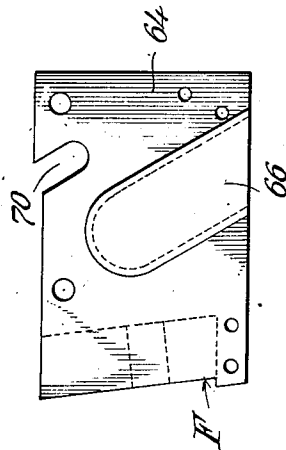
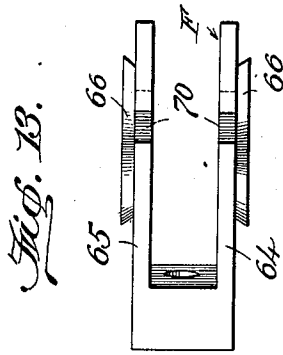
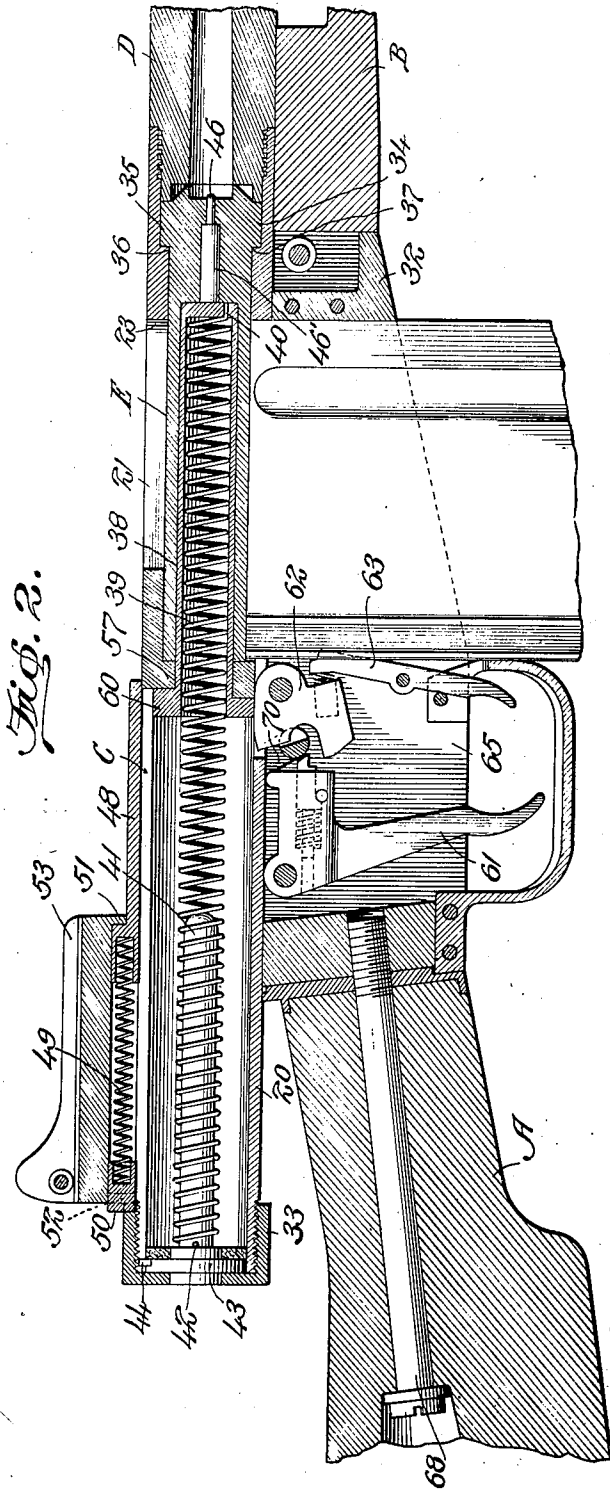


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1,376,834.

Patented May 3, 1921.  
 4 SHEETS—SHEET 2.



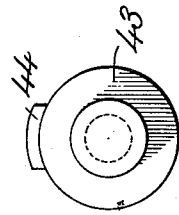
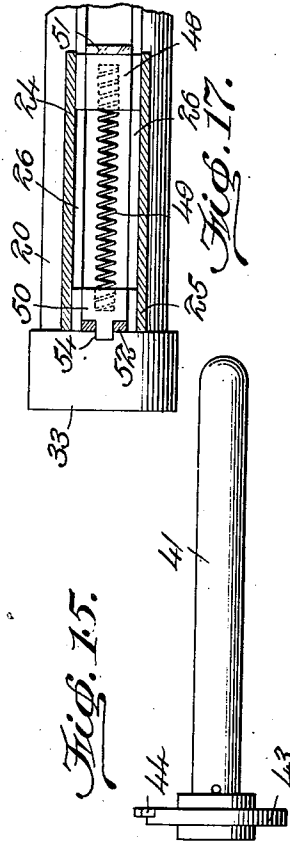
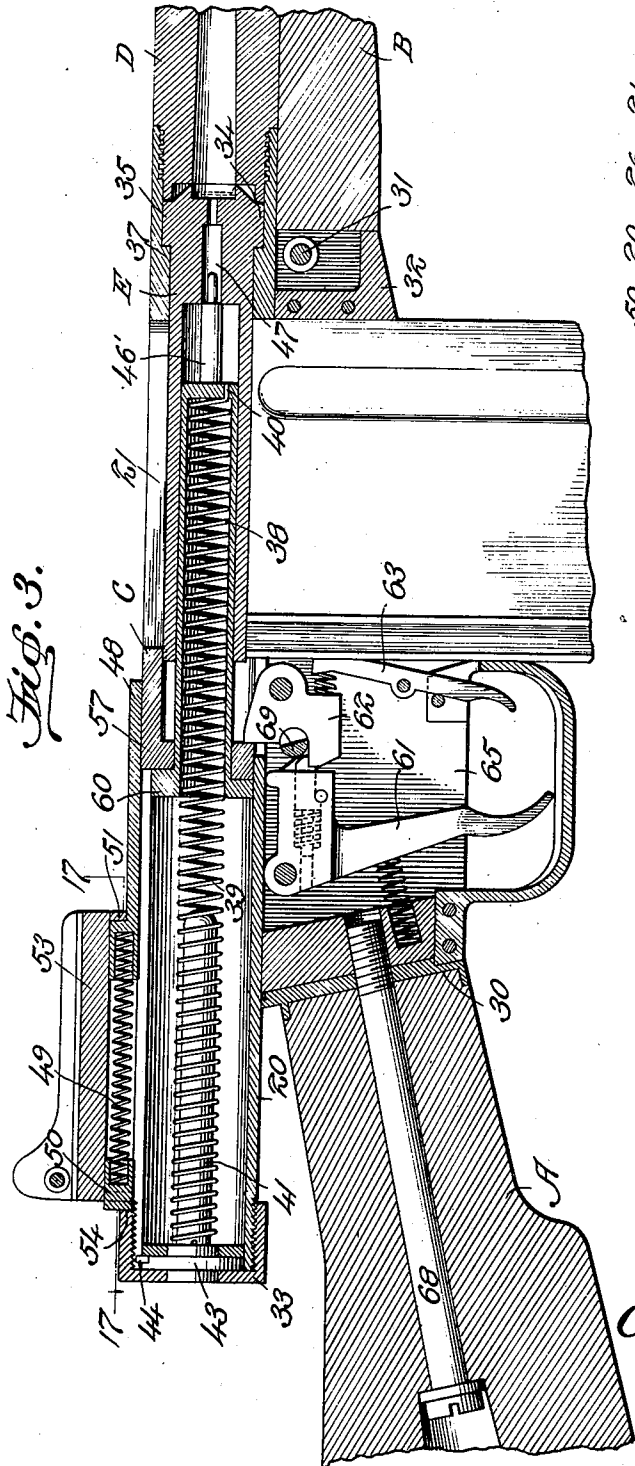
*Fig. 12.*  
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AUTOMATIC FIREARM.  
APPLICATION FILED JULY 9, 1920.

Patented May 3, 1921.

4 SHEETS—SHEET 3.



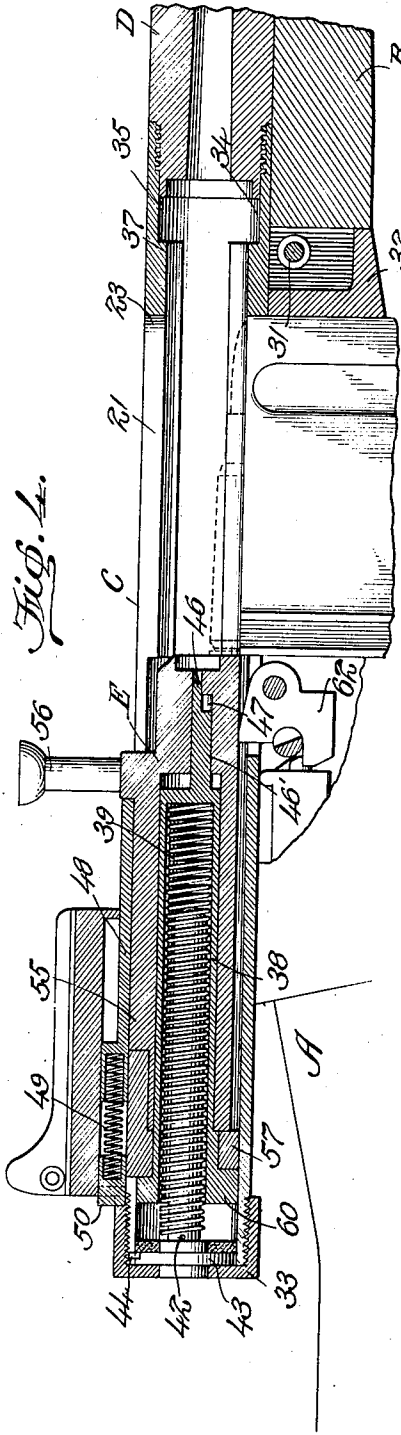
*Fig. 14.*

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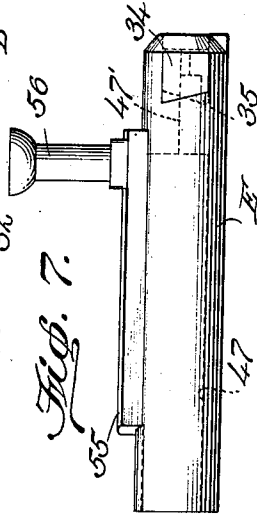
1,376,834.

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AUTOMATIC FIREARM.  
APPLICATION FILED JULY 9, 1920.

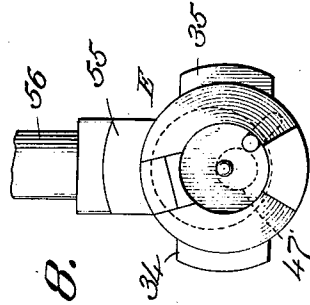
Patented May 3, 1921.  
4 SHEETS—SHEET 4.



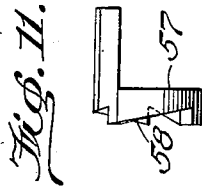
*Fig. 4.*



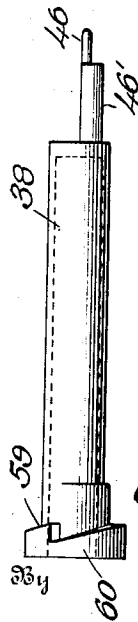
*Fig. 7.*



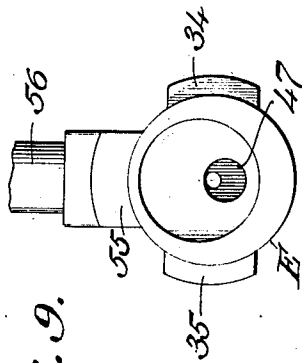
*Fig. 8.*



*Fig. 11.*



*Fig. 10.*



*Fig. 9.*

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# UNITED STATES PATENT OFFICE.

CREEDY C. SHEPPARD, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO  
UNITED STATES ORDNANCE COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA,  
A CORPORATION OF VIRGINIA.

## AUTOMATIC FIREARM.

1,376,834.

Specification of Letters Patent.

Patented May 3, 1921.

Application filed July 9, 1920. Serial No. 394,949.

*To all whom it may concern:*

Be it known that I, CREEDY C. SHEPPARD, a citizen of the United States, and resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Automatic Firearms, of which the following is a specification.

My invention relates to firearms and particularly those wherein a complete cycle of operation of the breech closure mechanism is accomplished automatically by the firing of the arm.

It is my purpose to provide a firearm of this type having a breech closure mechanism which will utilize certain desirable features described and claimed in U. S. Patent 1,291,689 granted to me January 14, 1919 and at the same time greatly simplify the construction disclosed in my aforesaid patent.

It is also my purpose to provide a breech closure mechanism for firearms adapted to be operated automatically and which will embody a minimum number of parts characterized by simple and rugged design, which will add little if any weight to the standard army shoulder rifle now in use, and which will be effective and reliable in operation.

Furthermore, it is my purpose to provide an automatically operated breech closure mechanism of the rotatable and slidable bolt type embodying my improvements and with which the barrel, sight, stock and other parts of existing arms can be associated, thus permitting conversion of such existing arms to automatic and semi-automatic type with a minimum of additional parts and expense.

I will describe my invention as applied to a shoulder rifle, but it will be apparent that the same is applicable to machine guns and other forms of guns, and that it is susceptible to changes in forms and proportions and to desirable mechanical additions with the exercise of only ordinary mechanical skill and without departing from the scope of the invention as set forth in the appended claims.

In describing my invention in detail reference will be had to the accompanying draw-

ings wherein like characters of reference denote corresponding parts in the several views, and in which—

Figure 1 is a side elevation of my improved firearm;

Fig. 2, a vertical section of what is shown in Fig. 1 with the breech bolt in locked position and the firing pin at the limit of its firing stroke;

Fig. 3, a view similar to Fig. 1 with the firing pin in cocked position and ready to be released for actuation by the firing spring to fire the arm;

Fig. 4, a view similar to Fig. 1 with the breech bolt in full open position;

Fig. 5, a plan view of the receiver detached;

Fig. 6, a section on the line 6—6 of Fig. 5;

Fig. 7, an elevation of the bolt detached and viewed from the side when in unlocked position;

Fig. 8, a front view of Fig. 7;

Fig. 9, a rear view of Fig. 7;

Fig. 10, a side view of the firing pin;

Fig. 11, a side view of the cocking piece;

Fig. 12, a side view of the housing which carries the trigger sear and magazine latch and detachably interlocks with the receiver;

Fig. 13, a top view of the housing shown in Fig. 12;

Fig. 14, a rear view of the guide for the combined recoil and firing spring;

Fig. 15, a side view of said guide;

Fig. 16, a section on the line 16—16 of Fig. 5; and

Fig. 17, a section on the line 17—17 of Fig. 3.

Referring to the drawings my improved arm is shown as comprising a rear stock section A, a forward stock section B, a receiver C, and a barrel D threaded in the forward end of the receiver. The receiver C comprises a substantially tubular body portion 20 which is provided in its upper side with a longitudinal slot 21 the rear end of which opens through the rear end of the receiver while the forward end is enlarged laterally to one side to provide the cartridge ejecting opening 22 and a cam surface 23, the purpose of which latter will presently

appear. Rising from the receiver on the sides of the slot 21 are flanges 24 and 25 respectively, the inner faces of which are provided with opposite lower grooves 26 and opposite upper grooves 27 for a purpose that will presently appear. Formed on the lower side of the receiver are depending parallel longitudinal flanges 28 and 29 which in the assembled arm extend between the stock sections. The forward end of the receiver is secured to the stock section B by a fastening device 31, said section embracing the flanges at the point of connection and between the flanges at this point is inserted and secured a strengthening filler block 32.

The receiver C has its rear end closed by a cap 33 threaded thereon and housed in said receiver is a rotatable and longitudinally slidable breech bolt E having locking lugs 34 and 35 at its forward end which are adapted to cooperate respectively with corresponding lugs 36 and 37 on the receiver to secure the bolt in closed or firing position. The construction of the lugs 34, 35, 36 and 37 is similar to the construction disclosed in my prior Patent 1,291,689. In other words the coacting faces of these lugs are inclined at such an angle to a plane perpendicular to the axis of the bolt that they will engage immovably during the time of high powder pressure but will disengage under the influences of the moderate pressure obtained as and after the bullet leaves the bore. Within the bolt E is slidably engaged a hollow firing pin 38 disposed eccentrically to the bolt and open at its rear end and receiving within its interior a combined firing and recoil spring 39. The forward end of this spring is anchored to the firing pin at 40 while the rear end thereof is engaged over a guide 41 anchored to the latter at 42. The rear end of the guide 41 has fixed thereon a disk 43 having a peripheral extension 44 of such size as will permit it to be moved freely in the groove 21. By this construction it will be obvious that upon slightly withdrawing the disk 43 from the rear end of the receiver the guide 41 can be rotated to torsion the spring 39 and then reinserted into the receiver with the extension 44 in the slot 21 when the torsional action of the spring will operate to seat the extension 44 in a recess 45 in one wall of the slot 21 and thereby lock the guide against rearward movement. The forward end of the firing pin 38 terminates in a firing point 46 having an enlarged portion 46' disposed eccentric to both the body portion of the pin and the breech bolt E; a suitable eccentric chamber 47 being provided in the breech bolt for its reception. Owing to the eccentric relation between the bolt E, firing pin body and the portion 46' of the firing pin point it will be apparent that the torsional action of the spring 39 operates upon the bolt through

the firing pin 38 and eccentric enlargement 46' of the firing pin point to keep the bolt seated in locked position or in other words in position to align the lugs 34 and 35 with the lugs 36 and 37 respectively.

To close the slot 21 and prevent dirt entering the receiver I have provided a sliding member 48 guided in the grooves 26 and pressed forward by a spring 49 which seats at its rear end in a member 50 also slidably mounted in the grooves 26. Forward movement of the member 48 and rearward movement of the member 50 under the influence of the spring 49 is positively limited by stops 51 and 52 respectively which depend from a sight base 53 mounted in the grooves 27 which latter are slightly converged in a forward direction to provide a snug seat for the sight base. The member 50 projects into a recess 54 in the cap 33 and thereby prevents removal of the cap until said member is manually forced out of said recess against the influence of the spring 49.

The bolt E is provided with a lateral extension 55 from which projects a handle 56, the latter traveling in the slot 21 during rearward movement of the bolt and acts against the forward end of the member 48 to force the latter to the rear against the influence of the spring 49 whereby said spring also serves to check recoil of the bolt as well as to normally hold the member 48 in forward position in covering relation to the slot 21. Slidably and rotatably mounted on the firing pin 38 is a cocking piece 57 which has sliding, but non-rotating engagement with the receiver and is provided with cam faces 58 which coact with similar cam faces 59 on a flange 60 at the rear end of the firing pin to hold the firing pin point 46 away from the cartridge primer except when the bolt E is in closed or locked position.

The forward end of the extension 55 of the bolt is designed to cooperate with the cam surface 23 on the receiver to control the movements of the bolt, the forward end of which member coacts with the cam surface 23 during unlocking rotation of said bolt to transform the energy of rotation into energy of translation while coaction between these parts, as the bolt moves forward or home, transforms the energy of translation into energy of rotation and thus effects locking of the bolt. As has been previously stated the angle of the coacting faces of the bolt and receiver lugs is such that these surfaces will engage immovably during the time of high powder pressure, but will disengage and thereby impart energy of rotation to the bolt under the influence of the relatively moderate powder pressure obtained as and after the bullet leaves the bore. By experiment I have determined that a pitch of from 2.75 to 3 turns per inch for the coacting faces of the lugs gives a

suitable helix for this purpose. My experiments have also determined that the mass of the moving parts is an essential factor in successful operation. If the mass be too light the velocities of the moving parts will be too high and dangerous stress developed. If the mass be too great the energy of the escaping gases is dissipated before imparting the necessary motion to the mass.

In my invention I have utilized rotational inertia of the mass to properly control this action. By providing the lateral extension 55 and handle 56 I position mass at a considerable distance from the axis of rotation of the bolt and thereby increase the radius of gyration and hence the inertia effect of this mass.

My arm further embodies a trigger 61, sear 62, and magazine latch 63 all mounted between the arms 64 and 65 of a U-shaped member F. The arms of the member are provided respectively with outwardly extending ears 66 which engage respectively in slots 67 formed respectively in the depending flanges 28 and 29 of the receiver. These slots are arranged at an angle to the axis of the receiver as are likewise the ears 66 so that backward pressure on the member serves to hold said member securely in position. This pressure is exerted by a stock bolt 68 passing through stock section A and being threaded in the arm connecting portion of the member F. It will be observed that the operating parts carried by the receiver can be dismantled by simply removing the receiver cap and drawing them rearward, while the stock section A and the parts carried by member F can be removed by simply removing the stock bolt 68. A safety 69 is mounted in the flanges 28 and 29 of the receiver and the shaft thereof is adapted to seat in recess 70 in the arms of the member F as the latter is interlocked with the flanges 28 and 29 in the manner heretofore referred to.

I claim—

1. In a firearm, the combination of a receiver, a rotatable and slidable bolt in the receiver, coacting lugs on the bolt and receiver operating when subjected to maximum powder pressure to lock the bolt immovable and effective when subjected to the reduced pressure obtaining as the bullet leaves the bore to impart unlocking movement to the bolt, and an extension on the bolt for imparting a relatively high moment of inertia thereto to properly control its action when energized by said powder pressure.

2. In a firearm, the combination of a receiver, a rotatable and slidable bolt in the receiver, coacting lugs on the bolt and receiver operating when subjected to maximum powder pressure to lock the bolt immovable and effective when subjected to

the reduced pressure obtaining as the bullet leaves the bore to impart unlocking movement to the bolt, and a lateral extension on the bolt producing a relatively high radius of gyration thereto and increasing the inertia effect of the mass of the bolt to properly control its action when energized by said reduced powder pressure.

3. In a firearm, the combination of a receiver, a slidable and rotatable bolt, a firing pin slidable in the bolt, and a combined recoil and firing spring acting torsionally through the pin to rotate the bolt.

4. In a firearm, the combination of a receiver, a slidable and rotatable bolt, a firing pin slidably and non-rotatably mounted in the bolt, and a torsionally energized combined recoil and firing spring having its forward end anchored to the firing pin, and its rear end anchored to a part held in fixed position with respect to the receiver,

5. In a firearm, the combination of a receiver, a rotatable and slidable bolt, a firing pin slidably and non-rotatably mounted in the bolt, a combined recoil and firing spring having its forward end anchored to the firing pin, and a spring guide detachably interlocked with the receiver and on and to which the rear end of the spring is engaged and anchored whereby said guide may be rotated to torsionally energize the spring and then interlocked with the receiver.

6. In a firearm, the combination of a receiver, a rotatable and slidable bolt, a firing pin slidably and non-rotatably mounted in the bolt and having a circumscribing flange at its rear end, cams formed on the forward face of the flange, a firing spring normally holding the pin at the limit of its forward movement with respect to the bolt, a cocking piece rotatable on the firing pin and slidably and non-rotatably engaged with the receiver, and cams on the cocking piece coacting with the cams on the flange during unlocking rotation of the bolt to retract said pin relatively to the bolt against the influence of said spring.

7. In a firearm, the combination of a receiver having a longitudinal slot therein, flanges rising from the receiver on each side of the slot, a sight base mounted between the flanges, depending lugs on respective ends of the sight base, a spring seat slidable between the flanges beneath the sight base and abutting the depending lugs at the rear of the base, a dust guard for said slot slidably mounted between the flanges and having a shoulder abutting the lug at the forward end of the sight base, and a spring interposed between said seat and guard normally holding the latter in extreme forward position.

8. In a firearm, the combination of a receiver having a longitudinal slot therein, flanges rising from the receiver on each side

of the slot, a sight base mounted between the flanges, depending lugs on respective ends of the sight base, a spring seat slidable between the flanges beneath the sight base and abutting the depending lugs at the rear of the base, a dust guard for said slot slidably mounted between the flanges and having a shoulder abutting the lug at the forward end of the sight base, and a spring interposed between said seat and guard normally holding the latter in extreme forward position, and a cap secured to the rear end of the receiver having a recess receiving a portion of the spring seat when the latter is in normal position whereby the cap is held against unlocking movement with respect to the receiver.

9. In a firearm, a receiver having spaced depending longitudinal flanges provided with corresponding rearwardly inclined recesses respectively, a mechanism carrier hav-

ing lugs engaged in said recesses, a rear stock section, and means connecting the carrier to the stock section and exerting a backward pressure on the carrier.

10. In a firearm, a receiver having spaced depending longitudinal flanges provided with corresponding rearwardly inclined recesses respectively, a U-shaped mechanism carrier detachably mounted between the flanges and having lugs on the arms thereof engaged in said recesses, a rear stock section, and a stock bolt threaded in the arm connecting portion of the carrier and exerting a rearward pull on the latter.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CREEDY C. SHEPPARD.

Witnesses:

JOHN H. SIGGERS,  
HENRY T. BRIGHT.