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[54] **IMPROVEMENTS IN RECIPROCATING SLIDE TYPE HANDGUN AUTOMATIC FIREARMS**

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[56] **References Cited**

UNITED STATES PATENTS

984,519	2/1911	Browning	89/163 X

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[57] **ABSTRACT**

A reciprocating slide type handgun automatic firearm is disclosed comprising a slide, a recoil mechanism comprising front and rear spring guides and recoil compression spring means operative therebetween, and take-up means holding said spring guides slidable in respect to each other so that all parts of said recoil mechanism are held together as a subassembly without loose parts, said slide having means for holding the front end of said recoil mechanism, an internal radial slot formed in said slide on opposite sides of the vertical axis thereof, said slot being open at opposite ends thereof, a barrel bushing having spaced apart protuberant lock means thereon disposed in said slot, said barrel bushing rotatable in respect to said slide to facilitate assembly of said recoil mechanism in said firearm, said protuberant lock means holding said barrel bushing axially fast in the front end of said slide, said barrel bushing having means thereon for pushing upon the front end of said recoil mechanism during recoil of said firearm.

13 Claims, 6 Drawing Figures

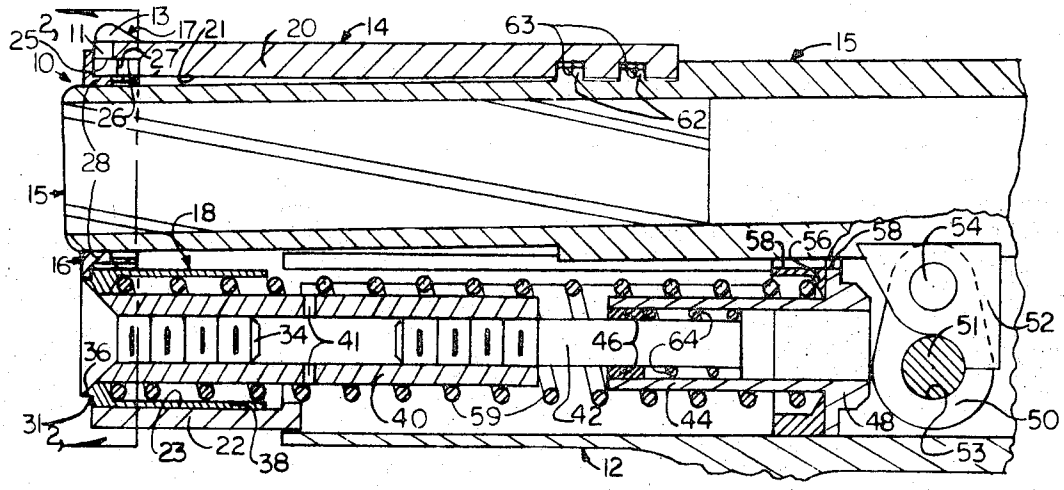


FIG-1

FIG-2

FIG-3

FIG-4

FIG-5

FIG-6

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IMPROVEMENTS IN RECIPROCATING SLIDE TYPE HANDGUN AUTOMATIC FIREARMS

My invention relates to reciprocating slide type handgun automatic firearms particularly of the type exemplified by the Browning-Colt U.S. Army Models of 1911, and 1911 Al.

The principal object of my invention is to provide improvements in such handgun automatic firearms including a recoil mechanism which renders the handgun automatic firearm more durable and handy for use in the field and which may be incorporated in the original manufacture of or in existing such handgun automatic firearms. The barrel and slide are shortened to incorporate such improvements in existing such handgun automatic firearms which is a modification many firearm users prefer.

The foregoing object of my invention and the advantages thereof will become apparent during the course of the following description, taken in conjunction with the accompanying drawings, in which:

FIGS. 1, 2, 3 and 4 are, respectively, front elevational, transverse and longitudinal sectional views of a shortened 45 caliber Browning-Colt U.S. Army Model of 1911 reciprocating slide type handgun automatic firearm which incorporates improvements embodying my invention;

FIG. 5 is an exploded view of said recoil mechanism; and

FIG. 6 is an enlarged fragmentary front elevational view showing the slide and my gunsight made fast thereto.

Referring to the drawings in greater detail, 10 generally designates said handgun automatic firearm which comprises a conventional receiver 12 and a slide 14 and barrel 15 modified in accordance with my invention, and a barrel bushing 16 and a recoil mechanism 18 constructed in accordance with my invention.

Said slide 14, as is usual, has an upper generally cylindrical portion 20 with an axial opening 21 therein which accommodates the barrel 15 and a lower generally cylindrical portion 22 with an axial opening 23 therein which accommodates the front end of the recoil mechanism 18. Said openings 21 and 23 open to each other across spaced apart wall portions 24 joining said upper and lower portions 20 and 22, respectively. Inwardly from the front end of the slide 14 an internal radial slot 26 is formed in said upper portion 20 and extends circumferentially therearound and is open at opposite ends thereof in said wall portions 24. A front wall portion for the slot 26 is designated 27. Said slide 14 has a cutaway notch 25 centrally formed in its front end which extends radially outwardly from said opening 21 and axially inwardly across said front wall portion 27 to communicate with said slot 26. Said barrel bushing 16 is as short axially as it can be, i.e., its axial length is about one-half of its diameter. Said barrel bushing, as is usual, is provided with a cylindrical body portion 28 which extends rearwardly from its front plate portion 30. Said plate portion 30 is centrally notched, as is usual, at the lower end thereof to operate against the front end of the recoil mechanism 18 and to bear against an annular shoulder 31 formed on a part of said recoil mechanism 18. In accordance with my invention two diametrically spaced apart protuberant

radial lock portions 32 and 33 upstand from the outside cylindrical surface of the body portion 28 and operate in the slot 26 to hold the barrel bushing 16 axially fast in the front end of the slide 14. The diameter on which the lock portions 32 and 33 are located is disposed at about a 45° included angle with the vertical axis of the barrel bushing 16. The lock portion 32 is disposed in the lower left quadrant of the barrel bushing 16 viewed from the front thereof and the lock portion 33 is disposed in the upper right quadrant viewed in the same manner. The lock portion 32 is circumferentially wider than the lock portion 33, i.e., the lock portion 32 has about a 30° circumferential width while the lock portion 33 has about a 20° circumferential width.

The front end of the recoil mechanism 18 is made up of the head of a plug screw 34 and an annular rim 36 on the front end of a front plug 38 for said recoil mechanism 18. Said plug 38 has said annular shoulder 31 on the front end thereof behind the rim 36. Said plug screw 34 is threadably engaged in the front end of a hollow cylindrical front spring guide 40 via internal threads at said front end. The rear end of the front spring guide 40 is provided with internal threads which threadably engage the threaded front end of a take-up screw 42. Said spring guide 40 is provided with transverse through-aperture means 41 extending diametrically between opposite walls thereof for receiving a tool to hold said spring guide 40 fast during tightening and loosening of said plug screw 34 or said take-up screw 42. A hollow cylindrical rear spring guide 44 is slidably carried on the take-up screw 42 and for this purpose is provided with a bushing 46 fast to the interior of said rear spring guide 44 at the front end thereof. Said rear spring guide 44 is provided with a head 48 at the rear end thereof which bears against a pivot link 50 pivotally carried at the rear of said barrel 15. At the lower rear end of said barrel 15 a bifurcated pivot support 52 is provided which carries a pivot pin 54 by which said link 50 is pivotally moveable in respect to said barrel 15. The receiver 12 carries a removeable slide stop a portion of which serves as a pivot pin 51 which extends through an aperture 53 in the free end of said link 50 by which the latter and the barrel 15 are pivotally moveable in respect to said receiver 12. A rear plug 56 is made fast to the front of the head 48 and the upper ends of both said plug 56 and said head 48 are centrally notched as at 58 to accommodate the bottom portion of the barrel 15. A compression recoil spring 59 is disposed about said front and rear spring guide 40 and 44, respectively, and extends between and operates against said front and rear plugs 38 and 56, respectively, the hollow interiors of which accommodate end coils of said recoil spring 59. A compression take-up spring 64 is disposed about the shank of the take-up screw 42 and extends between and operates against the head of said take-up screw 42 and said bushing 46. Said take-up spring 64 pushes the front and rear spring guides, 38 and 56, in opposite directions, the net effect of which is to urge them together (as shown in FIG. 4) in opposition to the push of said recoil spring 59 which pushes them apart (as shown in FIG. 3).

Said slide 14 is provided with a front gunsight 17 at the upper front end thereof in accordance with my invention. Said gunsight 17 has an upper portion 13

which is longitudinally humped in the usual manner and a transversely thinner lower portion 11 which extends longitudinally over the front half of said sight 17. The upper front end of said slide 14 is provided with a slot 19 which is filled by said lower portion 11. Said slot extends axially inwardly across the front wall portion 27 to communicate with the slot 26. Said slot 19 also extends vertically between the hotch 25 and the outer cylindrical wall of the slide 14. Said sight 17 is electrically spot welded to the slide 14 after the lower portion 11 is disposed in place in said slot 19.

My invention can be incorporated in the original manufacture of such hand gun automatic firearms and in such firearms already manufactured. In the original manufacture of such firearm 10 the slot 26 is formed in the front portion of the slide 14 to receive the lock means 32 and 33 on the barrel bushing 16, the notch 25 is also formed therein to accommodate the lock portion 33, the slide 14 is slotted at 19 to receive the lower portion 11 of the gunsight 17, and the recoil mechanism 18 is constructed and assembled for use in such hand gun automatic firearm 10. In the already manufactured handgun automatic firearm 10, the slide 14 and the barrel 15 are advantageously shortened by cutting off the front ends thereof which, as mentioned, is a desirable modification for many firearm users as it renders the handgun automatic firearm handier and lighter. The range of calibers that I have modified in accordance with my invention are 45, 38 special, super 38, and 9 mm calibers. The barrel bushing and recoil mechanism including the front plug thereof are discarded and my barrel bushing 16 which is less than half of the axial length of the discarded barrel bushing and my recoil mechanism 18 including the front plug 38 thereof which is less than half of the axial length of the discarded front plug are constructed and assembled in said firearm 10.

In assembly of said handgun automatic firearm 10 modified in accordance with my invention, said recoil mechanism 18 is first assembled by inserting the take-up spring 64 through the rear end of the rear spring guide 44 and inserting the take-up screw 42 thereafter and threadably engaging the front end of said take-up screw 42 with the rear end of said front spring guide 40. The front spring guide 40 is held fast during tightening of the take-up screw 42 by a tool inserted in the aperture means 41. Assuming that the barrel 15 is in place in the slide 14, the barrel bushing 16 is placed over the front end of the barrel 15 and disposed so that its vertical axis is at a 45° angle with respect to the vertical axis of the slide 14 and so that the protuberant lock portion 32 is disposed between the walls 24 and the protuberant lock portion 33 disposed in the slot 25. Said barrel bushing 16 is rotated about 135° clockwise (to the position shown for said barrel bushing in FIG. 5) to provide clearance for said front plug 38 to enter the opening 23 and the thus assembled front spring guide 40 is inserted into the rear end of the recoil spring 59, the front end of which is threaded front to back through the lower portion 22 and the front plug 38 is placed over said front end of said recoil spring 59 and over the front end of said front spring guide 40. Said recoil spring 59 is compressed while the plug screw 34 is threaded into the front end of the spring guide 40 which again is held fast, this time during tightening of the plug screw 34, by a tool inserted in the aperture means 41. It should be noted that this position of the partially assembled firearm 10 is also the cleaning position for cleaning the barrel from both ends thereof and advantageously said recoil mechanism 18 is a unitary sub-assembly, no part of which is loose and all parts of which are held together with the slide 14 and with the barrel 15 in a larger subassembly, no part of which is loose and all parts of which are held together. This is as far as the gun need be disassembled for field stripping to clean the barrel and the fact that there are no loose parts (with the sole exception of the conventional slide stop) is a significant military advantage as invariably parts are lost during field stripping for cleaning or the like.

To complete the assembly of the firearm 10 from this point of field stripping said recoil mechanism 18 is pushed axially rearwardly into the opening 23 until the front end thereof is disposed rearwardly of the plate portion 30 whereupon the barrel bushing 16 is rotated counterclockwise about 90° until its vertical axis is aligned with the vertical axis of the slide 14 as shown in FIG. 1 in which position the lower end of said plate portion 30 engages the circular shoulder 31. Said recoil mechanism 18 is disposed so that the notch 58 is directed upwardly toward the underside of the barrel and the slide 14 thus assembled with the assembled recoil mechanism 18 disposed therein is assembled in respect to the receiver 12 in the usual manner by interlocking said receiver 12 and said slide 14 via their axial tongue and groove slides and by longitudinally aligning the slide 14 and the receiver 12 so that the aperture 53 is aligned with spaced apart apertures in the receiver so that the pivot pin portion 51 of the slide stop can be threaded through said receiver apertures and said aperture 53 to complete the assembly of the firearm 10.

To assemble the gun sight 17 in respect to the slide 14 the lower portion 11 is inserted into the slot 19 and the gun sight 17 is electrically spot welded to the slide 14.

In operation of said firearm 10 modified in accordance with my invention, a round is chambered into the firing chamber, the hammer is cocked, the trigger is pulled and the hammer strikes the firing pin which strikes the primer of the projectile whereupon the powder ignites and drives the round out of the front end of the barrel 15. In this condition of the firearm 10 the rear end of the barrel 15 is in its elevated battery position with its axially spaced apart lock ridges 62 on the upper rear portion thereof disposed in axially spaced apart grooves 63 in the slide 14. The slide 14 and the barrel 15 are thus made axially fast and recoil together during the initial recoil of the slide. During this same period the rear end of the barrel 15 pivots downwardly and rearwardly on the pivot link 50 and unlocks from the slide 14 allowing the latter to continue its rearward travel while the former is stopped by the pivot pin 51 and by the pivot support 52 abutting a radial interior wall (not shown) of the receiver 12. Continued rearward travel of the slide 14 extracts the fired shell and when the slide 14 reaches its extreme recoil position it cocks the hammer for the next firing and allows the next round to be moved into the chamber port. During recoil of the slide 14 the barrel bushing 16 pushes upon the annular shoulder 31 and

the front plug **38** slides rearwardly on the front spring guide **40** against the urging of the compression spring **59**. During compression of the recoil spring **59** its axial position is maintained by the spring guides **40** and **44** which are pulled together as the recoil spring **59** is compressed as shown in FIG. **4**. Upon the slide **14** reaching its extreme recoil position said recoil mechanism **18** reverses the movement of said slide **14** and moves it forwardly on the receiver **12**. During such forward movement, said slide **14** moves the next round into the firing chamber. During its final forward movement the slide **14** abuts the rear end of the barrel **15** and causes said rear end to pivot upwardly and forwardly on the pivot link **50** to lock said barrel **15** in its battery position with the lock ridges **62** disposed in the grooves **63**. The handgun automatic firearm **10** is thus automatically ready to be fired again in which case the above operation is repeated.

It will thus be seen that there has been provided by my invention improvements in reciprocating slide type hand gun automatic firearms in which the object hereinabove set forth together with many thoroughly practical advantages has been successfully achieved. While a preferred embodiment of my invention has been shown and described it is to be understood that variations and changes may be resorted to without departing from the spirit of my invention as defined by the appended claims.

What I claim is:

1. A reciprocating slide type handgun automatic firearm having a slide, a recoil mechanism comprising front and rear spring guides and recoil compression spring means operative therebetween, and take-up means holding said spring guides slidable in respect to each other and so that all parts of said recoil mechanism are held together as a subassembly without loose parts, said slide having means for holding the front end of said recoil mechanism, an internal radial slot formed in said slide on opposite sides of the vertical axis thereof, said slot being open at opposite ends thereof, a barrel bushing having spaced apart protuberant lock means thereon disposed in said slot, said barrel bushing rotatable in respect to said slide to facilitate assembly of said recoil mechanism in said firearm, said protuberant lock means holding said barrel bushing axially fast in the front end of said slide, said barrel bushing having means thereon for pushing upon the front end of said recoil mechanism during recoil of said firearm.

2. A reciprocating slide type handgun automatic firearm as claimed in claim **1**, said barrel bushing having a front plate portion which accomplishes said pushing and an integral cylindrical body portion projecting rearwardly from said plate portion, said lock means diametrically spaced from each other and upstanding from the outside cylindrical surface of said body portion.

3. A reciprocating slide type handgun automatic firearm as claimed in claim **2**, said opposite ends of said slot being spaced apart, said slide having an access notch in the upper end thereof, said access notch extending axially inwardly from the front end of said slide and opening to said slot, said barrel bushing insertable in the front end of said slide in one rotated position in respect thereto in which one of said lock means is disposed in said access notch and the other of said lock means is disposed between said opposite ends of said slot, said barrel bushing rotatable in respect to said slide from said one position to another rotated position in which both of said lock means are disposed in said slot, whereby to hold said barrel bushing axially fast in respect to said slide.

4. A reciprocating slide type handgun automatic firearm having a slide, an internal radial slot formed in said slide on opposite sides of the vertical axis thereof, said slot being open at opposite ends thereof, said slide having an access notch in the upper end thereof, a barrel bushing having spaced apart protuberant lock means thereon disposed in said slot and holding said barrel bushing axially fast in the front end of said slide and so that said barrel bushing is rotatable in respect to said slide, one of said lock means being circumferentially wider than said other lock means, said wider lock means being disposed between said opposite ends of said slot and said other lock means being disposed in said access notch in one rotated position of said barrel bushing.

5. In a reciprocating slide type handgun automatic firearm a recoil mechanism comprising front and rear spring guides and a compression recoil spring disposed about said front and rear spring guides and yieldably pushing said spring guides away from each other, take-up means holding said spring guides slidable in respect to each other, said take-up means including yieldable means yieldably urging said spring guides toward each other in opposition to said recoil spring, said front and rear spring guides and the part of said take-up means between adjacent ends of said spring guides extending over the full length of said recoil spring in its expanded condition, and means at opposite ends of said spring guides for holding opposite end coils of said recoil spring so that all parts of said recoil mechanism are held and maintained together as a subassembly without loose parts.

6. In a reciprocating slide type handgun automatic firearm as claimed in claim **5**, each of said spring guides being hollow cylindrical, and one having internal threads in opposite ends thereof, said take-up means including a take-up screw extending through the hollow interior of the other of said spring guides and threadably engaging the interior threads in an adjacent end of said one spring guide.

7. In a reciprocating slide type handgun automatic firearm as claimed in claim **5**, said yieldable means including a take-up compression spring disposed about the shank of said take-up screw and operative upon said rear spring guide and the head of said take-up screw.

8. In a reciprocating slide type handgun automatic firearm as claimed in claim **5**, front and rear plugs associated with said front and rear spring guides, respectively, each said plug constructed with a cavity for receiving an end coil of said recoil spring, said rear plug fast to said rear spring guide and said front plug slidable on said front spring guide, and means threadably engaged in the front end of said front spring guide serving as a stop for said front plug in the forward movement thereof during expansion of said recoil spring.

9. In a reciprocating slide type handgun automatic firearm having a slide and a barrel slidably carried in

said slide, a recoil mechanism as claimed in claim 5 also carried in said slide, said recoil mechanism being held and maintained, together with said slide and said barrel, in a subassembly without loose parts to facilitate field stripping of said firearm.

10. A reciprocating slide type handgun automatic firearm as claimed in claim 1, and a barrel slidably carried in said slide, said recoil mechanism being held and maintained together with said slide and said barrel in a subassembly without loose parts to facilitate field stripping of said firearm, the lower end of said barrel bushing extending downwardly in front of the front end of said recoil mechanism when the axis of said barrel bushing is aligned with the axis of said slide, said lower end of said barrel bushing pushing upon the front end of said recoil mechanism during the recoil of said firearm.

11. In a reciprocating slide type handgun automatic firearm having a slide, a recoil mechanism held in said slide, a barrel bushing carried in said slide, a method of assembling said barrel bushing and said recoil mechanism in said slide comprising providing front and rear spring guides and recoil compression spring means operative therebetween, holding said spring guides slidable in respect to each other and so that all parts of said recoil mechanism are held together as a subassembly without loose parts, holding the front end of said recoil mechanism in said slide, forming an internal radial slot in said slide on opposite sides of the vertical axis thereof so that said slot is open at opposite ends thereof, forming spaced apart protuberant lock means on said barrel bushing, inserting said barrel bushing in the front of said slide so that said protuberant lock means are disposed in said slot, said barrel bushing rotatable in respect to said slide to facilitate assembly of said recoil mechanism in said firearm, said protuberant lock means holding said barrel bushing axially fast in the front end of said slide.

12. In a reciprocating slide type handgun automatic firearm having a recoil spring, a method of guiding said recoil spring comprising forming front and rear spring guides, disposing a recoil spring about said spring guides so as to yieldably push said spring guides away from each other, providing take-up means to hold said spring guides slidable in respect to each other and to yieldably urge said spring guides toward each other in opposition to said recoil spring, extending said front and rear spring guides and the part of said take-up means between adjacent ends of said spring guides over the full length of said recoil spring in its expanded condition, whereby all parts of said recoil mechanism are held and maintained together as a subassembly without loose parts.

13. In a reciprocating slide type handgun automatic firearm having a slide, a recoil mechanism held in said slide, a barrel bushing carried in said slide, a method of assembling said barrel bushing and said recoil mechanism in said slide as claimed in claim 12, said firearm having a barrel slidably carried in said slide, forming front and rear spring guides, disposing a recoil spring about said spring guides so as to yieldably push said spring guides away from each other, holding said spring guides slidable in respect to each other and yieldably urging said spring guides toward each other in opposition to said recoil spring, whereby all parts of said recoil mechanism are held and maintained together as a subassembly without loose parts, together with said slide and said barrel in a larger subassembly without loose parts, to facilitate field stripping of said firearm.

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