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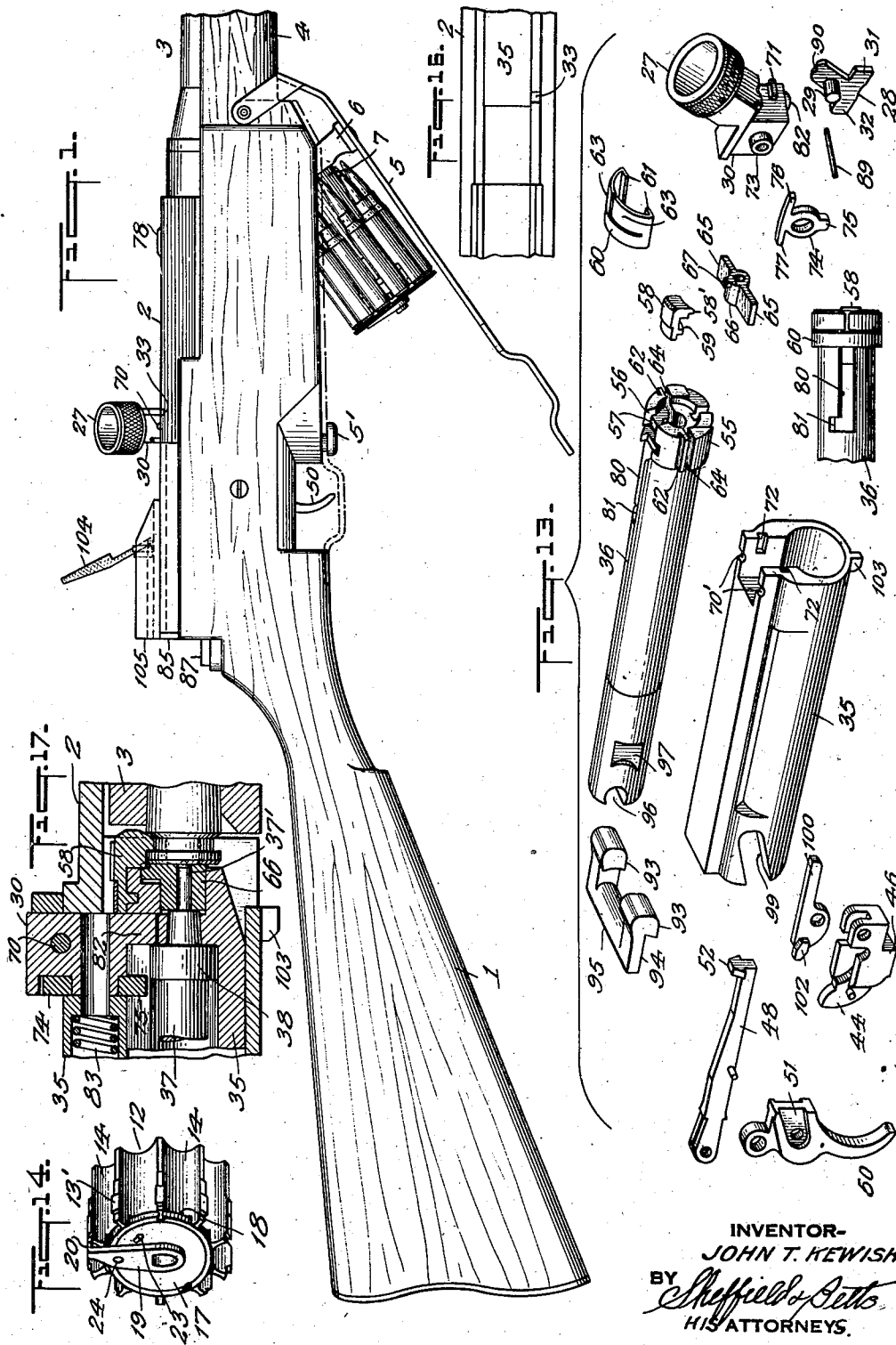
J. T. KEWISH

1,993,887

AUTOMATIC FIREARM

Filed April 16, 1932

4 Sheets-Sheet 1



INVENTOR-
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BY *Sheffield & Betts*
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March 12, 1935.

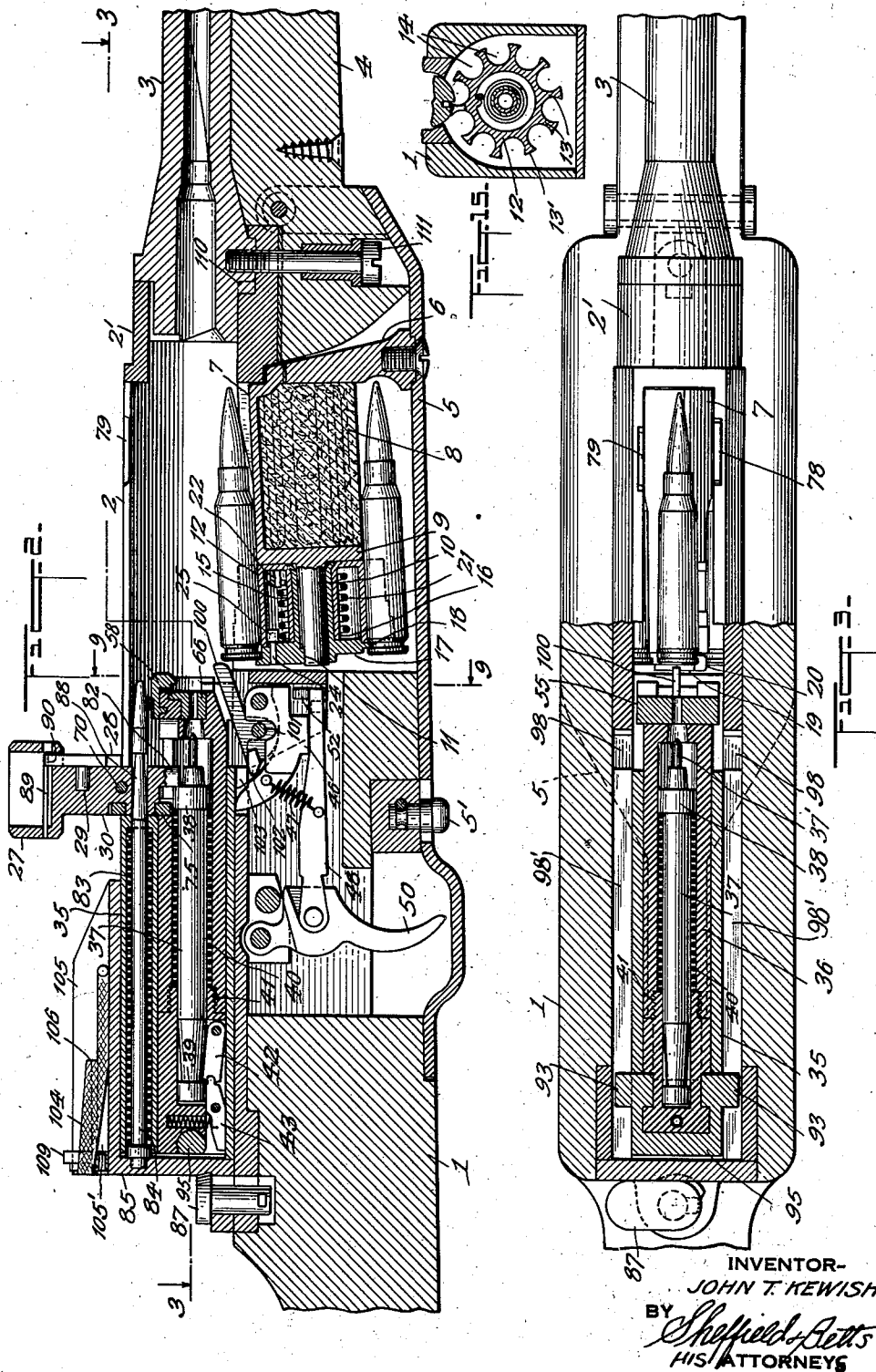
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AUTOMATIC FIREARM

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4 Sheets-Sheet 2



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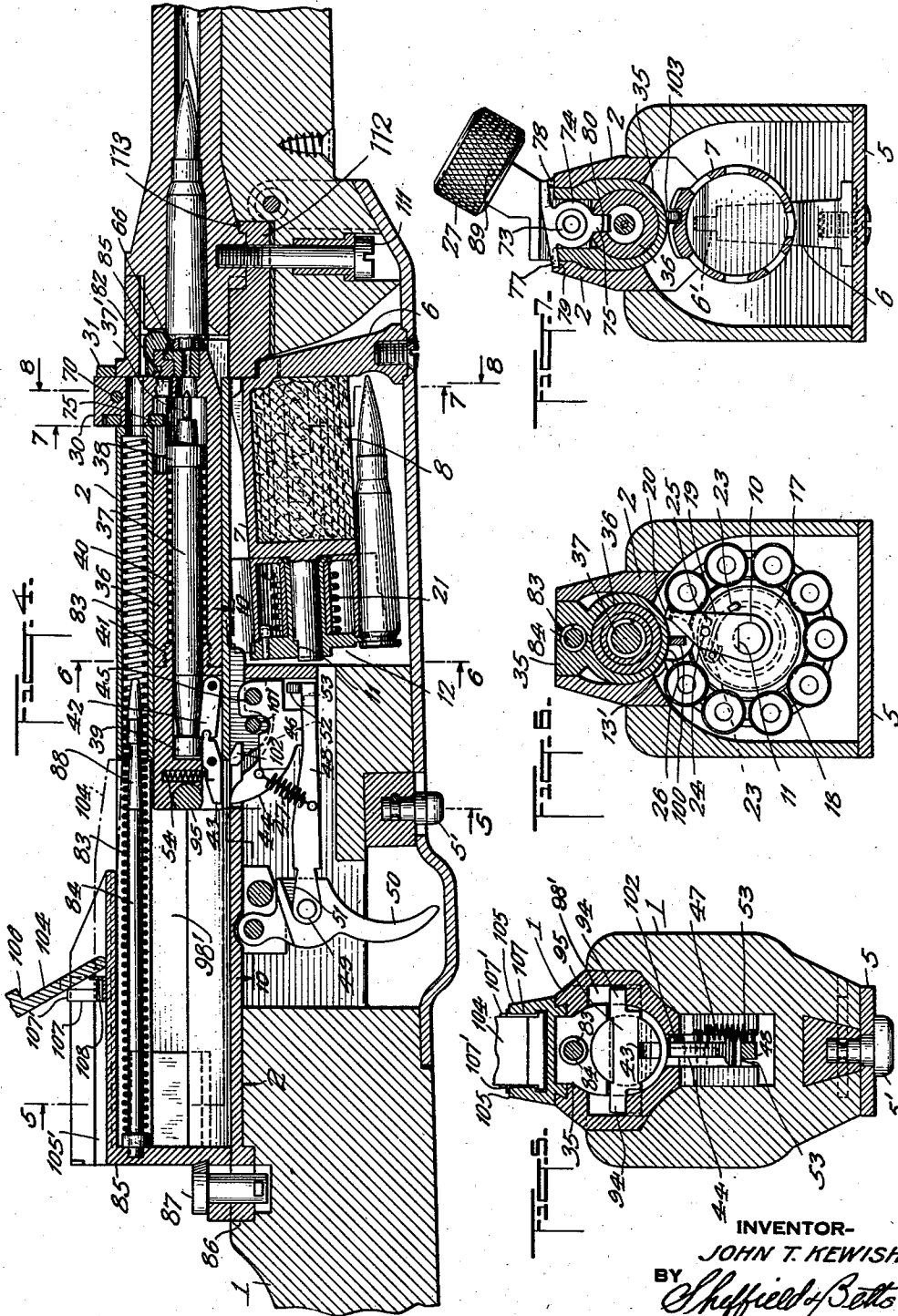
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AUTOMATIC FIREARM

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4 Sheets-Sheet 3



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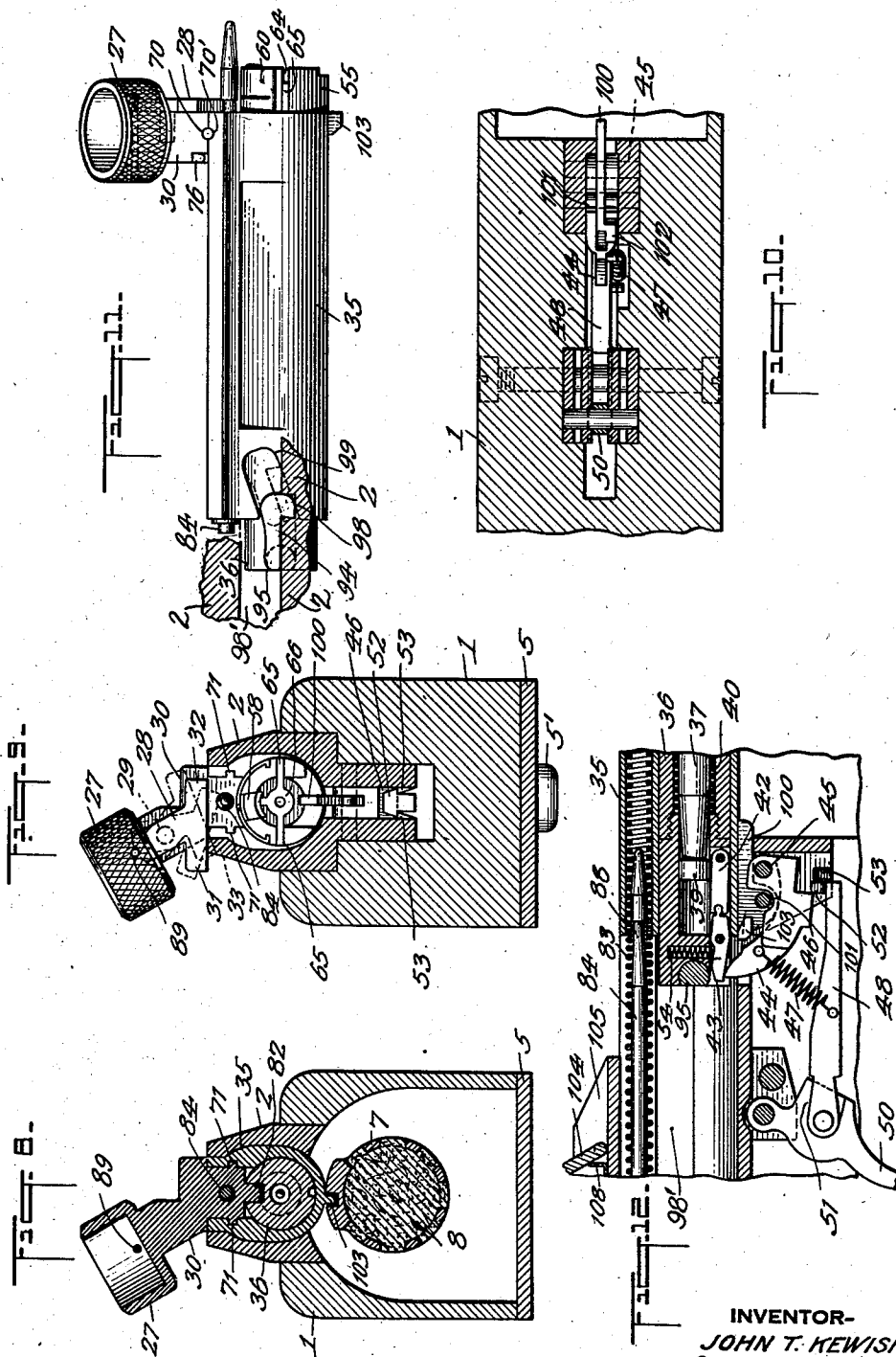
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AUTOMATIC FIREARM

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

1,993,887

AUTOMATIC FIREARM

John T. Kewish, New York, N. Y.

Application April 16, 1932, Serial No. 605,610

23 Claims. (Cl. 42—3)

The principal object of my invention is to simplify the construction of automatic firearms in which the power for actuating the automatic parts is derived from the cartridge, and also to provide a lightweight, reliable and easily manufactured device.

Another object of my invention is to provide a cartridge magazine of an improved construction whereby a relatively large number of cartridges may be contained within a removable or replaceable cylinder or cylinders without the use of cartridge clips or other such devices for carrying the cartridges as assembled for use.

Another object of my invention is to provide means in connection with the support for the cartridge magazine for lubricating the cartridges when the gun is being fired, so that said cartridge will be free to actuate the mechanism preparatory to another shot or shots, by eliminating friction between the cartridge and the cartridge chamber in the barrel.

A further object of my invention is to provide a trigger and ejecting mechanism of simple construction, as well as various other new arrangements and advantages, as will more clearly appear from the description set forth hereinafter.

My new invention involves improvements made by me in automatic rifles in addition to the improvements described and claimed in my prior Patent No. 1,696,537 December 25, 1928. A form of the present invention which I now deem preferable is disclosed in the following description and illustrated in the accompanying drawings forming a part thereof, in which

Fig. 1 is a longitudinal elevation of the stock portion of my improved firearm, illustrating the position of the cartridge cylinder just after being placed in position;

Fig. 2 is a longitudinal sectional view of a portion of the stock and breech mechanism of my improved firearm;

Fig. 3 is a plan view, partially in section, taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a longitudinal sectional view similar to Fig. 2, but showing the position of the parts after the cartridge has been placed in position in the cartridge chamber in the barrel;

Fig. 5 is a transverse sectional view taken substantially on the line 5—5 of Fig. 4;

Fig. 6 is a transverse sectional view taken substantially on the line 6—6 of Fig. 4;

Fig. 7 is a transverse sectional view taken substantially on the line 7—7 of Fig. 4;

Fig. 8 is a transverse sectional view taken substantially on the line 8—8 of Fig. 4;

Fig. 9 is a transverse sectional view taken substantially on the line 9—9 of Fig. 2;

Fig. 10 is a horizontal sectional view taken substantially on the line 10—10 of Fig. 4;

Fig. 11 is a side elevation of the actuator containing the breech bolt;

Fig. 12 is a vertical longitudinal sectional view of the breech bolt as is shown in Fig. 4, but showing the position of the firing pin and other parts immediately after the firing pin has been released to discharge the gun;

Fig. 13 is a collective view showing various parts of the breech mechanism in perspective;

Fig. 14 is a perspective view of the cartridge carrier or cylinder removed from the gun;

Fig. 15 is a transverse section of the cartridge carrier with cartridges removed;

Fig. 16 is a plan view of a detail of the receiver; and

Fig. 17 is a sectional view showing the actuator, bolt and firing pin in their respective positions at the instant of discharge.

Referring to the drawings, particularly Figs. 1 and 2, the numeral 1 indicates the stock of the gun; the numeral 2 the receiver mounted thereon; and the numeral 3 the barrel thereof.

As indicated in the drawings, the stock 1 is preferably made of a single piece of suitable material, such as hard wood, and carries a forward extension indicated by the numeral 4, which forms a means for grasping the barrel when the gun is being fired.

To the portion 4 of the stock there is pivoted a strip or plate of metal, indicated by the numeral 5, which is reduced in width and bent to form a trigger guard and is provided with a slot through which projects a suitable locking device as at 5'. To this piece is attached a support or standard 6, the upper portion of which carries a slotted cylinder 7. The slotted cylinder 7 is filled with a suitable porous or fibrous material 8 for absorbing and carrying a suitable lubricating material, such as lubricating oil. The end of the slotted cylinder 7 is provided with a closure or head 9 from which projects an integral stud 10. The stud 10 is provided at its outer end with a flattened portion 11 illustrated in Figs. 2, 4 and 6.

The support 6 where it forms the end of the slotted cylinder 7 is provided with a projection 6' which enters a recess or notch in the bottom of the receiver as indicated in dotted lines in Figs. 2, 4 and 7. When the slotted cylinder 7 is in position within the stock the projection 6' locates the same and the cartridge carrier centrally in the proper position so that the cartridges may be

projected accurately forward into the cartridge chamber in the barrel.

The stud 10 is adapted to receive the cartridge carrier or cylinder which is illustrated at 12, particularly in Figs. 2, 4 and 14. The cartridge cylinder, as indicated in said figures, comprises a substantially cylindrical shell having separating walls 13 forming grooves 14 cut therein to receive the main portion of the cartridges. The projecting walls 13 are at their lowest points equal in height to the radius or one-half the diameter of the largest part of the cartridges, but are slightly higher and wider at their rear portions, as at 13', in order to hold the cartridges within the grooves until they are pushed forward to enter the cartridge chamber. The outer cylinder is carried on a central tube 15 which is preferably integral with the cylinder 13 and the latter tube 15 telescopes with inner tube 16 integral with the outer circular head 17. The two tubes are held telescoped together by expanding the end of the inner tube as indicated in Figs. 2 and 4; said innermost tube also forms a bearing which slidably fits on to the stud 10. The rear head 17 of the cartridge carrier 12 is provided about the main portion of its circumference with a narrow integral flange 18 which is adapted to fit into the grooves in the heads of the cartridges. This flange 18 is discontinued at one point, as indicated in Fig. 6, so that the cartridge may be moved forward when it is to be inserted in the barrel prior to firing. The head 17 is provided with a radial projection 19 (Figs. 6 and 14), the upper end 20 of which is bent at a right angle and forms a stop at the rear of the cartridge which is to be moved forward.

The arm 19 is integral with or fixed to the head 17, and since the head 17 is always retained in the same position by the flattened portion 11 on the stud 10, said arm will not move when the cartridge cylinder 12 is rotated to bring another cartridge into position for insertion in the barrel. The bent portion 20 of the arm 19 will frictionally engage the rear end of the cartridge to prevent it sliding forward when the projecting flange 18 no longer retains it. All of the cartridge carriers or cylinders include the parts just above mentioned. Each cartridge cylinder is also provided with an internal helical spring 21 which has one end fixed to the inner head of the cylinder 12 by the pin 22, the other end of the spring being fixed to the head 17 as at 23 (indicated in Figs. 2, 6 and 14). The head 17 is also provided with an internally projecting pin 24, which is adapted to contact with a stop or projection 25 on the inner surface of the cylinder 12, when the spring 21 is being wound up and the cartridges are being inserted in the grooves of the cylinder. The spring 21 causes rotation of the cartridge cylinder 12 in a clockwise direction or toward the right (Fig. 6) to cause the successive cartridges to be placed opposite the end of the barrel so that they may be projected forward into firing position. The pin 24 and the stop 25 prevent the rotation of the outer cartridge carrying cylinder 12 beyond the position indicated in Fig. 15.

Referring to Fig. 6, it will be seen that the cartridge has been projected forward into the cartridge chamber of the barrel, and the groove in the cartridge cylinder is empty. However, the cylinder is prevented from rotating by reason of the fact that upper end 13' of the left hand dividing wall 13 between the cartridge grooves, has come into contact with the under side of the actuator casing 26. This relation of the parts con-

tinues until the actuator is moved backwards into the position shown in Figs. 2 and 3. A rearward movement of the actuator removes the casing from contact with the dividing wall between the cartridge recesses or grooves, and therefore allows the cylinder to rotate until the rear end of the next cartridge comes into contact with the radial arm 19 and stop 20. Further rotation is then prevented and the cartridge is held in that position, as shown in Fig. 2, until pushed forward into the barrel. This step by step rotation of the cartridge barrel continues as each cartridge is discharged, until the last cartridge has been fired. The walls 13' between the cartridges contact with the cartridges at points above their greatest diameters so that they cannot fall out of their grooves radially but the bolt can push them out forwardly.

It will be noticed that since the cartridges rotate about the fixed slotted cylinder 7, the felt, or other absorbent material contained therein, and which projects through the slots, comes in contact with the surfaces of the cartridges and serves to oil them. This oiling of the cartridges prevents any tendency of the shells to stick in the cartridge chamber in the barrel when the shells are withdrawn by the bolt.

Referring now to the mechanism for cocking and firing the gun, reference may be had first to Figs. 2 and 3, which show the actuator and the bolt withdrawn toward the left, and in position just before the cartridge is pushed forward into the barrel. The bolt and the actuator in the normal operation of the gun are placed in this position by the recoil action of the cartridge, but said parts may be placed in said position by drawing the knob 27 toward the rear when the cartridge cylinder is being changed after the discharge of the last cartridge. The actuator and the bolt are held in this position, as occasion may require, by the use of a transversely pivoted bar 28, indicated in Figs. 2 and 9. Said bar is carried on a pivoting stud 29 in a block 30 forming the base for the knurled knob 27. This bar has two projecting parts 31 and 32, the outer end 31 of which is adapted to enter a notch or groove 33 in the upper edges of the receiver (Fig. 16). This arrangement will hold the actuator bolt and firing pin in their rearmost positions until the bar 28 is removed to lie horizontally as in Fig. 9. Thereupon said parts will be released and can assume their forward positions as in Fig. 4.

Referring to Fig. 4, it will be seen that the parts are in a position to fire the cartridge, and it will be evident that the actuator 35 contains the bolt 36 as two relatively slidable parts. These are illustrated in perspective in Fig. 13. The bolt 36 is bored longitudinally to form a hollow cylinder, and contains the firing pin or bar 37 which terminates in the firing pin or striker, proper, 37'.

The firing pin 37 is provided with a terminal flange 38 at its forward end, and with a terminal flange 39 at its rear end to engage the sear. The forward flange 38 forms a stop for one end of the helical spring 40, the rear end of which rests against a contracted portion of the rear end of the bolt, which is screwed into the main part, as indicated at 41 in Fig. 4 and which carries the other parts hereafter described. This spring 40 tends to force the firing pin 37 toward the right. The flange 39 is adapted to engage a short pivoted lever or sear 42, which holds the firing pin in its retracted or cocked position.

The sear 42 is recessed at its outer end to engage and form a joint with a rounded projec-

tion on a pivoted lever 43 which may be termed the "sear depresser". It will be noted that the left end of the sear depresser 43 is in Fig. 4 situated directly above the end of a curved lever 44 which may be termed a sear tripper, the same being pivoted on the pin 45. The sear tripper 44 is provided on its lower edge with a projection 46 and toward its outer end with a pin to which the spring 47 is attached, the other end of the spring being attached to the horizontal lever or bar 48.

Thus the sear tripper and the lever 48 are always drawn toward each other by the spring 47. The parallel ends of the lever 48 are pivoted as at 49, on the trigger 50, the pivoting motion being limited by the tapering recesses 51. The opposite end of the lever 48 is provided with an upwardly extending bevelled projection 52, as indicated in Figs. 4, 9, 12 and 13.

When the projection 52 leaves the projections 53 the lever will be forced downward by the inclined surfaces of the recesses 51 and the projection 46 on the sear tripper 44 under the action of the spring will force the projection 52 downward so that when the trigger is released it will pass toward the right below the projections 53 and then upward until the parts are again in the position shown in Fig. 4.

The lever 48 passes between the two triangular projections 53, indicated in Figs. 9 and 12. Assuming, now, that the foregoing parts are in the position indicated in Fig. 4, the firing pin is released by pulling the trigger 50 towards the left. This draws the horizontal lever 48 in the same direction, and consequently the projection 52 comes in contact with the projection 46 on the sear tripper 44. The sear tripper will then be rotated upon its pivot 45 until its upper end comes in contact with the sear depresser 43. Thereupon the opposite end of the sear depresser will be forced downward and the sear 42 will be depressed below the edge of the flange 39, and the firing pin will be released. This is indicated in Fig. 12, in which the position of the firing pin is that which occurs immediately after being released during its motion toward the right. A spring 54 placed within a recess in the bolt 36 tends to keep the sear depresser in its normal position, just previous to the depression of the sear. When the firing pin has been released it will, of course, be projected forward toward the right and come in contact with the primer in the cartridge, (indicated in Fig. 4).

The result is that the cartridge is fired and the firing pin is forced backward toward the left into the cocked position by the reaction or recoil of the primer or the cartridge itself after the bullet leaves the cartridge. The actuator 35 is also forced backward to the limit of its travel by the reactive force of the cartridge. These actions are incident to the arrangement of parts now to be described.

The end of the bolt 36 is provided with a flanged end as indicated at 55 in Fig. 13. The upper portion of the flange is provided with a groove 56 within which is a transverse partition 57. A small piece 58 forming an extractor and having a lip 58' adapted to enter the groove in the end of the cartridge and acts similar to a pawl. The extractor 58 fits slidably in the slot 56 and is provided at its underside with a lug 59 adapted to lie behind the partition 57, so that the parts may assume the positions indicated in Figs. 2 and 4. The piece 58 is held in position in the slot 56 by means of the spring clip 60, which has two radially extending lugs 61 adapted to enter

grooves 62 in the flange 55. The resilient tongues 63 are provided and, being bent slightly inward, tend to hold the piece 58 movably in its position in the groove 56, also indicated in Figs. 2, 4 and 9. The flange 55 of the bolt 36 is also provided with longitudinal grooves 64 which are adapted to receive two laterally extending wings 65 in a tappet member 66. This tappet member enters a central hole in the flanged head 55, and the wings 65 enter the grooves 64.

The tappet 66 is provided with a small projection 67, which when in position within the bolt 36, comes within the small flange on the extractor 58. The tappet 66 is therefore prevented from being released from its position in the bolt. It does, however, have a slight movement equal to about .010 (ten-one-thousandths) of an inch. The object of this slight play will be hereinafter described. It will be seen that the central hole in the tappet 66 is just large enough to receive the striker 37' of the firing pin 37, said point being of sufficient length to project therethrough and come in contact with the primer in the cartridge and the tappet member 66 may also press against the primer and consequently receives a blow sufficient to cock the firing pin. The bolt 36 is adapted to fit slidably within the actuator 35, the right hand end of which is adapted to receive the block 30 which is provided with lateral lugs 71 which enter grooves 72 in the upper part of the end of the actuator 35. The block 30 is fixed in position in the end of the actuator 35 by means of a transverse pin 70 which passes through said block and engages grooves 70' in the adjacent sides of the actuator 35. The block 30 is also provided with a hollow boss or flange 73 upon which is placed an annular locking member 74. This member is provided with a lower projection 75, and upper projection 76 and a projection 77 which is in effect a continuation of the projection 76. The position of said annular member 74 when assembled as indicated in Fig. 7, it will be noticed, enables it to oscillate about the boss 73 when its right-hand end is raised by the small rib 78 on the upper margin of the receiver 2.

When in this position the opposite projection 77 is depressed into a groove on the opposite margin of the receiver 2, as indicated at 79 in Fig. 7 taken with Figs. 2 and 3. It will be noticed that the rib 78 and its opposite depression in the receiver 2 are at the forward end of the receiver, and that the projection 75 is adapted to enter a slot 80 in the bolt 36. The slot 80 is provided with a lateral recess 81 at its left-hand end, as indicated in Fig. 13. It will therefore be seen that when the projection 75 is allowed to move from the position in Fig. 7 into the lateral portion 81 of the slot 80, the bolt and the actuator will be locked together. This will only occur, however, when the actuator is approaching and leaving the forward end of the receiver as determined by the rib 78 and the depression 79 respectively in the receiver. See Fig. 3. The length of said rib 78 and said depression 79 is such as to allow sufficient movement of the actuator toward and from the cartridge without locking the bolt to the actuator.

Block 30 is provided with a lug 82 projecting from its lower surface, which lug is adapted to contact with the outer margin of the flange 33 on the firing pin 37. This is for the purpose of causing the said firing pin to be drawn to its cocked position toward the left when the actuator is pulled back by the knob 27, as indicated in Fig. 2.

The actuator and the bolt are forced toward the right at all times by a helical spring 83, which is retained within a longitudinal hole or bore in said actuator, as indicated in Figs. 2 and 4. The spring 83 surrounds a guide rod 84, the left-hand end of which is retained in position by the housing 85 secured to a lug 86 on the end of the receiver 2 by means of a locking stud and lever 87. The right-hand end of the spring 83 rests against the inner end of the hole or bore in the actuator, and consequently always tends to force the actuator toward the right, the actuator being shown in retracted position in Fig. 2 and in its extended position just before firing in Fig. 4. The rod 84 is provided with a reduced portion at 88. This reduced portion forms a shoulder just within the end of the rod 84, and said shoulder is adapted to be engaged by the arm 32 on the bar 28, so that when said actuator is retracted, as shown in Fig. 2, said terminal lug will engage said shoulder, as shown in dotted lines in Fig. 9. This arrangement forms a lock to hold the actuator 35, rod 84 and spring 83 together, so that the housing 85 can be removed and the actuator and bolt taken out of the receiver or said parts may be assembled without danger of the expansion of the spring 83.

It will be noted that the bar 28 may be held fastened in its neutral position by means of the pin 89, adapted to engage a recess 90 above the stud 29.

The rear end of the bolt 36 is provided with an additional locking device which consists of a pair of detents 93 carried on parallel arms 94 which project from a substantially cylindrical bar 95, which is retained within an undercut, semi-circular groove 96 in the end of the bolt 36. This pivoted connection allows the detents to move upward and downward on each side of the bolt, recesses 97 being provided to permit such movement. Detents 93 do not become active until the bolt and actuator are in substantially the position indicated in Figs. 4 and 11. In that position the detents engage two notches 98, which extend downward from the slots 98' (Figs. 3, 5 and 11) in the sides of the receiver 2. In these positions the detents prevent any considerable rearward motion of the bolt until after the actuator has also moved back a definite distance of about $\frac{1}{2}$ inch toward the rear or left. The detents are caused to disengage from their respective notches by inclined slots 99 in the end of the actuator 35. As indicated in Fig. 11, a rearward motion of the actuator just after firing will first raise the detents owing to the inclined position of the slots 99 and thereafter the bolt will be pushed toward the left with the continued motion of the actuator until the parts are in the positions indicated in Figs. 2 and 3. When this motion commences the locking lug 75 is disengaged from the notch 81 (Figs. 7 and 13), but when the detents 93 are raised said lug locks the bolt and actuator together so that they continue to move as a unit.

On again going forward the bolt reaches the barrel when the actuator is a distance of about $\frac{1}{2}$ inch away from the front of the receiver to which it must ultimately go, while the bolt goes no farther. In going this distance the actuator moves along on the bolt, and in doing so forces down the detents 93 into locked position on the receiver against the walls of the notches 98 extending from the slots in the lower walls of the receiver. Coincident with the depression of the detents 93, the disengagement of the lock 75 takes place. So as member 75 goes out of locked engagement with the bolt the detents 93 engage

the receiver, and as detents 93 come out the locking member 75 engages the bolt. Movements of the actuator operate both locks.

When the bolt and actuator have reached the limit of their position toward the left, as indicated in Fig. 2, the discharged shell is ejected from the receiver by the following mechanism: A lever 100 is pivoted on a suitable pin 101 and is provided at its rear end with a laterally projecting lug 102. When the actuator is in its right-hand position, as shown in Fig. 4, the lever 100 lies parallel with the lower surface thereof, so that it does not retard the movement of said actuator. The right-hand end of the lower surface of the actuator is provided with a lug 103 which in its travel toward the left is adapted to come in contact with the lug 102 on the lever 100. This does not take place, however, until just before the actuator reaches the position indicated in Fig. 2, whereupon the lug 102 is depressed and the opposite end of the lever 100 is raised. Said end thereupon strikes the empty cartridge which is retained on the end of the bolt by the small flanged piece 58, and owing to the positive upward motion of the lever 100 the cartridge is given an upward push which primarily causes it to turn about the flange on the end of said piece 58, so that it is then thrown angularly upward, causing the flange on the end of the cartridge to become dislodged from said piece 58 and the cartridge to be ejected from the receiver.

As is usual in this type of automatic firearm, my improved gun is preferably provided with a pivoted sight 104 which is adapted to be raised into its operative position, as indicated in Fig. 1. When the sight is folded downward parallel with the housing 85, as in Fig. 2, it is protected by two parallel walls 105 which have inner grooves 105' to receive the bearings or pivots of the sight 104 and projections on the sight elevating member 108.

The sight 104 may be turned forward into a horizontal position, as indicated by dot and dash lines in Fig. 4. When in that position the off-set portion 106 enters the space between the edges of the receiver and forms a cover between the end of the actuator 35 and the end of the rear housing 85 so that no dirt or foreign matter may enter the receiver and also holds the actuator in forward position when the gun is not in use for firing.

The sight is also adjustable to various positions, according to the desired range, by means of a slidable member 107 which comprises a piece of resilient metal formed to engage the walls 105 of the sight protector and with a projection 108 to form a support for the sight 104. The edges of the walls 105 are graduated to indicate hundreds of yards in the well-known manner, so that when the slidable member 107 is placed on or adjacent one of such graduations the sight 104 will be supported at the proper angle by the projection 108 to give the proper range elevation, the sight bar being provided with a suitable V-shaped groove to form a V-shaped notch at its outer end, as indicated by dotted lines in Fig. 2.

The resilient sides 109 of the slidable member 107 extend upward and frictionally engage the lateral edges of the sight bar 104 to hold the latter steadily in position when it has been elevated to the desired angle by the slidable member 107.

The operation of my improved firearm in firing the same may be described as follows:

Assuming that the operative parts are in the positions indicated in Fig. 4, and the actuator is against the flange 55 of the bolt as shown in Fig.

11, one cartridge has been inserted into the breech chamber of the barrel by the release of the actuator and through manual operation of the knob 27. All that is necessary then to fire the cartridge is to pull the trigger 50 towards the left in the usual way. This releases the firing pin 37, so that its striker 37' hits the primer of the cartridge and discharges the cartridge (Fig. 17). Thereupon, the recoil of the primer first forces the small tappet 66 toward the rear and takes up the .01 of an inch play between said tappet and the front end of the bolt. (See Fig. 17). This motion, being of considerable force and very rapid, projects the firing pin 37 backward until the sear 42 engages the flange 39 on the firing pin 37.

The end of the bolt is then against the cartridge and both the cartridge and the primer are in contact with the tappet piece. The wings 65 of the tappet 66 have already moved backward .010 or .012 of an inch to hit the firing pin and so at the instant of firing the tappet moves first to mount the firing pin or place it in cocked position in the bolt. The primer and the end of the cartridge both strike the tappet and as the tappet shoots back the bolt is also struck by the cartridge and also moves back a few thousandths of an inch. This shock from the cartridge on the bolt is transmitted to the actuator at about the same instant that the wings on the tappet strike the actuator when the tappet is thrust back to mount the firing pin. These produce a substantially unitary kick on the actuator through the bolt head and tappet. The actuator at that time being free from the bolt, moves back $\frac{1}{2}$ of an inch to raise the detents 93 because the projection 75 then does not engage the notch or recess 81 to lock the bolt and actuator together. However, this locking does occur almost instantly or a fraction of a second after the detents are raised from the notches 98. The bolt is then in its forward position in the actuator and goes back locked thereto as a unit by reason of the engagement of the projection 75 with the recess 81, since the rib 78 and the groove 79 are not acting on the projections 76 and 77.

If the primer at any time fails to force the firing pin into its cocked position to engage the sear 42 before the actuator has moved far enough to release the detents 93 from the notches in the receiver, the rearward movement of the actuator caused by the recoil of the cartridge meets with an increased resistance owing to the fact that the actuator must first force back the firing pin to its cocked position before the bolt detents 93 are freed from their notches in the receiver. This is accomplished by means of the projection 82 on the forward block 30 of the actuator, said projection being carried into the bolt to engage and force rearward the flange 38 on the firing pin so that the sear will then engage the flange 39 to cock the firing pin.

After this action the bolt and the actuator move rearwardly while locked together as above described and only against the resistance of the actuator spring 83, into the position indicated in Fig. 2. This is accomplished either by the reaction of the cartridge or by manually drawing rearward the knob 27.

Thereupon, the cartridge is ejected as previously described, and, since the rearward motion of the actuator has stopped at the end of its travel, the spring 83 will immediately act to force the actuator towards the right. The actuator will then again move in that direction until it is stopped by the end of the actuator coming in

contact with the end of the receiver, as indicated in Fig. 4. The firing pin having been placed in its firing position by the first recoil of the primer or the cartridge, or the rearward movement of the knot 27 and the actuator, the parts are then in position for firing the next cartridge which has been introduced into the breech chamber by the motion of the actuator towards the right. Thereupon, when the trigger 50 is again pulled, the firing pin will be released and the cartridge discharged. This cycle of actions may be repeated as long as the cylinder 12 contains a cartridge to be fired.

When the last cartridge has been fired and the actuator has gone back to the rear of the receiver, the empty cartridge cylinder rotates just a little more to reach stop pin 25, and there stops with one of the walls of the cartridge grooves obstructing the passage of bolt and actuator (Fig. 15). The actuator is thus held in rearward position and the end 31 of the bar 28 is pressed down into the notch 33 on the receiver to lock the actuator in position. When the cylinder is empty of cartridges the same may be removed by simply lowering the plate 5 and removing the used cylindrical cartridge holder and replacing a new one.

When the loaded magazine and the plate have been put back to normal position, it is then only necessary to withdraw member 31 from notch 33 on the receiver to permit the actuator to go forward, which it instantly does under the impulse of spring 83. It is never necessary to retract the actuator manually by use of the knob 27 if there is a cartridge in the barrel and when the bolt and actuator are in their right-hand positions. Firing such cartridge brings the actuator back. But in the event the actuator and parts are in the forward position, with no cartridge in the barrel, it is then necessary to draw back the actuator by hand. The most desirable way of starting the gun is to place the loaded magazine in operative position, which can only be done when the actuator is detained at the rear of the receiver, then to let spring 83 force the actuator forward, which movement places a cartridge in the barrel. The cartridge in the barrel may then remain there so long as desired, and the actuator can be locked in this forward position until it is desired to fire the gun, in which case releasing the actuator stop 104 and pulling the trigger is all that is required.

The actuator must, of course, travel in a definitely fixed central position relative to the barrel, and this it does by means of an oval channel (Figs. 6 and 7) cut lengthwise in the receiver housing. The upper margins of the channel form a slot that extends the entire length of the receiver. The top of the actuator fits slidably between said margins and is thus kept in perfect alignment when in operation. It is also easily withdrawn from or inserted into the receiver when desired after the rear housing member 85 has been removed.

The oval shape of the actuator channel formed in the receiver is carried through the receiver head 2', the hole formed therein being a little greater in vertical diameter than the vertical diameter of the end of the barrel (Fig. 2). This permits the barrel to be rapidly detached when hot, so that a new barrel may be quickly replaced. The barrel is not screwed into the receiver, as is ordinarily done. It is designed to slide into place at an angle which the shape of the hole in the receiver permits. It may then

drop down into proper alignment where it is fixed by a guide lug 110 which fits into a cut in the head of the receiver (Fig. 3). The barrel at its rear end, just in front of the guide 110, engages a strong retaining screw 111. The barrel is quickly removed by removing the screw 111.

The retaining screw 111 passes through a projection 112 extending from the end 2' of the receiver 2, said projection leaving a small stop 113 to aid in locating the barrel in position. Thus it is only necessary to remove the screw 111 and lift the barrel to the limit of clearance in the hole in the end of the receiver and slide it forward. Of course, the barrel must also be freed from all forward straps which fix it to the stock.

Having thus described the present embodiment of my improved automatic firearm, what I claim and desire to protect by Letters Patent is:

1. In a gun, a stock therefor, said stock having a recess in the lower portion thereof, a plate pivoted to the stock, a magazine carrier attached to said plate, a rotatable cylinder provided with radial ribs forming grooves thereon and adapted to carry cartridges therein, said ribs being slightly widened at their outer edges above the diametral line of said cartridges, spring means for rotating such cylinder upon said carrier, and a centering device comprising a projection entering a recess, said projection being located on said carrier and said recess being located in an adjacent fixed part of the gun, to center said carrier in proper position within said stock.

2. In a gun, a stock therefor, a chamber in the lower portion of said stock, a cylindrical cage, a support for said cage, a plate on which said support is carried, said plate being pivoted on said stock, absorbent material within said cage, a cartridge carrier rotatably supported on the end of said cage so that parts of said cartridge project adjacent the surfaces of said cage to cause the cartridges to contact with said absorbent material.

3. In a gun, a stock therefor, a receiver, a slidable actuator, bolt and firing pin, a plate pivoted to said stock, a lubricating device carried by said plate, a cartridge magazine removably mounted on said cartridge lubricating device, said magazine comprising a cylinder having grooves formed by walls projecting from its outer surface and adapted to receive and retain cartridges in position thereon, a fixed head supported by said lubricating device and having a small peripheral flange to hold cartridges in place in said grooves, a helical spring within said cartridge magazine adapted to rotate the latter in one direction, said cylinder being mounted rotatably in relation to said head, said cylinder and said head being longitudinally removable from said lubricating device, said head having a fixed arm thereon to limit the rotary movement of said cartridge and means to permit said cylinder to rotate when the cartridge in contact with said stop arm is removed from said head, whereby said magazine presents said cartridges successively in position to be inserted in the barrel.

4. In a gun, the combination, a pivoted cylindrical cartridge carrier having a fixed head, a rotatable cylinder provided with grooves in which said cartridges are retained, a spring within said cylinder tending to rotate the same in one direction to bring successive cartridges into operative position, an actuator slidably mounted as a part of the breech mechanism of the said gun, said actuator being slidable forward and backward above said cylindrical cartridge carrier, an internal projection on said cartridge cylinder, a

stop carried by the fixed head thereof to limit the motion of said cylinder when the cartridges have been removed therefrom, said stop being so located that one dividing wall between the grooves of said cartridge carrier will be located in front of said actuator to prevent forward movement thereof when the last cartridge has been removed from said carrier.

5. A cylindrical cartridge carrier, comprising a grooved cylinder, the walls between said cylinder being slightly expanded above the central diameter of said cartridges to hold the latter in position in said grooves, a head in relation to which said cylinder is rotatably mounted, a spring connecting said cylinder and said head and tending to rotate the same in one direction, an internal projection carried by said cylinder, a stop projecting from said head adapted to engage said projection, said head being provided with a fixed arm adapted to engage the ends of said cartridges successively, said head having means thereon for preventing rotation thereof on its support.

6. In a gun, in combination, a breech housing, a receiver, a slidable actuator, bolt and firing pin in said receiver, a spring for forcing said actuator forward, a removable guide rod within said spring, and having a recess at its forward end a handle connected with said actuator and adapted to force the latter and compress said spring rearwardly, the support for said handle being provided with a movable locking member adapted to enter the recess in said rod to lock the said actuator and guide rod together so that the same may be removed from said receiver, independently of the breech housing.

7. In a gun, in combination, a receiver, a slidable actuator, bolt and firing pin therein, said bolt being provided with a longitudinal slot having an offset notch at its rear end, a handle carried by said actuator and longitudinally slidable relative to said bolt, an oscillatory member carried by the support for said handle and provided with a downwardly extending projection adapted to enter said slot and engage said notch, whereby when said projection is in said notch, the actuator and bolt will be locked together, and means on the receiver to engage said member to oscillate the same and to lock said actuator and bolt together when said parts are moved back from firing position.

8. In a gun, in combination, a receiver, a slidable actuator, bolt and firing pin therein, a handle connected with said actuator, a firing pin cocking device carried by said handle, a spring for forcing said actuator forward, a guide rod within said spring, an oscillatory locking member carried on the support for said handle, a notch in the margin of said receiver adapted to engage said lock to hold the said actuator in its most rearward position when the gun is not being operated and a cartridge carrier is being removed from or inserted in the stock of said gun.

9. In a gun, in combination, a receiver, a slidable actuator, bolt and firing pin therein, a handle connected with said actuator, a firing pin cocking device carried by said handle, a spring for forcing said actuator forward, a guide rod within said spring, an oscillatory locking member carried on the support for said handle, a notch in the margin of said receiver adapted to engage said notch to hold the said actuator in its most rearward position when the gun is not being operated and a cartridge carrier is being

removed from or inserted in the stock of said gun, said locking member having a projecting portion adapted to engage said guide rod to lock said actuator and rod together to permit removal thereof from the receiver without expansion of said spring.

10. In a gun, a slidable actuator, bolt and firing pin therein, said bolt having a forward end adapted to engage the cartridge being fired and to be forced rearwardly by the recoil of the primer and the cartridge when discharged, pivoted means on the rear end of said bolt having detents adapted to engage fixed portions of said receiver when said bolt is in its forward position and devices carried by said actuator for causing said pivoted means to engage and disengage said detents with the fixed portions of the said receiver at a definite point in the reciprocating motions of said actuator.

11. In a gun, a receiver, a slidable actuator, bolt and firing pin therein, said bolt having a forward end adapted to engage the primer and the cartridge being fired and to be forced rearwardly by the recoil thereof, pivoted detents carried by said bolt and adapted to engage notches in the sides of said receiver when said bolt is in its forward position and devices carried by said actuator for removing said detents from said notches at a definite point during the rearward motion of said actuator.

12. In a gun, in combination, a receiver having upper margins forming a slot, an actuator slidable in said slot, a housing enclosing the rear end of said receiver and forming an abutment for said actuator, a guide rod supported by said housing, a spring surrounding said guide rod and adapted to force said actuator forward, a bolt and a firing pin slidably carried within said actuator, pivoted detents carried by said bolt and adapted to engage notches in the walls of the receiver when said bolt is in a forward position, inclined slots in said actuator adapted to engage said detents to remove the same from said notches and to lock and release said bolt when said actuator has moved forward and backward a desired distance.

13. In a gun, the combination, a receiver, a slidable actuator, bolt and firing pin therein, a movable locking device carried on the rear end of said bolt and adapted to engage inclined parts in the rear end of said actuator and having projections adapted to engage notches in the walls of said receiver when the actuator is in its forward position, said locking means being elevated or depressed with relation to the said notches by means of said inclined slots in said actuator.

14. In a gun, a receiver, a slidable actuator, bolt and firing pin carried thereby, a sear carried by said bolt adapted to engage said firing pin to cock the same, a sear tripper pivoted in the lower portion of said receiver and operatively connected with the trigger of the gun, a spring for forcing said actuator forward, said actuator having a projection on its lower surface adjacent its front end, a cartridge ejector pivoted below said actuator and comprising an arm adapted to be forced upward to engage and eject the cartridge, said projection on said actuator adapted to engage a portion of said ejector to elevate said arm when the actuator is approaching its rearmost position.

15. In a gun, a receiver, an actuator slidable in said receiver to and from the cartridge chamber in the breech thereof, a bolt slidable in said actuator, said actuator being provided with a downwardly projecting lug having a cam surface, a

pivoted lever having one arm adapted to move upwardly to strike the cartridge shell to eject the same when moved rearwardly with said bolt, said lever being provided with a projecting lug adapted to be displaced by the first mentioned lug to elevate the opposite end of said lever to eject the cartridge.

16. In a gun, a receiver, an actuator slidable in said receiver toward and away from the cartridge chamber in the barrel thereof, a slidable bolt in said actuator, said actuator being provided with a downwardly projecting lug at its forward end, a pivoted lever having one arm adapted to strike a cartridge shell and eject the same after being moved rearwardly with said bolt, one arm of said lever being provided with a laterally projecting lug adapted to be depressed by the first mentioned lug to cause the other end thereof to be elevated and strike the cartridge to eject the same.

17. In a gun, in combination, a receiver, a slidable actuator, bolt and firing pin therein, a sear carried by said bolt and adapted to engage said firing pin for cocking the same, a sear depressor also carried by said bolt and a sear tripper adapted to engage said sear depressor, said sear tripper being pivoted in the lower portion of said receiver at a point opposite said sear depressor when said bolt is in its firing position.

18. In a gun, in combination, a receiver, a slidable actuator, bolt and firing pin therein, a sear carried by said bolt and adapted to engage said firing pin, a sear tripper pivoted in the lower portion of said receiver, a lever having a vertical projection on one end thereof and adapted to engage said sear tripper to move the same about its pivot, said vertical projection having lateral extensions, and complementary projections carried by the lower portion of the receiver and adapted to engage said lateral extensions on said lever to guide the lever positively in its forward and rearward motions in different paths and to hold said vertical projection positively in contact with said tripper until said lever is drawn backward far enough to be disengaged from said receiver wall projections and a trigger connected with said lever and adapted to pull said lever rearwardly.

19. In a gun, a receiver mounted thereon, a housing adapted to enclose the end of said receiver, a slidable actuator bolt and firing pin mounted in said receiver, a plate forming a sight pivotally mounted on said housing and adapted to be moved to horizontal position to cover the space between said housing and said actuator when the latter is in its forward position and to form a rear stop for said actuator.

20. In a gun, a receiver mounted thereon, a housing adapted to enclose the end of said receiver, a slidable actuator, bolt and firing pin mounted in said receiver, a plate forming a sight, pivotally mounted on said housing and adapted to be moved to horizontal position to cover the space between said housing and said actuator when the latter is in its forward position and to form a rear stop for said actuator, a slidable support for said plate adapted to fix the same at various angles relative to said housing according to various ranges and elevations of said sight, said slidable support being provided with a resilient plate engaging grooves in said housing whereby the position of said support is maintained at the desired points.

21. In a gun, a slidable actuator, a bolt and a firing pin therein, said bolt having a forward end adapted to engage the cartridge being fired and to be forced rearwardly by the recoil of the primer

and the cartridge when discharged, means on the rear end of said bolt adapted to engage fixed stops on said receiver when said bolt is in a forward position, devices carried by said actuator for causing said means to engage and disengage the fixed stops on said receiver at definite points in the reciprocating motions of said bolt and actuator, and means for locking said bolt and actuator together, said means being operated by devices on the receiver which move the same to lock said bolt and actuator together simultaneously with the removal of said first named means from engagement with said fixed stops on said receiver, and also to unlock said bolt from said actuator when the first named means engage said fixed stops on said receiver.

22. In a gun, a slidable actuator, a bolt and a firing pin therein, said bolt having a forward end adapted to engage the cartridge being fired and to be forced rearwardly by the recoil of the primer and cartridge when discharged, an extractor member loosely mounted in a longitudinal slot in the forward end of said bolt and having a lip adapted to engage the rear end of a cartridge to withdraw the same, said extractor having a

radial projection for engaging a transverse recess in said slot retaining the same pivotally in position in a recess on said bolt and a semi-circular resilient clip having ends entering recesses in said bolt for holding said extractor pivotally in position on said bolt.

23. In a gun, a stock therefor, a receiver, a slidable actuator, bolt and firing pin, a plate pivoted to said stock, a lubricating device carried by said plate, a cartridge magazine movably mounted on said cartridge lubricating device, said magazine comprising two parts rotatable respectively, the outer part being a rotatable grooved cylinder and the other a non-rotatable part, means for mounting said parts on said lubricating device whereby the cartridges will rotate about the latter, an interrupted annular flange on said non-rotatable part adapted to engage recesses on the heads of said cartridges, a fixed member on said non-rotatable part forming a stop for the heads of said cartridges to prevent undue rotation of said cylinder, the interruption in said flange being adjacent said fixed member.

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