

Dec. 27, 1949

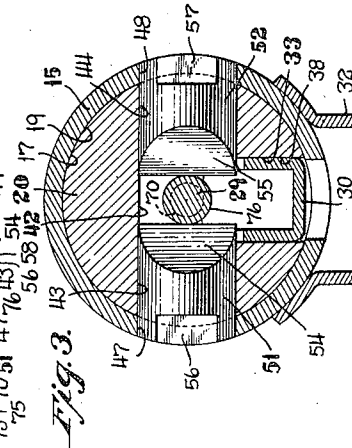
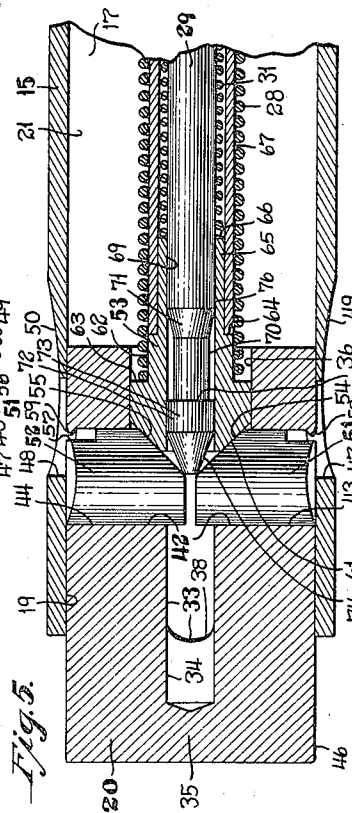
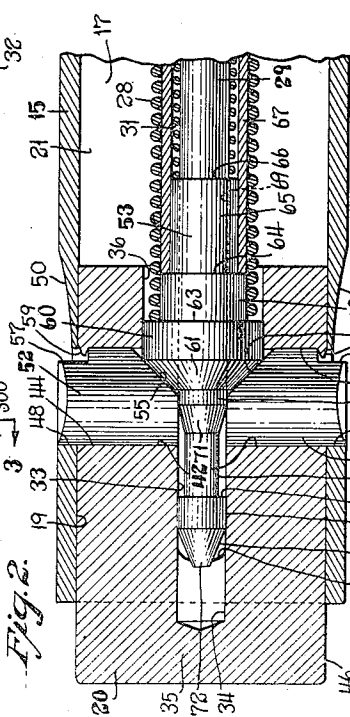
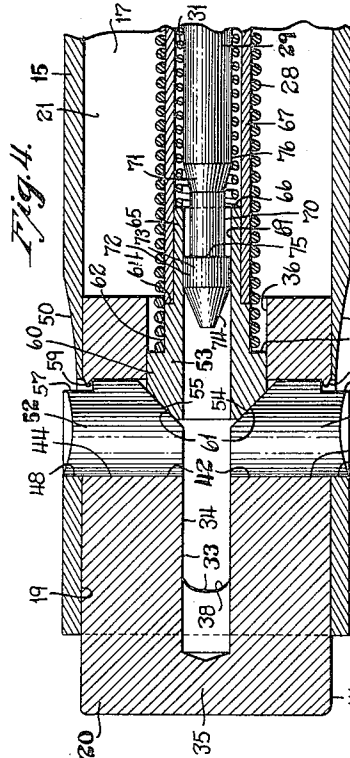
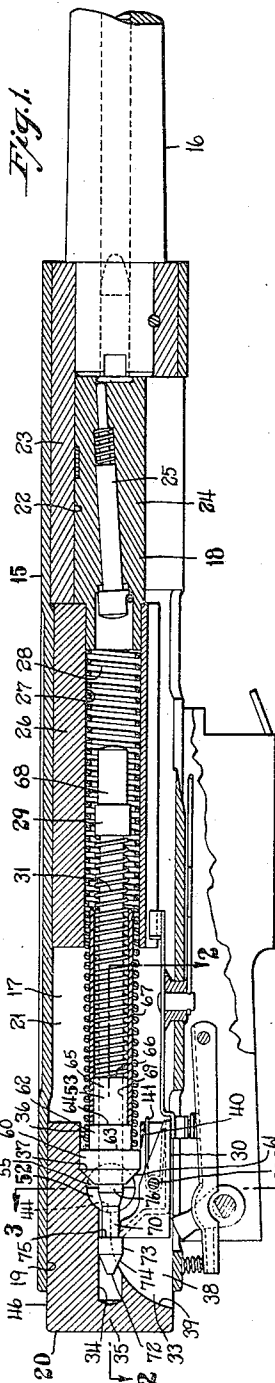
T. R. ROBINSON, JR

2,492,815

REMOVABLE END CLOSURE FOR FIREARM RECEIVERS

Filed Nov. 28, 1947

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 6

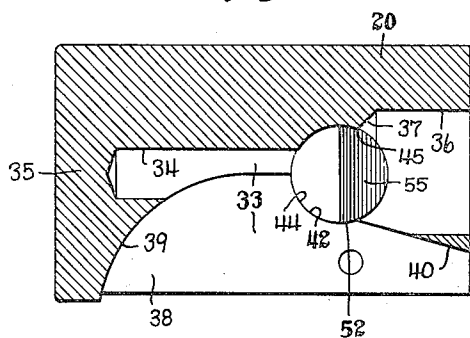


Fig. 7

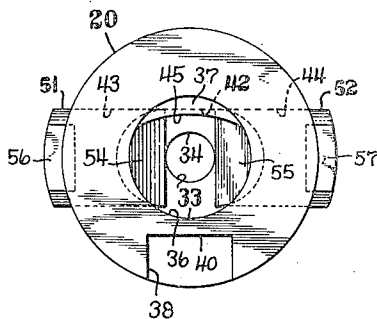


Fig. 8

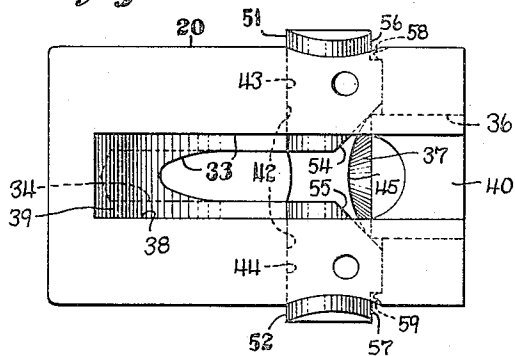


Fig. 10

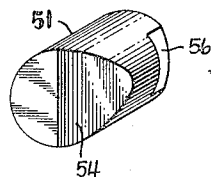
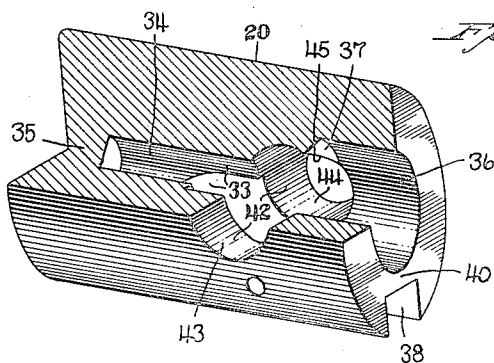


Fig. 9



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## UNITED STATES PATENT OFFICE

2,492,815

REMOVABLE END CLOSURE FOR FIREARM  
RECEIVERS

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Application November 28, 1947, Serial No. 788,529

19 Claims. (Cl. 89—199)

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The present invention relates in general to firearms and more especially to an automatic self-loading firearm having a receiver provided with a removable end-closure.

An object of the invention is to provide an improved end-closure for firearms which because of its simplicity of construction and novel arrangement of elements is both dependable and durable and effects a great economy both in space and in cost of manufacture.

A further object of the invention is to provide the receiver of a firearm with a removable end-closure and improved means for locking the end-closure in the receiver such that its removal may be effected only when the firearm is uncocked.

A still further object of the invention is to provide an improved removable end-closure for the receiver of a firearm having improved locking-means cooperatively associated with the firing mechanism such that the firearm may not be cocked while the end-closure is unlocked from the receiver.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art and which are not claimed in any separate application.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a side elevation partly in section of the receiver of an automatic firearm embodying the improved end-closure of this invention and including a fragmentary portion of the barrel;

Fig. 2 is an enlarged fragmentary plan view of the end-closure in the horizontal plane of the section line 2—2 of Fig. 1 showing the end-closure locking-lugs in locking engagement with the receiver and the firing-plunger in its cocked position;

Fig. 3 is an end elevation of the end-closure on section line 3—3 of Fig. 1;

Fig. 4 is a fragmentary plan view in section similar to Fig. 2 but with the firing-plunger in its forward firing position;

Fig. 5 is a fragmentary plan view in section similar to Fig. 2 but with the locking-lugs of the end-closure withdrawn from locking engagement with the receiver and the firing-plunger abutting the inner ends of the locking-lugs;

Fig. 6 is an enlarged side elevation in section of the improved end-closure of this invention including the locking-lugs;

Fig. 7 is a front end elevation of the end-closure of Fig. 6;

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Fig. 8 is a bottom view of the end-closure of Fig. 6;

Fig. 9 is a perspective view of the end-closure with a quarter-round section of its fourth quadrant removed to show its longitudinal recess and its transverse aperture; and

Fig. 10 is a perspective view of one of the locking-lugs of the end-closure.

Referring to the drawings which show an exemplary embodiment of the invention, the particular firearm shown for the purposes of illustrating the invention is an automatic self-loading firearm of the type disclosed in my co-pending application Ser. No. 766,663, filed August 6, 1947, now Patent No. 2,454,885, and comprises in the main a receiver indicated generally at 15 and a barrel 16 fixedly secured to the forward end thereof.

As shown especially well in Fig. 1, the receiver 15 comprises a substantially-cylindrical member preferably formed from a suitable length of tubular steel stock and is open at its opposite ends. The interior of the receiver constitutes a cylindrical chamber 17 for the action or breech-bolt 18 of the firearm; and a cylindrical sleeve-portion 19 rearwardly of the chamber 17 for the end-closure or receiver-plug indicated generally at 20. As shown clearly in Fig. 1, in this particular firearm the action-chamber 17 comprises a rear section 21 and a forward section 22, the latter being of relatively-small diameter and formed by securing a substantially-cylindrical bushing 23 of relatively-thick wall section in the forward end of the receiver. The breech-bolt 18 is likewise formed of two sections of different diameters corresponding to the size and shape of the respective sections 21 and 22 of the chamber 17, the forward reduced end 24 of the breech-bolt having a spring-retracted firing-pin 25 supported for longitudinal movement therein. The rear end portion 26 of the breech-bolt is provided with an axial aperture 27 which gives access to the rear end of the firing-pin and which also chambers the forward end of the action-spring 28 and the forwardly-projecting end of the firing-plunger 29. The latter is adapted to be held in its retracted cocked position as shown in Fig. 1 by a sear 30 mounted on a pivot-pin in the end-closure, as hereinafter described, the firing-plunger 29 being adapted to be thrust forwardly when released by the sear 30 into engagement with the firing-pin 25 by a firing-plunger spring 31 carried on the plunger. The underside of the receiver is provided with a trigger-plate indicated generally at 32 in which elements of the firing mechanism are mounted.

The present invention is concerned primarily with the end-closure 20 and the locking-means 60 thereof and their relationship to the action-

spring and firing-plunger, and hence the present disclosure will not be burdened with a detailed description of the receiver and breech-bolt nor the specific elements of the firing mechanism. For a more comprehensive disclosure of these elements of the firearm, reference may be had to a co-pending application.

Referring especially to Figs. 6 through 9, the end-closure or receiver-plug 20 constitutes a solid cylindrical metal member having a longitudinal recess therein indicated generally at 33 comprising an axially-aligned cylindrical aperture 34 which intersects the front face or end of the receiver-plug and extends rearwardly thereof terminating in an end wall 35, the over-all length of the blind aperture 34 of the receiver-plug being substantially  $\frac{5}{6}$  the length thereof. The forward end of the blind aperture 34 is provided with a concentric cylindrical counterbore 36 of relatively-large diameter, the end wall of which is blended into the forward end of the blind aperture 34 by a sloping stop-shoulder 37, for the purpose hereinafter described, the longitudinal dimension of the counterbore being slightly greater than  $\frac{1}{4}$  the length of the blind aperture 34. The foregoing statements of the relative lengths of the blind aperture 34 and the counterbore of the receiver-plug are not to be taken as specific dimensions of these elements, but as illustrative only of their relative proportions.

Formed in the bottom of the receiver-plug in a vertical plane through its longitudinal axis and symmetrical with respect thereto, is a longitudinal inverted-U-shaped sear-slot 38 which intersects the front face of the plug and extends rearwardly thereof to a point substantially opposite the end wall 35 of the aperture 34. The sear-slot 38 is preferably formed by a milling operation and, hence, the rear end wall 39 of the slot comprises a substantially-cylindrical surface of revolution.

The depth of the sear-slot 38 is such that the top thereof intersects the rear end of the counterbore 36 so as to remove from the rear edge thereof substantially all of that portion of the sloping shoulder 37 which blends the lower half of the counterbore with the forward end of the blind aperture 34, as indicated clearly in Fig. 6. The forward end of the sear-slot has a rearwardly-and-upwardly-sloping top wall 40 which serves as a shoulder adapted to be engaged by the upper end of the sear-spring 41, as shown in Fig. 1, while the top wall of the rear end of the sear-slot constitutes a continuation of its rear end wall 39. The blind aperture 34, its counterbore 36 and the vertically-intersecting sear-slot 38 are hereinafter referred to for brevity as the longitudinal recess 33 of the receiver-plug.

Extending transversely through the receiver-plug on an axis which intersects the longitudinal axis of the recess 33 and which lies in the horizontal plane thereof at substantially right angles thereto is a cylindrical aperture indicated generally at 42, the opposite ends of which intersect the corresponding sides of the receiver-plug and constitute axially-aligned transversely-spaced-apart guide-apertures 43 and 44 for the locking-lugs of the receiver-plug as hereinafter described. The front wall of the transverse aperture 42 intersects the rear end of the counterbore, as shown in Figs. 6, 7 and 8, so as to provide a substantially-straight bottom edge 45 on the sloping stop-shoulder 37 of the counterbore.

The receiver-plug 20 is adapted to be assembled in the sleeve-portion 19 of the receiver, in the

manner shown in Figs. 1, 2 and 3, that is to say, with a short finger-grip portion 46 of the plug extending rearwardly of the rear end of the receiver so as to enable the shooter to readily grasp the plug to effect its removal from and assembly in the receiver. In its normal assembled position in the receiver, the guide-apertures 43 and 44 of the plug are in axial alignment with corresponding apertures 47 and 48 formed in diametrically-opposite sides of the receiver, the forward outer edge of each aperture of the receiver being slabbled off as at 49 and 50 respectively to facilitate access to the outer ends of the locking-lugs of the receiver-plug locking-means.

The latter comprises a pair of locking-lugs 51 and 52 and a lug-engaging and restraining-member indicated generally at 53 and hereinafter described. Referring especially to Figs. 2 and 10, the locking-lugs constitute short-cylindrical members having cam-faces 54 and 55 respectively at their inner ends, each cam-face extending from a major diameter on the inner end of its respective lug forwardly and outwardly on the front periphery thereof, the slope of each cam-face making an angle of substantially  $45^\circ$  with the longitudinal axis of its respective lug. The outer end of each lug comprises a cylindrical surface of revolution corresponding in radius to the radius of the peripheral surface of the receiver so as to blend smoothly therewith. Moreover, the lugs are provided in their front faces with transverse notches 56 and 57 respectively for limiting the outward radial movement of each lug from its guide-aperture in the receiver-plug. That is to say, when each lug is mounted in its respective guide-aperture 43 and 44 respectively of the receiver-plug, it is adapted to be permanently held from sliding out of its respective aperture by splaying the outer rim thereof opposite the shoulder of its respective transverse notch, as indicated at 58 and 59 respectively. As shown especially well in Figs. 2, 4 and 8, the over-all length of each locking-lug is such that when the lugs are assembled in their respective guide-apertures of the receiver-plug and are moved outwardly radially to their outermost positions therein as determined by engagement of the frusto-conical cam-face of the lug-restraining member 53, hereinafter described, with the sloping stop-shoulder 37 of the counterbore 36, the inner ends of the lugs will be spaced apart a distance substantially equal to the diameter of the blind aperture 34.

As thus spread apart, the outer end of each lug extends into the apertures 47 and 48 respectively of the receiver to lock the receiver-plug thereto, the curvilinear ends of the lugs being substantially flush with the periphery of the receiver.

The locking-lugs are adapted normally to be held in locking engagement with the receiver by means of the aforementioned lug-engaging-and-restraining member 53 which is shown especially well in Figs. 2, 4 and 5 and comprises an elongated tubular member having an enlarged cylindrical head 60 at its rear end, the diameter of which is substantially equal to the diameter of the counterbore 36 whereby the head makes a smooth longitudinally-sliding fit therein. The rear end of the head 60 is formed with a frusto-conical cam-face 61, the angle of its slope corresponding substantially to the slope of the cam-faces 54 and 55 of the respective lugs and to the slope of the shoulder 37 which constitutes a stop 75 for the restraining-member 53. Extending for-

wardly from the front face of the head 60 is an integral collar 62 which at its junction with the head 60 is of reduced diameter corresponding substantially to the internal diameter of the action-spring 28 and forms an annular shoulder 63 with the head 60 constituting a seat for the rear end of the action-spring. Forwardly of the annular shoulder 63, the diameter of the collar is reduced to provide a second annular shoulder 64 and a cylindrical shank 65 which extends forwardly thereof, the forward end 66 of the shank constituting a seat for the rear end of the firing-plunger spring 31, which as shown clearly in Figs. 1, 4 and 5 is mounted on the firing-plunger 29 and within the action-spring 28. Fitted securely on the collar 62 of the lug-actuating member 53 is a cylindrical sleeve 67, the rear end of which abuts against the annular shoulder 64 of the collar, the length of the sleeve being substantially twice the length of the restraining-member 53 and such that when the latter is in its normal operating position as shown in Figs. 1, 2 and 4 and the action is closed, the forward end of the sleeve will extend a short way into the open rear end of the longitudinal aperture 27 of the breech-bolt. In this connection, it will be noted that the outside diameter of the sleeve corresponds substantially to the diameter of the collar 62 and to the inside diameter of the action-spring 28, as a consequence of which the sleeve serves as a support therefor. Moreover, the inside diameter of the sleeve is substantially equal to the outside diameter of the firing-plunger spring 31 and hence constitutes a tubular-guide therefor.

As indicated clearly in Fig. 1, when the locking-lug engaging-member 53 is assembled in the forward end of the receiver-plug, the lug-engaging member is adapted normally to be resiliently held against the stop-shoulder 37 at the top rear edge of the counterbore 35 by the force of the action-spring 28 both when the latter is only partially stressed, that is to say when the action is closed, and when the action-spring is strongly compressed by the rearward displacement of the breech-bolt. In its normal position, the frusto-conical cam-face 61 of the lug-engaging member is in contact with the respective cam-faces 54 and 55 of the locking-lugs so that each lug is resiliently held in its normal outwardly-projecting position in locking engagement with the receiver, the inner ends of the outwardly-projecting lugs being spaced apart a distance corresponding substantially to the diameter of the blind aperture 34.

Referring more especially to Figs. 1 through 4, the firing-plunger 29 constitutes an elongated cylindrical rod having an enlarged head 68 at its forward end adapted to extend into the rear end of the breech-bolt aperture 27 to engage the rear end of the firing-pin 25, the diameter of the rod being substantially equal to the inside diameter of the plunger-spring so as to extend therethrough and support the latter thereon. The head 68 of the firing-plunger is supported freely within the action-spring 28 whereas the rear end-portion of the firing-plunger rod is adapted to be slidably supported in the cylindrical bore 69 of the lug-restraining member 53 and in its cocked position to extend through the head 69 of the latter rearwardly into the rear end of the blind aperture 34 in which position it is adapted to be engaged and held in its cocked position by the sear 39, the latter being pivotally supported in the sear-slot 38 by a transverse

pivot-pin 300. To this end, the rear extremity of the firing-plunger rod is formed with a cylindrical stem 70 of reduced diameter joined integrally to the rear end of the rod by a conical shoulder 71. Formed integrally at the rear end of the stem is a barb 72 having a cylindrical skirt 73, the diameter of which corresponds substantially to the diameter of the blind aperture 34 and the bore 69 of the lug-engaging member 53 so as to slide freely through these respective axially aligned apertures. The rear end of the barb 72 comprises a frusto-conical surface 74 for the purpose hereinafter described. The annular shoulder 75 formed at the juncture of the rear end of the stem 70 with the skirt 73 of the barb 72 constitutes the sear-shoulder with which the sear 39 is adapted to engage to hold the firing-plunger in its retracted cocked position, as shown in Figs. 1 and 2. In this connection, it will be noted by reference to Fig. 2 that when the firing-plunger is held in its cocked position, the rear end of the firing-plunger rod extends through the head 69 of the lug-engaging member 53 sufficiently so that a cylindrical portion 76 of the rod is in engagement with the oppositely disposed inner ends of the respective locking-lugs and constitutes a positive stop to prevent inadvertent retraction of the lugs from locking engagement with the receiver while the plunger is cocked.

The operation of the locking elements of the receiver-plug may be described briefly as follows. Assuming the receiver-plug is inserted into the sleeve-portion 19 in the rear end of the receiver and that the locking-lugs 51 and 52 have been spread apart in locking engagement with the respective apertures 47 and 48 of the receiver, by engagement of the frusto-conical cam-face 61 of the lug-engaging member 53 with the respective cam-faces 54 and 55 of the lugs, when the fire-arm is discharged the breech-bolt will move rearwardly in the receiver thereby compressing the action-spring 28. Moreover, since the rear end of the firing-pin 25 is in engagement with the head 68 of the firing-plunger 29, continued rearward movement of the breech-bolt effects the rearward movement of the firing-plunger such that its sear-shoulder 75 at the rear extremity thereof is moved rearwardly from its position shown in Fig. 4 through the lug-engaging member 53 into the rear end of the blind aperture 34 where it is engaged by the sear 39, the rearward movement of the firing-plunger simultaneously compressing the firing-plunger spring 31. On the return of the breech-bolt to its forward breech-closing position, as shown in Fig. 1, the firing-plunger is held in its retracted firing position by the sear and on release therefrom is thrust forwardly by its compressed spring 31 to drive the head 68 of the plunger against the rear end of the firing-pin 25 to fire a fresh cartridge in the chamber of the barrel. As pointed out above, the action-spring 28 is adapted to engage and hold the lug-engaging member in its rearmost position against the stop-shoulder 37, both when the action is open and when it is in its forward closing position, as a consequence of which the locking-lugs are resiliently held normally in their outward radial receiver-locking positions. Moreover, when the firing-plunger is in its cocked position, its rear end-portion 76 engages between the inner ends of the locking-lugs to positively prevent the latter from being inadvertently retracted in a manner to unlock the end-closure from the receiver. Assuming, however, that the last cartridge has been fired and

that the firing-plunger and the breech-bolt are in their forward positions in the receiver, as indicated in Fig. 4, in order to dismount the end-closure from the rear end of the receiver, the shooter need but press inwardly radially on the outer ends of the respective locking-lugs to move the outer ends thereof out of engagement with the apertures 47 and 48 of the receiver. To do so, the forces applied to the outer ends of the locking-lugs must be sufficient to overcome the resistance exerted by the action-spring against the lug-engaging member 53 so as to move the latter forwardly in the counterbore of the end-closure. Having disengaged the locking-lugs from the apertures of the receiver, the end-closure may then be drawn rearwardly out of the receiver, as indicated in Fig. 5, carrying with it the locking-lug engaging-member 53, the firing-plunger, the action-spring and the firing-plunger spring. Moreover, it should be noted that while the locking-lugs are pressed inwardly out of locking engagement with the receiver during the removal of the end-closure, the inner ends of the locking-lugs are so close together as to prevent the frusto-conical end 74 of the firing-plunger from engaging therebetween. Consequently, any effort to cock the firearm while the end-closure is unlocked from the receiver is effectively frustrated. On reinserting the end-closure in the end of the receiver, the locking-elements of the end-closure are retained in the relative positions shown in Fig. 5 until the locking-lugs arrive opposite the apertures 47 and 48 of the receiver, whereupon the force of the compressed action-spring acting against the head of the lug-engaging member 53 to seat the latter against the stop-shoulder 37 cams the locking-lugs outwardly radially into locking engagement with their respective apertures of the receiver, while the inner ends of the lugs are spaced apart, as shown in Fig. 4, so as to permit the firing-plunger to move rearwardly into its cocked position in the end-closure. Should the lug-restraining member 53 fail to seat properly against its stop-shoulder 37, then by pressing against the rear end of the end-closure 20 while simultaneously cocking the firearm, the barb 72 of the rearwardly-moving firing-plunger would be driven between the inner ends of the locking-lugs and positively force the latter outwardly into locking engagement with the receiver.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and locking-means to secure said end-closure in said receiver said locking-means comprising elements carried by said end-closure and arranged to move outwardly into locking engagement with said receiver, and an element-restraining member cooperatively associated with said elements and engaged by said action-spring to hold said elements

outwardly in locking engagement with said receiver.

2. In an automatic firearm including in combination: a receiver; a barrel supported on the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and locking-means to secure said end-closure in said receiver said locking-means comprising a pair of elements supported in said end-closure for transverse movement with respect thereto, to and from locking engagement with said receiver, and an element-restraining member mounted in said end-closure, said element-restraining member being cooperatively associated with said elements and engaged by said action-spring to hold said elements outwardly transversely in resilient locking engagement with said receiver.

3. In an automatic firearm including in combination: a receiver; a barrel supported on the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; and end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and locking-means to secure said end-closure in said receiver said locking-means comprising lugs supported in said end-closure for transverse movement with respect thereto and having cam-faces on the inner ends thereof, and a lug-restraining member mounted in said end-closure and having a cam-face at its rear end arranged to engage the respective cam-faces of said lugs, said actuating-spring being arranged to engage the forward end of said lug-restraining member normally to urge its cam-face into cooperative engagement with the respective cam-faces of said lugs to hold the outer ends thereof outwardly resiliently in locking engagement with said receiver.

4. In an automatic firearm including in combination: a receiver; a barrel supported on the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; locking-means to secure said end-closure in said receiver said locking-means comprising lugs supported in said end-closure for transverse movement with respect thereto, to and from locking engagement with said receiver, and a lug-restraining member mounted in said end-closure, said lug-restraining member being cooperatively associated with said lugs and engaged by said action-spring to hold said lugs outwardly resiliently in locking engagement with said receiver; and stop-means on said end-closure arranged to engage the outer ends of said lugs to positively hold said lugs from moving transversely beyond the outer walls of said receiver.

5. In an automatic firearm including in combination: a receiver; a barrel supported on the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; locking-means to secure said end-closure in said receiver said locking-means comprising lugs supported in said end-closure for transverse movement with respect thereto and having cam-faces on the inner ends thereof, and a lug-restraining member mounted in said end-closure and having

a cam-face at its rear end arranged to engage the respective cam-faces of said lugs said actuating-spring being arranged to engage the forward end of said lug-restraining member normally to urge its cam-face into cooperative engagement with the respective cam-faces of said lugs to hold the outer ends thereof resiliently in locking engagement with said receiver; and stop-means in said end-closure to limit the outward movement of said lugs therefrom.

6. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; and end-closure mounted in the rear end of said receiver to retain said action-mechanism therein said end-closure having a longitudinal aperture substantially coaxial with the longitudinal axis of said receiver and a transverse aperture intersecting said longitudinal aperture at substantially right angles thereto; and locking-means to secure said end-closure in said receiver said locking-means comprising lugs slidably mounted in the opposite ends respectively of said transverse aperture for movement to and from locking engagement with said receiver and a lug-restraining member mounted in the longitudinal aperture of said end-closure in axial alignment with said action-spring and in cooperative engagement with said lugs said action-spring being arranged to engage one end of said lug-restraining member thereby to urge the opposite end thereof between the respective inner ends of said lugs whereby the latter are held outwardly in resilient locking engagement with said receiver.

7. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver to retain said action-mechanism therein; fire-control mechanism including a firing-plunger reciprocally mounted in said end-closure, a firing-spring supported on said plunger and a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver; and locking-means to secure said end-closure in said receiver said locking-means comprising lugs carried by said end-closure and a lug-restraining member mounted in said end-closure and cooperatively associated with said lugs, said action-spring being arranged to engage said lug-restraining member normally to hold said lugs resiliently in locking engagement with said receiver, and said firing-plunger being arranged to cooperatively engage said lugs when said firing-plunger is held in its cocked position by said sear to hold said lugs positively in locking engagement with said receiver.

8. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver to retain said action-mechanism therein said end-closure having a longitudinal aperture substantially coaxial with the longitudinal axis of said receiver and a transverse aperture intersecting said longitudinal aperture at substantially right angles thereto; fire-control mechanism including a firing-plunger, a firing-spring supported on said plunger and a sear mounted in said lon-

gitudinal aperture and arranged to hold said firing-plunger rearwardly in cocked position in said receiver; and locking-means to secure said end-closure in said receiver said locking-means comprising lugs slidably mounted in the opposite ends respectively of said transverse aperture and having cam-faces on the inner ends thereof and a lug-restraining member having a longitudinal aperture in which to slidably support said firing-plunger said restraining-member being slidably mounted in the longitudinal aperture of said end-closure and having a cam-face at its rear end arranged to cooperatively engage the respective cam-faces on the inner ends of said lugs, said action-spring being arranged to engage the forward end of said lug-restraining member thereby to wedge its cam-face between the respective cam-faces of said lugs normally to hold the latter resiliently outwardly in locking engagement with said receiver and said firing-plunger being arranged to cooperatively engage said lugs when said firing-plunger is held in its cocked position by said sear to hold said lugs positively in locking engagement with said receiver.

9. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; an end-closure mounted in the rear end of said receiver to retain said action-mechanism therein said end-closure having a longitudinal aperture substantially coaxial with the longitudinal axis of said receiver and a transverse aperture intersecting said longitudinal aperture at substantially right angles thereto; fire-control mechanism including a firing-plunger, a firing-spring supported on said plunger and a sear mounted in said longitudinal aperture and arranged to hold said firing-plunger rearwardly in cocked position in said receiver; and locking-means to secure said end-closure in said receiver said locking-means comprising lugs slidably mounted in the opposite ends respectively of said transverse aperture and having cam-faces on the inner ends thereof and a lug-restraining member having a longitudinal aperture in which to slidably support said firing-plunger said restraining-member being slidably mounted in the longitudinal aperture of said end-closure and having a cam-face at its rear end arranged to cooperatively engage the respective cam-faces on the inner ends of said lugs, said action-spring being arranged to engage the forward end of said lug-restraining member thereby to wedge its cam-face between the respective cam-faces of said lugs normally to hold the latter resiliently outwardly in locking engagement with said receiver and said firing-plunger being arranged to cooperatively engage said lugs when said firing-plunger is held in its cocked position by said sear to hold said lugs positively in locking-engagement with said receiver; and stop-means in the outer ends of said transverse aperture to limit the outward movement of said lugs.

10. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; firing-mechanism including a sear and a firing-plunger; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein said end-closure having a longitudinal recess to receive said sear and said firing-plunger; and locking-means to secure said end-

closure in said receiver said locking-means comprising axially-aligned lugs supported in said end-closure for outward radial movement, and a lug-restraining member slidably mounted in the longitudinal recess of said end-closure and having a longitudinal axial aperture arranged to support said firing-plunger for longitudinal sliding movement normally between the spaced-apart inner ends of said lugs said action-spring being arranged to engage said lug-restraining member to wedge the rear end thereof between the inner ends of said radially-movable lugs so as to hold the said inner ends of said lugs in spaced-apart relationship and the outer ends thereof resiliently in engagement with said receiver and said firing-plunger being arranged to cooperatively engage said lugs when said firing-plunger is held in its cocked position by said sear to hold said lugs positively in locking engagement with said receiver.

11. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring and a reciprocable breech-bolt mounted in said receiver; firing-mechanism including a sear and a firing-plunger; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein said end-closure having a longitudinal recess to receive said sear and said firing-plunger; and locking-means to secure said end-closure in said receiver said locking-means comprising axially-aligned lugs supported in said end-closure for outward radial movement and having cam-faces on the inner ends thereof, and a lug-restraining member slidably mounted in the longitudinal recess of said end-closure and having a longitudinal axial aperture arranged to support said firing-plunger for longitudinal sliding movement normally between the spaced-apart inner ends of said lugs and a cam-face at the rear end of said lug-restraining member arranged to cooperatively engage the respective cam-faces on the inner ends of said lugs said action-spring being arranged to engage the forward end of said lug-restraining member to wedge its cam-face between the corresponding cam-faces of said radially-movable lugs normally to hold the latter resiliently in spaced-apart relationship and to lockingly engage the outer ends thereof with said receiver and said firing-plunger being arranged to cooperatively engage said lugs when said firing-plunger is held in its cocked position by said sear to hold said lugs positively in locking engagement with said receiver.

12. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring mounted in said receiver; firing-means including a firing-plunger and a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and means carried by said end-closure to lock said end-closure in said receiver the locking-means comprising lugs mounted in said end-closure and arranged to be moved outwardly into locking engagement with said receiver, and a lug-restraining member mounted in said end-closure and arranged to be engaged by said action-spring normally to hold said lugs outwardly resiliently in locking engagement with said receiver said firing-plunger being constructed and arranged to coact with said lugs when said firing-

plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked.

13. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring mounted in said receiver; firing-means including a firing-plunger and a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and means carried by said end-closure to lock said end-closure in said receiver the locking-means comprising lugs mounted in said end-closure and arranged to be moved outwardly into locking engagement with said receiver, each of said lugs having a cam-face at its inner end, and a lug-restraining member mounted in said end-closure and having a cam-face at its rear end arranged to cooperatively engage the respective cam-faces of said lugs, said lug-restraining member being engaged at its forward end by said action-spring whereby the cam-face of said lug-restraining member is wedged normally between the respective cam-faces of said lugs to hold the outer ends thereof resiliently in locking engagement with said receiver said firing-plunger having an end-portion arranged to engage between the inner ends of said lugs when said firing-plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked.

14. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring mounted in said receiver; firing-means including a firing-plunger a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver and a firing-plunger spring; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and means carried by said end-closure to lock said end-closure in said receiver the locking-means comprising lugs mounted in said end-closure and arranged to be moved into locking engagement with said receiver each of said lugs having a cam-face at its inner end, and a lug-restraining member mounted in said end-closure and having a cam-face at its rear end arranged to cooperatively engage the respective cam-faces of said lugs, said lug-restraining member being engaged at its forward end by said action-spring and said firing-plunger spring whereby the cam-face of said lug-restraining member is wedged normally between the respective cam-faces of said lugs to hold the outer ends thereof resiliently in locking engagement with said receiver said firing-plunger having an end-portion arranged to engage between the inner ends of said lugs when said firing-plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked.

15. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring mounted in said receiver; firing-means including a firing-plunger and a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism

therein; means carried by said end-closure to lock said end-closure to said receiver the locking-means comprising lugs mounted in said end-closure and arranged to be moved outwardly into locking engagement with said receiver, and a lug-restraining member mounted in said end-closure and arranged to be engaged by said action-spring normally to hold said lugs outwardly resiliently in locking engagement with said receiver said firing-plunger being slidably supported within said lug-restraining member and arranged to move between the inner ends of said lugs when said firing-plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked.

16. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring mounted in said receiver; firing-means including a firing-plunger, a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver and a firing-spring mounted on said plunger; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein said end-closure having a longitudinal recess and a transverse aperture intersecting said longitudinal recess adjacent the forward end thereof and at substantially right angles thereto; and means to lock said end-closure in said receiver the locking-means comprising a pair of lugs mounted in opposite ends respectively of said transverse aperture and arranged to be moved outwardly into locking engagement with said receiver each of said lugs having a cam-face at its inner end, and a lug-restraining member mounted in the longitudinal recess of said end-closure and having a cam-face at its rear end arranged to cooperatively engage the respective cam-faces of said lugs said lug-restraining member being engaged at its forward end by said action-spring and said firing-plunger spring whereby the cam-face of said lug-restraining member is wedged normally between the respective cam-faces of said lugs to hold the outer ends thereof resiliently in locking engagement with said receiver said firing-plunger having a portion arranged to engage between the inner ends of said lugs when said firing-plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked.

17. In an automatic firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an action-spring mounted in said receiver; firing-means including a firing-plunger, a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver and a firing-spring mounted on said plunger; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein said end-closure having a longitudinal recess and a transverse aperture intersecting said longitudinal recess adjacent the forward end thereof and at substantially right angles thereto; means to lock said end-closure in said receiver the locking-means comprising a pair of lugs mounted in opposite ends respectively of said transverse aperture and arranged to be moved outwardly into locking engagement with said receiver each of said lugs having a cam-face at its inner end, and a lug-restraining member mounted in the longitudinal

tudinal recess of said end-closure and having a cam-face at its rear end arranged to cooperatively engage the respective cam faces of said lugs said lug-restraining member being engaged at its forward end by said action-spring and said firing-plunger spring whereby the cam-face of said lug-restraining member is wedged normally between the respective cam-faces of said lugs to hold the outer ends thereof resiliently in locking engagement with said receiver said firing-plunger having an end-portion arranged to engage between the inner ends of said lugs when said firing-plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked; and stop-means in the outer ends of said transverse aperture to limit the outward movement of said lugs.

18. In a firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism mounted in said receiver; firing-means including a firing-plunger, a firing-plunger spring, and a sear arranged to hold said firing-plunger rearwardly in cocked position in said receiver; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism therein; and means carried by said end-closure to lock said end-closure in said receiver the locking-means comprising lugs mounted in said end-closure and arranged to be moved outwardly into locking engagement with said receiver, and a lug-restraining member mounted in said end-closure, said lug-restraining member being engaged by said firing-plunger spring and urged thereby between the respective inner ends of said lugs normally to hold said lugs outwardly resiliently in locking engagement with said receiver said firing-plunger being constructed and arranged to coact with said lugs also when said firing-plunger is held by said sear in cocked position in said receiver to preclude inadvertent disengagement of said lugs from said receiver while said firearm is cocked.

19. In a firearm including in combination: a receiver; a barrel supported in the forward end of said receiver; action-mechanism including an apertured breech-bolt reciprocally mounted in the said receiver and an action-spring supported at its forward end in the aperture of said breech-bolt; fire-control means including a firing-plunger and a firing-plunger spring supported on said firing-plunger; an end-closure mounted in the rear end of said receiver for retaining said action-mechanism and fire-control means therein; and means to lock said end-closure in said receiver said locking-means comprising elements mounted in said end-closure for movement to and from locking engagement with said receiver, and a sleeve-member cooperatively associated with said elements, said sleeve-member being arranged to support the rear end of said action-spring and to support said firing-plunger and said firing-plunger spring within said action-spring.

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