch 34 in the slide and hold the gun open, thus indicating that it is necessary to reload the same. The catch can be released by pressing down on the button 33. The magazine can be very easily released by reason of the location of the catch behind the trigger guard.

The safety arrangement before described

is extremely efficient for example, if the trigger should be cocked with one hand, and if the thumb should slip the gun would not be fired, because with this position of the hand the safety lever would not be operated. If the gun is closed it can be readily seen by the indicator previously described whether a cartridge is in position. By reason of the rigid and solid connection of the barrel to the frame the gun is extremely accurate in firing. These points of construction and operation make the gun or arm extremely efficient for the purposes stated.

The details and arrangements herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

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

1. In an automatic firearm, the combination of a frame having a housing, a barrel rigidly supported by said housing, a slide fitted to the frame and having a housing fitting the housing on the frame, and an operating spring contained in said housings, the housing on the slide engaging the frame to limit the rearward movement of the slide.

2. In an automatic firearm, the combination of a frame having a tubular housing, a barrel rigidly supported by said housing, a slide fitted to the frame and having a housing arranged under the barrel, the top of the slide being cut away so as not to cover the barrel, and an operating spring contained in said housings.

3. In an automatic firearm, the combination of a frame, a slide, a barrel, a bolt fitted into the end of the slide, and a nut swiveled to the bolt, the rear end of the slide being screw-threaded to receive the nut.

4. In an automatic firearm, the combination of a frame, a slide, a barrel, a bolt fitted into the end of the slide and carrying a firing-pin, and a nut detachably swiveled to the bolt, the rear end of the slide being screw-threaded to receive the nut.

5. In an automatic firearm, the combination of a frame having slots, a slide having ways to engage said slots, a barrel, a bolt, and a nut screwed into the end of the slide for holding the bolt in the slide, the nut having extensions of the ways on the slide.

6. In an automatic firearm, the combination of a frame, a slide, a barrel carried by the frame, a bolt having a firing-pin, and a nut swiveled to the bolt, the nut having a beveled shoulder, and the end of the slide being beveled so that said beveled shoulder on the nut will engage the end of the slide and prevent the same from spreading.

7. In an automatic firearm, the combination of a frame, a barrel, a slide having a notch, a catch pivoted in the frame and

adapted to enter said notch to hold the slide open, a magazine and cartridge follower fitted into the frame, said follower being provided with a lug for engaging said catch and moving it into the notch when the cartridges are exhausted, and said catch having means whereby it can be manually operated from the outside of the frame.

8. In an automatic firearm, the combination of a frame, a barrel, a slide, a magazine and follower with an ear inserted in the frame, and a catch pivoted to the frame, said slide having a notch which the catch can engage, and said ear on said follower being arranged to directly engage and operate said catch to hold the slide in its rearward position when the cartridges are exhausted.

9. In an automatic firearm, the combination of a frame having a grip, a trigger guard carried by the grip, and a catch pivoted on the guard for holding the magazine in place arranged entirely in the trigger guard and removable therewith.

10. In an automatic firearm, the combination of a frame, a slide, a barrel, and a hammer pivoted in a slot in the frame and having a wing arranged to cover the outside of the rear edge of the slot in all positions of the hammer.

11. In an automatic firearm, the combination of a frame, a barrel, a slide, a hammer pivoted in the frame and having two notches, a safety grip pivoted to the frame, and a safety lever operated by the grip to engage and lock the hammer when it is in its cocked or half-cocked position.

12. In an automatic firearm, the combination of a frame, a slide, a barrel, a hammer pivoted in the frame, a main spring acting directly on the hammer, a trigger mechanism, and a hammer extension pivoted to the hammer independent of the main spring and movable longitudinally forward as the hammer descends for engagement with the trigger mechanism.

13. In an automatic firearm, the combination of a frame, a slide, a barrel, a hammer pivoted in the frame, a sliding trigger, a hammer extension connected to the hammer and extending forward at one side of the magazine, and a pivoted sear operated by the trigger.

14. In an automatic firearm, the combination of a frame, a slide, a barrel, a hammer pivoted in the frame, a hammer extension extending forward at one side of the magazine, a pivoted sear, and a sliding trigger having a pawl for operating the sear.

15. In an automatic firearm, the combination of a frame, a slide, a barrel, a hammer pivoted in the frame, a hammer extension extending forward at one side of the magazine, a pivoted sear, a trigger guard, a trigger fitted to slide in said trigger guard,

and a pin in said trigger guard on which the sear is pivoted and on which the trigger slides.

16. In an automatic firearm, the combination of a frame, a slide, a barrel, a hammer pivoted in the frame, a trigger mechanism, and a safety locking mechanism for the hammer held out of action by the hammer when the hammer is in its lowered position.

17. In an automatic firearm, the combination of a frame, a barrel, a slide, a hammer pivoted in the frame, a sear, a trigger, a safety grip pivoted to the frame, a safety lever or bar connected to said safety grip and arranged to engage and lock both the hammer and sear when the hammer is in its raised or cocked position, and to engage and lock the hammer when the same is in its half-cocked position.

18. In an automatic firearm, the combination of a frame, a barrel, a slide, a hammer pivoted in the frame, a trigger guard carried by the frame, a trigger arranged to slide therein, a sear pivoted in the trigger frame, a bar extending from the hammer forwardly to the sear, a safety grip lever, a safety rod or bar extending therefrom, notches on the hammer with which the safety bar can engage to lock the hammer in both its raised or half-cocked positions, said bar also having an engagement with the sear to lock the sear against operation when the hammer is cocked, and a pawl in the trigger for engaging and operating the sear.

19. In an automatic firearm, the combination of a frame, a barrel, a slide, a hammer, a trigger, a sear, a pawl in the trigger for engaging and operating the sear, a timing lever for engaging and holding the pawl in the trigger out of operation, and a lug on the slide arranged to engage the timing lever and operate the same to release the pawl when the slide is in its forward position and the gun closed.

20. In an automatic firearm, the combination of a frame, a barrel, a slide, a hammer, a trigger, a sear, a pawl in said trigger for engaging and operating the sear, a timing lever arranged to engage and hold said pawl inoperative, said timing lever having two cam projections, and a lug or projection on the slide cooperating therewith and arranged to operate said timing lever to release the pawl when the slide is in its forward position.

21. In an automatic firearm, the combination of a frame, a barrel, a slide, a hammer pivoted in the frame, a hammer extension, a trigger guard, a trigger sear, and timing lever mounted in the trigger guard, said timing lever having two cam surfaces, a pawl carried by the trigger for operating the sear, a projection or lug on the slide for engaging said cam projections, a spring for

normally forcing the timing lever to render
the pawl in the trigger inoperative, said lug
or projection being arranged so that as the
slide moves backward it will engage one cam
5 surface on the timing lever and render the
trigger pawl inoperative, and so that as the
slide moves forward and returns to its nor-
mal or closed position it will engage the
other cam projection and will force the tim-
10 ing lever to release the pawl, whereby the
timing lever is positively moved by said lug
into position to engage the pawl, and is posi-

tively moved to disengage said pawl, and
whereby said pawl is held inoperative ex-
cept when the slide is in its forward posi- 15
tion and the firearm closed.

In testimony whereof I have hereunto set
my hand, in the presence of two subscribing
witnesses.

WILLIAM H. GATES.

Witnesses:

LEROY G. BACHELDER,
WILLIAM S. ELLIOTT.