Oct. 31, 1944. D. M. WILLIAMS 2,361,519

FIRING MECHANISM FOR FIREARMS

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Fig. 1.

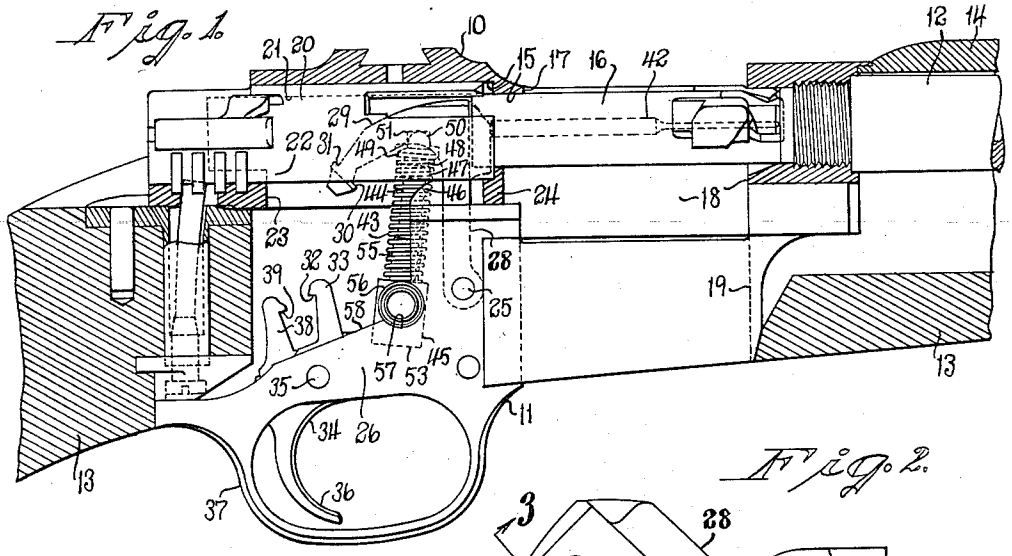


Fig. 2.

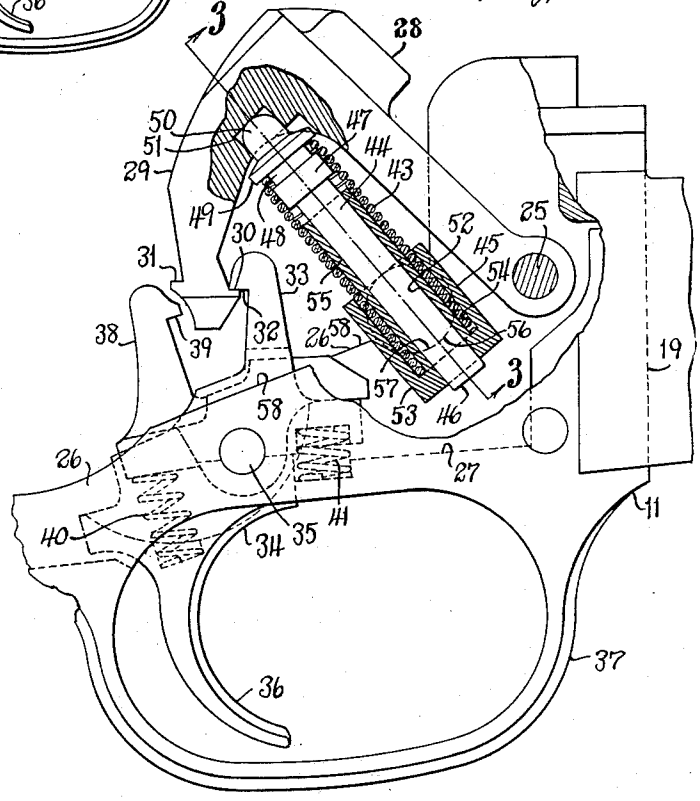
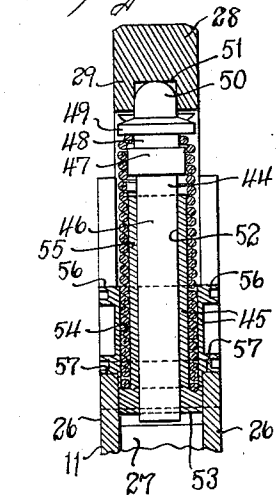


Fig. 3.



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Fig. 6.

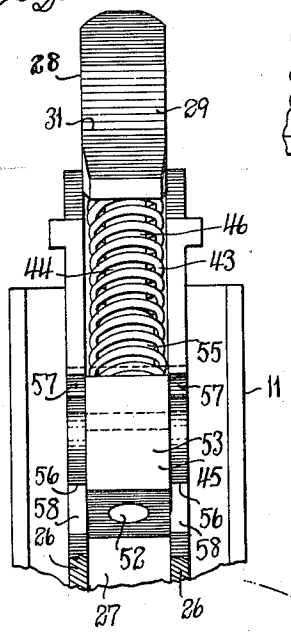


Fig. 5.

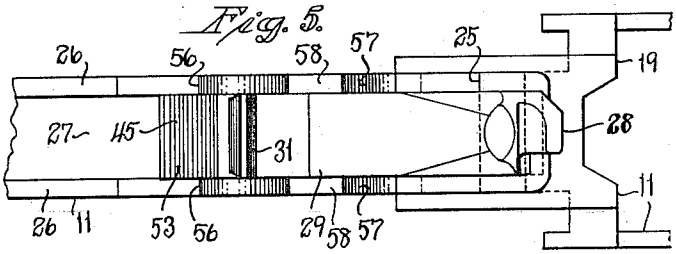


Fig. 4.

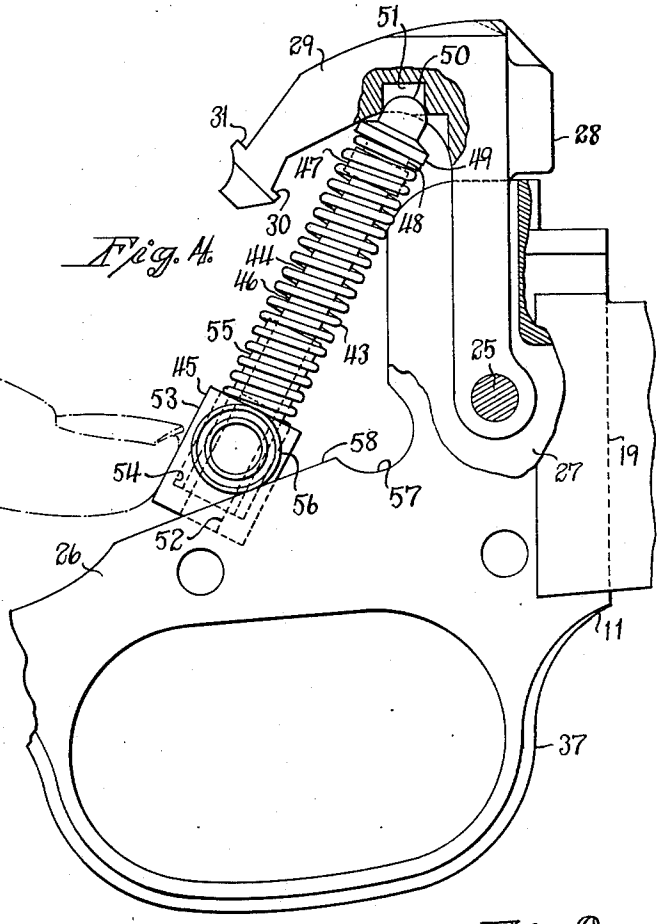


Fig. 7.

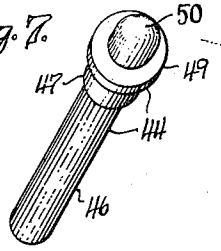


Fig. 8.

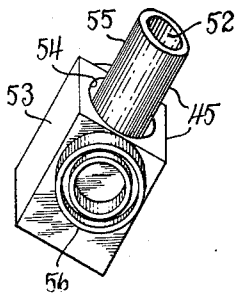
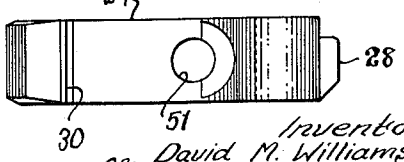


Fig. 9.



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FIRING MECHANISM FOR FIREARMS

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Application April 21, 1942, Serial No. 439,803

3 Claims. (Cl. 42—69)

The present invention relates to improvements in firearms and relates more particularly to improvements in firing-mechanisms for firearms, i. e., mechanisms responsive to a trigger or the like and whereby the firearm is discharged.

One of the objects of the present invention is to provide a superior firing-mechanism for firearms which combines ruggedness and reliability of operation over long periods of severe use with economy of manufacture.

Another object of the present invention is to provide a superior firing-mechanism which includes a hammer and hammer-spring means so constructed and arranged with respect to each other as to provide both compactness and maximum energy to drive a firing-pin or its equivalent.

A further object of the present invention is to provide a firing-mechanism wherein a superior construction and arrangement of hammer and hammer-spring means is provided to minimize the space-requirements for its accommodation in a direction lengthwise of the firearm and without sacrificing effectiveness of operation.

Still another object of the present invention is to provide a firearm having a superior construction and arrangement of hammer and hammer-spring means whereby the said hammer-spring means may be readily installed into and removed from the firearm-structure.

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 broken view of the central portion of one form of firearm embodying the present invention, the structure being shown partly in side elevation and partly in vertical central-longitudinal section, with the hammer shown in its released or firing position;

Fig. 2 is a broken view of the rear portion of the trigger-plate unit partly in side elevation and partly in vertical central-longitudinal section but on a larger scale than Fig. 1 and with the hammer shown in its normal cocked position;

Fig. 3 is a broken sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a broken view in side elevation similar to Fig. 2 but showing the lower end of the hammer-spring means in process of being pushed into its fully-installed position;

Fig. 5 is a top or plan view of the structure of Fig. 4;

Fig. 6 is a broken view thereof in rear elevation;

Fig. 7 is a perspective view of the upper spring-guiding member;

Fig. 8 is a similar view of the lower spring-guiding member; and

Fig. 9 is an underside view of the hammer.

The particular firearm-structure herein chosen for purposes of illustrating one form of the present invention includes, in the main, a receiver-unit 10, a trigger-plate unit 11, a barrel 12, a stock 13 and a barrel-cover 14. The parts 10, 11 and 12 are preferably formed of high-grade steel, while the parts 13 and 14 are preferably formed of wood or other suitable heat-insulating and shock-absorbing material.

The rear end of the barrel 12 is rigidly attached in any approved manner to the forward end of the receiver-unit 10, while the trigger-plate unit 11 is demountably attached in any approved manner to the underside of the said receiver-unit 10. The receiver-unit 10 and the trigger-plate unit 11 together may be viewed as constituting a frame or mount for the firing-mechanism to be later described.

The receiver-unit 10 is formed with a longitudinal bolt-receiving chamber 15 in which is adapted to reciprocate a breech-bolt 16 of any suitable type. The receiver-unit 10 is formed in its forward portion with an ejection-opening 17 leading upwardly from the bolt-receiving chamber 15 and through which cartridge-cases may be ejected in any suitable manner. Also adjacent its forward end, the under portion of the receiver-unit 10 is formed with a vertical magazine-receiving passage 18 leading downwardly from the forward portion of the bolt-receiving chamber 15 through to the under face of the said receiver-unit and into communication with a vertical magazine-receiving passage 19 in the trigger-plate unit 11.

Removably but rigidly mounted in the rear portion of the bolt-receiving chamber 15 in the receiver-unit 10 is a receiver-plug 20 having a forwardly-opening recess 21 therein, sized and shaped to accommodate the rear portion of the breech-bolt 16 when the same is moved rearwardly into its retired position. In its underside, the receiver-plug 20 is formed with a clearance-cut 22 connecting the forwardly-opening recess 21 in the said receiver-plug 20 with a vertical longitudinal clearance-passage 23 formed in the under rear portion of the receiver-unit 10 and separated from the magazine-receiving passage

18, by a transverse web 24 forming an integral part of the receiver-unit 10 and located about midway the length thereof.

Extending transversely across the trigger-plate unit 11 about midway the length thereof is a hammer-pin 25 supported at each of its respective opposite ends in the complemental side-walls 26—26 of the rear portion of the trigger-plate unit 11. As thus supported, the hammer-pin 25 spans a vertical longitudinal recess 27 located between the side-walls 26—26 and designed and adapted for the reception and clearance of certain features of the firing-mechanism, as will more fully hereinafter appear.

Pivotally mounted at its lower end upon the central portion of the hammer-pin 25 above referred to is a hammer generally designated by the reference character 28 and having its lower portion accommodated in the recess 27 in the trigger-plate unit 11. At its upper or outer end, the hammer 28 is formed with a rearwardly-and-downwardly-curved arcuate arm 29 formed respectively at the front and rear portions of its terminal end with upwardly-facing cocking-abutments 30 and 31. When the hammer 28 is in its normal cocked position as shown in Fig. 2, the front cocking-abutment 30 of its arcuate arm 29 is engaged by a downwardly-facing cocking-abutment 32 formed upon the upper portion of a sear-arm 33 which is formed integral with and upstands from a trigger 34. The said trigger 34 is pivotally mounted in the recess 27 in the lower rear portion of the trigger-plate unit 11 by means of a trigger-pin 35 supported at its respective opposite ends in the side-walls 26—26 of the said trigger-plate unit. The trigger 34 includes a depending finger-piece 36 which is normally protected by a loop-like trigger-guard 37 forming a rigid feature of the lower rear portion of the trigger-plate unit 11.

The trigger-pin 35 also pivotally mounts a secondary sear 38 which has pivotal movement relative to the trigger 34 and the sear-arm 33 thereof. The said secondary sear 38 forms no essential feature of the present invention and therefore requires no detailed description herein other than possibly to note that the said secondary sear is provided with a downwardly-facing cocking-abutment 39 which is adapted on occasion to engage with the rear cocking-abutment 31 on the arm 29 of the hammer 28. The secondary sear 38 is yieldingly held against turning movement in a counterclockwise direction relative to the trigger 34 by means of a helical spring 40 (Fig. 2) thrusting at its upper end aaginst a portion of the said secondary sear 38 and thrusting at its lower end against the trigger 34.

The entire trigger 34, and the parts carried thereby, is yieldingly maintained at the limit of its counterclockwise turning movement upon the trigger-pin 35, by means of a helical trigger-spring 41 thrusting upwardly at its upper end against a portion of the trigger 34 at a point forwardly of the said trigger-pin 35 and resting at its lower end against an adjacent portion of the trigger-plate unit 11.

The hammer 28 is urged to swing in a clockwise direction to strike the rear end of a firing-plunger 42 by means of a helical firing-spring 43. The said firing-spring encircles portions of an upper spring-guiding member 44 and a lower spring-guiding member 45.

The upper spring-guiding member 44 above referred to includes a relatively long cylindrically-contoured stem 46 projecting downwardly from a cylindrically-contoured integral collar 47. Above the collar 47 the member 44 is formed with an annular coupling-groove 48 receiving the contracted upper convolution of the firing-spring 43, as is especially well shown in Figs. 2 and 3. Immediately above the coupling-groove 48, the member 44 is provided with a flange-like spring-seat 49 against which the upper end of the firing-spring 43 thrusts. At its extreme upper end, the said member 44 is formed with a spherically-contoured head 50 normally seated in a downwardly-opening shallow pocket 51 formed in the under face of the arcuate arm 29 of the hammer 28.

The stem 46 of the upper spring-guiding member 44 telescopically interfits within a passage 52 extending axially from top to bottom through the lower or complemental spring-guiding member 45. The spring-guiding member 45 is formed at its lower end with a rectangular block-like head 53 formed with an upwardly-opening ring-shaped annular recess 54 from the bottom of which rises a relatively thin-walled tubular stem 55. It is mainly within the stem 55 that the passage 52 before referred to is formed and in which latter the rod-like stem 46 of the upper spring-guiding member 44 reciprocates. The extreme lower portion of the helical firing-spring 43 extends into the ring-like annular recess 54 in the lower spring-guiding member 45 and is guided in its compression and extension movement by the exterior surface of the tubular stem 55, as well as by the collar 47 of the upper spring-guiding member 44.

On each of its respective opposite side faces, the head 53 of the lower spring-guiding member 45 is formed with one of two cylindrically-contoured integral trunnions 56—56 each axially aligned with the other and each having a recessed outer face to afford an antislip surface for being gripped by the fingers for purposes as will hereinafter appear.

The lower portion of the block-shaped head 53 of the lower spring-guiding member 45 fits into the recess 27 between the respective opposite side walls 26—26 of the trigger-plate unit 11, as is especially well shown in Fig. 3. Each of the respective trunnions 56—56 of the said member 45 is normally seated in one of two cylindrically-contoured seats or bearings 57—57, one of which latter is formed in each of the side walls 26—26 of the trigger-plate unit 11. The said seats 57—57 are located beneath the downwardly-opening pocket 51 in the hammer 28 when the said hammer is in its firing position, as shown in Fig. 1. The said seats 57—57 open upwardly and slightly rearwardly and the upper surface of the given side wall 26 leading rearwardly from a given one of the said seats, is sloped rearwardly and downwardly to provide one of two ramps 58—58 for purposes as will hereinafter appear.

Should it be desired to remove the unit comprising the firing-spring 43 and spring-guiding members 44 and 45, the trunnions 56—56 of the lower spring-guiding member 45 may be grasped between the thumb and forefinger and pulled rearwardly out of their complemental seats 57—57 and allowed to slide down the complemental ramps 58—58 until the spherically-contoured head 50 of the upper spring-guiding member 44 is entirely freed from the pocket 51 in the hammer 28, whereupon the entire unit compris-

ing the parts 43, 44 and 45 may be completely removed from the firearm-structure after the trigger 34 and the parts carried thereby have been previously dismounted from the trigger-plate unit 11.

To reinstall the firing-spring 43, together with its complemental members 44 and 45, all that is required is that the parts to be positioned as indicated in Fig. 4, whereupon pressure exerted forwardly upon the head 53 will cause the trunnions 56—56 to travel up their respective ramps 58—58 against the tension of the firing-spring 43 until such time as the said trunnions come into registry with their respective seats 57—57, whereupon the tension of the said firing-spring 43 will assert itself and firmly seat the said trunnions in place.

It will be noted by reference to the drawings that the lower end of the firing-spring 43 is forwardly of both the cocking-abutment 30 of the hammer and the cocking-abutment 32 of the sear-arm 33, so that the said firing-spring thrusts in a direction substantially parallel with the body-portion of the hammer 28 in all positions of the latter intermediate its cocked position and its firing position.

By the construction and arrangement of parts shown and described, not only is the assembly and disassembly of the firing-spring rendered more rapid and convenient, but an adequate spring may be employed which does not require its extension rearwardly beyond the sear in order to effect the efficient operation of the said hammer.

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. A firearm-structure including in combination: a firearm-frame formed with an upwardly-opening bearing-seat for the reception of pivot-means; a swinging hammer mounted in the said frame and having a cocking-abutment; first pivot-means pivotally supporting the said hammer in the said firearm-frame; a sear supported in the said firearm-frame and having a cocking-abutment releasably engageable with the cocking-abutment of the said hammer for releasably holding the latter in its cocked position; pivotal spring-guiding means extending substantially vertically of the said firearm-frame and comprising an upper member and a lower member telescopically interfitting together, the said lower member being provided with transversely-extending pivot-means removably resting in the upwardly-opening bearing-seat in the said frame at a point longitudinally intermediate the said first pivot-means and the cocking-abutment of the said sear, the said lower member also having an upwardly-opening substantially-annular spring-receiving recess having a bottom wall located below the upper surface of the pivot-means of the said lower member; and a firing-spring associated with the said spring-guiding means for being guided thereby and thrusting the upper member thereof against the said hammer and thrusting downwardly against the bottom of the recess in the lower member of the said spring-guiding means to coincidentally yieldingly urge the said swinging hammer into its firing position and to urge the pivot-means of the said lower member into the bearing-seat of the said frame.

2. A firearm-structure including in combination: a receiver; a trigger-plate unit located adjacent and removably organized with the said receiver and having two laterally spaced-apart side-walls providing a recess therebetween and each of the said side-walls being provided in its upper edge with one of two notch-like upwardly-opening bearing-seats for the reception of trunnions, the upper edges of the said side-walls leading rearwardly from the rear of the said bearing-seats; a swinging hammer mounted in the said trigger-plate unit and extending upwardly into the said receiver unit, the said hammer having a cocking-abutment; first pivot-means pivotally supporting the said hammer in the said trigger-plate unit and located forwardly of the bearing-seats in the side-walls of the latter; a sear supported in the said trigger-plate unit and having a cocking-abutment located rearwardly of the bearing-seats in the side-walls of the trigger-plate unit and releasably engageable with the cocking-abutment of the said hammer for releasably holding the latter in its cocked position; pivotal spring-guiding means extending substantially vertically with respect to the longitudinal axis of the said receiver and comprising an upper member having a portion seated against an under-portion of the said hammer and also comprising a lower member telescopically interfitting with the said upper member and extending into the recess in the said trigger-plate unit, the said lower member being provided on each of its respective opposite sides with one of two trunnions each of which removably rests in one of the two upwardly-opening bearing-seats in the respective upper edges of the respective side walls of the said trigger-plate unit at a point longitudinally-intermediate the said first pivot-means and the cocking-abutment of the said sear; and a firing-spring associated with the said spring-guiding means for being guided thereby and thrusting the upper member thereof upwardly against an under-portion of the said hammer and thrusting downwardly against the lower member of the said spring-guiding means to urge the two trunnions thereof into the two bearing-seats respectively in the respective upper edges of the said trigger-plate unit; the rear-wall of each of the bearing-seats in the respective side-walls of the trigger-plate unit having a depth materially less than one-half of the diameter of the trunnion seated therein to enable the said trunnions to be cammed rearwardly and upwardly out of the said bearing-seats and onto the rearwardly-extending portions of the upper edges of the said side-walls for removal from the structure.

3. A firearm-structure including in combination: a receiver; a trigger-plate unit located adjacent and organized with the said receiver, the said trigger-plate unit having two laterally spaced-apart side-walls providing a recess therebetween, and each of the side-walls of the said firearm-frame being provided in its upper edge with one of two upwardly-opening notch-like bearing-seats for the reception of one of two trunnions, each of the side-walls of the said trigger-plate unit being provided on its upper edge with a ramp-surface leading rearwardly from one

of the two said notch-like bearing-seats; a swinging hammer mounted in the said trigger-plate unit and having a cocking-abutment; pivot-means pivotally supporting the said hammer in the said trigger-plate unit; a sear supported in the said trigger-plate unit and having a cocking-abutment releasably engageable with the cocking-abutment of the said hammer for releasably holding the latter in its cocked position; pivotal spring-guiding means extending substantially vertically with respect to the longitudinal axis of the said receiver and provided on each of its respective opposite sides with one of two trunnions each removably resting in one of the upwardly-opening bearing-seats in the said trigger-plate unit; and a firing-spring associated with the said spring-guiding means for being guided thereby and thrusting upwardly against the said hammer and thrusting downwardly against the said spring-guiding means to yieldingly urge the same toward the ramp-surfaces and the bearing-seats of the respective upper edges of the said trigger-plate unit.

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