

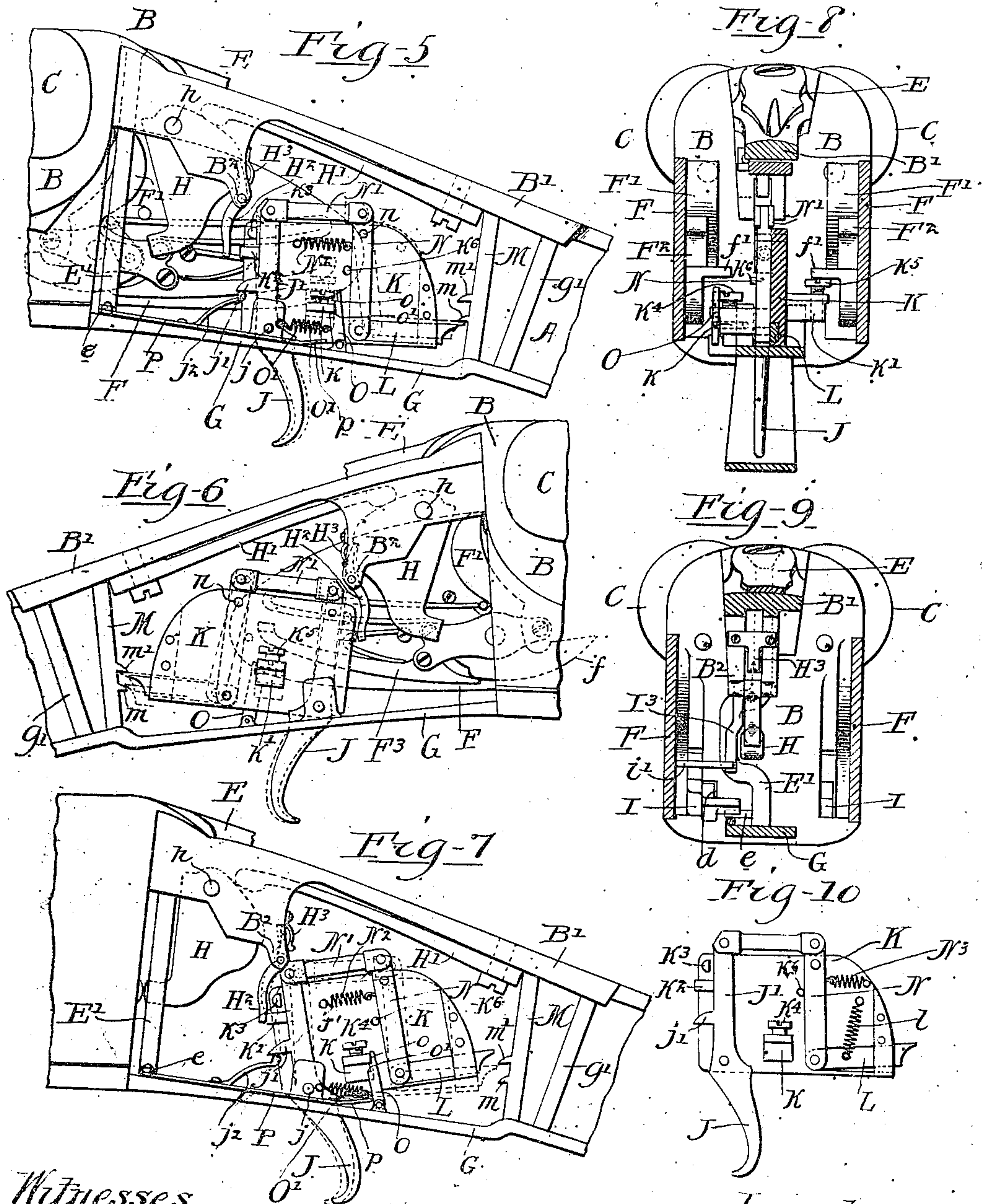
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TRIGGER MECHANISM FOR FIREARMS

(Application filed Apr. 1, 1898.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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TRIGGER MECHANISM FOR FIREARMS.

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To all whom it may concern:

Be it known that I, ALLAN E. LARD, of St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Firearms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in firing mechanism for firearms, and more particularly to firing mechanisms of that class more commonly used in shotguns having a plurality of barrels and in which a single trigger is employed and the firing of the several barrels is accomplished by successive movements of the single trigger.

The invention consists in an improved mechanism for discharging a plurality of barrels of a firearm, and particularly a shotgun, by means of a single trigger of an improved device, whereby the discharge of more than one barrel at a time is prevented, and in the matters hereinafter described, and pointed out in the appended claims.

The invention is herein shown in connection with a shotgun provided with three shot-barrels and locks or firing mechanisms embracing three hammers, together with means for actuating the same by successive pulls upon the trigger. The invention may, however, be applied to firearms of other kinds and to those having two or more than three barrels.

In the accompanying drawings, illustrating my invention, Figure 1 is a view in side elevation of a breech mechanism embodying my invention, the lock-plate, together with one of the hammers and its actuating-spring carried by said plate, being removed, so as to show the main operative parts of the firing mechanism in side elevation. Fig. 2 is a sectional view taken through the barrels on line 2 2 of Fig. 1. Fig. 3 is a view in elevation of one of the lock-plates with the lock or striking mechanism thereon. Fig. 4 is a detail plan section taken on line 4 4 of Fig. 1. Fig. 5 is a view similar to Fig. 1, showing the parts in changed position. Fig. 6 is a view similar to Fig. 1, showing that side of the firing mechanism opposite to that illustrated in said Fig.

1 and illustrating still another position of the parts. Fig. 7 is a view similar to Fig. 1, showing a fourth position of the parts. Fig. 8 is a sectional view taken on line 8 8 of Fig. 1. Fig. 9 is a sectional view taken on line 9 9 of Fig. 1. Fig. 10 is a detail view showing a modified construction in the detent which controls the movement of the firing-plate. Fig. 11 is a detail view showing a second trigger which may be used for firing the third barrel independently of the others.

The firearm in the accompanying drawings is a shotgun of the kind known as "breech-loading," or one in which the barrels are pivotally connected with the breech-frame at a point forward of the rear ends of the barrels and where the rear ends of the barrels are thrown upwardly above the breech-frame for the insertion of the cartridges. The breech mechanism illustrated is, moreover, of that class known as "hammerless," or one in which the retraction or cocking of the hammers is accomplished by the act of "breaking" the gun through suitable connections between a part attached to the swinging barrels and the said hammers.

As shown in the said drawings, A indicates the body or wooden portion of the gun-stock; B, the breech-frame; C, the barrels, which are pivoted to the front end of the breech-frame, and D the "fore end," which is detachably connected with the barrels beneath the same in the usual manner.

E indicates the top snap-lever, by which the locking-detent for holding the barrels in place is actuated.

F F indicate the lock-plates, upon which the locks or striking mechanisms belonging to the two main or upper barrels are mounted, and G is the trigger-plate, which carries the trigger and upon which in the particular instance illustrated the main parts of the mechanism embodying my invention are mounted. Said trigger-plate is attached at its forward end to the breech-frame B by means of a screw *g* and at its rear end is connected with the rearward extension or tang B' of the breech-frame by means of bolts *g' g'*, which also serve to attach the stock to said frame.

The locks for the main or upper barrels are mounted on the lock-plates F and are shown as consisting each of the usual hammer or

tumbler F' , mainspring F^2 , sear F^3 , and sear-spring F^4 . A supporting-plate F^5 , attached to each lock-plate, forms a support for the inner end of the hammer-pivot. The lock for the lower or central barrel is mounted in the breech-frame B beneath the tang and consists of a hammer H, which is mounted on a pivot-pin h , from which said hammer depends a mainspring H' , which is attached to the under surface of the tang, a sear H^2 , and a sear-spring H^3 , the said sear and sear-spring being mounted in a depending arm B^2 , forming part of the tang at the rear of the main part or body of the breech-frame B.

Means for setting or cocking the several hammers is provided as follows: I I are two cocking-levers which are mounted in recesses in the breech-frame B, at either side of the same, inside of the forward ends of the lock-plates F, said levers being mounted on pivot-studs i . The forward ends of the said cocking-levers extend into recesses d , formed in the metal part D' of the fore end D. Said forward ends of the cocking-levers are so shaped and arranged as to bear upon the upper walls of said recesses d , whereby when the muzzles of the barrels are thrown downwardly said forward ends of the cocking-levers will be depressed. At their rear ends the cocking-levers extend rearwardly to points adjacent to and engage forwardly-projecting lever-arms f of the hammers F' , the cocking-levers acting on the under surface of the said arms, so as to lift or force the same upwardly, and thereby throw backwardly the hammers in the usual manner. For the purpose of retracting or cocking the central hammer H one of the cocking-levers is provided at its rear end with an offset extension I^2 , which extends at the inner side of and past the hammer F' and is adapted at its rear end for engagement with a link I^3 , which is pivoted at its upper end to the hammer and is adapted for engagement at its lower end with the said extension I^2 of the cocking-lever. For the purpose of guiding the link I^3 guide-pins i' are located in position to engage opposite sides of said link, said guide-pins being attached, as herein shown, to the supporting-plate F^5 of the adjacent lock.

Now referring to the firing mechanism by which the several sears F^3 , F^3 , and H^2 are actuated for releasing the hammers the same is made as follows: J indicates the trigger, which is mounted on a pivot j in the trigger-plate G in the usual manner. Said trigger is extended upwardly in the lock-case in the form of a trigger-arm J' . K indicates a movable part or plate which is also pivoted to the trigger-plate and which is preferably mounted on the same pivot j by which the trigger is supported. Said plate constitutes a medium by which the motion of the trigger is transmitted to the several sears, and for convenience the same will be herein called the "firing-plate." Said firing-plate extends rearwardly and upwardly from the pivot j and is

swung or moved by a suitable connection with the trigger in such manner that its rear end rises and its upper part moves forwardly. Actuating engagement of said plate with the sears F^3 F^3 is secured by means of two laterally-projecting lugs k k' on said plate K, which lugs are adapted for engagement with the inwardly-bent rear extremities f' of the said sears and are provided with adjusting-screws k^4 k^5 , which come in direct contact with the sears. Similarly, actuating connection of the plate with the sear H^2 is formed by means of a forward projection or stud k^3 , which is located in position for contact with the depending end of the said sear H^2 . The screws k^4 k^5 on the lugs k k' and the lug k^3 are not arranged for simultaneous engagement with the several sears, but are so constructed as to come successively in contact with the same as the plate is swung or moved on its pivot by the action of the trigger, the intent being that the sears shall be successively moved and the barrels successively fired by a progressive or step-by-step movement of the said firing-plate. The said firing-plate is moved or swung on its pivot when the trigger is pulled backwardly by means of a stop or shoulder on the firing-plate, which is located in position for engagement with a part of or upon the trigger, the stop or projection herein shown having the form of a stop-pin k^3 , which is located near the upper edge of the firing-plate in position to engage the front edge of the trigger-arm J' . Said trigger-arm is not always in contact with the stud k^3 , but stands slightly at the rear thereof, so as to afford a small degree of independent motion between the trigger and the firing-plate when the trigger is drawn or pulled rearwardly, such independent motion giving the trigger a short preparatory movement before the firing-plate is engaged and moved thereby. The trigger is held normally at the forward limit of its movement by means of a suitably-applied trigger-spring, herein shown as consisting of a leaf-spring j^2 , which is attached to the trigger-plate in advance of the trigger and bears at its rear free end upwardly against a forwardly-projecting arm j' on the trigger-arm J' . Mounted on the firing-plate is a movable detent L, adapted for engagement with teeth or shoulders m m' , which are located or formed upon a stationary part of the breech-frame. As herein shown, the detent L projects at the rear of the firing-plate K, and the teeth m m' are located on a bar or bolt M, which is attached at its lower end to the rear part of the trigger-plate. The upper end of the bolt abuts the tang, thereby holding the trigger-plate and the tang always the same distance apart when the bolts g g^2 are tightened. The detent L is actuated from the trigger through the medium of a lever connection or equivalent mechanism, as herein shown, giving to the detent a much greater amplitude of movement than that of the trigger itself, and which

is so arranged as to advance the said detent L into position for engagement with one of the teeth *m* during the preliminary movement of the trigger J, which takes place before the stop-pin *k*³ on the firing-plate is engaged by the trigger-arm and the firing-plate is thereby bodily moved. In the particular construction illustrated the detent L has the form of a sliding bar in the firing-plate, and motion is transmitted thereto from the trigger-arm J' by means of a lever N and a link N', by which said lever N is connected with the upper end of the trigger-arm. The said lever N is mounted on a pivot-pin *n*, which engages the said lever at a point near the upper end of the same, this construction making the arms of the lever of unequal length and the lower arm of the lever very much longer than the upper one, so that a very slight movement in the upper end of the trigger-arm when transmitted to the upper or shorter arm of said lever N will produce a considerable extent of movement of the lower arm of said lever N and the detent which is attached thereto. In the firing mechanism from which the accompanying drawings were made a backward movement of the trigger of about one thirty-second of an inch produces a movement in the said detent of about one-eighth of an inch. If desired, the movement of the trigger with respect to that of the detent may be much less than that stated, and by properly proportioning the parts practical results may be obtained by a movement of the trigger of only one three-hundredths part of an inch. The said detent L, together with the teeth *m* and *m'*, constitute an escape or stop mechanism by which the movement of the firing-plate is made intermittent instead of continuous and by which the movement of the said plate is arrested after the release of each hammer, thereby preventing the firing of more than one barrel at a time, the release of the said detent from the teeth engaged by it after each barrel has been fired being permitted by a relaxation of the pressure upon and a very slight forward movement of the trigger under the action of its spring owing to the connections described between the detent and trigger, by which an exceedingly slight movement of the trigger produces a much greater movement of the detent. The said detent L is held normally at one limit of its movement by a suitably-applied spring N², herein shown as having the form of a coiled spring, attached at one end to the firing-plate and at its opposite end to the lever N, below the pivot of the latter, and tending to draw the detent L inwardly. Inasmuch as the stud *k*³ cannot come in contact with the trigger-arm except when the detent-lever N is thrown rearward against the action of said spring N², the presence of said spring N² insures that the firing-plate will be held in position with the stud *k*³ away from the trigger-arm and the detent retracted during the upward movement of the firing-plate until the latter comes in contact

with one of the sears, at which time the resistance of the sear-spring will arrest the movement of the firing-plate until the detent has been thrown rearwardly or into its holding position, after which the further movement of the firing-plate will effect the release of the sear. Immediately after such release the detent will strike the tooth *m* or *m'* and prevent further movement of the firing-plate until the trigger has been allowed to move slightly forward, when the rearward movement of the trigger-arm with respect to the firing-plate under the action of said spring N² will produce backward movement of the detent sufficient to clear the tooth engaged by it and permit further forward movement of the firing-plate under a subsequent pull upon the trigger. If the trigger be allowed to swing fully forward after firing the first barrel, the firing-plate (in the absence of the means hereinafter described to prevent backward movement of the firing-plate) will return to its original or lowermost position; but this will not affect the action of the detent, because upon pulling the trigger a second time the plate will be moved with the trigger-arm and without any rearward movement of the detent until the latter has passed the first tooth *m* and the firing-plate has engaged the second sear, when the resistance of the second sear, by arresting the movement of the plate, will produce through the yielding of the spring N² relative movement of the trigger-arm and firing-plate, with the result of throwing the detent outward into position to engage the second tooth *m'*. Said spring N² therefore, by holding the detent-lever N at the rearward limit of its movement, serves also to hold the firing-plate from rearward movement with respect to the trigger-arm during the movement of the firing-plate until the firing-plate comes in contact with and is arrested by one of the sears, whereupon the pull on the trigger overcomes the force of the spring N², throws the detent outwardly into position to engage the tooth, and then moves the sear until the lock controlled thereby has been released, after which the detent strikes the tooth *m* or *m'* and holds the plate from further movement.

Inasmuch as the firing of the several barrels is accomplished by a progressive movement of the firing-plate, it is desirable that the said plate and trigger should be held from backward movement after each barrel is fired, and for this purpose I have provided a detent so arranged as to engage and hold the firing-plate after the firing of each barrel. Said detent is shown as having the form of a stepped bar O, pivoted at its lower end to the trigger-plate and provided at its upper end with two shoulders *o o'*, said bar being located in such position that the shoulders may engage the lower surface of the lug *k* on one side of the firing-plate. The said detent is actuated by the spring O', so arranged as to throw its upper or free end toward the said lug *k*. When the firing-plate is in its normal

or lowermost position, the said detent, at a point below the lowermost step o' , bears against the lug k , and the said steps or notches are so disposed with respect to the teeth $m m'$ that when the firing-plate is swung upwardly, so as to bring the detent against the first tooth m , the lug will be engaged by the first step o' , and when said detent is brought against the second tooth m' the lug will be engaged by the second step o . It will of course be understood that the detent O is located in the position described and arranged to act upon the lug k merely as a matter of convenience and that a similarly-acting detent may be arranged in other positions to operate upon or in connection with the firing-plate.

The operation of the firing mechanism above described may be better understood from the following: When the parts are in their normal position, as seen in Fig. 1, the lower end of the firing-plate will rest against the trigger-plate, and the trigger will be held by the trigger-spring at the forward limit of its movement and with the trigger-arm J' slightly at the rear of the stop-pin k^3 on the firing-plate. At this time the sear belonging to the lock which is to be first released will be in contact with the lug k . The pressure required to operate the detent L against the action of its holding-spring N^2 being much less than the pressure required to move the sear, the first movement which takes place will be the throwing out of the said detent into position to engage the first or lowermost tooth m . By the time the said detent has reached or made contact with said tooth, as seen in dotted lines in Fig. 5, the hammer of the lock first to be actuated will have been released and the stepped detent O will fall into position to hold the firing-plate from backward movement. This is the position of the parts shown in full lines in Fig. 5. A release of the pressure upon the trigger will result in the retraction of the detent mainly through the action of the trigger-actuating spring, which by throwing the trigger forward while the firing-plate is held from backward movement will move the trigger-arm backwardly with respect to the firing-plate, and thereby retract the detent. This movement of the detent will be aided by the detent-spring N^2 . As soon as this slight forward movement of the trigger takes place the detent will be free from the tooth m , and the firing-plate will be free to rise when pressure is again applied thereto by the action of the trigger, as seen in said Fig. 5. As soon as pressure is again applied to the trigger the firing-plate will be advanced until the lug k thereon strikes the sear of the lock that is next to be fired, when the detent will be advanced into position to engage the second tooth m' , as shown in dotted lines in Fig. 6. The parts are so arranged that the firing-plate will move a short distance after its release by the retraction of the detent be-

fore it strikes the next sear, this movement being necessary in order that the detent shall be carried past or above the tooth last engaged by it before it is advanced to engage the next or succeeding tooth. Such movement of the firing-plate with the trigger before the detent is advanced is insured by the detent-spring N^2 , which holds the firing-plate and trigger from relative movement and prevents advance of the detent until the plate strikes the sear of the lock which is next to be fired and through the resistance of the sear-spring is retarded until the trigger-arm strikes the lug k^3 and the detent has been advanced, after which the firing-plate moves with the trigger until the second lock has been fired, after which its motion is again arrested by the contact of the detent with the second tooth m' . By the time this second tooth has been struck by the detent the second lock will have been released, and the forward movement of the firing-plate will be arrested by contact of the detent with said second tooth. The stepped or holding detent will at the same time engage the firing-plate, so as to prevent backward movement of the same, and upon release of the pressure upon the trigger the detent will be retracted by the action of the trigger-spring and detent-spring, and the parts will then be in readiness for the release of the third lock and the firing of the third barrel. This is the position shown in full lines in Fig. 6. The sear H^2 of the lock belonging to the third barrel will be actuated by pressure of the firing-plate thereon, as seen in Fig. 7, no special stop mechanism being required in this instance, as the firing-plate will have reached the upward limit of its movement when the firing of the third barrel is accomplished.

It is to be noted that when the firing-plate is in position for the actuation of either one of the sears said plate rests against a back-stop formed in the first instance by the trigger-plate itself and in the other instances by the stepped detent described and that when the said firing-plate thus rests against its back-stop the pressure of the trigger-spring holds the trigger-arm J' a short distance away from the stop-pin or stud k^3 . It will also be noted that when the trigger is pulled in firing the second and third barrels it moves the firing-plate a short distance before the latter strikes the sear of the lock which is next to be released, thereby insuring that the detent shall move past the tooth last engaged by it before being again advanced. The sear-spring is so much stronger than the detent-spring N^2 or the power required to move the sear is so much greater than that required to move the detent that as soon as the firing-plate strikes the sear the trigger-arm will move with respect to the firing-plate, such movement of the said arm with respect to the plate serving to move or actuate the detent L , and thereby bring the same into position for engagement with one of the

stop-teeth, so as to prevent a movement of the firing-plate at any one pull on the trigger in excess of the distance needed to actuate the same and release the hammer. In other words, inasmuch as the firing-plate is free to move except when restrained by the engagement of the detent L with one of the stop-teeth the detent-spring would hold the said detent from movement with respect to the plate and said plate would move with the trigger were it not for the engagement of the plate with the sears and the fact that the sear-springs are much stronger than the said detent-spring, so that as soon as one of the lugs on the firing-plate comes in contact with its corresponding sear movement of the firing-plate is temporarily arrested until the trigger has been moved the short distance necessary for bringing the trigger-arm against the stop-pin k^3 and for throwing the stop-detent outwardly into position to engage one of the stop-teeth. After such preliminary movement of the trigger and the actuation of the detent, however, the firing-plate moves with the trigger as the same is pulled backward, and thereby effects the lifting or actuation of that one of the sears which is at the time engaged by or is in contact with the firing-plate. It will of course be understood that the contact of the sear with the firing-plate, or, in other words, the resistance of the sear-spring to the movement of the plate, is necessary in order to hold the plate from movement while the detent is being actuated, it being obvious that in the absence of any resistance to the movement of the plate the latter would be moved or shifted by the action of the trigger without any movement of the detent itself, the detent-spring tending to hold the detent in its retracted position. The sear-spring being very much stronger than the detent-spring, and as considerable pressure is required to draw the sear out of engagement with the notch of the tumbler in which it is held by the pressure of the main-spring, much greater pressure is required to move the sear and release the hammer than is needed to move the detent, so that the pressure of the sear against the firing-plate will always hold said plate from movement until the holding-detent has been advanced against the action of the detent-spring, after which the plate will be bodily moved and the sear thereby actuated to release the hammer. It will also be noted that the trigger-spring acts to retract the detent L and would, in connection with the detent O, be sufficient for this purpose if the detent-spring were omitted, it being obvious that the pressure of the trigger-spring does not come directly upon the firing-plate, but is conveyed thereto through the medium of the trigger-arm, the lever N, and link N', so that when the firing-plate is resting against one of the back-stops, formed by the trigger-plate, or one of the two shoulders on the stepped detent O the trigger-arm will be pressed backwardly and the detent carried

inwardly by the trigger-spring, and such backward or rearward movement of the trigger-arm with respect to the plate will be limited by the contact of the said lever N on the detent with a surface or shoulder on the plate which forms a back-stop to limit the retraction of said detent. In the instance illustrated the said lever N strikes a pin k^6 when the detent is at the limit of its retracting movement, so that said pin forms such a back-stop.

It will be further observed that inasmuch as the trigger-spring and detent-spring act in the same direction upon the detent and both tend to withdraw the detent from engagement with the teeth on the frame when the firing-plate is resting against its back-stop the said detent-spring is not in all cases required, but may be dispensed with, provided the detent is so constructed that it will automatically rise above the tooth m or m' after its withdrawal therefrom in order that it may not again engage the same tooth in its subsequent advance.

In Fig. 10 I have shown a modification of the construction above described wherein a detent-spring N³ is used, which spring is applied between the firing-plate and lever N in such manner as to hold the lower or free end of said lever and the detent extended instead of retracted, and the detent is made vertically movable at its outer end and held at the upper limit of its movement by a lifting-spring L. When the said spring is thus applied, it tends to hold the detent L in its extended position, making it absolutely impossible to fire more than one barrel at a time, and in such case said spring is preferably a weak one and of very much less strength than the trigger-spring. The action of the mechanism in this latter instance is generally the same as that before described, the only difference being that in the one before described the detent-spring tends to aid the trigger-spring in retracting the detent, while in the modified construction the detent-spring acts against the trigger-spring and the former is made relatively weak, so that the trigger-spring will operate positively and certainly to withdraw the detent from engagement with that one of the teeth m or m' with which it may at the time be engaged. In the latter construction the detent lifting-spring yields downwardly and permits a slight depression of the detent when the latter strikes the tooth m or m' in the upward movement of the firing-plate, so that as soon as the detent is retracted by the action of the trigger-spring upon the release of the trigger said detent will be lifted above the tooth and in its subsequent advance will pass over the same. When the detent is made to yield or move in the manner shown in said Fig. 10, no actuating-spring for either advancing or retracting it is absolutely necessary, but the use of an advancing-spring is preferred for the reason that it holds the detent normally in a positive engaging position.

Instead of the stepped detent O, arranged

to act upon the firing plate, a similarly-acting detent may be applied to operate upon the trigger or trigger-arm, in which case both the trigger and the firing-plate will be held from backward movement after each sear has been actuated by the engagement of such detent with the trigger. When the detent is thus arranged, however, the presence of the detent-spring N^2 becomes important, inasmuch as said spring by its tension on the lever N tends to keep said lever at the rearward limit of its movement and prevents the firing-plate from falling by gravity, so as to bring the stop-pin k^3 against the trigger-arm, with the result of preventing the proper actuation of the detent by the trigger.

For the purpose of releasing the stepped detent O from the firing-plate, and thus permitting the said plate and the trigger to return to their original or starting point preparatory to firing a new charge or set of charges, provision is made for automatically moving said detent each time the breech is opened for loading. The device herein illustrated for the purpose mentioned consists of a sliding trip-bar P , which rests above the trigger-plate and is at its forward end attached to an arm e on the rod E' , which is attached to and moved by the snap-lever E and through the medium of which is actuated the locking-bolt, by which the barrels are locked or held in operative position. The said trip-bar P is shown as provided at its rear end with an elevated arm p , adapted for contact with the forward surface of the detent O when said trip-rod is thrown backwardly through the actuation of the snap-lever.

I have shown in the drawings a safety-catch consisting of a lever Q , pivoted to the tang B' and adapted at its lower end for engagement with a stop-pin q on the rear part of the firing-plate, the upper end of said lever Q being engaged with a slide q' , mounted on the outer surface of the tang. When said slide is moved forward, so as to bring the lower end of the stop-lever above and to the rear of the stop-pin q , the firing-plate will be free to move and the gun can be discharged.

A firing mechanism embodying the principal features hereinbefore described may be constructed for a double-barreled gun without the use of any detent such as has been described for forming a back-stop for the firing-plate. Assuming the breech-frame to have but one stop-tooth m , as will be the case in a double-barreled gun, and the holding-detent to be omitted, it is obvious that after the first barrel has been fired and the movement of the firing-plate arrested by the action of the detent upon the stop-tooth the firing-plate will return to its original position in contact with the trigger-plate. Upon a second actuation of the trigger no movement of the locking-detent will take place until the firing-plate encounters and is arrested by the second sear; but as soon as said firing-plate (or the lug thereon) strikes said second sear

the second barrel will be fired in the same manner that the third barrel is fired in the construction illustrated. The disadvantage arising from the omission of the stepped detent or its equivalent is that considerable forward movement of the trigger will occur after firing the first barrel before the firing-plate comes in contact with the back-stop or trigger-plate and a corresponding advance movement of the firing-plate before it comes in contact with the second sear; but at the same time the amount of such motion need not be so great as to be objectionable, for in quick action, where both barrels are fired in rapid succession, the trigger and firing-plate need not be allowed to return to their original position after the firing of the first barrel; but if the trigger be quickly released and again pressed it will, upon relaxation of the pressure thereon, move forward under the action of the detent-spring N^2 a short distance only to effect the retraction of the said detent and the passage of the same past the said tooth for the firing of the second barrel, and the latter may be fired by a second pull without moving the finger far enough or giving sufficient space for the return of the trigger to its starting-point. In other words, if the firing-plate needs to travel one-eighth of an inch to fire the first barrel the trigger must travel backward one-eighth of an inch (the distance from pivot of trigger and firing-plate to trigger and firing-lug being practically equal) before it would be in position to fire the second barrel, provided the finger were entirely removed from the trigger after firing the first barrel; but, as before stated, in rapid shooting it is not necessary to remove the finger from the trigger, and instead of allowing the trigger to travel forward one-eighth of an inch after firing the first barrel it is only necessary to allow it to advance one three-hundredths of an inch before again pulling it for firing the second barrel.

In Fig. 11 I have shown a construction in which a second trigger R is applied in position to actuate the sear belonging to the third barrel. Such second trigger is shown as pivoted on the pivot-pin j of the main trigger J and as extending rearwardly, so as to be out of the way of the said main trigger. It is also shown as provided with an arm r , which extends upwardly to the safety stop-lever Q in position to be engaged by said stop-lever when the latter is thrown into its operative position. Said second trigger will not usually be needed, but may sometimes be found useful when it is desired to fire the third barrel without firing the first and second ones, and especially when the third barrel is "choke-bored" to a greater extent than the other barrels for close shooting at long distances and it may be desired to use the said third barrel alone for that reason.

It has been proposed heretofore to employ as a means of firing several barrels with one trigger a pivoted ratchet-plate, which acts

upon the sears of the locks and is moved or advanced by a propelling-pawl, which is moved by the trigger and operates on the teeth of the ratchet-plate. Such prior construction has the disadvantage that a full advance movement of the trigger is required after each pull in order that the pawl which is moved by the trigger may engage a succeeding tooth on the ratchet-plate, and if the user shall fail to release the trigger in such manner as to permit such full forward movement thereof the ratchet-plate in the subsequent pull will not be moved by the subsequent pull and the gun will fail to fire. One important advantage of my improved construction over the prior one referred to is that an almost imperceptible forward movement of the trigger is required after each pull thereon to prepare the parts for the firing of the next barrel, so that it requires only a relaxation of pressure upon the trigger between each backward pull thereon to fire the several barrels in succession. Thus in the construction illustrated, in which the detent has a movement four times as great as that of the trigger, if the detent be arranged to overlap the teeth on the breech-frame to an extent of one thirty-second of an inch it will be clearly seen that after firing one barrel the trigger need be relieved and allowed to move forward only about one one-hundred-and-twenty-eighth of an inch in order to withdraw it from engagement with the teeth, and after this slight forward movement of the trigger the latter can be again instantly pulled to fire the next barrel. Moreover, if the parts are proportioned so that a movement of the trigger of one three-hundredth part of an inch only is required for releasing the detent the action of the device would be almost the same as though the trigger had no forward or release movement. When such a small extent of forward movement in the trigger is required for releasing the detent, if the pressure on the trigger be relaxed after firing it becomes impossible to throw the detent into engagement with the same tooth twice in succession or in two successive pulls upon the trigger, it being obvious that the slight movement referred to is so limited as to be imperceptible, and the release of the detent is accomplished by merely relaxing the pressure upon the trigger. The construction described constitutes a very important improvement over the construction embracing a single trigger with a ratchet-plate hereinbefore referred to, for the reason that such construction will require at least one-eighth of an inch backward movement of the trigger for firing each barrel and the same amount of forward or releasing movement before a succeeding barrel can be fired, and in rapid firing the necessary extent of forward movement in the trigger may often fail to take place, in which case the gun will not be discharged upon the pulling of the trigger.

I claim as my invention—

1. The combination with a plurality of locks or striking mechanisms, of a firing mechanism embracing a single trigger, a firing-plate which moves with but has a limited movement relatively to the trigger and which acts successively on the several locks and means acting to arrest or interrupt the movement of the firing-plate and trigger after the actuation of one lock and operating through the relative movement of the trigger and firing-plate to release the said firing-plate preparatory to the actuation of another lock.
2. The combination with a plurality of locks or striking mechanisms, of a single trigger, a firing-plate which moves with, but has a limited movement relatively to, the trigger, and which acts successively on the several locks and a detent which controls the movement of the firing-plate, said detent being actuated by the trigger during its movement relatively to the firing-plate and being connected with the said trigger by operative connections giving a greater amplitude of movement in the said detent than in the trigger.
3. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is operated by the trigger and acts successively on the several locks to release the same, said trigger having a limited movement with respect to the firing-plate and a detent which controls the movement of the firing-plate, said detent being connected with the trigger by connections affording movement of the detent into position to release the firing-plate and permit further movement thereof after a lock is actuated by the firing-plate.
4. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is operated by the trigger and acts successively upon the locks to release the same, said firing-plate being provided with a surface or shoulder which is normally free from contact with the trigger but which is struck by a part attached to the trigger during the rearward movement of the latter and a detent which controls the movement of the firing-plate and which is connected with the trigger by operative connections constructed to afford movement of the detent into a position to release the firing-plate preparatory to a further movement of the same after a lock has been fired.
5. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate constructed to act successively upon the said locks to release the same said firing-plate being actuated by the trigger, a detent operating to control the movement of the firing-plate and operative connections between the said detent and the trigger embracing a lever by which the detent is given a greater amplitude of movement than the trigger.
6. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and acts

successively upon the several locks to release the same, a detent which is actuated by the trigger and controls the advance movement of the firing-plate and a second detent operating to hold said firing-plate from rearward movement.

7. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and acts successively upon the several locks to release the same, a detent which is actuated by the trigger and controls the advance movement of the plate, connections between the detent and trigger giving a greater extent of movement in the detent than in the trigger, and a second detent operating to hold said firing-plate from rearward movement.

8. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and acts successively upon the several locks to release the same, a detent which has operative connections with the trigger and controls the advance movement of the plate and a second detent operating to hold said firing-plate from rearward movement and means for retracting said second or holding detent after the locks have been released.

9. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and acts successively upon the several locks to release the same, a detent which controls the advance movement of the plate, operative connections between the said detent and trigger, giving a greater extent of movement in the detent than in the trigger, a second detent operating to hold said firing-plate from backward movement and means for retracting said second or holding detent after the locks have been released.

10. A breech-loading firearm comprising a plurality of locks or striking mechanisms, a trigger, a firing-plate which is actuated by the trigger and acts successively on the locks to release the same, a detent which is operated by the trigger and controls the advance movement of the firing-plate, a spring-actuated detent which acts to hold the firing-plate from rearward movement and a trip mechanism for releasing said second detent, having operative connection with a part which is moved during the performance of the acts required for loading the arm.

11. The combination with a plurality of locks provided with hammers, sears, and sear-springs, of a trigger, a firing-plate provided with lugs or contact-surfaces located in position for successive action upon the several sears and a detent which is connected with the trigger and which arrests the movement of the firing-plate after the same has encountered and moved each of the sears.

12. The combination with a plurality of locks or firing mechanisms, of a trigger, a firing-plate which is actuated by the trigger and

is constructed to act successively upon the several locks to release the same, a detent mounted on the firing-plate and adapted for engagement with a holding tooth or teeth upon the breech-frame and operative connections between the said detent and the trigger.

13. The combination with a plurality of locks or firing mechanisms, of a trigger, a firing-plate which is actuated by the trigger and is constructed to act successively upon the several locks to release the same, a detent mounted on the firing-plate and adapted for engagement with a holding tooth or teeth upon the breech-frame and operative connections between the said detent and the trigger producing a greater extent of movement in the detent than in the trigger.

14. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and is constructed to act successively upon the several locks to release the same, said trigger having a limited movement with respect to the firing-plate, a detent mounted on the firing-plate and constructed to engage a holding tooth or teeth upon the breech-frame and operative connections, between the said detent and the trigger, mounted on the said firing-plate and embracing a lever having arms of unequal length and giving a greater extent of movement in the detent than in the trigger.

15. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and is constructed to act successively upon the several locks, said trigger being provided with a rigid trigger-arm and the firing-plate with a stop or shoulder which is normally free from contact with said trigger-arm, a detent mounted on the firing-plate and adapted for engagement with a holding tooth or teeth upon the breech-frame and means for actuating said detent embracing a lever pivoted upon the firing-plate and connected by a link with the said trigger-arm, said lever being arranged to give to the detent a movement greater than that of the trigger.

16. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is actuated by the trigger and acts successively upon the several locks to release the same, said trigger having a limited movement with respect to the firing-plate, a detent mounted on the firing-plate adapted for engagement with a tooth or teeth upon the breech-frame to control the advance movement of the firing-plate under the action of the trigger, operative connections between the said detent and the trigger giving to the detent a motion greater than that of the trigger, and a second spring-actuated detent acting on the firing-plate to hold the same from rearward movement.

17. The combination with a plurality of locks or striking mechanisms, of a trigger, a

firing-plate which is actuated by the trigger and acts successively on the several locks to release the same, said firing-plate being pivoted concentrically with the trigger and the trigger having a limited movement with respect to the said firing-plate, a detent mounted on the firing-plate and adapted for engagement with a tooth or teeth upon the breech-frame and operative connections between the trigger and said detent operating to give a greater movement in the detent than in the trigger and comprising a trigger-arm, a lever pivoted upon the firing-plate and a link connecting the lever with the trigger-arm.

18. The combination with a plurality of locks or striking mechanisms, of a trigger, a trigger-spring tending to hold said trigger at the forward limit of its movement, a firing-plate provided with a contact-shoulder which stands normally free from the trigger but which is encountered by the trigger after the same has been moved a short distance, and a detent which is operated by the trigger and operates to interrupt the advance movement of the firing-plate after the release of each hammer.

19. The combination with a plurality of locks or striking mechanisms, of a trigger, a trigger-spring tending to hold said trigger at the forward limit of its movement, a firing-plate provided with a contact-shoulder which stands normally free from the trigger but which is encountered by the trigger after the same has been moved a short distance, a detent which interrupts the advance movement of the firing-plate after the release of each hammer, operative connections between said detent and the trigger affording a greater extent of movement in the detent than in the trigger and a second spring-actuated detent acting to hold the firing-plate from rearward movement after the release of each lock.

20. A breech-loading firearm having three barrels and in which the barrels are hinged to the breech-frame said firearm being provided with a plurality of locks or striking mechanisms each having a hammer, a main-spring for actuating the same and a sear and in one of which the hammer is constructed to strike downwardly and forwardly, of means for cocking each of the hammers embracing two levers mounted on the breech-frame and engaged at their forward ends with a part which is attached to and moves with the barrels, one of said levers being provided with a

rearward extension for retracting the downwardly and forwardly striking hammer.

21. A breech-loading firearm having three barrels and in which the barrels are hinged to the breech-frame said firearm being provided with a plurality of locks or striking mechanisms each having a hammer, a main-spring for actuating the same and a sear, and in one of which the hammer is constructed to strike downwardly and forwardly, of means for cocking each of the hammers embracing two levers mounted on the breech-frame and engaged at their forward ends with a part which is attached to and moves with the barrels, one of said levers being provided with a rearward extension for retracting the downwardly and forwardly striking hammer and the latter hammer being provided with a pivoted link, one end of which is located in position for engagement with the said rearward extension of the said cocking-lever.

22. The combination with a plurality of locks or striking mechanisms, a trigger, a firing-plate which moves with the trigger but which has a limited movement relatively thereto and which acts successively on the several locks to release the same, a detent which is actuated by the trigger in its movement relatively to the firing-plate and operates to arrest the advance movement of the firing-plate after the release of each lock and a movable safety-stop adapted for engagement with the said firing-plate to hold the same from backward movement.

23. The combination with a plurality of locks or striking mechanisms, of a trigger, a firing-plate which is moved by the trigger, and acts successively on the several locks, and a detent which controls the movement of the firing-plate, said detent being actuated by the trigger and being connected with the same by operative connections giving a greater amplitude of movement in said detent than in the trigger, and a second trigger which acts upon one of said locks independently of the firing-plate and first-named trigger.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 17th day of March, A. D. 1898.

ALLAN E. LARD.

Witnesses:

C. CLARENCE POOLE,
W. O. WHITEHEAD.