May 23, 1939. C. C. LOOMIS 2,159,485

FIREARM

Filed April 22, 1936

Fig. 1

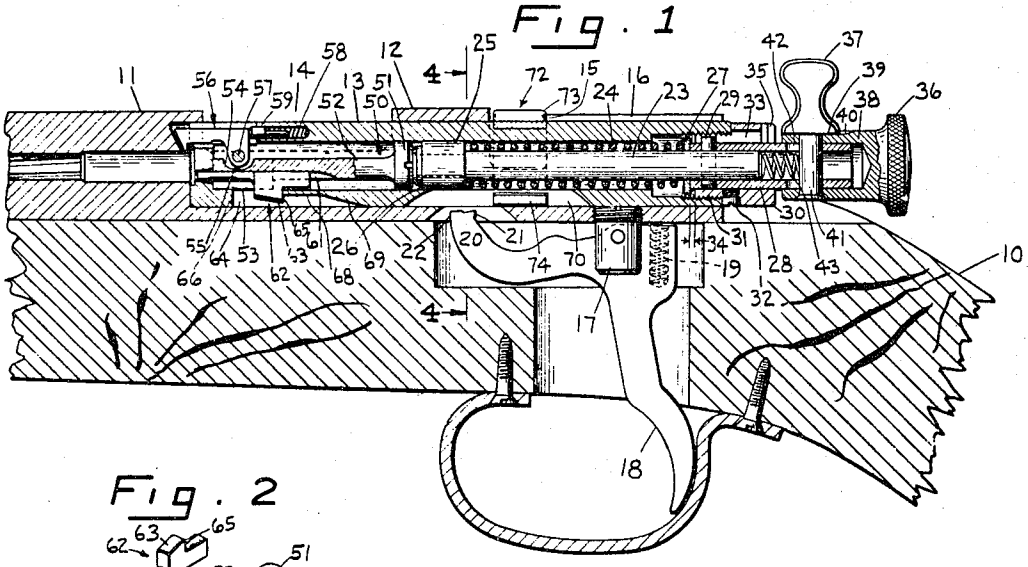


Fig. 2

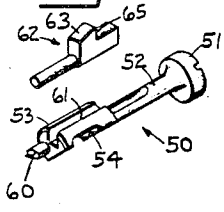


Fig. 3

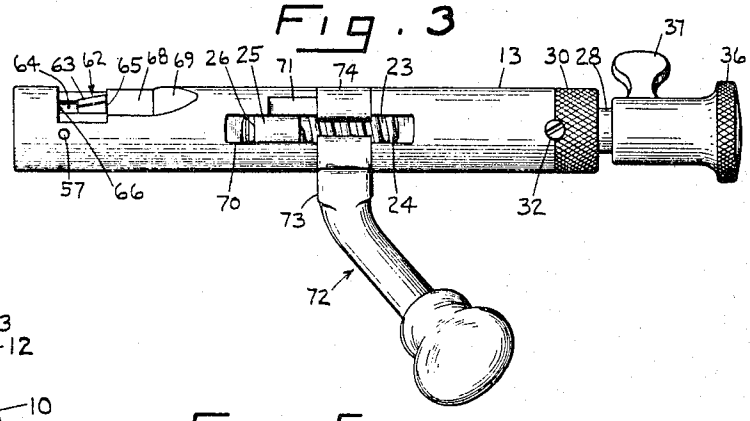


Fig. 4

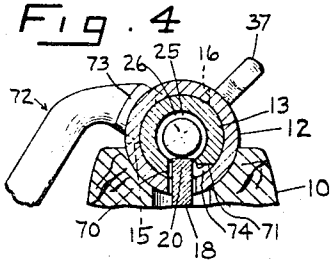
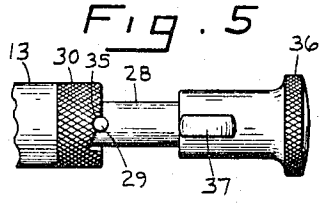


Fig. 5



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FIREARM

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12 Claims. (Cl. 42—16)

This invention relates to firearms of the bolt action type, and contemplates a simplified, safe and dependable mechanism particularly adapted although not necessarily limited to rifles of comparatively low power.

One object of the invention is to provide a construction in which a firing pin of novel configuration and separate from the striker cooperates in a unique manner with the extractor and ejector.

A further object of the invention is to provide a construction in which an ejector floats loosely in a recess in the firing pin and is actuated for shell ejection purposes by engagement with a part of the trigger.

A further object of the invention is to provide a striker and striker spring so constructed and related that the expansion of the striker spring is stopped before the striker engages the firing pin, so that after impact the firing pin is free from the thrust of the striker spring.

A further object of the invention is to provide a cocking head so joined to the striker that a blow upon the cocking head, instead of being transmitted directly to the striker, is cushioned and partly absorbed.

The invention likewise contemplates specific improvements in the construction and relations of bolt, striker, cocking head, trigger, ejector and other part.

With these and other objects in view, the invention consists in the novel combinations, constructions and arrangements of parts, a typical embodiment of which is illustrated in the accompanying drawing.

In the drawing:

Fig. 1 is a fragmentary sectional side elevation of a firearm constructed according to a representative embodiment of the invention, the mechanism being shown in fired position.

Fig. 2 is a detached perspective of the firing pin and ejector.

Fig. 3 is an inverted plan view of the bolt removed from the gun.

Fig. 4 is a transverse section, substantially on the line 4—4 of Fig. 1, the striker being cocked.

Fig. 5 is a fragmentary plan view of the rearward portion of the bolt and striker, showing the safety mechanism.

The gun comprises a stock 10 and a barrel 11, which barrel is preferably integral with a receiver 12. The receiver comprises a cylindrical bore adapted to contain a bolt 13, a loading and ejection port or cut-out 14, and a transverse bolt handle shank receiving and locking slot 15 communicating with a longitudinal slot 16 traversed by the bolt handle shank when the bolt is retracted. Suitably supported on the underside of the receiver, as by a depending slotted post 17, is a trigger 18 urged to effective position by suitable means such as a spring 19 and comprising an upwardly extending nose 20 provided with a rearwardly facing sear 21 and a forwardly facing shoulder 22 which cooperate with other mechanism in a manner to be described. The bolt is bored longitudinally to receive the striker, firing pin, and associated parts.

The striker comprises a cylindrical shank or body 23 surrounded by a striker spring 24, the forward end of which abuts a cylindrical collar 25 suitably secured to the striker body 23. The forwardly facing end or shoulder 26 of collar 25 is engaged by the sear 21 to hold the striker cocked. The rear end of striker spring 24 abuts a ring 27 loosely encircling the striker body 23. Ring 27 is urged by striker spring 24 into engagement with the forward end of a sleeve 28 secured to the shank 23 by a transversely extending pin 29. Thus, when the striker spring is fully expanded, as shown in Fig. 1, it is confined between collar 25 and sleeve 28, both of these members being fixed to the shank 23, so that the expansion of the striker spring is limited by the striker assembly itself as distinguished from the usual construction in which the striker spring abuts a part of the bolt and, when in fired position, exerts its full thrust against the firing pin.

The rearward end of the striker receiving bore in the bolt is closed by a bushing which encircles the striker sleeve 28. Said closing bushing is provided with a knurled head 30 abutting the end of the bolt and a threaded shank 31 received in the threaded end of the bolt aperture. There is preferably provided a locating stud 32, the lower portion of which is threaded and received in a threaded aperture in the bolt bushing, while the upper portion is received in matching cut-outs in the head 30 and the rear end of the bolt. The lower end of the striker assembly pin 29 is within or flush with the outer surface of the striker sleeve 28, while the upper end of said pin projects into a longitudinal slot 33 in the bolt bushing. When the striker is in its forward or fired position, the striker spring is confined, as heretofore stated, between the collar 25 and the end of striker sleeve 28, the loose ring 27 being interposed between the rear end of the spring and sleeve 28. Ring 27 is wider than sleeve 28, thus it provides a rearwardly facing surface which may abut the forward end of the shank 31 of the bolt bushing.

As clearly shown in Fig. 1, the dimensions of the parts are such that when the striker is forward the entire striker assembly has a movement with respect to the bolt equal to the distance 34 between the rear face of ring 27 and the end of shank 31.

In the firing of the gun, the striker moves the distance 34 under momentum before engaging the firing pin, the expansion of the striker spring ceasing when the rear face of ring 27 is engaged by the end of striker sleeve 28. The gun is cocked by retracting the striker against the thrust of spring 24 but this spring is not compressed until ring 27 has moved into engagement with the end of the bolt bushing shank 31. After this engagement, striker sleeve 28 moves away from ring 27 within bushing shank 31, the upwardly projecting end of striker assembly pin 29 traversing the slot 33 and, at the end of the cocking movement, emerging from the rear end of said slot. At this time the forward end of the fixed collar 25 clears the sear 21, and the sear is moved into engagement with said collar by the trigger spring 19, holding the gun cocked. The striker is now in position to be released by pressure on the trigger. To lock the striker against forward movement, it may be further slightly retracted and rotated, the upwardly projecting end of pin 29 moving transversely into a cut-out and safety notch 35 in the rear face of the bolt bushing head 30.

The striker is manipulated by means of a cocking head 36 aligned with the striker and a laterally projecting finger piece 37, the parts 36 and 37 forming an assembly which is preferably mounted on the striker in the following manner: The cocking head 36 comprises a hollow shank 38 adapted to receive the rear end of striker sleeve 28. Finger piece 37 is provided with a base 39 received in a slot 40 in the periphery of cocking head shank 38. From said base extends a circular stud 41 adapted to be received in circular apertures in the opposite sides of shank 38 and to traverse elongated apertures 42 in the striker sleeve 28. A spring 43 is interposed between the rear end of the striker body 23 and the stud 41. Spring 43 urges the cocking head assembly to the rear. Thus, by means of cocking head 36 and finger piece 37, the striker may be manipulated just as though a rigid connection with the striker were provided. However, a forward thrust or blow upon any part of the cocking head assembly is not transmitted directly to the striker; instead, such thrust or blow is chiefly absorbed in compressing the spring 43, a part only of the energy being transmitted to the striker, and even this part being transmitted as a gradually applied push, as distinguished from a sharp blow. Spring 43 serves the additional function of retracting the striker from contact with the firing pin after firing movement of the striker. Due to its momentum, the cocking head assembly will move forward, compressing the spring 43 at the end of the firing movement of the striker. The compressed spring 43 immediately reacts to restore the cocking head assembly to its rearmost position, and its rearward movement will retract the striker until ring 27 engages the end of shank 31, the striker being free to move rearwardly to this extent as heretofore explained. Forward movement of the cocking head assembly with respect to the striker is limited by the space between the forward end of cocking head shank 38 and the rear face of the head 30 of the bolt bushing.

The forward end of the striker is adapted to engage a head 51 of a firing pin identified generally by numeral 50 and preferably having the configuration illustrated in Fig. 2. The head 51 is of cylindrical configuration, fitting loosely in the bore of the bolt, thereby guiding the firing pin for rectilinear movement. A shank 52 of reduced dimensions connects the head 51 with a semi-cylindrical enlargement 53 likewise conforming in size and curvature to the bore of the bolt. The upper portion of the enlargement 53 comprises a transverse cut-out 54 adapted to receive the pivot encircling portion 55 of an extractor identified generally by the numeral 56. Extractor 56 is held on a pivot pin 57 extending through the bolt and urged to effective position by a suitable spring 58 and spring follower 59. The engagement of portion 55 of extractor 56 in the cut-out 54 retains the firing pin in place when the striker assembly is removed, the cut-out being of sufficient width to enable the firing pin to execute its normal forward and rearward movements. From the forward end of enlargement 53 projects a cartridge engaging point 60 of the firing pin, this point being received in an aperture in the bolt face and being thrust forward through this aperture to deliver the blow of the striker to a cartridge in the chamber of barrel 11.

The lower portions of enlargement 53 and shank 52 comprise a longitudinal slot 61 adapted to receive an ejector 62. The nose of said ejector occupies an aperture in the face of the bolt and is thrust forward therethrough to eject a shell held in the face of the bolt by extractor 56 when the bolt is retracted in the following manner. A foot 63 depending from the ejector traverses a slot 64 in the bolt, the margins of said slot limiting the ejector movement. Foot 63 comprises a rearward face 65 adapted to be engaged by the forwardly facing shoulder 22 of the trigger. This engagement takes place in the rearward movement of the bolt, after the bolt has moved a sufficient distance to enable a fresh cartridge to be inserted through the port 14. Upon engagement of face 65 with shoulder 22 the ejector is thrust forward, ejecting the empty shell which has been carried on the bolt face by the extractor 56. Immediately after ejection, the forward end of foot 63 engages the margin 66 of slot 64 and, said foot being in engagement with trigger shoulder 22, further rearward movement of the bolt is stopped. The bolt may be entirely withdrawn by pressing the trigger to lower the shoulder 22 out of the path of movement of face 65.

The bolt 13 is shown in section in Fig. 1, while Fig. 3 represents substantially an inverted plan view thereof. To the rear of the slot 64 which receives the ejector foot 63, the stock of the bolt is cut away to form a flat surface 68 beneath which projects the ejector face 65. The flat surface 68 merges with an inclined surface 69 which in turn merges with the cylindrical periphery of the bolt. In addition to slot 64, the bolt comprises a longitudinal slot 70 through which extends the nose 20 of the trigger to enable the engagement of sear 21 with striker shoulder 26. A transverse cut-out 71 communicates with the slot 70 and, when the bolt is rotated, the nose 20 of the trigger traverses this cut-out. Thereafter, in the rearward motion of the bolt, said trigger nose rides along the cylindrical periphery, down the inclined surface 69 and onto the flat surface 68, where it engages ejector face 65, in the manner heretofore described. A bolt han-

dle 72 is provided with a squared shank 73 and a hub 74 which occupies a peripheral recess in the bolt, its exterior surface being flush with the periphery of the bolt. The hub, however, is not continuous but is broken opposite the slot 70 and its ends are turned inwardly in engagement with the margins of said slot, thereby anchoring the handle securely to the bolt without the use of threads, pins, rivets, or other conventional securing devices.

It will be noted that the bore of the bolt is of the same diameter throughout its length except adjacent the rear end where it is slightly enlarged to accommodate the ring 27 and the closing bushing 30—31. The striker is guided for rectilinear movement in the bore of the bolt by contact of the collar 25 with the periphery of said bore, and the firing pin is similarly guided by the lateral contact of the head 51 and enlargement 53 with said periphery; the diameter of said head and enlargement being the same as the outside diameter of collar 25.

The operation of the gun may be summarized as follows: Assume the mechanism to be in the position shown in Fig. 1, and the chamber to contain a fired shell. The bolt is in locked position, the margin of the handle shank 73 being in engagement with the locking surface 15 of the receiver. To open the gun, the bolt handle is grasped and turned upwardly, bringing the handle shank into alignment with the longitudinal slot 16. In the rotation of the bolt the nose 20 of the trigger has traversed the transverse cut-out 71 and lies against the periphery of the bolt. The bolt is now retracted, shank 73 of the handle traversing the longitudinal slot 16 in the receiver and the shell in the chamber being carried to the rear in contact with the bolt face by extractor 56. As the bolt approaches the limit of its rearward movement, shoulder 22 of the trigger, riding on bolt surface 68, engages the face 65 of the ejector, moving said ejector forward, projecting its point through the bolt face, and ejecting the fired shell. A fresh cartridge may now be inserted in the chamber, and the bolt moved forward, the extractor 65 being deflected outwardly past the rim of the cartridge and dropping into engagement therewith as the bolt approaches its forward breech closing position. The bolt is then rotated downwardly to locked position, the trigger nose 20 again entering the slot 70 and resting against the periphery of collar 25. To cock the gun, the cocking head is grasped and drawn rearwardly until the sear 21 clears the shoulder 26 of collar 25 and moves into engagement therewith. The gun is now in condition to be fired. The striker may, however, be retained against forward movement, if desired, by rotating the cocking head by means of the finger piece 37, bringing the upwardly projecting end of striker assembly pin 29 into the safety notch 35 in the rear end of the bolt bushing head 30. This movement brings the finger piece 37 to an upright position in the light of sight; thereby plainly indicating whether the gun is in condition to be fired. Upon shifting the finger piece to the left, moving assembly pin 29 into alignment with slot 33, the gun is again placed in condition to be fired. Upon depressing the trigger 18, sear 21 moves downwardly to disengage shoulder 26 and the striker is propelled forward by striker spring 24, said spring expanding until in the forward movement of the striker the end of sleeve 28 is brought into contact with ring 27. The striker completes its forward movement under momentum, delivering a sharp blow to the firing pin and subsequently rebounding under the impulse of spring 43 which has been compressed in the stopping of the forward movement of the striker. A cartridge in the chamber cannot be fired by a blow on the cocking head, the striker being in forward position, due to the fact that such blow is cushioned and in part absorbed by spring 43.

It will be understood that the invention is susceptible to embodiment in firearms other than the typical one selected for purpose of illustration, all of which fall within the scope of the appended claims.

What is claimed is:

1. In a firearm, a striker assembly comprising a striker body, a striker spring, an abutment for limiting the expansion of said striker spring; a cocking head assembly comprising a rearwardly projecting head and a laterally extending finger piece, and means for supporting said cocking head assembly on said striker body for movement thereon, said means comprising a spring urging said cocking head assembly to its rearmost position on said striker body.

2. In a firearm, a striker assembly comprising a striker body, a striker spring, a sleeve secured to and forming a part of said striker body and furnishing an abutment for limiting the expansion of said spring; a cocking head assembly comprising a rearwardly projecting cocking head having extending therefrom a sleeve adapted to receive said striker body sleeve, a finger piece projecting laterally from said cocking head sleeve, means for securing said finger piece to said cocking head comprising a stud projecting from said finger piece and extending through aligned apertures in said cocking head sleeve, said stud traversing elongated apertures in said striker sleeve, and a spring abutting said stud and normally holding said cocking head assembly with said stud in the rear ends of said elongated slots.

3. A firearm comprising a bolt provided with a cylindrical bore, a striker assembly comprising a shank housed in said bore, a striker sleeve adapted to receive said shank, a bushing secured in said bolt and adapted to receive said striker sleeve, and a striker assembly pin extending through aligned apertures in said striker shank and striker sleeve and projecting upwardly from said striker sleeve, said bushing comprising a longitudinal slot adapted to receive the projecting end of said striker assembly pin thereby guiding said striker assembly for rectilinear movement.

4. A firearm comprising a bolt having a cylindrical bore, a striker assembly comprising a shank housed in said bore, a striker sleeve adapted to receive said shank, a bushing secured in said bolt and adapted to receive said striker sleeve, a striker assembly pin extending through aligned apertures in said striker shank and striker sleeve and projecting upwardly from said sleeve, said bushing comprising a longitudinal slot adapted to receive the projecting end of said striker assembly pin thereby guiding said striker assembly for rectilinear movement, said striker assembly pin being adapted to pass from the end of said slot when the striker is cocked, said bushing likewise comprising a locking notch into which said striker assembly pin may be rotated to prevent forward movement of the striker assembly.

5. A firearm comprising a bolt provided with a cylindrical bore of uniform diameter throughout substantially its entire length, a striker held

in said bore, a firing pin in said bore provided with a longitudinal slot and spaced guide surfaces contacting the periphery of said bore, and an ejector guided for rectilinear movement in said firing pin slot.

6. A firearm comprising a bolt, a firing pin, and an ejector; said bolt comprising a cylindrical bore of uniform diameter throughout substantially its entire length and an aperture communicating with said bore; said firing pin being located in said bore, provided with spaced guide surfaces contacting the periphery of said bore and comprising a longitudinally extending slot; said ejector being guided for rectilinear movement in said firing pin slot and comprising a foot projecting through said aperture in said bolt, the margins of said aperture serving to limit the movement of said ejector in said bolt.

7. A firearm comprising a bolt, a striker housed in said bolt, a firing pin separate from said striker likewise housed in said bolt and comprising a slot, an ejector guided in said slot in said firing pin, a trigger comprising a sear adapted to engage said striker, and a shoulder on said trigger adapted to engage and actuate said ejector.

8. A firearm comprising a reciprocating bolt, a striker, a firing pin, a trigger, and an ejector; said bolt being provided with a cylindrical bore of uniform diameter throughout substantially its entire length, a longitudinal slot, a transverse cut-out communicating with said slot, and an aperture located forwardly from said slot; said firing pin and striker being located in the bore of said bolt; said trigger comprising a portion adapted to pass through said slot in said bolt to engage said striker and to enter said transverse cut-out when said bolt is rotated; said ejector being guided for rectilinear movement in said firing pin slot, and comprising a foot extending through said aperture in said bolt, said foot being adapted for engagement by said trigger in the rearward movement of said bolt, whereby said ejector is actuated and such rearward movement of the bolt is stopped.

9. A firearm comprising a bolt, a firing pin housed in said bolt, a firing pin actuating striker assembly partially housed in said bolt, said assembly comprising a shank, a head fixed to said shank and adapted to engage said firing pin, said head guiding said striker for rectilinear movement in said bolt and providing a spring abutment, a striker spring abutting said head, a ring loosely mounted on said shank and engaged by said striker spring, a sleeve secured to said shank, an abutment associated with said bolt, said ring being adapted to engage said bolt abutment when the striker spring is compressed and to engage said sleeve when the striker spring is extended.

10. In a firearm, a striker assembly comprising a shank, a head secured to said shank and forming a spring abutment, a ring loosely mounted on said shank, a spring encircling said shank and compressed between said head and said ring, a sleeve comprising longitudinal slots secured to said shank and furnishing an abutment for said ring; a cocking head assembly mounted on said sleeve, said assembly comprising a rearwardly projecting head and a laterally extending finger piece rigidly joined to said head, a stud joined to said assembly and passing through said slots in said sleeve, and a spring urging said stud toward one extremity of said slots.

11. In a firearm, a striker assembly comprising a shank, a collar secured to said shank and forming a spring abutment, a ring loosely mounted on said shank, a spring encircling said shank and compressed between said collar and said ring, a sleeve secured to said shank and furnishing an abutment for said ring, a cocking head mounted on said sleeve for movement thereon, and a spring normally controlling the position of said cocking head on said sleeve.

12. A firearm comprising a bolt, a firing pin, an extractor, and an ejector; said bolt having a cylindrical bore of uniform diameter throughout substantially its entire length; said firing pin being located in the bore of said bolt, provided with spaced guides contacting the periphery of said bore, and comprising a transverse cut-out and a longitudinal slot intersecting one of said guide surfaces; said extractor being mounted in said bolt and comprising a portion adapted to be received in the cut-out in said firing pin, thereby retaining said firing pin in said bolt; and said ejector being guided for rectilinear movement in said firing pin slot.

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