Nov. 9, 1943. W. C. ROEMER 2,333,677

SELF-LOADING FIREARM

Filed May 13, 1940 2 Sheets-Sheet 1

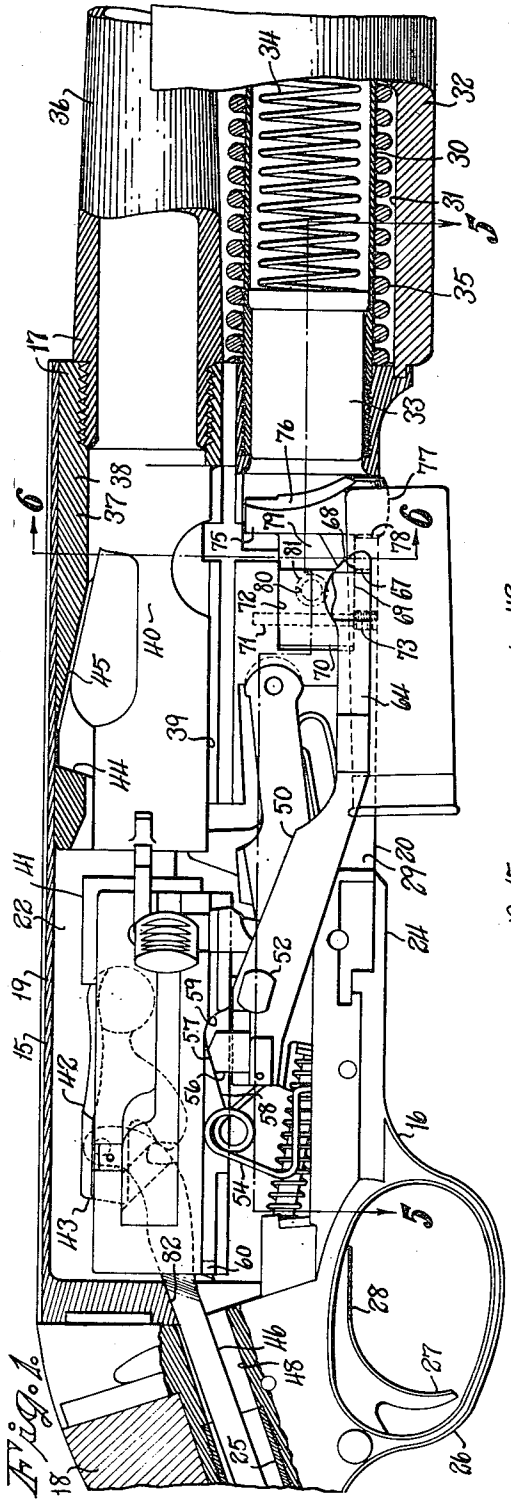

Fig. 1.

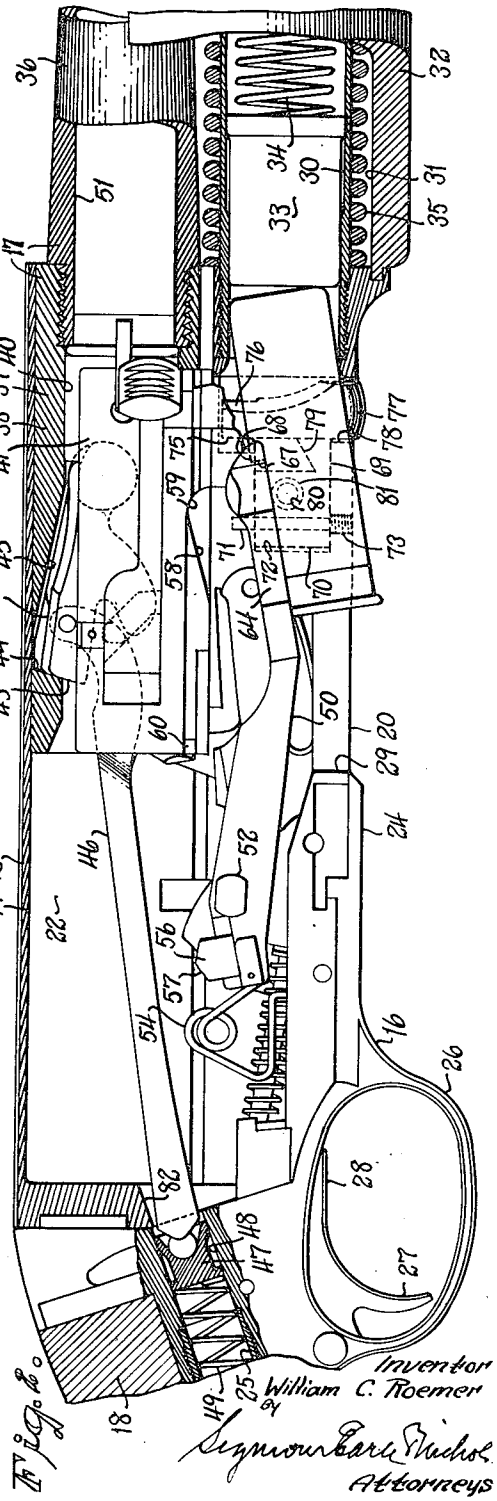

Fig. 2.

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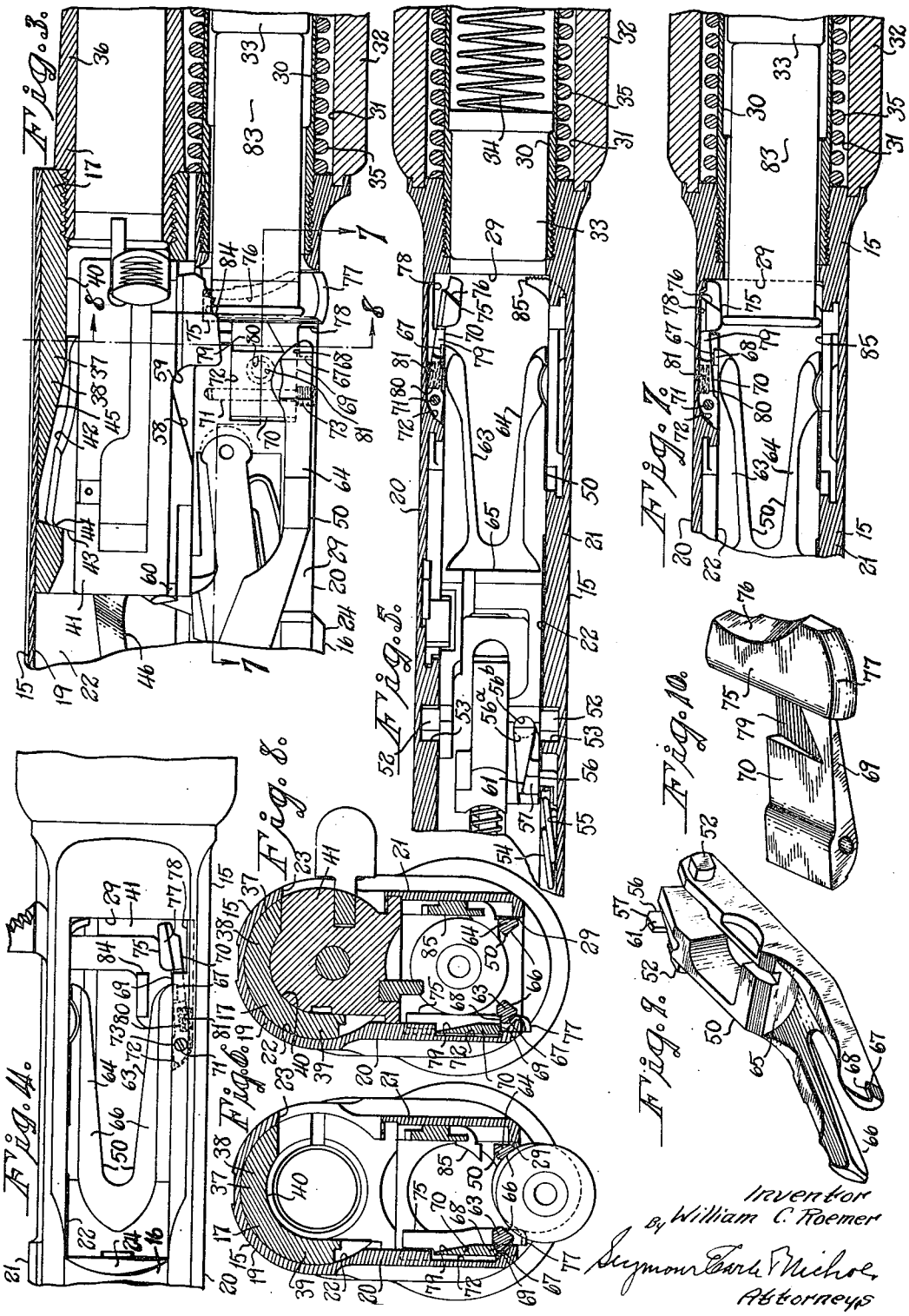

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

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Patented Nov. 9, 1943

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UNITED STATES PATENT OFFICE

2,333,677

SELF-LOADING FIREARM

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Application May 13, 1940, Serial No. 334,813

6 Claims. (Cl. 42—17)

The present invention relates to improvements in firearms, and more particularly to self-loading firearms, i. e., firearms in which a magazine is provided for the storage of cartridges and in which each discharge of the firearm actuates the mechanism to effect the ejection of the just-fired cartridge and the insertion of a fresh cartridge into the cartridge-chamber of the firearm.

In self-loading firearms of the class referred to, as heretofore constructed, means have been provided for holding the retirable breech-bolt in its retired position automatically after the discharge of the last cartridge in the firearm. This locking of the breech-bolt has been indirectly effected by latching the pivotal cartridge-carrier which normally serves to sequentially elevate or shift cartridges as they emerge from the magazine of the firearm up into position in front of the breech-bolt for insertion into the cartridge-chamber. The latch-mechanism referred to requires that it be released in order to permit the insertion of a fresh string of cartridges into the magazine. In the prior firearms, a push button or its equivalent has been made available upon the exterior of the firearm in position to be operated by the user of the gun with one hand, while he employs the other hand to insert the cartridges. This condition of affairs is very often awkward.

One of the objects of the present invention is to provide a superior self-loading firearm in which the release or unlocking of the cartridge-carrier may be automatically effected by the mere insertion of a cartridge into the loading-opening of the firearm.

Another object of the present invention is to provide a superior self-loading firearm having means for automatically locking the breech-bolt in its retired position after the discharge of the last cartridge, and also having convenient, reliable and effective means whereby the said breech-bolt may be manually released for movement into its breech-closing position.

Still another object of the present invention is to provide a superior self-loading firearm in which the cartridge-carrier is free for pivotal movement until the discharge of the last cartridge, after which the said cartridge-carrier is automatically locked in its inoperative position.

A further object of the present invention is to provide a superior self-loading firearm in which the cartridge-carrier is free for pivotal movement while the magazine of the firearm contains cartridges to thereby facilitate the removal of cartridges from the magazine.

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 carying out the present invention are shown for illustrative purposes:

Fig. 1 is a view partly in vertical central-longitudinal section and partly in side elevation of the central portion of a self-loading firearm embodying the present invention, the breech-bolt being shown locked in its retired position and the magazine empty;

Fig. 2 is a view corresponding to Fig. 1 but showing the breech-bolt in its breech-closing position and a cartridge in the process of being inserted into the magazine of the firearm;

Fig. 3 is a broken view partly in vertical central-longitudinal section and partly in side elevation of the forward portion of the reeciver together with a portion of the barrel and magazine, and showing a cartridge fully inserted in place in the magazine;

Fig. 4 is a broken underside view of the portions of the firearm adjacent the forward portion of the receiver and showing the carrier-latch in the position it assumes when the magazine is empty;

Fig. 5 is a broken horizontal sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 1;

Fig. 7 is a broken horizontal sectional view taken on the line 7—7 of Fig. 3;

Fig. 8 is a transverse sectional view taken on the line 8—8 of Fig. 3;

Fig. 9 is a perspective view of the cartridge-carrier or -elevator; and

Fig. 10 is a perspective view of the carrier-latch.

The firearm herein chosen for illustrating the present invention is of the type wherein the barrel-unit upon the discharge of the firearm, is moved rearwardly by the recoil forces generated by the discharge of a cartridge to effect the extraction and ejection of the just-fired cartridge and the insertion of a fresh cartridge into the cartridge chamber of the firearm.

The firearm chosen for illustrating the present invention includes a receiver 15, a trigger-plate 16, a barrel-unit generally designated by the reference character 17 and a buttstock 18. The receiver 15 has a top-wall 19 and side-walls 20 and

21 depending therefrom and providing a mechanism-receiving chamber 22 communicating with the right-hand side-face of the receiver by means of an ejection-opening 23 (Figs. 6 and 8).

The trigger-plate 16 may be secured to the receiver 15 in any suitable manner and has its forward portion 24 located between the respective lower edges of the rear portion of the side-walls 20 and 21 of the receiver 15. Rearwardly extending from the trigger-plate 16 is a tubular-extension 25 serving to firmly secure the buttstock 18 to the said trigger-plate, which latter has depending therefrom a trigger-guard 26 enclosing the finger-piece 27 of a trigger 28 forming a usual part of the fire-control mechanism of the firearm and requiring no detailed description herein.

The forward portion 24 of the trigger-plate 16 terminates about midway the longitudinal length of the receiver 15 to provide a loading-opening 29 forwardly thereof and opening downwardly from the mechanism-receiving chamber 22 between the respective lower edges of the forward portion of the side-walls 20 and 21 of the receiver 15. Opening rearwardly into the loading-opening 29 just described, is a tubular magazine 30 threadedly secured in and forwardly projecting from the forward wall of the receiver 15 beneath the barrel-unit 17 in substantial parallelism therewith. The tubular magazine 30 extends forwardly from the forward wall of the receiver 15 through a longitudinal clearance-groove 31 formed in a forestock 32 extending forwardly beneath the barrel-unit 17 and secured in place in any suitable manner and covering the tubular magazine 30.

The tubular magazine 30 houses a cartridge-follower 33 which latter is constantly urged rearwardly by the customary helical magazine-spring 34 also housed in the tubular magazine 30. Encircling the said magazine is a relatively-heavy helical barrel-return spring 35 functioning in the usual manner to return the barrel-unit 17 to its normal forward position immediately following the recoil of the said barrel-unit upon the discharge of the firearm.

The barrel-unit 17 before referred to, comprises a barrel 36 and a cylindrically-contoured barrel-extension 37 rigidly united with the rear end of the said barrel so as to form a part thereof and projecting rearwardly therefrom into the upper portion of the mechanism-receiving chamber 22 in the receiver 15. The barrel-extension 37 of the barrel-unit 17 is mounted with freedom for axial reciprocation in the mechanism-receiving chamber 22 of the receiver 15 in the general manner of recoil-operated automatic or self-loading firearms.

The barrel-extension 37 of the barrel-unit 17 has a top-wall 38 transversely curved exteriorly to slidingly fit the mechanism-receiving chamber 22 of the receiver 15, and a side-wall 39 extending downwardly from the said top-wall 38 at the left-hand side thereof and similarly transversely curved exteriorly in continuation of the curvature of the said top-wall. The top-wall 38 and the side-wall 39 of the barrel-extension 37 provide a bolt-receiving chamber 40 which opens outwardly through the right-hand side face of the barrel-extension 37 in registration with the ejection-opening 23 in the receiver 15, when the barrel-unit 17 is in its forward position. The bolt-receiving chamber 40 provided in the barrel-extension 37 of the barrel-unit 17 is adapted to receive a breech-bolt 41 normally rearwardly movable with the said barrel-unit and also normally movable forwardly independently of the said barrel-unit in the chamber 22 of the receiver 15.

The breech-bolt 41 is releasably locked in its breech-closing position in the bolt-receiving chamber 40 of the barrel-unit 17, as shown in Fig. 2, by a pivotal bolt-locking lever 42 carried by the breech-bolt 41 to which it is pivotally mounted at its forward end. The rear end of the bolt-locking lever 42 constitutes an abutment 43 adapted to engage a forwardly-facing bolt-locking abutment 44 forming the forwardly-facing rear wall of a longitudinal clearance-notch 45 provided in the under face of the top-wall 38 of the barrel-extension 37. Adjacent its rear or free end, the bolt-locking lever 42 has pivotally secured thereto the forward end of an operating-link 46.

The operating-link 46 above referred to extends rearwardly from the breech-bolt 41 and its bolt-locking lever 42, and has its rear end in seated engagement with the concaved front face of a short spring-plunger 47. The said spring-plunger reciprocates in a passage 48 formed in the rear wall of the trigger-plate 16 as well as in the axially aligned tubular-extension 25 of the said trigger-plate. The said spring-plunger 47 is yieldingly urged forwardly by a helical bolt-return spring 49 housed in the tubular-extension 25, as shown in Fig. 2.

The bolt-return spring 49 serves, through the intermediary of the spring-plunger 47, the operating-link 46 and the bolt-locking lever 42 to constantly but yieldingly urge the breech-bolt 41 forwardly into its breech-closing position within the bolt-receiving chamber 40 of the barrel-unit 17, as will more clearly hereinafter appear. The bolt-return spring 49 also serves by means of the operating-link 46 to yieldingly urge the rear end of the bolt-locking lever 42 upwardly into its breech-bolt-locking position, shown particularly well in Fig. 2, when the breech-bolt 41 is in its full forward or breech-closing position within the bolt-receiving chamber 40.

Partly underlying the breech-bolt 41 and the barrel-extension 37 and located in the lower portion of the chamber 22 of the receiver 15, is a pivotal cartridge-carrier or -elevator 50, the forward portion of which normally is located in the loading-opening 29 and which serves to sequentially elevate cartridges fed from the tubular magazine 30 into position to be inserted into the firing-chamber 51 of the barrel 36 by the forward return movement of the breech-bolt 41, as will hereinafter appear. Under certain conditions the cartridge-carrier 50 also serves to hold the breech-bolt 41 in its retired or recoiled position when the tubular magazine 30 of the firearm is empty, as will later be described.

The cartridge-carrier or -elevator 50 is provided adjacent its rear end with two trunnions 52—52 one of which extends laterally outwardly from each of its respective opposite sides into the adjacent one of two sockets 53—53 respectively formed in the adjacent inner faces of the side-walls 20 and 21 of the receiver 15, as is clearly shown in Fig. 5. To yieldingly hold the cartridge-carrier 50 in its normal or retired position, the rear end of the said cartridge-carrier is engaged by one arm of a torsion-spring 54 mounted in a recess 55 (Fig. 5) formed in the inner face of the adjacent side-wall 21 of the receiver 15.

For the purpose of swinging the cartridge-carrier 50 in a counterclockwise direction and the

forward end thereof upwardly to elevate cartridges fed from the tubular magazine 30 into position for engagement by the forward face of the breech-bolt 41 for effecting the insertion of a cartridge into the cartridge-chamber 51 of the barrel 36, the said cartridge-carrier carries to the rear of its trunnions 52—52 an upwardly-extending pivotal lug 56. The said lug 56 is provided with a downwardly-extending trunnion 56a turning in a socket 56b in the upper edge of the cartridge-carrier 50 adjacent its right-hand side as shown particularly well in Fig. 5. The said lug 56 projects upwardly into the path of movement of the breech-bolt 41 and has the rear portion of its upper edge rearwardly-and-downwardly-inclined to form an elevating-cam surface 57. The said surface 57 is adapted to be engaged by a complemental downwardly-and-rearwardly-inclined carrier-elevating cam 58 forming the rear-wall of a notch 59 provided on the lower right-hand side of the breech-bolt 41 about midway the length thereof and opening downwardly through the underside of the said breech-bolt. The said notch 59 receives the lug 56 which projects upwardly thereinto when the breech-bolt 41 is in its fully retired position, as shown in Fig. 1.

When the breech-bolt 41 is in its fully retired position, the lug 56 of the cartridge-carrier 50 will be located in the notch 59 of the said breech-bolt and the carrier-elevating cam 58 thereof is in engagement with the elevating-cam surface 57 of the lug 56 of the cartridge-carrier 50. The forward return movement of the said breech-bolt 41 into its breech-closing position will cause the carrier-elevating cam 58 thereof to move the rear end of the cartridge-carrier 50 downwardly to thus swing the said cartridge-carrier in a counterclockwise direction about its trunnions 52—52. The swinging movement of the cartridge-carrier 50 as just described, will raise the forward end thereof to elevate a cartridge, all as will more clearly hereinafter appear.

The lug 56 is mounted on the cartridge-carrier 50 for lateral outward pivotal movement to enable the breech-bolt 41 to move rearwardly past the said lug 56 without swinging the said cartridge-carrier as above described. To move the lug 56 laterally out of the path of rearward movement of the breech-bolt 41, the latter is provided adjacent the lower rear corner of its right-hand side with a vertical rearwardly-and-inwardly-inclined lug-retiring cam 60 adapted to engage the portion 61 of the inner face of the said lug 56.

The forward portion of the cartridge-carrier 50 is bifurcated to provide two arms 63 and 64 normally positioned in the loading-opening 29 of the firearm structure with their upper faces in a plane substantially in horizontal alignment with the lower boundary of the tubular magazine 30. As thus positioned, the arms 63 and 64 of the bifurcated forward portion of the cartridge-carrier 50 are in position to receive upon their upper faces cartridges fed from the tubular magazine 30. The upper face of the forward portion of the cartridge-carrier 50 including the arms 63 and 64 is transversely curved to substantially conform to the curvature of the cartridges being handled. The curvature referred to terminates at a forwardly-facing stop-shoulder 65 formed about midway the length of the said cartridge-carrier and serving to limit the rearward movement of a cartridge being fed from the tubular magazine 30. The arms 63 and 64 of the cartridge-carrier 50 also have their undersides transversely curved as at 66 to form a guideway for the insertion of cartridges from the loading-opening 29 of the firearm structure into the tubular magazine 30 as will later appear. Normally, however, the under portions of the said arms 63 and 64 act as a barrier to the manual insertion of fresh cartridges into the magazine until retired upwardly.

For releasably locking the cartridge-carrier 50 in its normal or retired position, and hence also to lock the breech-bolt 41 in its recoiled or retired position in a manner as will hereinafter appear and as shown in Fig. 1, the forward end of the arm 63 of the cartridge-carrier 50 is formed on its outer side-face with a laterally-projecting lug 67. The upper face of the lug 67 forms a locking-abutment 68 adapted to be engaged by a downwardly-facing latch-abutment 69 constituting the lower edge of a retirable T-shaped carrier-latch 70.

The carrier-latch 70 is mounted for pivotal movement laterally of the firearm structure in the forward left-hand portion of the loading opening 29 on a vertical pivot-pin 71. The pivot-pin 71 is mounted in and extends upwardly in the side-wall 20 of the receiver 15 through an inwardly-opening recess 72 formed in the inner face of the said side-wall and in which the carrier-latch 70 is located. At its lower or outer end the pivot-pin 71 is formed with an externally-threaded head 73 threaded into the side-wall 20 of the receiver 15.

The T-shaped carrier-latch 70 has its vertically-extending head 75 positioned closely adjacent the open rear end of the tubular magazine 30 and has its forward edge rearwardly-and-inwardly-beveled to form a cam-surface 76 for the purpose as will hereinafter appear. The vertical head 75 of the carrier-latch 70 normally projects laterally inwardly into the loading-opening 29 and has its lower portion 77 extending downwardly through the said loading-opening to a point slightly below the lower edge of the side-wall 20 of the receiver 15. The portion 77 of the carrier-latch 70 is adapted upon occasion to be accommodated in a vertically-extending clearance-recess 78 forming in effect a downward extension of the recess 72 before referred to.

Immediately to the rear of the vertical arm 75 of the carrier-latch 70 the latter is formed in the upper portion of its inner face with a cam-surface 79 extending downwardly-and-inwardly from its upper edge and slidably engageable by the lug 67 of the cartridge-carrier 50. The cam-surface 79 of the carrier-latch 70 is engaged by the lug 67 of the cartridge-carrier 50 to laterally retire the carrier-latch 70 when the forward end of the said cartridge-carrier moves downwardly from its fully-elevated position to its lower or retired position in which latter position it is shown in Fig. 1. The said lug 67, and hence the forward end of the cartridge-carrier 50, is thus permitted to pass downwardly by the said carrier-latch to position the locking-abutment 68 of the lug 67 of the cartridge-carrier 50 beneath the latching-abutment 69 of the carrier-latch 70.

For the purpose of yieldingly swinging the carrier-latch 70 into position to lock the cartridge-carrier 50, the said carrier-latch is provided forwardly of its pivot-pin 71 with an outwardly-opening spring-socket 80 housing a helical spring 81. One end of the spring 81 is seated against the adjacent surface of the recess 72 and the op-

posite end thrusts against the end-wall of the socket 80.

As will be apparent from the foregoing, when the forward end of the carrier-latch 70 is swung inwardly to locate its latching-abutment 69 over the locking abutment 68 of the cartridge carrier 50, the said carrier-latch serves to releasably prevent the counterclockwise swinging of the cartridge-carrier 50 and hence the raising of the arms 63 and 64 thereof, for purposes as will hereinafter appear.

For the purposes of description let it be assumed that the breech-bolt is in its breech-closing position and that the cartridge-chamber 51 of the barrel 36 contains a cartridge and that the magazine contains one or more cartridges, all as shown in Fig. 3. Under these conditions the firearm may be discharged.

Immediately following the discharge of the firearm, the barrel-unit 17 comprising the barrel 36 and the barrel-extension 37, together with the breech-bolt 41, will be moved rearwardly by the recoil forces generated by the discharge of the just-fired cartridge. The barrel-unit 17 will be moved rearwardly against the tension of the barrel-return spring 35 while the breech-bolt 41 will be retired against the tension of the bolt-return spring 49.

The rearward movement of the breech-bolt 41 will cause the lug-retiring cam 60 thereof to engage the surface 61 of the lug 56 on the cartridge-carrier 50 to swing the said lug laterally outwardly about its trunnion 56a, thus retiring the said lug from out of the path of rearward movement of the breech-bolt 41 to permit the said breech-bolt to move past the said lug into its fully retired position. The rearward movement of the breech-bolt 41 past the lug 56 as just described, will, at the same time, bring the notch 59 of the said breech-bolt into registration with the lug 56, whereupon the latter is moved laterally inwardly into the notch 59 by a suitable spring (not shown). In this manner, the lug 56 of the cartridge-carrier 50 is positioned in the notch 59 of the breech-bolt 41 to have its elevating-cam surface 57 engaged by the carrier-elevating cam 58 of the said breech-bolt when the latter moves forwardly.

During the retiring of the breech-bolt 41 as above described, the tension of the bolt-return spring 49 will maintain the locked or coupled relationship of the breech-bolt 41 and the barrel-extension 37 of the barrel-unit 17, until the said barrel-unit and breech-bolt have reached substantially their fully-retired or recoiled positions whereupon the said breech-bolt becomes unlocked from the barrel-extension 37. The breech-bolt 41 is unlocked from the barrel-extension 37 by the engagement of the upper edge of the operating-link 46 with an inclined surface 82 provided in the rear wall of the receiver 15 (Figs. 1 and 2), which causes the said link to move downwardly to withdraw the locking-lever 42 from its locking engagement with the locking-abutment 44 of the barrel-extension 37.

Immediately upon the breech-bolt 41 being unlocked from the barrel-extension 37 of the barrel-unit 17, the latter is moved forwardly by the barrel-return spring 35 to its full forward position while the said breech-bolt remains in its retired position for a brief interval. The forward movement of the barrel-unit 17 as just described, effects the ejection of the just-fired cartridge through the ejection-opening 23 in the side-wall 21 of the receiver 15.

During the recoil or rearward movement of the barrel-unit 17 and breech-bolt 41, the rearmost cartridge 83 housed in the tubular magazine 30 will have been also moved rearwardly under the urge of the magazine-spring 34. It may here be noted that the column of cartridges housed in the magazine 30 is prevented from moving rearwardly until such time as the breech-bolt is retired by a cartridge-stop 84 depending from the underside of the said breech-bolt. It will be understood that the said cartridge 83 is held in engagement with the forward face of the cartridge-stop 84 by the said magazine-spring during the rearward travel of the said breech-bolt 41 until the rear end of the said cartridge engages the cartridge-stop 65 of the cartridge-carrier 50. The emergence of the cartridge 83 from the magazine as just described will have positioned the said cartridge on the upper surfaces of the arms 63 and 64 of the cartridge-carrier 50.

It may here be noted and as will be understood from the following, that the carrier-latch 70 is held in its retired position by the cartridge 83 while the said cartridge is in the position shown in Fig. 3 or rearwardly of such position and in the same plane, so that the cartridge-carrier 50 is free to be swung in a counterclockwise direction by the forward travel of the breech-bolt 41 as will later appear.

Upon the initiation of the forward or return movement of the breech-bolt 41 under the urge of the bolt-return spring 49, the carrier-elevating cam 58 of the said breech-bolt will engage and act upon the elevating-cam surface 57 of the lug 56 to swing the cartridge-carrier 50 in a counterclockwise direction as viewed in the drawings, about its trunnions 52—52 to thus raise the arms 63 and 64 thereof. The elevation of the arms 63 and 64 of the cartridge-carrier 50 will elevate the cartridge 83 carried thereby into position to be engaged by the forward face of the breech-bolt 41 during the forward movement of the latter to be thus inserted by the said breech-bolt into the cartridge-chamber 51 of the barrel 36. The cartridge immediately following the cartridge 83 in the tubular magazine 30 may be retained therein by any suitable means such, for instance, as a cartridge cut-off 85, until the cartridge-carrier has been returned to its normal position.

As soon, during the forward movement of the breech-bolt 41, as the rear face thereof passes by the lug 56 of the cartridge-carrier 50, the latter will be swung in a clockwise direction by the torsion-spring 54 to bring its forward portion into its normal or retired position. The breech-bolt 41 will thus have effected the insertion of a fresh cartridge into the cartridge-chamber 51 of the barrel 36, preparatory to another cycle of operations, as just above described.

Upon the emergence of the last cartridge from the tubular magazine 30 and its elevation by the cartridge-elevator 50, the carrier-latch 70 will be freed of restraint and will, under the urge of the helical spring 81, be moved inwardly into its cartridge-carrier latching position to interpose its latching-abutment 69 above the abutment 68 of the cartridge-carrier 50. With the tubular magazine 30 empty and the cartridge-carrier 50 locked against swinging movement as previously described, the breech-bolt 41 upon being retired into its fully-recoiled position will

have the lug 56 of the cartridge-carrier 50 entered into the notch 59 thereof.

The breech-bolt 41 will be held in its retired position, due to the inability of the said breech-bolt to depress the rear end of the now locked cartridge-carrier 50 and hence swing the forward end of the cartridge-carrier 50 in a counterclockwise direction. The breech-bolt 41 will thus be securely locked in its fully-retired position (indicating to the user of the firearm that the magazine thereof is empty) until such time as a fresh cartridge is entered into the loading-opening 29 for insertion into the tubular magazine 30 of the firearm. The entry of a cartridge will, as will hereinafter appear, retire the latching-abutment 69 of the carrier-latch 70 from the path of movement of the abutment 68 of the cartridge-carrier 50 or, if desired, the same may be accomplished by manually retiring the said carrier-latch 70. Upon the carrier-latch 70 being retired, the breech-bolt 41 will be free to depress the rear end of the cartridge-carrier 50 and to move forwardly into its breech-closing position, as previously described.

To charge the tubular magazine 30, a cartridge is placed in the loading-opening 29 in engagement with the under face of the forward portion of the cartridge-carrier 50 (Figs. 1 and 6). With the cartridge positioned as just described, the forward end of the said cartridge will engage the lower portion 77 of the carrier-latch 70. If slight upward pressure is now applied to the cartridge, the forward end thereof will cam the carrier-latch 70 laterally outwardly against the tension of the spring 81. The described lateral swinging movement of the carrier-latch 70 will remove the latching-abutment 69 of the carrier-latch 70 from over the abutment 68 of the cartridge-carrier 50. The retirement of the latching-abutment 69 as just described, will unlock the cartridge-carrier 50 and permit the same to be swung counterclockwise about its trunnions 52—52 against the tension of the torsion-spring 54 from the position shown in Fig. 1 to that in which it is shown in Fig. 2, when upward pressure is applied to the cartridge now in process of being inserted into the magazine 30.

The swinging of the cartridge-carrier 50 as just above described, will be caused by the cartridge being moved upwardly through the loading-opening 29 to bring the forward end of the said cartridge into substantial alignment with the open rear end of the tubular magazine 30. With the cartridge positioned as just described, forward pressure on the rear end thereof will move the said cartridge forwardly into the tubular magazine 30 against the tension of the magazine-spring 34. With the cartridge positioned as shown in Fig. 2, it will be apparent that the said cartridge during the entire course of its being introduced through the loading-opening 29 and into the tubular magazine 30, will hold the carrier-latch 70 in its retired position.

Upon the cartridge being inserted in place in the tubular magazine 30 as shown in Figs. 3 and 7, the rear end thereof will project slightly rearwardly from the said magazine into the forward portion of the loading-opening 29. With the cartridge in this position it will be in engagement with the inner surface of the vertical head 75 of the carrier-latch 70 to maintain the said carrier-latch in its retired or unlatching position against the tension of the spring 81. The cartridge is maintained in its partly exposed position by the magazine-spring 34 which exerts a constant but yielding rearward pressure upon the said cartridge to hold the rear face thereof against the forward face of the cartridge-stop 84 of the breech-bolt 41.

It will thus be seen that the cartridge just inserted into the tubular magazine 30 serves to hold the carrier-latch 70 in its retired position to enable the cartridge-carrier 50 to be again swung counterclockwise about its trunnions 52—52 by the next succeeding cartridge loaded into the said magazine. One or more cartridges may be thus inserted into the tubular magazine 30 by repeating the steps just above set forth. Each succeeding cartridge inserted into the magazine thus will serve to maintain the unlatched state of the cartridge-carrier to facilitate the insertion of the next succeeding cartridge.

It may here be pointed out that each succeeding cartridge following the cartridge being fed from the tubular magazine 30 onto the arms 63 and 64 of the cartridge-carrier 50 for insertion into the cartridge-chamber 51 of the barrel 36 by the breech-bolt 41, engages the cam-surface 76 of the carrier-latch 69 to retire and to constantly hold the said carrier-latch in its retired position until such time as the magazine is empty, as previously described.

It may here be stated that preferably prior to loading the empty magazine, a cartridge may be placed in the cartridge-chamber 51 of the barrel 36 through the ejection-opening 23 in the side-wall 21 of the receiver 15 while the breech-bolt 41 is locked in its retired position as shown in Fig. 1. Under these conditions, the breech-bolt may be released by manually retiring the carrier-latch 69.

In the event that the user of the firearm should desire to empty the cartridges from the magazine, the same may be accomplished by manually moving the forward end of the now-unlocked cartridge-carrier 50 upwardly, to thus permit the adjacent cartridge in the magazine 30 to ride out of the same beneath the said cartridge-carrier. Due to the cartridges in the magazine holding the carrier-latch 70 in its retired position, as before described, the cartridge-carrier 50 may be readily swung counterclockwise for emptying the magazine. Each swinging movement of the unlocked cartridge-carrier will release another cartridge from the magazine, but when the last cartridge has fully emerged therefrom, the carrier-latch 70 automatically is moved into its latching-position by the spring 81 to again lock the cartridge-carrier 50 against swinging movement. In this manner, the magazine of the firearm may be readily and efficiently emptied by the simple expedient of swinging the forward end of the cartridge-carrier upwardly.

It will be apparent from the foregoing that the cartridges contained in the magazine serve to effectively retain the carrier-latch in its retired position until such time as the said magazine is empty, to enable the user of the firearm to readily remove the cartridges contained in the magazine whenever he should so desire without any thought on his part to unlatching the cartridge-carrier. Furthermore, it will be readily seen that the magazine may be emptied by the operator pressing upwardly upon the forward portion of the cartridge-carrier to permit the cartridges contained in the magazine to be moved outwardly beneath the said carrier. By this method, the

cartridges may, one by one, be readily removed from the magazine.

From the foregoing, it will be readily seen that cartridges may be inserted in place into the magazine of the firearm by the simple operation of placing a cartridge in the loading-opening of the firearm and subjecting the same to upward pressure, followed by a forward movement of the cartridge. As will be apparent, the placing of the cartridge to be inserted into the magazine in the loading-opening of the firearm structure, automatically unlatches the cartridge-carrier to permit the latter to be swung upwardly, which operation may be performed by one hand of the user of the firearm.

By means of the construction herein shown and described, the loading and unloading of the magazine is greatly facilitated while at the same time permitting the carrier-latch to function upon the emergence of the last cartridge from the magazine to lock the breech-bolt in its fully-retired position through the intermediary of the cartridge-carrier, as is customary in the general type of firearm herein shown and described.

While the member 70 has been designated as a "carrier-latch," it will be apparent that its prime function is to lock the breech-bolt in its retired position after the last cartridge has been fired.

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 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 self-loading firearm-structure having a cartridge-chamber and including in combination: a retirable breech-bolt for holding a cartridge in the cartridge-chamber of the firearm-structure; a magazine having a cartridge-receiving opening; a movable cartridge-carrier for transferring cartridges from the said magazine to the cartridge-chamber of the firearm-structure and having a portion engageable with the said breech-bolt to hold the same in its retired position when the said magazine is empty and including a magazine-blocking portion normally barring the manual insertion of a fresh cartridge into the said magazine; and a latch-member releasably engageable with the said cartridge-carrier to hold the same in position to restrain the said breech-bolt in its retired position, the said latch-member having a releasing-portion located adjacent the outer end of the cartridge-receiving opening in the said magazine in position to normally block the insertion of a fresh cartridge thereinto and in position to be engaged and retired into releasing position by a cartridge in the manual process of being inserted into the said cartridge-receiving opening; whereby a cartridge inserted into the cartridge-receiving opening of the said magazine may be engaged with the releasing-portion of the said latch-member to retire the latter and release the said breech-bolt.

2. A self-loading firearm-structure having a cartridge-chamber and a loading-opening, and including in combination: a retirable breech-bolt for holding a cartridge in the cartridge-chamber of the firearm-structure; a magazine having a cartridge-receiving opening communicating with the loading-opening of the firearm-structure; a movable cartridge-carrier for transferring cartridges from the said magazine to the cartridge-chamber of the firearm-structure and having a portion engageable with the said breech-bolt to hold the same in its retired position when the said magazine is empty and including a magazine-blocking portion normally barring the manual insertion of a fresh cartridge into the said magazine; and a latch-member releasably engageable with the said cartridge-carrier to hold the same in position to restrain the said breech-bolt in its retired position, the said latch-member having a releasing portion located in the loading-opening of the firearm-structure and adjacent the outer end of the cartridge-receiving opening in the said magazine in position to normally block the insertion of a fresh cartridge thereinto and in position to be engaged and retired into releasing position by a cartridge inserted into the said magazine from the loading-opening of the firearm-structure; whereby a cartridge in the manual process of being inserted through the loading-opening of the firearm-structure into the cartridge-receiving opening of the said magazine may be engaged with the releasing-portion of the said latch-member to retire the latter and release the said breech-bolt.

3. A self-loading firearm-structure including in combination: a frame; a barrel-unit having a cartridge-chamber; a breech-bolt movable with respect to the said barrel-unit to releasably hold a cartridge in the cartridge-chamber thereof; a tubular magazine extending in substantial parallelism with the said barrel-unit and having a cartridge-receiving opening; a movable cartridge-carrier for transferring cartridges from the said tubular magazine to the cartridge-chamber of the said barrel-unit and having a portion engageable with the said breech-bolt to hold the same in its retired position when the said tubular magazine is empty and including a magazine-blocking portion normally barring the manual insertion of a fresh cartridge into the said magazine; and a latch-member associated with the said frame and releasably engageable with the said cartridge-carrier to hold the same in position to restrain the said breech-bolt in its retired position, the said latch-member having a releasing-portion located adjacent the outer end of the cartridge-receiving opening in the said tubular magazine in position to normally block the insertion of a fresh cartridge thereinto and in position to be engaged and retired into releasing position by a cartridge inserted into the said cartridge-receiving opening; whereby a cartridge in the manual process of being inserted into the cartridge-receiving opening of the said tubular magazine may be engaged with the releasing-portion of the said latch-member to retire the same into position to release the said cartridge-carrier and hence the said breech-bolt.

4. A self-loading firearm-structure including in combination: a frame having a loading-opening; a barrel-unit having a cartridge-chamber; a breech-bolt movable with respect to the said barrel-unit to releasably hold a cartridge in the cartridge-chamber thereof; a tubular magazine extending in substantial parallelism with the said barrel-unit and having a cartridge-receiving opening communication with the loading-opening of the said frame; a movable cartridge-carrier for transferring cartridges from the said tubular magazine to the cartridge-chamber of the said barrel-unit and having a portion engageable with the said breech-bolt to hold the same in its re-

tired position when the said tubular magazine is empty and including a magazine-blocking portion normally barring the manual insertion of a fresh cartridge into the said magazine; and a latch-member releasably engageable with the said cartridge-carrier to hold the same in position to restrain the said breech-bolt in its retired position, the said latch-member having a releasing-portion located in the loading-opening of the said frame and adjacent the cartridge-receiving opening in the said tubular magazine in position to normally block the insertion of a fresh cartridge thereinto and in position to be engaged and retired into releasing position by a cartridge inserted into the said magazine from the loading-opening of the said frame.

5. A self-loading firearm-structure including in combination: a receiver having a mechanism-receiving chamber therein and a loading-opening leading downwardly therefrom; a barrel-unit having a cartridge-chamber; a breech-bolt movable in the mechanism-receiving chamber of the said receiver and engageable with the said barrel-unit to releasably hold a cartridge in the cartridge-chamber thereof; a tubular magazine extending in substantial parallelism beneath the said barrel-unit and having a cartridge-receiving opening communicating with the mechanism-receiving chamber in the said receiver adjacent the loading-opening therein; a pivotal cartridge-carrier for transferring cartridges from the said tubular magazine to the cartridge-chamber of the said barrel-unit and pivoted intermediate its forward and rear ends within the mechanism-receiving chamber of the said receiver, the said cartridge-carrier having a portion engageable with the said breech-bolt to hold the same in its retired position; and a pivotal latch-member pivoted in the mechanism-receiving chamber of the said receiver and having a releasing-portion extending below the said cartridge-carrier and located adjacent both the cartridge-receiving opening in the said tubular magazine and the loading-opening in the said receiver in position to be engaged and retired into releasing position by a cartridge inserted into the loading opening in the said receiver; whereby a cartridge in the manual process of being introduced into the loading-opening of the said receiver for insertion into the cartridge-receiving opening of the said tubular magazine may be engaged with the releasing portion of the said pivotal latch to retire the same into position to release the said pivotal cartridge-carrier.

6. A self-loading firearm-structure including in combination: a retirable breech-bolt for holding a cartridge in the cartridge-chamber of the firearm-structure; a magazine constructed and arranged to successively supply cartridges for introduction into the cartridge-chamber of the firearm-structure and having a cartridge-receiving opening; retirable magazine-blocking means normally barring the manual insertion of a fresh cartridge into the cartridge-receiving opening of the said magazine; and releasable locking-means releasably holding the said magazine-blocking means in position to prevent the manual insertion of cartridges into the cartridge-receiving opening of the said magazine, the said releasable locking-means including a releasing-portion located adjacent the cartridge-receiving opening in the said magazine in position to be engaged and retired into releasing position by a cartridge manually inserted into the said cartridge-receiving opening, the said releasing-portion being positioned relative to the said retirable magazine-blocking means and the cartridge-receiving opening of the said magazine so that a cartridge being manually inserted into the said cartridge-receiving opening engages with the releasing-portion of the said latch-member to retire the latter before the movement of the said cartridge is blocked by the previously-locked magazine-blocking means.

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