(No Model.) 3 Sheets—Sheet 1.

C. A. KING.

EJECTOR MECHANISM FOR BREECH LOADING FIREARMS.

No. 470,157. Patented Mar. 1, 1892.

Fig. 1,

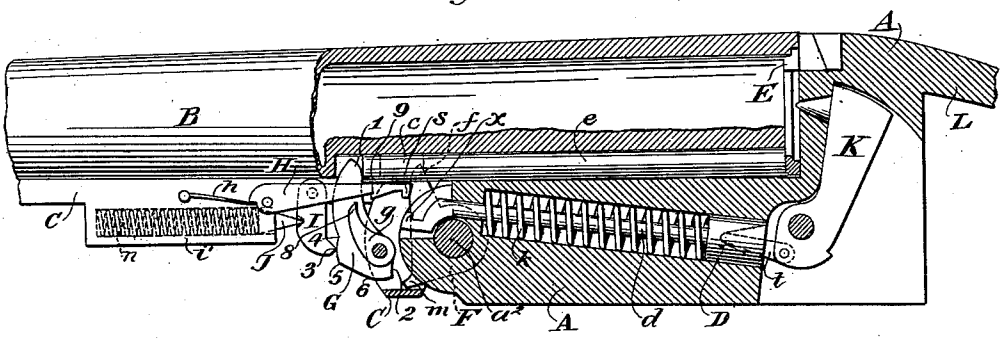


Fig. 2,

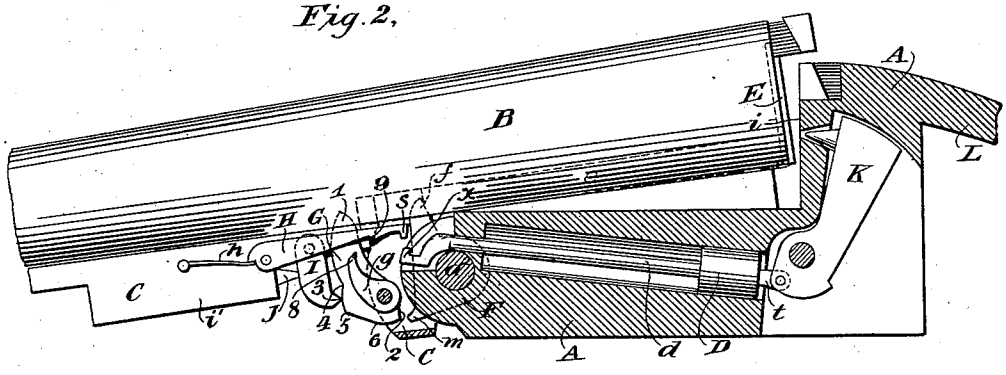
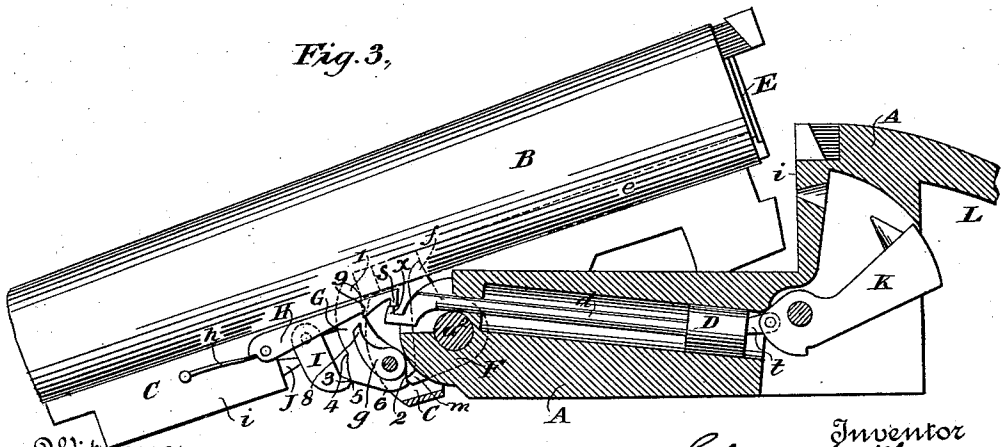


Fig. 3,



Witnesses

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(No Model.) 3 Sheets—Sheet 2.

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EJECTOR MECHANISM FOR BREECH LOADING FIREARMS.

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Fig. 4,

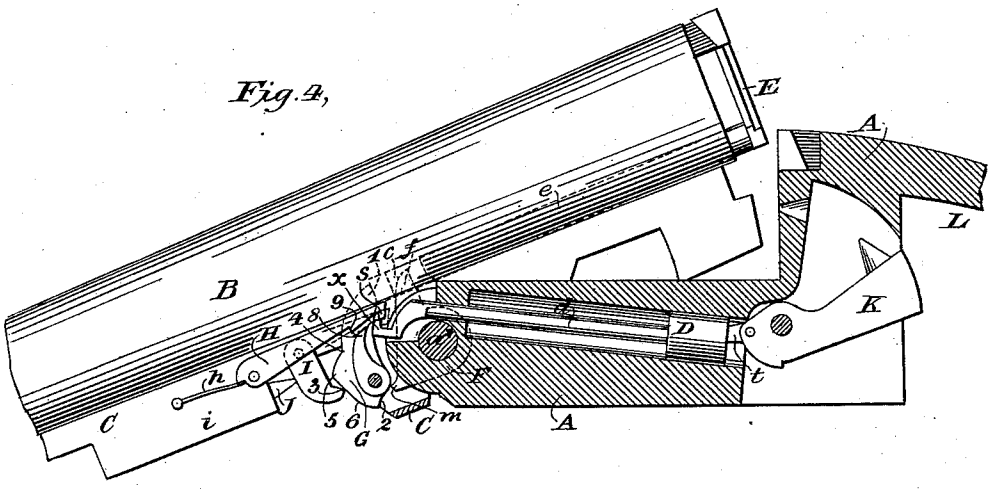


Fig. 5,

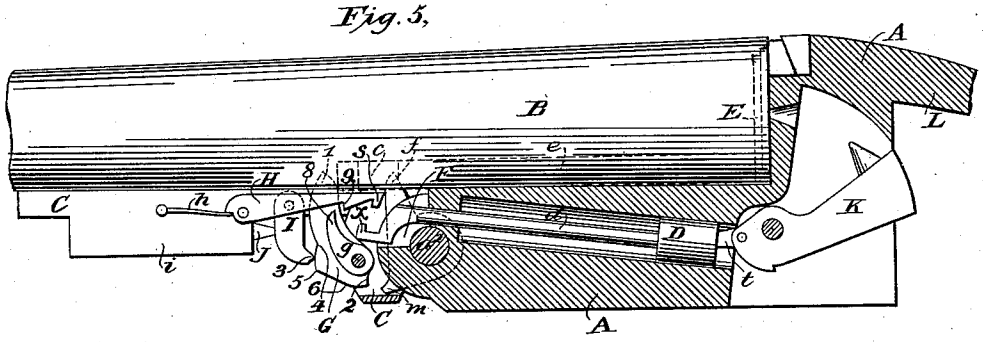
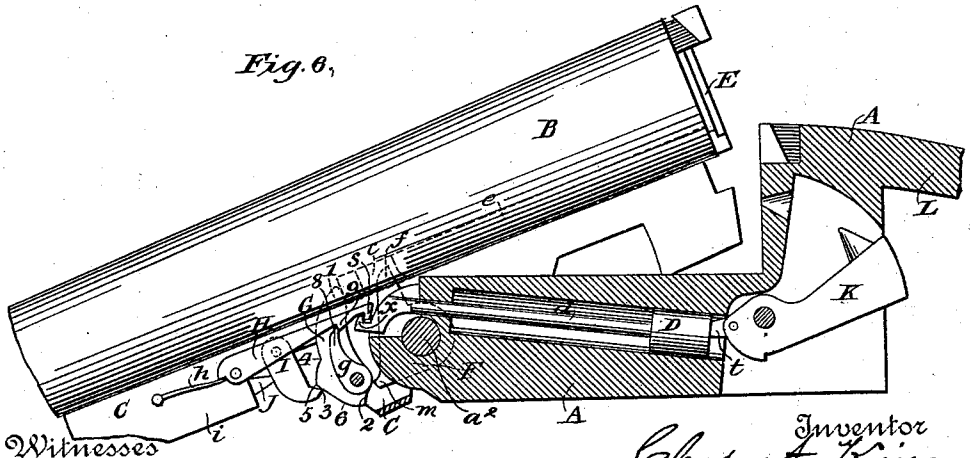


Fig. 6,



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EJECTOR MECHANISM FOR BREECH LOADING FIREARMS.

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Fig. 7,

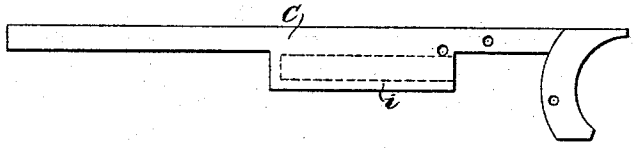


Fig. 8,

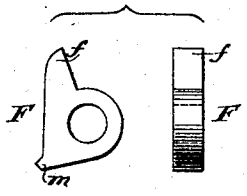
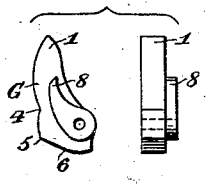


Fig. 9.



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UNITED STATES PATENT OFFICE.

CHARLES A. KING, OF MERIDEN, CONNECTICUT.

EJECTOR MECHANISM FOR BREECH-LOADING FIRE-ARMS.

SPECIFICATION forming part of Letters Patent No. 470,157, dated March 1, 1892.

Application filed July 27, 1891. Serial No. 400,797. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. KING, of Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Breech-Loading Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of breech-loading fire-arms in which the barrel or barrels is or are pivotally connected with the frame at a point forward of the recoil-plate or breech-piece of the gun in such manner that the rear portion of the barrel or barrels may be tipped up to expose the cartridge chamber or chambers (for the usual purposes) and in which some sort of "cartridge-ejector" is embodied that acts automatically to expel the empty cartridge shell or shells whenever the rear portion of the barrel or barrels may have been turned up sufficiently to permit the ejectment of such empty shell or shells and the reloading of the empty barrel or barrels. In this type of breech-loading fire-arm it is usual to have the hammer or hammers concealed, though they need not be hidden, and (whether concealed or not) the mode of operation is always such that whenever with the hammer or hammers in the position in which it or they do not affect the firing off of the gun and the barrel or barrels shall be tipped up at the rear end the said hammer or hammers will invariably be turned into the cocked position, or will be reset, ready for use again to explode the cartridge or cartridges of the reloaded barrel or barrels.

Previous to my invention guns of the type above alluded to have been provided with variously constructed and operating ejector devices or mechanisms operating to effect the extraction and complete expulsion of the empty cartridge-case; and my present invention has for its main object to provide for use a gun of the type alluded to provided with a novel construction of ejector that is exceedingly durable and efficient in practical use and at the same time comparatively simple, and hence easily made and not liable to get out of order.

In all the ejector mechanisms heretofore made that I know of the principle of construction and mode of operation have been such that some sort of spring or spring-actuated device operating to impart to the ejector device *per se* the necessary sudden motion has been put into an active or operative condition by some action upon it of an instrumentality influenced by the hammer of the gun during the movement of the hammer or cock toward and into the cocked condition. My improved ejector mechanism, however, differs in principle of construction and mode of operation from all those heretofore devised that I know of, in that in my ejector the spring-actuated device, which operates to impart to the ejector device *per se* its sudden movement, (as well as that part of the mechanism which performs the function of loosening and starting the expanded empty cartridge-case,) is thrown into the active condition by means of a projection on the forward end of the frame that operates to thus affect said spring-actuated device every time the barrel or barrels is or are fully tilted, irrespectively of whether the hammer or hammers is or are cocked during such tilting of the barrel or barrels or remain in the cocked condition during such tilting operations, and a detaining device is employed to sometimes intervene between the said spring-actuated device and the said ejector device *per se*, said detaining device being allowed to interfere with the said spring-actuated device only when the barrel or barrels shall have been tilted with the hammer or hammers in an already or previously cocked condition, and which detaining device is at other times prevented from performing this detaining function or office through the influence upon it of an intermediary device or devices that is or are connected with the hammer or hammers of the gun, all as will be more fully explained and perhaps made clearer by the hereinafter-contained description read in connection with the accompanying drawings, that form part of this specification.

In the drawings, Figure 1 is a longitudinal sectional elevation of so much of a double-barreled shotgun of that type to which my improvements relate as I deem it necessary to show in order to describe my invention with sufficient fullness and clearness to enable those skilled in the art to understand and practice it, and in said figure I have

shown the gun in the condition in which it would be at the time of firing, and I have purposely omitted some of the parts for the sake of perspicuity in the drawings. Fig. 2 is a substantially similar view, except that in this view the barrels are shown as slightly tilted up at the breech and the ejector device *per se* thereby moved sufficiently to merely loosen or slightly force rearwardly the empty cartridge shell or shells supposed to have just been exploded. Fig. 3 is another similar view, but with the barrels tilted almost to the utmost extent of their designed movement and showing all the working parts in the position which they occupy at the instant an empty shell or empty shells is or are expelled from or thrown clean out of the gun. Fig. 4 is a similar view, but with the barrels moved or tilted to the utmost limit of their oscillatory movement and showing most particularly the changed relationship of the spring-actuated device of the ejector and its detainer resulting from the finishing movement of the parts. Fig. 5 is a similar view, but with the barrels returned to their normal position and with the hammer or hammers cocked ready for firing. Fig. 6 is another similar view with the barrels tilted clear up at the breech without, however, having had the hammer or hammers lowered to fire the gun as in the case exhibited by Fig. 1. Fig. 7 is a detail view showing in side elevation the fore-end detached. Fig. 8 is a detail view showing in side and front elevations the spring-actuated device detached. Fig. 9 is a similar detail view of a piece which is secured to the forward end of the frame and that operates to actuate the ejector mechanism.

In the several figures I have used the same letter or numeral to indicate the same part, and in explaining now the constructions and operations of these parts I will assume throughout the description that the gun has only one barrel, lock, and ejector, since a clear understanding may thus, perhaps, be more easily derived from the specification of just how the gun works with reference to each of its two similar parts than if both parts were kept always in mind.

A is the frame, and B the barrel, these parts being hinged together at the pivotal point a^2, and the first-mentioned having a tank L, to aid in the securement together of the stock and frame of the gun, all after a fashion well known.

C is the fore-end or fore-arm, in which are mounted some of the working parts of the ejector mechanism, and which is detachably secured to the under side of the barrel in the relative position thereto and to the forward end of frame A, illustrated.

Within the frame A is arranged, in an approved manner, the lock mechanism, which in the case shown comprises a concealed hammer K (the gun illustrated being of that species known in the market as the "Parker" shotgun) that is actuated by a spiral mainspring *k*, confined within a cylindrical chamber or housing formed in the frame A, said spring being arranged to expand at one end against the forward end of a short plunger D, that is arranged to slide within said chamber and that has its rear end recessed out, as shown, for the accommodation of the forward end of a pusher-bar *t*, that at its rear end is pivoted to the lower end of the hammer K.

Extending forward from the part D and arranged interiorly and centrally of the spiral spring *k* is a rod or bar *d*, (which is either formed integrally with part D or has its rear end secured thereto,) the forward end of which is provided, as shown, with a hook *x*, that is adapted to engage with the rearmost downward projection *s* of a toothed detent or checking latch-bar H, in a manner and for a purpose to be presently explained. This latch-bar or detainer H is pivoted at its forward end in the fore-arm C, and has combined with it a small flat spring *h*, which at its forward end is fastened to the fore-arm C, and at its rear end presses constantly in an upward direction against a slight shoulder or lip-like projection on the forward end of the pivoted bar H, and thus continually tends to throw down the rear end of said bar, all in a manner which will be perfectly obvious to the skilled mechanic and gun-maker.

E *e* is the cartridge extractor or ejector device *per se*, which at its rearmost vertical portion E engages with a portion of the forward surface of the usual circular flange of the cartridge-shell, and the stem-like portion *e* of which slides within a suitable hole or cavity in the lower rear portion of the barrel A in a well-known manner, the said stem-like portion *e* being cut out or recessed at *c* in a manner not unusual for the accommodation of the starter device *f*, which operates, as will be presently explained, to impart a positive initial rearward movement to the ejector E *e*. This starter *f* is merely an upward tooth-like projection of a perforated block F, that has another lower and smaller tooth or projection *m*, and that is mounted, in the case shown, on the pintle or arbor a^2 in a manner to render it immovable relatively to the forward end of the frame A, and that will of course cause its projection *f* to relatively move longitudinally of the barrel A whenever the latter turns on the pintle a^2. The lower projection *m* of the part F operates to give an initial and positive movement to the flipping-dog or extractor-impeller G, which has a final sudden movement imparted to it through the medium of pendent pusher-link I, that in turn is actuated by a spiral spring *n*, confined and acting expansively within a cylindrical chamber *i* of the fore-end C, all as shown and as will be further explained later on. The flipping-dog or extractor-impelling device G, which, as shown, is pivoted near its lower end in the rearmost downwardly-curved portion of the fore-end C, is shaped so that its upper finger-

like portion 1 is perfectly adapted to press backward the forward end of the stem *e* whenever it may be brought into contact therewith, and then moved backward round about the pivotal point of connection of said part G with the part C, while the lower back surface 2 of said part G is of a proper form to permit the projection *m* to act thereupon in a manner calculated to easily turn part G on its pivotal point and give it its initial movement. The forward edge or face of said part G is practically composed of two surfaces, which at their meeting points or line form a sort of wedge-shaped ridge or apex, one of said surfaces extending from 4 to 5, lying in the arc of a circle, the center of which is coincident with the axis of the pivot on which G turns, and the other from 5 to 6, lying in a plane which, as seen, is nearest to the axis of said pivot at 6 and farthest from it at 5. On one side of the pivoted piece G is a pawl-shaped projection *g*, (preferably formed integrally with the said piece,) the upper end 8 of which engages, under circumstances or in a manner and for a purpose to be presently explained, with the tooth 9 of the detainer H. The pendent link I, which, as clearly shown, has its upper end pivotally connected to the fore-end C, is formed with a rearward angular projection 3, the ridge or knife-edge of which bears against the front edge or surface of the piece G, and said device I has formed in its front edge a conical depression, within which lies and works the apex of an acute-angled conical strut or pusher-piece J, the forward end of which rests against the rear end of, and is severely pressed upon by, the spiral spring *n*.

After what has so far been explained with reference to the construction and arrangement together of the various parts and their several offices or mechanical functions, the following description, read in connection with the drawings, will, I think, now make clear all the operations of the gun shown. Starting with a visual observation of Fig. 1 it will be understood that with the entire mechanism of the gun in the condition in which it is at the time of a discharge of the piece, the stem *c* of the shell-ejector is pushed forward (or into the barrel) as far as possible. The upper end or operative point 1 of the impelling finger or device G is at its most forward position. The hook-like forward end *x* of the reciprocatory bar or rod *d* is in its most rearward position, and hence is drawn wholly within the curved forward end of frame A. The relative positions of the parts G and I are such that the knife-edged portion 3 of the latter is bearing upon that portion (4 to 5) of the forward edge of the latter that lies in a circular curve struck from the center of motion of part G, and consequently the spring *n* is compressed to its highest degree of tension, and the detainer device or latch-bar H has its vibratory rear toothed end in about its lowermost (and normal) position, and under these conditions the mainspring *k* is of course under the least tension it is ever subjected to. The back edges of the upper parts of *f* and G are respectively in contact with the rear end of the recess *c* and the forward end of the stem-like portion *e* of the extractor E *e*. The lower projection *m* of the piece F is out of contact with and stands some distance back of the portion 2 of the impelling device G. The parts *x* and *s* of the rod *d* and the detainer H, respectively, are separated some distance, and although the part 3 of pendent link I is forced against the front edge of G with a force due to the maximum motive power of the spiral spring *n*, said link exerts no tendency to turn the part G on its axis or motion, because the pressure is in the direction of the dead-center, or in line with a radius of the concentrically-curved surface 4 5 of the piece G. Now if the rear end of the barrel be tilted up the initial movement thereof—say the movement to the position seen at Fig. 2—will have caused the following operations of the working parts, viz: The stationary lug or tooth-like projection *f* of piece F will have operated to positively push the stem *e* of the ejector device slightly rearward to the extent shown in Fig. 2, whereby the empty cartridge-shell will have been started backward ready to be expelled from or thrown out of the barrel, the projection *m* of F will have approached nearer to the surface 2 of the piece G, against which surface it is soon to press, and the intermediary devices by which the hammer is cocked by the tilting movement of the barrel (which parts of the gun are not shown, and may be like those shown in my patent of January 18, 1887, No. 356,321) will have begun to turn the hammer K in the proper direction to ultimately bring it into the cocked position, thus causing the hook end *x* of bar or rod *d* to move slightly forward, as illustrated. Now by a continuance of this tilting movement of the barrel—say to the extent shown at Fig. 3, which figure shows the barrel tilted almost to the greatest possible and designed extent—the following operations and effects will have resulted therefrom, viz: the hammer K will have been turned nearly or quite into the cocked position and the rod *d* thereby caused to slide forward to almost the full extent of its stroke, so that the upper end of its hook *x* will have reached a position such that the lower face of the tooth *s* of latch-bar H will in its bodily descent (along with the fore-end C) have come down onto the top of hook *x* and said bar H been thereby forced upward at its rear end, all as clearly shown, the pressure-surface 2 of piece G will have come into contact with the stationary projection *m* of part F and part G will have been thereby turned on its pivotal attachment until the finger-like portion 1 of C shall have come nearly or quite into contact with the forward end of stem *c* (which by this time has been moved a little farther rearward by the continued action of the positive push-

er-dog *f*) and until the concentrically-curved portion 4 5 of the front edge of G shall have traveled upwardly, so as to bring the point or ridge 5 about coincident with the knife-edged portion 3 of the spring-actuated pendant I and the tilted barrel will have been brought to a position such that a cartridge-shell expelled rearwardly from its firing-chamber will just about shoot out clear of the upper edge of the recoil-surface or battery-plate of the frame A. Now by a very slight further and final movement of the barrel into the position illustrated at Fig. 4 the following changes will occur, viz: The piece G will be turned a little farther on its axis by the action on its lower end of the projection *m* of F, and, the angle 5 of G passing upwardly by the knife-edge 3 of I, said swinging piece I will, under the powerful influence of the compressed spring *n*, operate to suddenly flip up the angular portion 5 of G, thus causing its finger-like portion 1 to impart a sudden and forcible movement (rearwardly) to the stem *e* of the extractor E *e*, and by this movement of said extractor the empty shell is shot or thrown out of the open breech of the barrel B, passing over the top of the battery-plate of the frame. An instant after the flipping or sudden oscillatory movement of the impelling dog or piece G shall have occurred the upper end or point of the hook *x* of the rod *d* will have passed forward slightly, so as to be clear of the tooth *s* of the latch-bar H, and so that under the slight influence of its spring *h* said detaining device will then descend at its rear end into its normal position, the parts *x* and *s* then assuming the relative positions illustrated in dotted lines. Now when the barrel shall be tilted down again after reloading into the position seen at Fig. 5, the descent past the battery-plate of the protruded rear end E of the ejector will result of course in the forcing forward of the ejector device E *e*, (and the forcing home into the firing-chamber of the fresh cartridge,) and this enforced movement of *e* will cause the finger-like portion 1 of part G to be pushed forward and downward (against the resistance of the spring-actuated pendant I) until the parts G I *e f m* H all assume, as shown in this figure, their original conditions or positions, the point 8 of pawl *g* passing along under tooth 9, lifting H, and getting finally in front of said tooth 9, as shown. If, however, the barrel A be now again tilted up at the rear end without having first exploded the cartridge by a descent of the hammer K, the opening up thus of the barrel without first having let fall the hammer will not cause the hereinbefore-explained operations of the ejector mechanism and the latter will not operate to expel from the gun the unexploded cartridge, for the following reasons: As seen at Fig. 5, when the gun is closed and cocked ready for firing, the detainer device or latch-bar H stands in such relationship to the flipping-dog G and its pawl-like lateral projection *g* that if the said part G be turned on its axis of motion in the proper direction to cause its finger-like part 1 to push backward the forward end of stem *e* the initial movement of G in such direction will bring the point 8 of the projection *g* up against the forward face of the tooth 9 of the latch-bar H, when any further movement of G is rendered impossible by the interference thus of the said toothed latch-bar or detaining device. Therefore, although in tilting up the barrel without having first let fall the hammer, as illustrated at Fig. 6, the positively-actuating devices *f* and *m* will have respectively caused the stem *e* to have been pushed rearwardly (to start out the loaded cartridge) and the flipping device G to have been turned on its pivot in the operative direction until the angle 5 shall have just passed by the knife-edge 3 of pendant I, this actuating pendant I is powerless to further move the part G, (though it exerts its tendency to move it,) because any further movement of G will be estopped by the abutment of the point 8 of its portion *g* against the forward face of the ratchet-shaped tooth 9 of the part H. The mechanism which under the designed condition of affairs operates as I have hereinbefore explained is simply prevented from completing its operation and producing its intended effect when, by reason of the gun not having been fired off, such effect is not desired. This peculiar mode of operation, as is well understood by gun-makers and those familiar with the use of fire-arms of the type shown, is in practice indispensably necessary in guns having more than one barrel, as otherwise in tilting up the united barrels to recharge one of them only the loaded cartridge of the unfired barrel would always be expelled or thrown out. Of course in closing down the barrel again from the condition seen at Fig. 6 to that shown at Fig. 5 the recoil-plate acts upon E to restore the ejector device *per se*, the loaded cartridge, and the working parts G and I to the conditions in which they appear at Fig. 5, and it will be understood that the forms and sizes of all the parts are preferably such, and that their relative movements can be so timed, that in the case illustrated by Figs. 5 and 6 the point 8 will be so nearly in perfect contact with the forward face of tooth 9 of the detainer device H that at the instant when the knife-edge 3 passes the angle 5 of flipper-dog G there need be no concussive or other injurious action of the moving and contacting parts. It is desirable to have the hook end *x* of the rod *d* and the tooth-like projection *s* of the latch-bar H shaped so that, while the designed tripping (or lifting) action of the former on the latter as the barrel is tilted up will be positive and certain, there will be no unnecessary friction between the parts and no jar or other unduly wearing action of the parts when the spring-actuated tooth *s* drops in rear of the hook *x*, and it is not necessary that there be any material wear or hammer between the tooth 9 of H and the point 8 of

the projection *g* of piece G, though, of course, in the restoration of the part G to its original position after the expulsion of the empty shell (and the subsequent reloading and closing of the barrel) the point 8 of pawl *g* must be forced forward beneath the ratchet-like tooth 9, thus lifting the vibratory end of H against the depressing tendency of its spring *h*. In the redescent, however, of the latch-bar H, after the point 8 gets in front of its tooth 9, said bar may come to rest on some suitable stopping surface or device in the fore-end C, so that it will neither strike nor press upon the point 8, and hence so that this point will not be subjected to any undue wear and tear.

As in a mechanism of the type shown it is necessary, in order to enhance the practical efficiency and durability of the gun, to eliminate out of the structure all the elements of wear and tear possible and at the same time have the small parts strong and powerful in their actions, I deem it important in making a gun embracing my improved ejector mechanism to have all the active parts so timed in their movements and so arranged together that there shall be no unnecessary jarring or abrasive wear and tear on any of the working elements. By the use, in combination with the oscillatory impelling or suddenly-flipping dog or piece G and the strong spring *n*, necessary to move said dog with rapidity and the proper degree of force, of an intermediate pendent link I, arranged and operating as described, I am enabled to produce an organized mechanism in which the necessary angular parts—as, for instance, 3 and 5—may be made of very hard and durable metal, which is of considerable advantage. I therefore consider the combination shown of some importance, though it embodies only a minor part of my present invention. In like manner the minor novel feature of the combination, with a spring-actuated device I, of a confined spiral spring acting expansively, and an intermediately-located piece J, having a sharp and very hard apex stopped in a less acute-angled socket in the hardened piece I and bearing at its circular base on the compressed spring *n*, I consider of more or less importance, though so far as the primary or main feature of my invention is concerned the gun shown might be made differently with reference to the minor features of my improvement just alluded to.

With reference to the main or most important part of my invention, the gist of which rests in the idea of a mechanism for automatically giving to the ejector device *per se* the necessary sudden movement put into action by means of devices with which the forward end of the frame is provided and prevented from effectuating its action on the extractor *per se* (except when the hammer shall have first been lowered) by a detaining device or a barrier to its complete movements, controlled through the movements of the hammer, various changes in the details of construction may of course be made by the experienced mechanic and gun-maker without departing from the novel principle of construction peculiar to my invention. It is not necessary in carrying into effect this main feature of my invention that the form of detaining device shown or the kind of device exhibited for influencing the detainer through the movements of the tumbler or other moving part of the hammer be used, so long as the described structural features by which the principle of my invention is carried into effect be employed.

Having now so fully described my invention that any one ordinarily skilled in the art can make and use a gun containing it, either in whole or in part, and carried into effect either in the form shown or under some modification thereof, what I claim as new, and desire to secure by Letters Patent, is—

1. In a fire-arm of the type shown and described, the combination, with the frame, the hammer carried thereby, the tilting barrel, and the ejector device *per se* arranged therein, of a mechanism operating automatically to impart motion to the said ejector device and having its parts thrown into the condition to thus automatically act by a fixture or or projection on the frame, and a detaining device or mechanism under the control of the hammer and operating to engage the said automatically-operating mechanism and prevent it from affecting the said ejector device except when necessary, all substantially as hereinbefore set forth.

2. In a fire-arm of the type shown and described, the combination, with an impelling device G, formed with a surface 4 5, concentric to the axis of motion of said device, and means for turning said device through the tilting movement of the barrel, of an actuating-spring carried by the fore-end C, and a movable part located intermediately of said impelling device and said actuating-spring and formed or provided with a hard working ridge or knife-edge acting on the impelling device, the whole constructed to operate in substantially the manner described, for the purpose set forth.

3. In a fire-arm of the type shown and described, the combination, with a pivoted impelling device G, a moving part I, acting directly on said impelling device, and an actuating-spring to move said parts, of piece J, interposed between the spring and the piece I and having an acute-angled apex stepped in a socket-bearing in the part I, all substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand this 13th day of July, 1891.

CHARLES A. KING.

In presence of—
JAMES R. SLOANE,
RALPH A. PALMER.