

Jan. 5, 1965

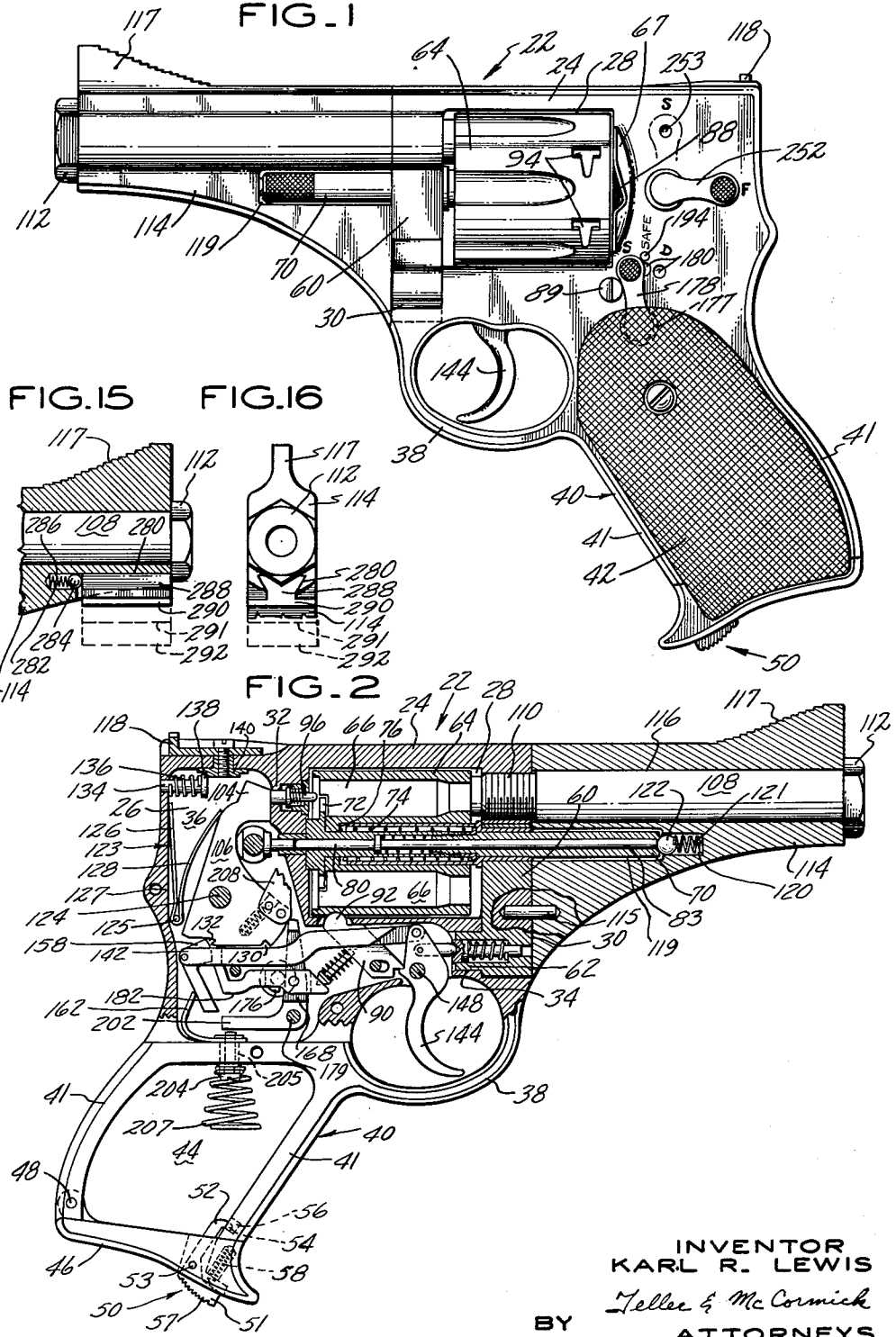
K. R. LEWIS

3,163,951

FIREARM FIRING MECHANISM

Filed Nov. 23, 1960

4 Sheets-Sheet 1



INVENTOR
 KARL R. LEWIS
 BY *Tellee & Mc Cormick*
 ATTORNEYS

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K. R. LEWIS

3,163,951

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FIG. 5

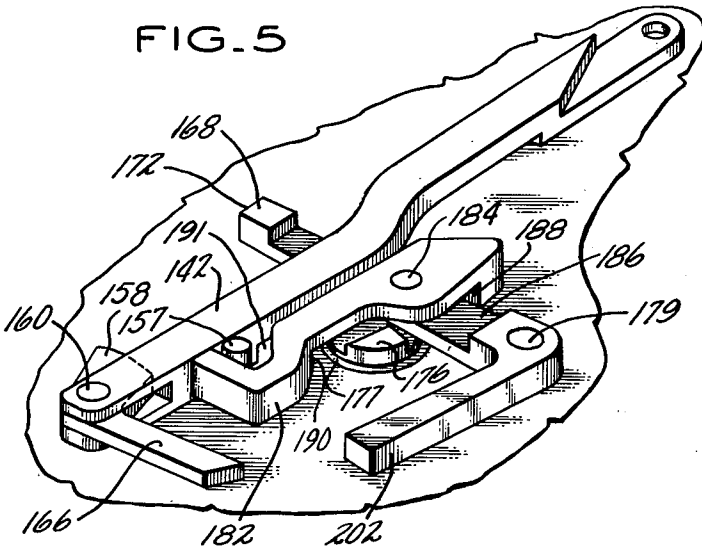


FIG. 13

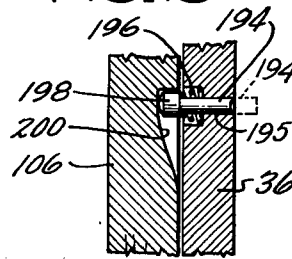


FIG. 10

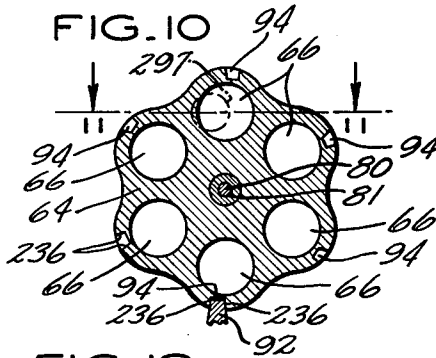


FIG. 11

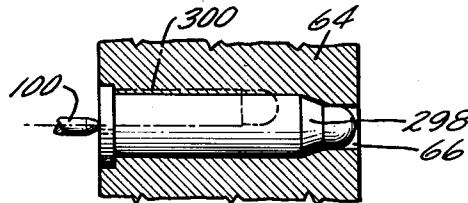


FIG. 12

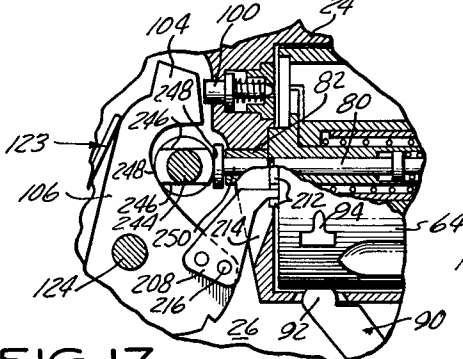


FIG. 14

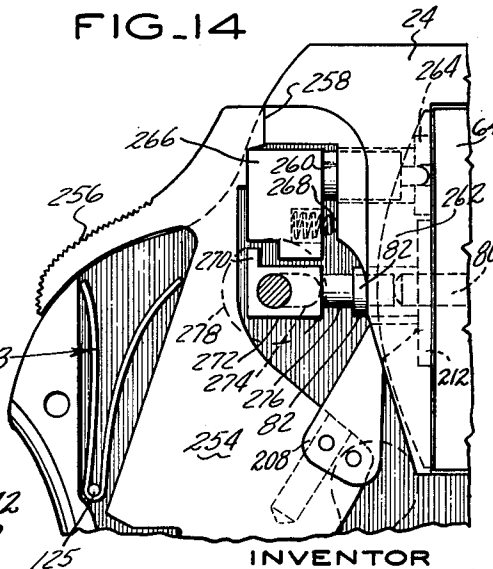
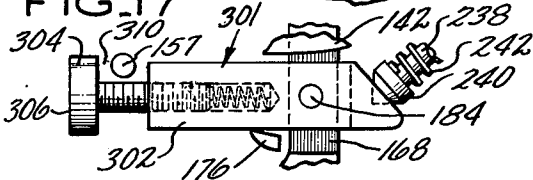


FIG. 17



INVENTOR
KARL R. LEWIS
BY *Teller & Mc Cormick*
ATTORNEYS

Jan. 5, 1965

K. R. LEWIS

3,163,951

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Filed Nov. 23, 1960

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FIG. 6 SINGLE ACTION
FIRST TRIGGER PULL

FIG. 7 SINGLE ACTION
SECOND TRIGGER PULL

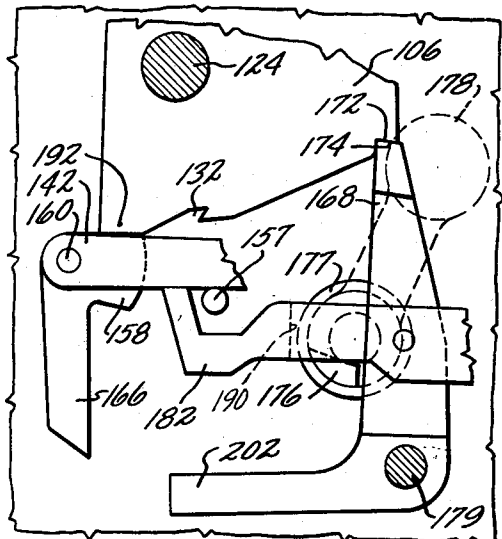
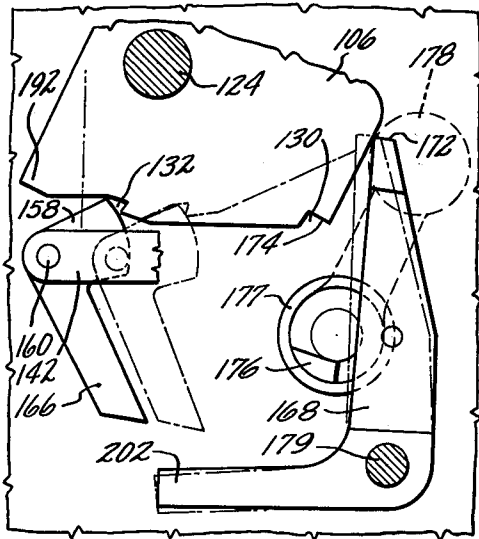
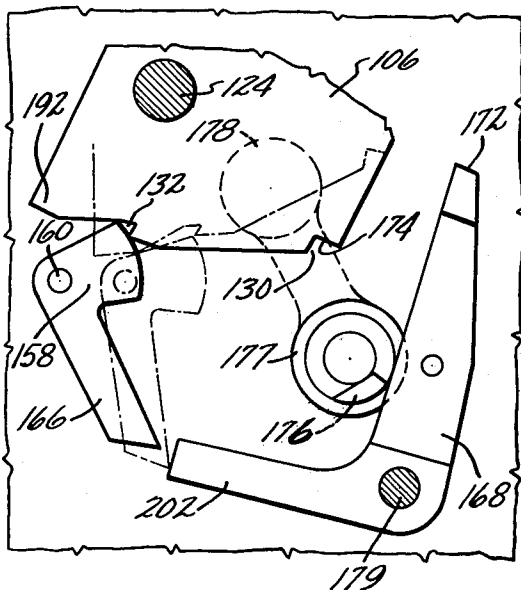
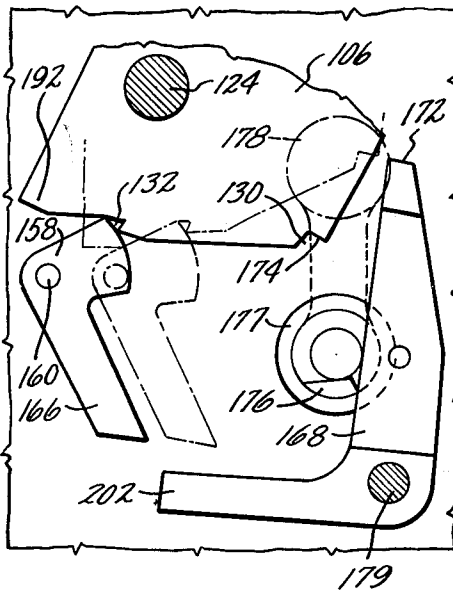


FIG. 8 ON SAFE.

FIG. 9 DOUBLE ACTION



INVENTOR
KARL R. LEWIS
BY Jeller & McCormick
ATTORNEYS

3,163,951
FIREARM FIRING MECHANISM
 Kari R. Lewis, 2450 Grant Ave., Ogden, Utah
 Filed Nov. 23, 1960, Ser. No. 71,339
 43 Claims. (Cl. 42-65)

This invention relates to firearms, and deals more particularly, but not exclusively, with improvements in the construction of small firearms or pistols of the revolver type.

Although the invention concerns improvements intended primarily for use in connection with small firearms of the revolver type illustrated herein, certain improvements such as those relating to the firing mechanism find utility in other types of firearms as well. Therefore, the invention should not be construed as extending in all its aspects to only the type of firearm illustrated, but when the improvements do find utility in other types of firearms, it is intended that the invention extend also to such other firearms.

As used herein, the term "single action" means that the fire arm operates in such a manner that the trigger must be pulled twice to effect firing. On the first stroke of the trigger the hammer is cocked and is held in the cocked position until the second stroke of the trigger which releases the hammer for firing. This type of firing is generally more accurate than double action firing and is preferred for target shooting. The term "double action" as used herein means that the firearm operates in such a manner that each pull of the trigger effects firing. That is, with each stroke of the trigger the hammer is both cocked and released. This type of firing is, of course, more rapid than single action firing and is often preferred for police and military purposes. The term "safety action" as used herein refers to operation of the firearm in a deactivated manner whereby the trigger is ineffective to cause firing even with repeated pulling thereof.

The primary object of this invention is to provide an improved firearm of the pistol or handgun type, which firearm is more accurate than prior firearms in its class, which is safer to handle, and which is sturdy and reliable, yet simple in construction and easy to manufacture.

Another important object of this invention is to provide a firing mechanism having particular utility in a firearm of the pistol type, but which is also capable of being used in other types of firearms, such firing mechanisms being selectively adjustable to produce either single action, double action, or safety action operation of the firearm.

Another object of this invention is to provide a pistol having a firing mechanism of the foregoing character and wherein the selective adjustment between the different types of operation may be made by movement of the thumb of the hand holding the pistol without shifting the hand or pistol from normal firing position.

Another object of the invention is to provide a firearm having either single action or double action operation and having trigger cocking of the hammer on single action operation, and in which firearm the trigger assumes the same forward position on both single and double action operation so that the trigger finger is not repositioned when the firearm is changed from one type of operation to the other, the firearm further including means for adjusting the trigger pull poundage required to effect firing on single action, which means are readily accessible from the exterior of the firearm so that adjustments may be made without the necessity of disassembling the firearm.

Another object of this invention is to provide a firearm of the revolver type which is selectively adjustable to pro-

duce either single action or double action operation and wherein on single action operation the cylinder is freed at the instant of firing to permit the bullet entering the barrel to more perfectly align the cylinder chamber with the barrel bore, thereby increasing the accuracy of the firearm and reducing stresses and lead shaving.

A further object of this invention is to provide a firearm of the revolver type in which the cylinder and barrel are readily replaced, without changing the sights, by various other cylinders and various other barrels to adapt the firearm for use with different caliber cartridges. Preferably, the various barrels and cylinders which may be used in the firearm have such a relationship of lengths that as a safety feature it is impossible to match a small caliber barrel with a large caliber cylinder.

Another object of this invention is to provide a firearm of the revolver type which includes a firing mechanism that may be made with either an enclosed or an exposed hammer, which firearm in the enclosed hammer model includes an indicator pin for indicating whether the hammer is cocked, and which in the exposed hammer model includes an inertial firing pin that eliminates the conventional rebound lever and prevents the firearm from being accidentally fired by the firearm falling or being otherwise struck on the exposed hammer.

An additional object of the invention is to provide a firearm with working parts designed to give ample room for the installation of needle bearings at pivot points to reduce friction and wear and to extend useful life of the firearm.

Still other objects of this invention are to provide a pistol of the revolver type having a storage chamber in the grip with an improved closure and to provide a firearm having improved means for weighting the same for target shooting.

Various other objects of the invention will be apparent from the drawings and the following description and claims.

The drawings show the preferred embodiments of the invention and such embodiments will be described, but it will be understood that various changes may be made from the constructions disclosed, and that the drawings and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

FIG. 1 is a side view of firearm embodying the invention,

FIG. 2 is a side view of the firearm shown in FIG. 1 with the upper portion thereof being shown in vertical longitudinal section and with the lower portion being shown in elevation with the grip pieces removed from the frame, the parts of the firing mechanism in this view being shown in the neutral position of single action firing,

FIG. 3 is an enlarged fragmentary view similar to the upper rear portion of FIG. 2, but with the firing mechanism being shown in the cocked position of single action firing.

FIG. 4 is an enlarged fragmentary view similar to the upper rear portion of FIG. 2, but with the firing mechanism being shown in the cocked position of double action firing.

FIG. 5 is a perspective view illustrating the structure of certain parts of the firing mechanism,

FIG. 6 is a fragmentary and somewhat schematic view showing the relationship between certain parts of the firing mechanism when the latter is adjusted for single action firing. The solid lines indicate the positions occupied by the parts in their neutral positions at the beginning of the first trigger pull, while the broken lines indicate the

positions occupied by the parts at the end of the first trigger pull,

FIG. 7 is a view similar to FIG. 6 but with the parts shown in the positions occupied at the beginning of the second trigger pull of single action firing,

FIG. 8 is a view similar to FIG. 6 but illustrating the parts as adjusted for safety action operation. The solid lines indicate the positions occupied by the parts at the beginning of the trigger pull, while the broken lines indicate the positions occupied at the end of the trigger pull,

FIG. 9 is a view similar to FIG. 6 but illustrating the parts as adjusted for double action operation. The solid lines show the positions occupied by the parts at the beginning of the trigger pull, while the broken lines indicate the positions occupied near the end of the trigger pull.

FIG. 10 is a transverse sectional view taken through the cylinder of the firearm of FIG. 1 on a plane passing through the cylinder notches,

FIG. 11 is a fragmentary sectional view taken on the line 11—11 of FIG. 10,

FIG. 12 is an enlarged fragmentary vertical sectional view of a portion of the firing mechanism shown in FIG. 2, but with the parts being shown in the positions occupied for blocking the hammer and for releasing the cylinder and with the lower portion of the figure being taken on a plane located in front of the plane on which the upper portion of the figure is taken so as to show the arrangement of the cylinder rotating mechanism,

FIG. 13 is a fragmentary transverse sectional view through the frame and hammer showing the selector lever blocking pin and the hammer cam surface,

FIG. 14 is a fragmentary longitudinal sectional view showing a firearm comprising a modified form of the invention and having an exposed hammer,

FIG. 15 is a fragmentary longitudinal sectional view of the front portion of a firearm comprising a modified form of the invention and which firearm includes provision for adding weights,

FIG. 16 is a front end view of the firearm shown in FIG. 15, and

FIG. 17 is a side view illustrating an alternate form of releasing arm.

General Organization

Referring to the drawings and first particularly to FIGS. 1 and 2, there is shown a firearm, indicated generally at 22, embodying the invention. The particular firearm shown is of the revolver pistol type; however, certain aspects of the invention apply to other types of firearms and are therefore not to be construed as being limited to the type of firearm shown. The illustrated firearm is therefore to be considered as exemplary only in regard to these aspects. The firearm 22 comprises a frame 24 which is provided with a mechanism cavity 26, a cylinder recess 28 and a crane recess 30 in the upper portion thereof. Between the mechanism cavity 26 and the cylinder recess 28 is a transverse or intermediate wall 32, and a longitudinal bore 34 extends between the crane recess 30 and the mechanism cavity 26. The mechanism cavity 26 has one side wall 36 which is integral with the other portions of the frame. The outer surface of this side wall is shown facing the viewer in FIG. 1. The other side wall of the mechanism cavity is provided by a removable side plate, not shown, which is attached to the side of the frame facing the viewer in FIG. 2 by means of screws or other fasteners. Removal of the side plate provides access to all of the parts of the firing mechanism shown in FIG. 2.

The lower portion of the frame includes a trigger guard 38 of conventional configuration and a depending grip portion 40 located rearwardly of the trigger guard. As shown in FIG. 1, the grip portion of the frame comprises two generally downwardly extending arms 41, 41 that are spaced apart longitudinally of the frame. The

arms 41, 41 have attached thereto two side pieces 42, 42 which are located one on either side of the frame and which are preferably made of wood or plastic. These side pieces, together with the grip portion of the frame, constitute the grip of the firearm, the grip being hollow to provide a storage chamber 44 for holding extra cartridges or other articles. Access to the storage chamber 44 is provided by a swingable floor plate 46, as shown in FIG. 2, which is pivotally connected adjacent its rear end to the grip portion 40 by a transverse pin 48. The forward end of the floor plate 46 is provided with a releasable latch means indicated generally at 50 which normally holds the floor plate in closed position in respect to the chamber and which is manually operable by a thumb or finger to release the floor plate for swinging movement away from the grip portion and about the axis of the pin 48. The latch means 50 includes an L-shaped latch bolt 51 having one arm 52 that extends upwardly through an opening in the floor plate. The latch bolt is pivotally connected to the floor plate by a transverse pin 53. The inner end of the latch bolt arm 52 has a small finger 54 thereon which is normally received in the notch 56 of the frame grip portion as shown in FIG. 2. The other arm 57 of the latch bolt 51 extends forwardly and downwardly beyond the lower surface of the floor plate and is biased outwardly, or in a clockwise direction as viewed in FIG. 2, by a spring 58. The spring 58 is received in a bore formed in the floor plate and engages the inner surface of the latch bolt arm 57. The bias exerted by this spring on the latch bolt serves to normally hold the finger 54 of the arm 52 in engagement with the notch 56 to hold the floor plate closed with respect to the bottom of the storage chamber 44. To open the floor plate the arm 57 of the latch bolt is pressed inwardly in opposition to the spring 58 which causes the finger 54 to be swung rearwardly and out of engagement with the notch 56. The floor plate may then be swung downwardly from the position shown in FIG. 2 to provide access to the storage chamber 44.

A crane 60 is attached to the frame for outward swinging movement about an axis extending longitudinally of the frame. This mounting of the crane to the frame is obtained by providing the crane with a pivotal portion 62 which is loosely received by the longitudinal frame bore 34. As viewed in FIG. 1, the crane 60 is swingable outwardly about the axis of the longitudinal bore 34 in a direction toward the viewer from the position shown. Swinging movement of the crane in a direction away from the viewer in FIG. 1 is limited by engagement of the crane with the side wall of the crane recess. This side wall is not shown in FIG. 1, but is located immediately behind the crane and is integral with the frame.

A cylinder 64 of somewhat conventional construction is rotatably secured to the crane for rotation about an axis extending longitudinally of the firearm. Normally, the cylinder 64 is positioned within the cylinder recess 28 as shown in FIGS. 1 and 2, but it is swingable outwardly therefrom with the crane 60 in order to displace the cylinder to an open position located to one side of the frame for loading and shell ejecting purposes. The cylinder 64 includes a plurality of cartridge receiving chambers 66, 66 which are shown empty in FIG. 2. When the cylinder is in its normal position, the intermediate wall 32 of the frame and the flanges 67, 67, one of which is formed on either side of the frame behind the cylinder, at least partially close the rear ends of the cartridge chambers 66, 66 to prevent the addition or removal of cartridges to or from the chambers; however, when the cylinder is swung outwardly from the frame the rear ends of the cylinder cartridge chambers are positioned away from the wall 32 and the adjacent flange 67 so that cartridges may be removed or added.

The cylinder 64 is rotatably secured to the crane 60

for rotation about an axis extending longitudinally of the frame. As best shown in FIGS. 3 and 4, the cylinder mounting means includes a sleeve 63 which is fixedly secured to the crane 60 and extends rearwardly therefrom through the center of the cylinder 64. The outer surface of the sleeve 63 fits loosely with the center bore of the cylinder 64 to permit the cylinder to rotate about the sleeve. An ejector rod 70 is received within the sleeve 63 and is longitudinally slidable relative thereto, the sleeve 63 at its forward end having a reduced diameter section which engages and slidably supports the ejector rod. At its rear end the ejector rod 70 is provided with a conventional cartridge extractor 72 which is movable rearwardly to eject cartridges from the cylinder when the cylinder is disposed in its open position to the side of the frame. In ejecting the cartridges the extractor engages the rims of the cartridges in the cartridge chamber and moves them rearwardly and out of the chambers. The ejector rod 70, it will be noted, extends forwardly beyond the crane 60 and this forwardly extending portion of the rod is movable rearwardly by the user to effect a rearward cartridge ejecting movement of the cartridge extractor. The ejector rod 70 and the cartridge extractor are normally held in the forward positions shown in FIGS. 2, 3 and 4 by a compression spring 74 which is located in the bore of the sleeve 63 and which at one end engages an abutment 76 in the cylinder 64 and on its other end engages an ejector rod collar 78 carried by the ejector rod 70.

The cylinder 64 is normally held in the closed position illustrated in FIGS. 1 and 2 by means of a cylinder bolt 80 which has a rearward portion slidably received in the bore 81 of the cartridge extractor and in the bore of a sleeve 82 fitted into the intermediate frame wall 32, and a forward portion slidably received in the bore 83 of the ejector rod 70. The cylinder bolt 80, as seen best in FIGS. 3 and 4, includes an integral collar 84 which is normally held in the rearward position shown by a spring 86. The means provided for moving the cylinder bolt 80 forwardly to unlock the cylinder from the frame for outward swinging movement thereof will be described in more detail below. Referring to FIG. 1, however, it will be noted that the flange 67 located on the side of the frame from which the cylinder 64 swings is provided with a cam surface 88 which engages the rear end of the cylinder bolt 80 and cams the same forwardly as the cylinder is swung from its open position back to its normal closed position. When the cylinder is in its open position it is held in place on the sleeve 63 by a blocking element 89 which is connected with the frame and has a forwardly facing surface that abuts the rear face of the cylinder to restrain its rearward movement.

The cylinder 64 is releasably held in a fixed angular position with respect to the frame by a cylinder stop 90 having a head 92 which is engageable with any one of several cylinder notches 94, 94 which are formed in the outer surface of the cylinder and arranged in an annular series. The number of notches 94, 94 corresponds to the number of cartridge chambers 66, 66 and the notches are so located that when the cylinder stop head 92 is in locking engagement with a notch 94 a corresponding cartridge chamber 66 will be in proper operative relationship with the firing pin means 96 which is located in the intermediate wall 32.

The firing pin means is or may be constructed as shown in FIGS. 2, 3 and 4 wherein the means is shown to include a recoil plate 98, a firing pin 100 and a spring 102 between the recoil plate and the firing pin. The spring urges the firing pin rearwardly toward a retracted position relative to the ends of the cartridges in the cartridge chambers and opposes the forward firing movement of the pin. In the fully retracted position of the firing pin shown in FIGS. 3 and 4 the pin extends rearwardly the intermediate wall 32 and is engageable with the head portion 104 of the hammer 106 during the forward firing

movement of the latter so that a forward firing movement is imparted to the pin. The firing pin assumes its fully retracted position, however, only when the hammer is displaced rearwardly toward its cocked position. When the hammer is in its neutral or uncocked position it engages the pin and holds it in a position displaced somewhat forwardly of its fully retracted position. When a cartridge is positioned in the upper or active cartridge chamber 66, the forward end of the pin will engage and fire the cartridge before the forward movement of the hammer head 104 is arrested by its striking the intermediate wall 32. The hammer 106 forms a part of the firing mechanism of the firearm and will be described in detail hereinafter.

The barrel 108 of the firearm is located in front of the cylinder 64 and has a threaded rear portion 110 which is received in a corresponding threaded opening in the frame 24. The barrel, of course, is so located with respect to the frame and the cylinder 64 that the longitudinal axis of its bore is in alignment with the longitudinal axis of the upper or active cartridge chamber 66 which is held in firing position by the cylinder stop head 92. The forward end of the barrel 108 is provided with a radially outwardly extending flange 112. A shroud 114 surrounds the barrel 108 and extends substantially the entire length of the barrel from the forward end face of the frame to the barrel flange 112. The shroud 114 has a bore 116 for receiving the barrel which bore conforms closely to the outside surface of the barrel, but with a sufficiently loose fit existing between the barrel and the shroud as to permit the barrel to slide longitudinally and angularly of the shroud during assembly or disassembly of the firearm. The shroud 114 is held longitudinally in place on the barrel by means of engagement with the forward face of the frame 24 at its rear end and by means of engagement with the barrel flange 112 at its other end. Angular displacement of the shroud with respect to the frame is prevented by means of a locking pin 115 which extends between the frame and the shroud and which is preferably located below the barrel as shown in FIG. 2. In FIG. 2 the partial section illustrating the locking pin 115 is taken on a plane located in front of or closer to the viewer than the plane on which the remainder of the view is taken. The upper front portion of the shroud 114 is provided with a front sight 117 which is preferably formed integral with the shroud, and a rear sight 118 is attached to the rear portion of the frame 24 as shown in FIGS. 1, 2, 3 and 4.

As shown best in FIGS. 1 and 2, the shroud 114 also includes a longitudinally extending recess 119 formed in one side thereof for receiving the ejector rod 70 when the crane 60 and the cylinder 64 are in their normal closed or firing positions with respect to the frame. Adjacent the forward end of the recess the shroud is provided with a bore 120, FIG. 2, which receives a spring 121 and a ball 122, the spring urging the ball rearwardly as shown and the ball being retained in the bore by the shroud being staked adjacent the mouth of the bore. The ball 122 extends partially from the bore 120 and normally engages the forward end of the ejector rod 70, the mouth of the bore 83 of the ejector rod forming a detent for receiving the ball. The spring-loaded ball 122 therefore serves as a support for the forward end of the ejector rod when the cylinder is in closed or firing position.

Firing Mechanism

In accordance with the invention, the firearm 22 is provided with a firing mechanism which is selectively adjustable to provide single action operation, double action operation or safety action operation. To this end, the firing mechanism includes the hammer 106 and a main spring 123 as shown in FIGS. 2, 3 and 4. The hammer is normally held in a neutral position by the main spring 123 which, in the firearm of this invention, corresponds to the "just fired" position of the hammer, and the ham-

mer is pivotally connected with the frame 24 for swinging movement between the neutral position and the cocked position with the spring 123 serving to oppose its movement toward the cocked position and thereafter serving to return the hammer to the neutral position at a relatively high velocity to cause the hammer head 104 to strike the firing pin 100 with sufficient violence to cause firing of the cartridge in the upper cartridge chamber 66 of the cylinder 64. In FIG. 2 the hammer is shown in its neutral position, while in FIGS. 3 and 4 it is shown in or near its cocked position. A transverse stud 124 is provided to pivotally mount the hammer 106 to the frame, the stud 24 being fixedly connected with the frame and the hammer 106 being loosely mounted thereon. The main spring 123 is a generally U-shaped spring having its closed end partially surrounding a pin or stud 125 which is fixed to the frame behind the hammer 106. That is, the closed end of the spring is not coiled around the stud 125 but instead extends or is wrapped around the stud by an angle of no greater than 360°, thereby permitting the spring to be made of relatively wide flat stock. The spring extends upwardly from the stud 125 and has one arm 126 in engagement with the rear wall 127 and the other arm 128 in engagement with the rear face of the hammer 106. The two arms 126 and 128 of the main spring 123 are normally spread apart, as shown in FIG. 2, so as to urge the hammer toward its neutral position. The bottom portion of the hammer 106 extends below its mounting stud 124 and is provided in the bottom surface thereof with a sear notch 130 and a cocking notch 132, the sear notch 130 being located forwardly of the cocking notch 132, as shown. The purpose of these notches will be described below.

Means is also provided in association with the firing mechanism for visually indicating the cocked condition of the hammer 106. As shown in FIGS. 2, 3 and 4, this means includes an indicator pin 134 which is slidably received in the rear wall 127 of the mechanism cavity. As indicated in FIG. 2, the indicator pin 134 is provided with a spring 136 which, when the hammer 106 is in its neutral position, holds the pin in a forward unexposed position at which position none of the pin 134 extends beyond the rear face of the wall 127, the indicator pin 134 including an enlarged head 138 adjacent its forward end which engages the lower end of the rear sight mounting bushing 140 when the pin is in the forward unexposed position. The spring 136, as shown in FIGS. 2, 3 and 4, surrounds the pin 134 and extends between the head 138 and the forward face of the wall 127. When the hammer 106 is moved to the cocked position shown in FIGS. 3 and 4, the rear face of the hammer head 104 engages the head 138 of the pin 134 and moves the pin rearwardly to an exposed position at which the rearward portion of the pin extends rearwardly beyond the rear wall 127. The exposed condition of the pin 134 therefore indicates to the user that the hammer of the firearm is cocked and ready for firing. After the firearm is fired, the spring 136, of course, returns the pin 134 to its unexposed position which indicates to the user that the firearm is uncocked.

The hammer 106 is moved from its neutral position to its cocked position in opposition to the main spring 123 by a cocking means which is movable relative to the frame 24 away from and toward an initial position and which means is releasably engageable with the hammer during its movement away from such initial position to move the hammer to its cocked position and is thereafter returnable toward its initial position independently of the hammer. The cocking means may take various different forms and may be comprised of one or more parts which may move with either substantially rotary or rectilinear motion relative to the frame without departing from the broader aspects of the invention. In the illustrated case, as shown best in FIGS. 3 and 4, the cocking means includes a trigger bar 142 and trigger 144. The trigger bar

extends longitudinally of the frame and has its forward end pivotally connected to the upper portion of a trigger 144. The lower portion of the trigger 144 is positioned within the trigger guard 38 and is adapted for engagement with the index finger of the hand of a user engaged with the grip of the firearm. The trigger is pivotally mounted to the frame by means of a transverse stud 143 and is normally biased toward the counterclockwise direction, as viewed in FIGS. 3 and 4, so that the lower portion thereof is normally held in a forward position. This bias for the trigger is provided by a connecting pin 150 which is pivotally connected to the upper portion of the trigger 144 and which extends forwardly into a bore 152 formed in the pivotal portion 62 of the crane 60, there being provided in the bore 152 a helical compression spring 154 and spring guide 156 which serve to engage the forward end of the connector pin 150 and to urge it rearwardly. The spring guide 156 is slidably received in the bore 152 and extends rearwardly through the center of the spring 154 to prevent the spring from buckling or bending in a transverse direction. The rear end of the spring guide 156 is provided with an enlarged head having a forward face which abuts the spring 154 and a rear face which abuts the connector pin 150, the latter face preferably being provided with a depression for receiving the forward end of the connector, as illustrated. The spring 154 and the connector pin therefore function to normally hold the lower portion of the trigger in a forward position and to oppose its movement to the rear. In FIG. 3 the forward extent of the trigger movement is shown by the solid lines representing the trigger, while the rearward extent of its movement is shown by the broken lines.

From FIG. 3, it will also be observed that movement of the trigger 144 from its forward solid line position to its rearward broken line position will cause the trigger bar 142 to be moved forwardly, and that the return of the trigger to its full line position will cause the trigger bar to be moved rearwardly, the rear portion of the trigger bar 142 being guided and vertically supported by a stud 157 fixed to the frame 24, which stud permits the bar to slide longitudinally thereover.

At its rear end, the trigger bar 142 is provided with a latch means which comprises part of the cocking means and which is releasably engageable with the cocking notch 132 of the hammer so as to drive the hammer from its neutral to its cocked position during the forward movement of the trigger bar 142. This latch means preferably comprises a pawl 153 that is pivotally connected to the rear portion of the trigger bar by means of a transverse pivot pin 160, the rear portion of the trigger bar being preferably bifurcated, as shown in FIG. 5, with the pawl being disposed between the furcations. The pawl is located directly below the bottom of the hammer 106 and is biased upwardly toward the hammer.

The biasing means for urging the pawl 153 upwardly toward engagement with the cocking notch 132 in the bottom of the hammer 106 may take various forms; however, it preferably comprises a curved pawl spring 162 which has one end connected to the frame 24 as at 164. The spring 162 curves rearwardly and upwardly and then forwardly from the connection 164 and into engagement with a depending lever arm 166 provided on the pawl 153. The spring 162 is so designed as to urge the depending arm 166 forwardly in all positions of the pawl and the trigger bar 142, that is, the spring 162 engages the depending arm 166 throughout the full extent of the longitudinal movement of the pawl and trigger bar so as to always exert a forward biasing force on the pawl arm 166 which force constantly urges the pawl upwardly towards the hammer. The manner in which the pawl 153 cooperates with the cocking notch 132 and other parts of the hammer will be described in more detail below in connection with the discussion as to the various modes of operation of the firing mechanism. At this point, however, it will be sufficient to note that when the hammer 106 is in its neu-

tral position and the trigger bar 142 is in the rearward position corresponding to the forward position of the trigger 144 the pawl 158 is positioned in the cocking notch 132 as shown in FIG. 2. As the trigger bar is moved forwardly by pulling rearwardly on the trigger 144, the forward face of the pawl 158 engages the rear face of the notch 132, as shown in FIG. 4, to impart a cocking movement to the hammer. As the pawl picks up the hammer to move it toward its cocked position, the force of the main spring 123 is imposed on the trigger through the hammer, the pawl and the trigger bar so that the rearward movement of the trigger is resisted by both the main spring 123 and the trigger spring 154. Although the spring 162 normally holds the pawl in the cocking notch 132 to prevent return or firing movement of the hammer independently of the pawl it will be noted that the pawl lever arm constitutes a trip means whereby the pawl may be tripped or released from the hammer as by rotating the lever arm clockwise in FIG. 4 against the force of the spring 162.

The firing mechanism further includes a latch means which is releasably engageable with the hammer to hold the same in its cocked position after it is moved to such position by the forward movement of the trigger bar 142 and pawl 158. As shown in FIGS. 2, 3 and 4, this latch means includes a sear 168 which is movable relative to the frame 24 and which, in one position of its movement, is engageable with the sear notch 130 of the hammer to releasably hold the same in its cocked position. The sear 168 is located generally forwardly of the hammer 106 and is a generally vertically extending member which is pivotally connected adjacent its lower end to the frame 24 by means of a transverse pivot stud 179 so that the upper end thereof is swingable generally rearwardly and forwardly with respect to the hammer. Biasing means hereinafter more fully described are provided for urging the sear rearwardly or in the counterclockwise direction, as viewed in FIGS. 2, 3 and 4, and toward engagement with the hammer 106. The upper end portion of the sear 168 is provided with an abutment face 172 which, when the sear is in latching relation with the hammer, as shown in FIG. 3, supportingly engages the wall 174 of the sear notch 130.

The sear 168, however, is permitted to latchably engage the hammer 106 only during single action operation of the firearm, and to this end, the firing mechanism includes a selectively adjustable stop means which is engageable with the sear to limit its rearward movement toward the hammer, the stop means permitting the sear to engage the hammer in the single action position thereof and holding the sear forwardly and away from the hammer in the safety and double action positions thereof. The particular stop means employed may take various forms, but preferably it comprises a pie-shaped cam 176 located adjacent and rearwardly of the sear 168 as shown in FIGS. 2, 3 and 4. The cam 176 is formed on the inner end of a stud that is pivotally mounted to the side wall 36 of the mechanism cavity 26 for rotation about a transverse axis, the cam 176 being located eccentrically with respect to the axis of the stud. Preferably, the stud is mounted to the frame by means of a bushing 177 which is press fitted into the side wall 36 and which loosely receives the stud so as to permit its rotation relative to the frame and bushing. The inner end of the stud, which end carries the cam 176, is of larger diameter than the bore of the bushing 177 so as to prevent the stud from moving outwardly with respect to the frame and bushing. The various positions of the cam 176 are best shown in FIGS. 6, 7, 8 and 9. In FIGS. 6 and 7 the cam is shown adjusted for single action operation of the firing mechanism and, as shown, is positioned rearwardly and out of engagement with the sear so that the latter is free to engage the hammer. For safety action operation of the firing mechanism, the cam 176 is positioned as shown in FIG. 8 so as to hold the sear 168 some distance away

from the hammer 106, thereby limiting its rearward movement and preventing its latching engagement with the sear notch 130. For double action operation, the cam 176 is positioned as shown in FIG. 9 so as to hold the sear 168 a still further distance away from the hammer 106. The results of this selective positioning of the sear 168 by the cam 176 will be described in more detail below.

On the outside of the frame 24, as shown in FIG. 1, there is provided a selector lever 178 which is connected with the cam stud so as to be operable to move the cam 176 to its various positions, the selector lever being located just above the grip of the firearm so that it may be moved by the thumb of a hand holding the firearm without the necessity of shifting the hand or the firearm from normal firing position. The lower end of the selector lever 178 is connected with the cam stud while the upper end thereof is provided with detent means for releasably holding the lever in its various angular positions, the detent means including dimples 180, 180 formed in the frame 24. The lever 178 also serves to hold the cam stud in the bushing 177 by preventing its movement inwardly with respect to the frame and bushing. When the selector lever is in the forward dimple marked S in FIG. 1, the firearm is adjusted for single action operation with the cam 176 being positioned as shown in FIGS. 6 and 7. When the selector lever is moved to the middle dimple marked "safe" in FIG. 1, the firearm is adjusted for safety operation, with the cam being positioned as shown in FIG. 8, while when the selector lever is moved to the rearward dimple marked D in FIG. 1, the firearm is adjusted for double action operation, with the cam being positioned as shown in FIG. 9.

When the firing mechanism is adjusted for single action operation so that the sear 168 engages and holds the hammer in cocked position, some means must further be provided to move the sear forwardly and out of engagement with the cocking notch to permit the hammer to move forwardly for firing. In accordance with the invention, this means comprises a releasing arm 182 which is connected with the sear 168 and which cooperates with the pawl 158 to release the sear from the hammer. The releasing arm 182 extends generally longitudinally of the frame 24, as shown in FIGS. 2, 3 and 4, and is pivotally connected to the sear 168 by a transverse pin 184 which is fixed to the sear and movable therewith. FIG. 5 shows best the preferred shape and arrangement of the releasing arm 182 and the sear 168 wherein it will be noted that the sear includes a recess 186 for receiving the releasing arm and the releasing arm includes a recess 188 for receiving the sear. The recess 186 of the sear extends upwardly beyond the releasing arm 182 and also serves to receive the trigger bar 142, while the recess 188 of the releasing arm extends rearwardly some distance beyond the sear 168 so as to partially receive the cam 176 when the latter is adjusted for single action firing, the releasing arm recess 188 defining a forwardly facing abutment 190 on the releasing arm which abutment serves a purpose to be described hereinafter. The rear portion of the releasing arm is provided with a recess 191 to accommodate the trigger bar supporting stud 157 and the releasing arm is engageable with the trigger bar 142 as shown in FIGS. 2, 3 and 4 to limit movement of the releasing arm in the clocking direction as viewed in these figures, the releasing arm being normally biased in the clockwise direction by means later to be described.

As shown in FIG. 3, when the hammer 106 is held in its cocked position by the sear 168 and the trigger bar 142 and pawl 158 are in their respective rearward positions, the heel or hold down portion 192 of the hammer, which is located rearwardly of the cocking notch 132, engages the pawl 158 and holds it in a lowered position, bringing the forward face of the pawl 158 into alignment with the rear face of the releasing arm 182. Upon forward movement of the trigger bar 142, therefore, the pawl 158 engages the releasing arm and moves it forwardly so that

the sear 168 is in turn moved forwardly to effect the release of the hammer for firing. The forward movement of the trigger bar 142 is, of course, effected by a rearward pull on the lower portion of the trigger 144, and when pulling the trigger on this firing stroke of single action firing, it is generally desirable that the trigger move rearwardly only a slight amount in comparison to its movement on the first or cocking pull thereof. In order to accomplish this, the cam 176 is so dimensioned that when adjusted for single action operation a portion of it will be positioned in alignment with the releasing arm abutment 190 so that the cam engages the abutment shortly after the sear is released from the hammer to limit further forward movement of the releasing arm, the pawl, the trigger bar and the trigger.

It will also be evident from FIG. 3 and from FIG. 7 that when the hammer 106 is held in cocked position by the sear 168 on single action firing that it may be possible to effect firing by moving the selector lever 178 from the single action position to the double action position which will cause the cam 176 to engage the sear and to move it out of latching engagement with the hammer 106. The possibility that the firearm may be fired in this manner is generally undesirable and therefore it is preferred that some means be provided to prevent movement of the selector lever from its single action position when the hammer is cocked. In the illustrated firearm means for performing this function is provided and is shown in FIG. 13 to comprise a blocking pin 194 which is slidably received in a transverse bore 195 extending through the side wall 36 of the mechanism cavity 26 and which pin is biased laterally inwardly toward the side of the hammer 106 by a conical spring 196. The inner end of the blocking pin 194 is provided with an enlarged head 198 which engages a cam surface 200 formed on the side wall of the hammer facing the pin 194. The cam surface 200 is so dimensioned and arranged that when the hammer is in its uncocked or neutral position the pin 194 is held by the spring 196 in its innermost position at which position none of the pin 194 extends outwardly beyond the side wall 36. When the hammer 106 is moved to its cocked position, however, the cam surface 200 cams the head of the pin 194 outwardly so that the other end of the pin extends beyond the outer surface of the wall 36, with the pin 194 being so located relative to the selector lever 178 as to be positioned in the path of the lever and to block its movement from the single action position to the double action position. The location of the pin 194 with respect to the selector lever is shown in FIG. 1. The blocking pin 194 therefore serves to permit movement of the selector lever between its various positions only when the hammer is in its neutral or uncocked position. From FIG. 1, it will also be evident that when the selector lever is set to the safety action position it will be positioned in alignment with the blocking pin 194 so that when the trigger is pulled to move the hammer toward its cocked position the pin will be driven laterally outwardly and into engagement with the selector lever. The selector lever is therefore made sufficiently resilient so that it may be bent outwardly by the blocking pin in this situation without danger of damaging the lever.

On double action operation the sear 168 is not employed to hold the hammer in its cocked position for release on a second trigger pull, but instead means is provided for releasing the pawl 158 from the cocking notch after the pawl has moved forwardly to a predetermined extent to allow the hammer to return in a firing movement to its neutral position. In other words, on each stroke of the trigger 144 on double action firing the pawl 158 picks up the hammer 106 at the beginning of a forward stroke, moves the hammer toward its cocked position throughout the remainder of its forward stroke, and at the end of the stroke is operated to release the hammer for firing movement, the hammer therefore being cocked

and fired during each full pull of the trigger. In order to effect the release of the pawl from the hammer as the hammer approaches its cocked position on double action firing, abutment means are provided for engaging and arresting the depending pawl arm 166 so that continued forward movement of the trigger bar 142 after the pawl arm is arrested causes the pawl to be pivoted downwardly and out of engagement with the cocking notch 132. The abutment means for operating the pawl arm 166 is selectively positionable with the sear cam 176 so as to be effective to engage and operate the pawl arm 166 when the cam 176 is positioned for double action firing and so as to be ineffective to engage and operate the pawl arm when the cam 176 is set for single action or safety action operation. Preferably as shown, the abutment means for operating the pawl arm comprises a rearwardly extending arm 202 connected with the sear 168 so as to be movable therewith. The arm 202 is connected to the sear 168 adjacent its lower end and is preferably integral with the other portions of the sear so as to give the sear a substantially L-shaped appearance. As shown in FIG. 4, when the sear 168 is held out of engagement with the hammer by the cam 176 being set in its double action position, the rear face of the arm 202 will be positioned in the path of the pawl arm 166 so that the arm 166 will engage the arm 202 as the trigger bar 142 is moved forwardly. FIG. 4 shows the various parts of the firing mechanism at the instant the pawl arm 166 first strikes the rear face of the arm 202 and it will be evident from this figure that further forward movement of the trigger bar 142 will cause the pawl 158 to be pivoted downwardly from the position shown and out of the cocking notch 132 to permit the hammer 106 to return to its neutral position under the action of the main spring 123 to cause firing. By then releasing the trigger, the trigger bar and pawl are returned to their rearward positions at which positions they are conditioned to again engage, cock and release the hammer on the next pull of the trigger.

In addition to its cooperation with the depending pawl arm 166 on double action firing the rearwardly extending arm 202 is also used on single action firing as part of a means for adjusting the trigger pull poundage required to effect firing on the second trigger stroke of single action operation. As viewed in FIG. 3, this adjusting means includes, besides the arm 202, an adjusting screw 204 which is threadably received in a bushing 205 that is fitted into the frame adjacent the upper portion of the grip, as shown. The upper end of the adjusting screw is engageable with the arm 202 and serves to limit the counterclockwise movement of the sear 168 so as to control the extent of engagement between the upper face 172 of the sear and the wall 174 of the sear notch 130. As will be evident from FIG. 3, the extent of this engagement will determine the force required to move the sear out of engagement with the hammer, since the greater the area of engagement, the greater will be the friction force tending to oppose movement of the sear out of the notch. FIG. 3 shows the adjusting screw set 204 in such position as to limit the rearward movement of the sear 168 to a position at which a minimum engagement between the sear and the hammer is obtained so that a minimum trigger poundage will be required to pull the sear out of engagement with the hammer. Turning the adjusting screw to move it downwardly somewhat from the position shown in FIG. 3 will permit the sear to more fully engage the notch 130 so that a greater trigger poundage will be required to release the hammer. By this arrangement it has been found, for example, that the trigger pull poundage may be adjusted from a minimum of 1/2 pound or less to a maximum of 9 pounds or more. The lower end of the adjusting screw 204 is positioned within the storage chamber 44 of the grip so as to be normally out of sight, but is readily accessible for adjusting purposes by opening the floor plate 46. Since the vibrations imposed on the frame during

firing may tend to loosen or change the position of the adjusting screw 204, an anti-vibration lock means is preferably provided in association with the screw. As shown, the connection 164 for the pawl spring 162 consists of the lower forward end of the pawl spring being received by the upper end of a bushing 205 between a bushing cap 206 and the frame so as to be held in place by the cap 206. In addition to the lock means, the adjusting screw may also be provided with a spring 207. The spring 207 has an upper portion located between the head of the screw 204 and the frame 24, as shown, to resist vibrational loosening of the screw, and also has a lower portion which extends outwardly and downwardly from the screw 204 and which serves to engage the cartridges or other articles contained in the grip storage chamber 44 to prevent rattling by holding the cartridges or other articles in forced engagement with one another.

After a cartridge is fired it is, of course, necessary that the cylinder 64 be rotated to bring a fresh cartridge into firing position before the hammer is again released for firing. Means for effecting such cylinder rotation is provided in the illustrated firearm and comprises a hand 208 which is attached to the lower forward portion of the hammer 106 and which is biased upwardly and forwardly into engagement with an annular series of ratchet teeth 212, FIG. 12, at the rear of the cylinder 64. The number of ratchet teeth 212 corresponds with the number of cartridge chambers in the cylinder 64 and each time the hammer 106 is moved from its neutral to its cocked position, the upper end of the hand 208 engages one of said ratchet teeth and moves it an angular distance corresponding to the angular distance between the cartridge chambers of the cylinder, thus removing one cartridge chamber from the firing position and bringing the next adjacent cartridge chamber into the firing position. During the movement of the hammer from its cocked to its neutral position on firing, the hand 208 overrides an adjacent ratchet tooth 212 and becomes positioned to pick up a new tooth the next time the hammer is cocked. The hand 208 extends through a slot 214, FIG. 12, in the frame and is connected adjacent its lower end portion with the hammer by a transverse pin 216. The biasing means for the hand 208, as shown best in FIGS. 2 and 3, includes a generally downwardly extending and upwardly opening bore 218 formed in the hammer 106 and a laterally extending slot 220 formed adjacent one side of said bore so as to communicate with the mouth thereof. A second transverse pin 222 is fixed to the hand rearwardly of the pin 216 and extends laterally inwardly through the slot 220 and into the bore 218. A compression spring 224 is located in the bore 218 and serves to engage the transverse pin 222 of the hand so as to bias the hand upwardly and forwardly to bring the upper end thereof into engagement with the cylinder ratchet teeth.

Of course, before the cylinder 64 may be rotated by the hand 208, the cylinder 64 must be freed for rotation by moving the cylinder stop 90 to bring the head 92 thereof out of locking engagement with the cylinder. To achieve this end, the cylinder stop 90 in the illustrated firearm is pivotally connected adjacent its lower end with the frame by means of a transverse stud 226 and is also adapted for rearwardly sliding movement of its lower end relative to said pin by means of a longitudinally elongated slot 228 which receives the stud 226. The cylinder stop is normally biased upwardly and forwardly by means hereinafter described so that the stud normally engages the rear end of the slot 228 as shown in FIGS. 2, 3 and 4. Forwardly of the slot 228 the lower end of the stop 90 is provided with a lip 230 having a downwardly facing abutment surface, while the trigger 144 is provided with a dog 232 having an upwardly facing abutment surface which is positioned below the lip 230 when the trigger is in its forward position as shown by the solid lines of FIG. 3. A rearward pull of the trigger, therefore, causes the dog 232 to engage the lip 230 and to pivot the stop 90

about the stud 226 to bring the head 92 of the stop out of locking engagement with the cylinder 64. After the trigger is moved rearwardly to a predetermined extent, however, the trigger dog 232 will move out of engagement with the stop lip 230 so that the stop is biased back into locking engagement with the cylinder, the cylinder having been moved to a new position by the hand 208 while the stop was freed from the cylinder so that the head when it returns to engagement with the cylinder engages a new cylinder notch 94 and holds a new cartridge in firing position. When the trigger is moved from its rearward to its forward position, it is desirable that the stop 90 remain in locked relationship with the cylinder 64 and therefore the trigger is provided with a downwardly extending cam surface 234 below the dog 232 which engages the forward end of the stop lip 230 and cams it rearwardly by sliding the elongated slot 228 relative to the transverse stud 226 so that the trigger dog 232 may be repositioned below the stop lip 230 without moving the head 92 of the stop out of engagement with the associated cylinder notch 94. That is, the movement of the cylinder stop 90 during the return movement of the trigger 144 is essentially a pivot movement about the head 92 with the head remaining in its notch 94.

The cooperation between the stop lip 230 and the trigger dog 232 is such that on single action firing the stop head 92 is positioned free of the cylinder 64 at the instant the hammer 106 is released for firing so that when a cartridge is fired the cylinder 64 is free to rotate to correct for any misalignment which may occur between the active cartridge chamber and the barrel bore. This freedom of the cylinder to rotate at the instant of firing reduces the possibility of lead shaving and provides for greater accuracy of firing by reducing the lateral stress or "kick" which may be applied to the firearm by the bullet entering a slightly misaligned barrel bore. On double action firing, however, where accuracy is not of primary importance, the cylinder stop 90 returns to locking engagement with the cylinder 64 before the hammer is released for firing so that at the instant of firing the cylinder is held in locked relation to the frame. This difference in operation of the cylinder stop 90 is due to the fact that the trigger 144 is pulled a further distance rearwardly to effect firing on double action operation than it is on single action operation. On the second or firing stroke of single action operation the trigger 144 is pulled only a small distance rearwardly so that the trigger dog 232 does not move out of engagement with the stop lip 230 to permit the stop to return to locked engagement with the cylinder, whereas on double action operation, the trigger is moved a sufficient distance rearwardly so that the trigger dog is driven out of engagement with the stop lip, and so that the stop 90 returns to locking engagement with the cylinder before the hammer is released for firing.

Although an accurate alignment between the active cartridge chamber and the barrel bore is not as important in double action firing as it is in single action firing, it is nevertheless desirable that the alignment on double action firing be as precise as possible, and another aspect of this invention involves a novel cooperation between the stop head 92 and the cylinder notches 94 whereby the stop functions to hold the cylinder in relatively accurately determined positions and to prevent any looseness or play of the cylinder relative to the frame. Referring to FIG. 10, it will be observed that the notches 94, as viewed in transverse cross section, are provided with outwardly diverging walls 236, 236 so that each notch has a substantially V-shaped appearance. The head 92 of the stop 90 which fits into the notches 94 is also provided with a corresponding V-shaped transverse cross section so that when the head is biased into a notch 94 a wedging action occurs between the head and the walls 236, 236 of the notch with the result that the head firmly holds the cylinder in the desired position, the wedging

action eliminating any play between the head and the walls of the notch so that the cylinder is held firmly in place.

In accordance with another aspect of this invention, a single biasing means is employed for biasing the cylinder stop 90, the sear 168 and the releasing arm 182. Referring to FIGS. 3 and 4, a spring means is employed between the stop 90 and the releasing arm 182 which spring means operates to exert an upwardly and forwardly directed biasing force on the stop 90 so as to normally hold the head 92 in engagement with the cylinder 64 and also operates to exert a downwardly and rearwardly directed biasing force on the forward end portion of the releasing arm 182. The biasing force exerted on the releasing arm tends to pivot the same in the clockwise direction to bring the rear end thereof into engagement with the trigger bar 142 and also produces a rearwardly directed force component on the releasing arm which is transmitted to the sear 168 through the pivot pin 184 so as to bias the sear rearwardly toward the hammer 106. It is contemplated that the spring means employed between the stop and releasing arm may take various forms, however, the presently preferred form is shown in FIGS. 3 and 4 and includes a spring guide 238 having at one end thereof a pointed head 240 positioned in a depression formed in the forward face of the releasing arm 182. The other end of the spring guide is slidably received in a bore that is formed in the rear portion of the cylinder stop 90. A helical compression spring 242 surrounds the spring guide 238 and at one end engages the guide head 240 while its other end engages the cylinder stop 90, thereby tending to spread apart the releasing arm and the cylinder stop and to urge them in the desired directions. Of course, the relative positions of the spring guide ends with respect to the stop 90 and the releasing arm 182 is unimportant and the position of the spring guide could be reversed from that shown so that the head 240 thereof engages the stop 90 rather than the releasing arm 182. In this case, the other end of the spring guide would be slidably received in a bore of the releasing arm 182 and the stop 90 provided with a depression for receiving the head 240.

Combination Hammer Block and Cylinder Release

In accordance with another aspect of this invention, the firearm 22 is provided with a single means for both blocking the hammer 106 against firing engagement with the firing pin 100 and for releasing the cylinder 64 and crane 60 for lateral swinging movement to a cartridge loading and ejecting position. As best illustrated in FIGS. 3 and 4, this means comprises a cam element 244 that is pivotally connected with the frame 24 for pivotal movement about a transverse axis between active and inactive positions. On its periphery the cam element 244 has two closely spaced faces 246, 246 and two widely spaced faces 248, 248. In its inactive position the cam element 244 is positioned as shown in FIGS. 3 and 4 so that one of the closely spaced faces 246 faces the hammer 106 while the other face 246 engages a cylinder bolt release member 250 which has its forward part positioned in the sleeve 32 and in engagement with the rear end of the cylinder bolt 80, the cylinder bolt 80 under the action of its bias urging the cylinder bolt release member rearwardly and into engagement with the cam element 244. As shown in FIG. 2, the hammer 106 is permitted to engage the firing pin 100 when the cam element 244 is in the inactive position as shown. The cam element 244 is moved to its active position by rotating the cam approximately 90° about its transverse axis from the position shown in FIGS. 3 and 4 to the position shown in FIG. 12. This brings one of the widely spaced faces 248 into opposing relation with the hammer 106, as shown in FIG. 12, and causes the other face 248 to hold the cylinder bolt release member 250 in a forward position at which the cylinder bolt 80 is held out of the sleeve 32

so that the cylinder is freed for lateral swinging movement. The spacing of the faces 248, 248 is such that the face which opposes the hammer 106 is engageable with the same to hold it slightly rearwardly from its neutral position and to thereby prevent or block it from engaging the firing pin 100. The cam element 244 therefore in this respect serves as an additional safety device for the firearm. Movement of the cam element 244 from its active to its inactive position is produced by manual operation of a lever 252 located on the outside surface of the firearm as shown in FIG. 1, the lever being connected with the cam element 244 which extends through the side wall 36 of the mechanism cavity 26. With the lever 252 in the position marked F as shown in FIG. 1 the cam element 244 is disposed in its inactive position so as to permit the hammer to engage the firing pin to cause firing of a cartridge, while with the lever in the position marked S in FIG. 1, as shown by the broken lines, the cam 244 is in its inactive or safety position at which the hammer is blocked against firing engagement with the pin and at which the cylinder bolt is released from the frame to permit lateral outward movement of the cylinder. At both the S and F positions of the lever 252 the frame 24 is provided with an indent, such as shown at 253 in FIG. 1, which cooperates with the lever to releasably hold it in the position to which it is moved.

Single Action Firing

Having now described the construction of the firing mechanism, its operation may be considered more fully. Its operation on single action firing will be first be considered, and for this purpose, special reference is made to FIGS. 6 and 7 which show the selector lever 178 and the sear cam 176 adjusted for single action firing, FIG. 6 showing the relative positions of the hammer 106, the pawl 158, the releasing arm 182, the sear 168 and the sear cam 176 at the beginning and the end of the first trigger pull, and FIG. 7 showing the relative positions of the same parts at the beginning of the second trigger pull. To obtain single action firing the selector lever 178 is first set on the single action position marked S in FIG. 1 by the thumb or finger of the user. This setting of the lever causes the sear cam 176 to be moved to the position shown in FIGS. 6 and 7 at which the cam is located rearwardly from the sear so that the sear is free to engage the hammer 106, the spring 242 serving to bias the sear rearwardly toward the hammer. In FIG. 6 the solid lines show the positions of the parts at the beginning of the first trigger pull. As the trigger is pulled rearwardly the pawl 158 engages the cocking notch 132 of the hammer and drives the hammer from its neutral to its cocked position against the action of the main spring 123. As the hammer is brought into its cocked position, the sear notch 130 is brought into alignment with the sear 168 so that the latter falls into the sear notch and will hold the hammer in the cocked position after the trigger is released and the pawl 158 moved rearwardly and out of driving engagement with the cocking notch. The position of the various parts at the end of the first trigger pull at the instant the sear has moved into engagement with the sear notch 130 is shown by the broken lines of FIG. 6. During the time that the parts are moved from the solid line to the broken line positions shown in FIG. 6, the cylinder stop 90 is moved to bring the head 92 thereof out of locking engagement with the associated cylinder notch 94 to free the cylinder for rotation, this movement of the stop being effected by the engagement of the trigger dog 232 with the stop lip 230. While the cylinder is free, the hand 208 attached to the hammer 106 is urged by the spring 224 against the ratchet teeth 212 at the rear of the cylinder 64, with the movement of the hammer causing the hand to rotate the cylinder to bring a fresh cartridge into firing position with respect to the firing pin 100 and the barrel 103. After the hand brings a fresh cartridge into firing position, a continued pull on the

trigger causes the trigger dog 232 to clear the stop lip 230 so that the cylinder stop 90 is brought back into engagement with a cylinder notch 94 by the action of the spring 242 to again lock the cylinder against rotation.

As the sear 168 falls into the sear notch 130, its rearward movement is limited by engagement of the rearwardly extending sear arm 202 with the adjusting screw 204 so as to control the extent of frictional engagement between the sear notch and the sear to thereby regulate the trigger pull poundage required to release the sear from the hammer. Movement of the hammer to its cocked position also causes the indicator pin 134 to be moved to its exposed position at the rear of the gun to indicate to the user that the firearm is in its cocked position. Also, as the hammer is drawn back to its cocked position, the cam surface 200 on the side thereof drives the blocking pin 194 outwardly from the frame and into the path of the selector lever 178 to prevent an accidental firing of the gun by movement of the selector lever.

After the parts of the firing mechanism are moved to the cocked or broken line position shown in FIG. 6 by a rearward pull on the trigger, the hammer is released to allow the pawl and trigger bar to return to their respective rearward positions independently of the hammer, the return movement of the trigger, the trigger bar and the pawl being effected by the trigger return spring 154 which acts on the trigger through the connecting pin 150. As the trigger is returned to its forward position, the cam surface 234 below the trigger dog 232 engages the forward portion of the stop lip 230 so as to move the lower portion of the stop 90 rearwardly by means of a sliding movement between the elongated slot 228 and the transverse stud 226 so that the dog 232 clears the stop lip 230 without moving the stop head 92 from engagement with its cylinder notch 94. That is, the force of the spring 242 acting upwardly and forwardly on the stop 90 holds the stop head 92 in the cylinder notch while the lower end of the stop 90 is moved rearwardly to permit the trigger dog to be repositioned below the stop lip 230.

FIG. 7 shows the positions of the various parts of the firing mechanism at the beginning of the second trigger pull at which time the hammer 106 is held in its cocked position and the pawl 158 and trigger bar 142 are in their rearward positions. At this time, the heel or hold down portion 192 of the hammer engages the top of the pawl 158 and holds it in a lowered position against the action of the pawl spring 162, and in which lowered position the pawl 158 is cleared from the cocking notch 132 and brought into alignment with the rear face of the releasing arm 182. The hammer 106 is then released for firing by pulling rearwardly a second time on the trigger 144 which causes forward movement of the trigger bar 142 and the pawl 158. As the pawl 158 moves forwardly it engages the releasing arm 182 and imparts a forward motion to this element which in turn moves the sear 168 forwardly and drives the same out of the sear notch 130 to cause the release of the hammer, the latter thereafter being driven forwardly to effect firing by the action of the main spring 123. The forward movement of the pawl 158 during the second or firing stroke of single action operation is limited to a predetermined extent which is slightly greater than that necessary to effect release of the sear from the hammer. As will be noted from FIG. 7, the sear cam 176, when set for single action operation, is positioned slightly within the releasing arm recess 138 so as to be engageable with the releasing arm abutment surface 190. Shortly after the trigger is moved the distance necessary to release the hammer 106, the releasing arm engages the sear cam so that its forward movement is stopped, thus stopping the rearward movement of the trigger and eliminating backlash. The extent of rearward trigger movement required to effect firing is sufficient to cause the trigger dog 232 to move the cylinder stop 90 out of engagement with the cylinder so that the cylinder is free to rotate at the instant of firing. The release of the hammer 106 also releases the indicator pin 134 so

as to allow the same to return to its unexposed position indicating that the firearm is now in an uncocked position.

After the hammer is fired, the trigger is released and is returned to its forward position by the trigger return spring 154, bringing the trigger bar and pawl back to their rearward positions, as shown by the solid lines of FIG. 6, and at which positions the pawl spring 162 urges the pawl toward engagement with the cocking notch so that the firing mechanism is conditioned to repeat the firing cycle set forth above.

Double Action Firing

The operation of the firing mechanism during double action firing is best understood by reference to FIG. 9 which shows the sear cam 176 set in its double action position. In this position the cam holds the sear 168 forwardly and out of engagement with the hammer 106 and at such a position that the rearwardly extending sear arm 202 is brought into the path of the forward movement of the depending pawl arm 166. As mentioned, to effect double action operation, the sear cam 176 is set in the position shown in FIG. 9 by manually moving the selector lever 178 to the double action position marked D in FIG. 1. With the trigger in its forward position, the hammer 106, the pawl 158 and the sear 168 assume the positions shown by the full lines of FIG. 9. As the trigger is pulled rearwardly, the pawl moves forwardly in engagement with the cocking notch 132 to move the hammer towards its cocked position against the action of the main spring 123, the pawl being held in the cocking notch by the pawl spring 162. At the same time as the hammer is moved toward the cocked position, the cylinder stop 90 is moved out of engagement with the cylinder 64 by the cooperation of the trigger dog 232 and the stop lip 230 and the cylinder is rotated by the hand 208 to bring a fresh cartridge into firing position, as described above in connection with single action operation. As the trigger pull is continued, however, the trigger dog 232 clears the stop lip 230 so that the stop 90 snaps back into engagement with the cylinder 64 and holds the cylinder in locked position at the instant of firing.

Also, as the trigger is pulled rearwardly, the depending pawl arm 166 is brought into engagement with the rearwardly extending sear arm 202 which, upon continued rearward movement of the pawl, causes the pawl 158 to be pivoted downwardly so as to be moved out of latching engagement with the cocking notch 132 to release the hammer for forward firing movement by the main spring 123. The broken lines of FIG. 9 show the relative positions of the parts near the end of the rearward trigger pull just before the pawl is moved fully out of the cocking notch to release the hammer. A slight further forward movement of the pawl from the broken line position shown in FIG. 9 will release the hammer for firing, the hammer thereafter moving toward its neutral position independently of the pawl and trigger bar and forcefully striking firing pin 100 with sufficient violence to fire the cartridge in the active cartridge chamber. The trigger is then released to return the trigger bar and the pawl to their rearward positions, and during this rearward movement, the trigger dog 232 cooperates with the stop lip 230, as described in connection with the single action operation to permit the trigger dog to be repositioned below the stop lip without freeing the stop head 92 from its cylinder notch 94. When the pawl and trigger bar reach their rearward positions, the pawl is urged back into the cocking notch 132 by the pawl spring 162 and the parts are now back in their original positions and ready for a repeat performance.

Safety Action Operation

On safety action operation the sear cam 176 holds the sear 168 away from the hammer 106, as in double action operation, but in such a position that the rearwardly extending sear arm 202 is located out of the path of the

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depending pawl arm 166. This relationship of the parts is best shown in FIG. 8 wherein the sear cam 176 is shown set in the safety action position, the full lines indicating the positions of various parts at the beginning of the trigger pull and the broken lines indicating the same parts in the positions occupied at the end of the rearward trigger pull. The sear cam 176 is set to the position shown in FIG. 8 by manually moving the selector lever 178 to the position marked "safe" in FIG. 1. From FIG. 8 it will be noted that a rearward pull on the trigger 144 causes the pawl 158 to engage the cocking notch 132 and to drive the hammer 106 toward its cocked position; however, the sear 168 is ineffective to engage the sear notch 130 to hold the hammer in the cocked position and the rearward extending arm 202 is ineffective to operate the depending pawl arm 166. As a consequence, the pawl 158 remains in engagement with the cocking notch 132 and as the trigger is returned to its forward position the hammer 196 will return to its neutral position with the rearward movement of the pawl 158. In other words, although the hammer is moved to its cocked position on safety action operation during the rearward pull of the trigger, the firing mechanism is ineffective to release the hammer from the pawl so that as a result no firing occurs on the safety action operation.

Exposed Hammer Model

A modified form of the invention is shown in FIG. 14. In this case the firearm is generally similar to that shown in FIGS. 1 to 13 inclusive except that the frame 24 is cut away adjacent the upper rear portion thereof so as to expose the hammer 254, and the hammer is provided with a spur 256 to permit the same to be cocked by hand on single action operation. The firearm shown in FIG. 14 includes the same firing mechanism as described above so that the firearm may be adjusted for single action, double action or safety action operation, the main difference being that the hammer 254 instead of being cocked by a first trigger pull on single action operation may, instead, if desired, be cocked by pulling back the spur 256 by the thumb of the user. When hand cocking the firearm, it is necessary to at first trip the trigger to disengage the cylinder stop 90 from the cylinder 64 so that the hammer can be pulled back and rotate the cylinder as explained in more detail below.

Also, the firearm shown in FIG. 14 includes a somewhat different firing pin means than that shown in connection with the firearm of FIGS. 1 to 13 inclusive. With the exposed hammer provided in this firearm, it will be obvious that it may be possible to accidentally drop the firearm onto the hammer and in this situation it is desirable that the firing pin means be such as to be incapable of causing the firing of a cartridge. To this end the firearm of FIG. 14 includes an abutment 258 on the frame for engaging the hammer 254 to limit its forward movement and a firing pin 260 which is mounted for reciprocable movement in the intermediate frame wall 262. As shown in FIG. 14, the firing pin 260 is of such length that when the hammer 254 simultaneously engages the abutment 258 and the firing pin the forward end of the pin is located rearwardly in a neutral position and out of firing engagement with a cartridge that is held in firing position in front thereof. In other words, the forward end of the firing pin in this case is located a slight distance rearwardly from the forward face of the recoil plate 264. At its rear end portion the firing pin 260 includes an enlarged anvil 266 which is biased rearwardly by the spring 268 that acts between the anvil and the frame wall 262 as shown. When the hammer 254 is moved back towards its cocked position, the anvil and the remainder of the firing pin are pushed from their neutral position to their furthest rearward position by the spring 268 so that on its forward firing movement the hammer will strike the anvil before engaging the abutment 258. The anvil 266 adds sufficient mass to the firing pin so that the momentum imparted thereto by its being

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struck by the hammer will be sufficient to carry the firing pin forwardly independently of the hammer to engage and fire the cartridge after the hammer is arrested by the abutment. That is, at the instant the firing pin strikes the cartridge it is free of the hammer 254 and the force that is imparted to the cartridge is derived solely from the momentum of the firing pin and its anvil. Firing of the cartridge therefore demands that the firing pin anvil be struck by the forwardly moving hammer while the anvil is in its rearward position, and with the hammer in its neutral position and in engagement with the abutment 258, as shown in FIG. 14, it is impossible for firing to occur as a result of the firearm being dropped on the exposed hammer.

Rearward movement of the firing pin 260 is limited by the engagement of its anvil 266 with an upwardly extending abutment 270 formed on the cylinder release member 272. In the firearm of FIG. 14 the cylinder release means is different from that shown in the firearm of FIGS. 1 to 13, inclusive, and consists of the member 272 which is mounted for reciprocable movement relative to the frame 24 by means of an elongated slot 274 formed in the side wall 36 of the mechanism cavity 26. On its forward end the release member 272 has a forwardly extending pin 276 which enters the sleeve 82 and is engageable with the rear end of the cylinder bolt 80 and which pin, upon forward movement thereof, is effective to move the cylinder bolt out of the sleeve 82 to free the cylinder for outward swinging movement. The cylinder release member 272 is operated by a button 278 connected therewith and located adjacent the outside surface of the frame for actuation by the thumb of the user. The button and cylinder release member are normally held in the rearward position shown by the bias of the cylinder bolt 80.

All other parts of the firearm shown in FIG. 14 are or may be similar to those of the firearm of FIGS. 1 to 13. When this is so it will be noted that the hand 208 in cooperation with the ratchet teeth 212, 212, the cylinder 64 and the cylinder stop 90 serves as a means for normally locking the hammer in its forward or neutral position and for thereby preventing the hammer to be moved to its cocked position by means of the spur 256. That is, the cylinder is prevented from rotating by the stop 90 and therefore movement of the hammer is prevented by engagement of the hand 208 with one of the ratchet teeth 212, 212. The cylinder stop 90 is connected with the trigger however and is moved out of locking engagement with the cylinder when the trigger is pulled rearward a predetermined extent, thereby freeing the hammer for cocking by means of the spur.

Provision for Adding Weights

Another embodiment of the invention is shown in FIGS. 15 and 16 and relates to a firearm similar to that shown in FIGS. 1 to 13, inclusive, except that the forward portion thereof, which is shown in FIGS. 15 and 16, is modified to include a provision for adjusting the weight of the firearm, as is oftentimes desirable when using the firearm for target shooting purposes. As brought out in more detail below, another aspect of the invention provides for the interchangeability of barrels and cylinders to adapt the firearm for use with various caliber cartridges. Since the different barrels which are selectively used in the firearm are of differing weight, it is also desirable to be able to compensate for the changes in weight of the firearm brought about by the changes in the barrel and cylinder.

As shown in FIG. 15, the shroud 114 is provided with a longitudinally extending slot 280 in its forward portion, the slot extending for some distance rearwardly from the front face of the shroud. In transverse cross section the slot 280 has a shape, such as the dovetail shape shown in FIG. 16, which has a laterally wide portion located inwardly from another laterally narrow portion so that the slot serves as a guideway which will restrain

a member having a similar shaped cross section against any movement other than a longitudinal sliding movement relative to the slot when the member is positioned in the slot. Adjacent the rear end of the slot there are provided a spring 232 and a ball 234 located in a bore 236, the ball being retained in place in the bore 236 by the forward end of the bore which is staked inwardly to engage the ball, the spring 232 urging the ball forwardly into engagement with the staked portion so that a part of the ball extends forwardly beyond the bore 236. The slot 230 serves to receive the head portion 238 of one of a plurality of weights such as indicated at 290, 291 and 292. The head portion 238 of each weight has a cross section corresponding to that of the slot 230 so that the weight is slidably receivable by the slot and is restrained by the same to longitudinal movement relative thereto, the length of the weights being such that one end face thereof engages the spring-loaded ball 234 while the other end face engages the radially outwardly extending flange 112 on the forward end portion of the barrel 108. Preferably, as shown, the flange 112 is of hexagonal shape, or other shape having flats, to permit the application of a wrench for tightening or loosening the barrel when assembling or disassembling the same with respect to the frame, and is so arranged that when the barrel is fully tightened a corner portion of the hexagon is positioned downwardly to block the forward end of the slot 230, as shown in FIG. 16, the flange being of such a size that when turned slightly from the position shown in FIG. 16 to align one of the flats of the flange with the upper surface of the slot 230, the forward end of the slot will be unblocked to permit the removal and replacement of weights thereto. In FIG. 15 the weight 290 is shown by the solid lines, while the sizes of two other weights 291 and 292 are shown by the broken lines, but it will be understood that any number of weights could be provided and that their sizes and shapes could differ from those shown.

As mentioned, one weight at a time is selectively positioned within the slot 230 so as to adjust the weight of the firearm, and when it becomes necessary to replace a particular weight with one of a different mass, the interchange is conveniently performed by turning the barrel 108 until a wrench flat on the barrel flange 112 is parallel with the dovetail slot flat, sliding the weight out of the slot 230, positioning a different weight in the slot 230 and thereafter repositioning the barrel 108 as before. The spring-loaded ball 234 serves to urge the weight forwardly into tight engagement with the barrel flange 212 to prevent any rattling or looseness between the weight and the shroud. Of course, the firearm may also be operated without a weight attached to the slot 230.

Interchangeable Barrels and Cylinders

In accordance with another aspect of this invention the firearm 22 is so designed that both the barrel 108 and the cylinder 64 may be replaced with other barrels and cylinders to adapt the firearm for use with cartridges of different calibers. As mentioned previously, and as shown in FIG. 2, the barrel 108 has a threaded rear portion 110 which is received in a corresponding threaded bore formed in the frame 24 forwardly of the cylinder recess 28. Also, the shroud 114 which surrounds the barrel 108 has a loose fit therewith so that the barrel may slide angularly and longitudinally relative to the shroud during assembly and disassembly of the barrel with the shroud and frame. Therefore, the barrel may be quickly removed from the frame and shroud by unscrewing it from the frame, the barrel flange 112 preferably having a hexagonal cross section to permit the application of a wrench thereto for the purpose of rotating the barrel when threading or unthreading it with respect to the frame. Also, after the barrel 108 is disassembled from the frame and shroud, the crane 60 may be disconnected from the frame by swinging the cylinder from its recess 28 and

then sliding the crane forwardly to remove the pivotal portion 62 thereof from its frame bore 34. Once the crane is removed from the frame, the cylinder 64 may be removed from the crane by sliding the cylinder forwardly with respect to the sleeve 68. Thus, both the cylinder and the barrel may be removed from the firearm to permit their replacement by another cylinder and barrel, respectively, to change the caliber of the firearm, there being provided in association with the firearm various matched sets of cylinders and barrels for this purpose. That is, there is provided a plurality of barrels generally similar to that shown at 108 but having different caliber bores, together with a corresponding plurality of cylinders, similar to that shown at 64, each of which is adapted for use with a particular one of said barrels and which is provided with cartridge chambers dimensioned to receive a cartridge having a caliber similar to that of the bore of the barrel with which the cylinder is associated. Therefore, each time a barrel is replaced with a different caliber barrel the cylinder is also replaced with a new cylinder which corresponds in caliber with that of the new barrel.

The procedure for attaching a new barrel and cylinder to the firearm is substantially the reverse of the procedure used for removing the old barrel and the old cylinder. That is, the new cylinder is positioned on the sleeve 68 while the crane 60 is detached from frame 24, and then the crane is connected to the frame by positioning the pivotal portion 62 thereof in the frame bore 34, and then the cylinder is swung into its recess. Then the shroud 114 is positioned in front of the frame 24 and the crane 60 with the locking pin 115 positioned between the frame and the shroud and with the shroud bore in alignment with the threaded barrel-receiving bore of the frame. The new barrel is then slid longitudinally into the shroud bore and rotated in the proper direction to thread the rear portion thereof into connected relationship with the threaded frame bore and to bring the barrel flange 112 into tight engagement with the forward face of the shroud 114 so that the shroud is held firmly in place between the forward face of the frame and the barrel flange 112.

As a precautionary measure, the relative sizes of the various interchangeable cylinders and barrels are such as to make impossible the matching of a small caliber barrel with a large caliber cylinder. In FIGS. 3 and 4, which show a barrel matched with a cylinder of the proper size, it will be noted that the rear portion of the barrel extends rearwardly beyond the rearwardly facing wall 294 of the cylinder recess 28, as at 296, and is positioned in closely spaced relationship with the forward face of the cylinder 64. The distance which the barrel extends rearwardly beyond the rearwardly facing wall 294 of the cylinder recess is predetermined and is made to vary with the size of the barrel bore so that a barrel having a small caliber bore will extend rearwardly beyond the wall 294 a greater distance than a barrel having a larger caliber bore. Likewise, the various cylinders 64 are of different lengths so that when properly matched with the proper corresponding barrel the close spacing between the forward face of the cylinder and the rear face of the barrel will be maintained. Thus, a cylinder having cartridge chambers dimensioned to receive large caliber cartridges will have a longer longitudinal length than a cylinder having cartridge chambers dimensioned to receive cartridges of a smaller caliber. From this, therefore, it will be evident that in the event a small caliber barrel were to be connected with the firearm at the same time as a larger caliber cylinder the forward face of the cylinder would be disposed at a location forwardly of the rear face of the barrel. Therefore, the barrel would interfere with the cylinder to prevent the cylinder from being swung into its normal operating position in the cylinder recess 28 and thus the firearm would be rendered inoperative in the event of such a potentially dangerous mismatch between the barrel and the cylinder. If the cylinder, prior to at-

taching the barrel, is in place within the recess 28, the mismatched smaller bore barrel would be tightened against the front face of the cylinder to bind its action and thereby to prevent operation of the firearm.

Besides being able to interchange the barrels and the cylinders to bring about a change in the caliber of cartridge usable therewith, it is also possible to interchange the barrels and the cylinders to adjust the firearm for use with either center-fire or rim-fire cartridges. For example, it may be desirable to change the firearm from one using .22 caliber rim-fire cartridges to one using larger caliber center-fire cartridges. FIGS. 10 and 11 show the difference between a cylinder 64 usable with center-fire cartridges and a cylinder usable with rim-fire cartridges, the locations of center-fire cartridge chambers 66, 66 are indicated by the full lines and the relative position of one rim-fire chamber 297 with respect to the positions of the center-fire chambers is shown in broken lines. FIG. 11 also, for clarity, shows in full lines a center-fire cartridge 298 in position in a center-fire chamber and in broken lines shows the relative position of a rim-fire cartridge 300. From this, it will be noted that the rim-fire chambers are positioned eccentrically with respect to the axis of the corresponding center-fire chambers. When a center-fire cylinder is held in locked position by the cylinder stop 90 engaging one of the cylinder notches 94, the upper or active cartridge chamber will have its axis aligned with the axis of the barrel bore and with the axis of the firing pin, whereas a rim-fire cylinder when held in locked position by the cylinder stop 90 will have the cartridge chamber positioned somewhat to one side of the firing pin 100, as shown best in FIG. 11, so that the firing pin engages the rim of the cartridge 300. Of course, the use of a rim-fire cylinder requires that the associated barrel have its bore in alignment with the axis of the active cartridge chamber of the cylinder. This alignment between the cartridge chamber and the barrel bore is achieved by providing the barrel with a bore which has an eccentricity with respect to the central axis of the barrel similar to the eccentricity of the rim-fire cartridge chambers with respect to the axes of the center-fire cartridge chambers. Since the barrel in this case is provided with an eccentric bore, it is necessary to assure that when the barrel is connected with the frame that it is so threaded into the frame that the barrel will assume the proper angular relationship with respect to the frame as to bring the bore thereof into correct alignment with the active cartridge chamber of the cylinder. This may be assured by providing the shroud and the barrel with scribed lines which, when brought into alignment as the barrel is threaded into the frame, indicate the correct position of the barrel with respect to the shroud and frame.

Adjustable Releasing Arm

Another embodiment of the invention resides in the replacement of the releasing arm 182 shown in FIGS. 2, 3 and 4 with an adjustable releasing arm to provide for the control of the length of stroke required to effect firing on the second trigger pull of single action operation. One form of adjustable releasing arm is shown at 301 in FIG. 17 and comprises a forward part 302 which is pivotally connected to the sear 163 by the transverse pin 184, and a rearward part 304 which has an abutment 306 for engaging the pawl 158 during the forward movement of the latter on the second pull of the trigger on single action firing as described above. The two parts 302 and 304 are threadably connected, as shown, so that the position of the abutment 306 relative to the sear may be adjusted by threading the rearward part into or out of the forward part. A spring 308 is received by a bore in the forward part and acts between the two parts to prevent any undesired movement therebetween as the result of vibrations caused by firing. The screw thread adjustment between the two parts permits the length of the releasing arm to be varied and, thus, when the firearm

includes the adjustable releasing arm, the distance between the abutment 306 and the forward face of the pawl may be varied to control the extent of rearward trigger pull required to effect the release of the hammer. As the length of the releasing arm is increased, the abutment is brought closer to the pawl 158 so that a shorter trigger pull is required, while with a shorter releasing arm the abutment is spaced a further distance from the pawl so that a longer trigger pull is required. When installed in the firearm, the space 310 between the forward and rear parts 302 and 304 serves to accommodate the trigger bar supporting stud 157 in a manner similar to the recess 191 of the releasing arm 182.

The invention claimed is:

1. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral or fired and a cocked position and biased toward said neutral position, cocking means movable relative to said frame away from and toward an initial position and which means in movement away from said initial position is releasably engageable with said hammer to drive the same from said neutral position to said cocked position, a sear for engaging and holding said hammer in its cocked position after its movement to such position by said cocking means and after said cocking means is returned toward its initial position, means for selectively rendering said sear effective or ineffective to engage and hold said hammer in its cocked position, and means effective when said sear is ineffective to engage and hold said hammer for releasing said cocking means from said hammer upon movement of said cocking means to a predetermined extent away from said initial position to enable said hammer to return to its neutral or fired position under the action of its bias and independently of said cocking means while said cocking means remains displaced from its initial position.

2. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, cocking means movable relative to said frame away from and toward an initial position and which means is releasably engageable with said hammer during movement away from said initial position to drive the hammer from said neutral position to said cocked position, said cocking means being movable independently of said hammer in the other direction of its movement, a sear movable relative to said frame and engageable with said hammer to releasably hold the latter in cocked position, a stop for limiting the movement of said sear toward said hammer, said stop being selectively movable between a position at which said sear is permitted to engage and releasably hold said hammer and a position at which said sear is prevented from engaging and releasably holding said hammer, an arm on said cocking means operable to release said cocking means from said hammer, a movable abutment, and means for moving said abutment out of the path of said arm when said sear is permitted to engage and hold said hammer and for moving said abutment into the path of said arm so as to engage and operate the same to release said cocking means from said hammer during the cocking movement of said cocking means when said sear is prevented from engaging and holding said hammer.

3. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, a pawl movable bodily relative to said frame away from and toward an initial position and which pawl is releasably engageable with said hammer to drive the same from said neutral position to said cocked position during movement away from said initial position, the said pawl being movable bodily in the opposite direction independently of said hammer, an arm on said pawl operable to release said pawl from driving engagement with said hammer, a pivotally movable sear biased toward said hammer, a

stop engageable with said sear to limit its movement toward said hammer, and an abutment on said sear and movable therewith, said stop being selectively movable between a first position at which said stop is free of said sear so that said sear engages said hammer and moves into latching relationship therewith when said hammer is moved to cocked position and a second position at which said stop holds said sear away from said hammer, said abutment being so positioned relative to said sear and pawl arm as to be out of the path of said pawl arm when said sear engages said hammer and in the path of said arm so as to engage and operate the same during the cocking movement of said pawl when said sear is held away from said hammer by said stop in the second position thereof.

4. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position and biased toward said neutral position and which hammer is provided with a cocking notch and a sear notch, a reciprocable trigger bar, a pawl movably mounted on said trigger bar, said pawl being engageable with said cocking notch to move said hammer from said neutral toward said cocked position upon movement of said trigger bar in one direction of its reciprocation, the said trigger bar and said pawl being movable in the opposite direction of their reciprocation independently of said hammer, a sear pivotally movable relative to said frame and engageable with said sear notch to releasably hold said hammer in cocked position, a stop adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer, said stop being selectively movable between a position at which said sear is permitted to engage said sear notch and a position at which said cam holds said sear away from said hammer and prevents engagement of said sear with said sear notch, an arm on said pawl, and an abutment arm connected with said sear which arm is so positioned relative to said sear and pawl arm as to be out of the path of said pawl arm when said sear engages said hammer and as to be in the path of said arm so as to engage and operate the same to move said pawl from said cocking notch during the movement of said pawl with the trigger bar in the said one direction when said sear is held away from said hammer by said stop.

5. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position and biased toward said neutral position and which hammer is provided with a cocking notch and a sear notch, a reciprocable trigger bar located adjacent said hammer, a pawl movably mounted on said trigger bar and biased toward said hammer, said pawl being engageable with said cocking notch to move said hammer from said neutral toward said cocked position upon movement of said trigger bar in one direction of its reciprocation, a sear pivotally movable relative to said frame and engageable with said sear notch to releasably hold said hammer in cocked position, an arm on said pawl, an abutment on said sear engageable with said arm to move said pawl from said cocking notch upon movement of said trigger bar to a predetermined extent in said one direction to enable said hammer to return to said neutral position under the action of its bias, and a stop adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer, said stop being selectively movable between a single action position at which said sear is permitted to engage said sear notch and at which said sear abutment is ineffective to engage said pawl arm, a safety position at which said stop holds said sear away from said hammer to prevent engagement of said sear with said sear notch and at which said sear abutment is ineffective to engage said pawl arm, and a double action position at which stop holds said sear away from said hammer to prevent engagement of said sear with said sear notch and at which said sear abutment is

effective to engage said pawl arm and to move said pawl from said cocking notch.

6. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position, a main spring for opposing the movement of said hammer toward said cocked position and for thereafter imparting a return movement thereto, a member reciprocable longitudinally of said frame and located generally below said hammer, latch means on said reciprocable member releasably connecting the member with the hammer to enable the member to move the hammer toward said cocked position in opposition to said main spring upon forward movement of said member and permitting said member to move rearwardly independently of said hammer, trip means on said latch means for releasing the same from said hammer to enable the hammer to be returned to its neutral position under the action of said main spring, a sear movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said trip means to operate the same upon forward movement of said reciprocable member to a predetermined extent, and stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer which stop means is selectively movable between a first position at which said sear is permitted to releasably engage said hammer and at which said abutment is ineffective to operate said trip means and a second position at which said stop means holds said sear away from said hammer to prevent said sear from holding said hammer and at which said abutment is effective to engage and operate said trip means to release said latch means from said hammer.

7. The combination defined in claim 6 further characterized by means for preventing movement of said stop means from said first to said second position while said sear holds said hammer in its cocked position.

8. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position, a main spring for opposing the movement of said hammer toward said cocked position and for thereafter imparting a return movement thereto, a member movable relative to said frame, a pawl on said member and biased toward said hammer which pawl releasably connects the member with the hammer to enable the member to move the hammer toward said cocked position in opposition to said main spring upon movement of said member in one direction and which pawl permits said member to move in the opposite direction independently of said hammer, an arm on said pawl operable to release said pawl from said hammer to enable the hammer to be returned to its neutral position under the action of said main spring, a sear pivotally movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said pawl arm to operate the same upon movement of said member to a predetermined extent in said one direction, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer which stop means is selectively movable between a first position at which said sear is permitted to releasably engage said hammer and at which said abutment is ineffective to operate said pawl arm and a second position at which said stop means holds said sear away from said hammer to prevent said sear from holding said hammer and at which said abutment is effective to engage and operate said pawl arm to release said pawl from said hammer.

9. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position, a main spring for opposing the movement of said hammer toward said cocked posi-

tion and for thereafter imparting a return movement thereto, a trigger bar reciprocable longitudinally of said frame and located generally below said hammer, a pawl on said trigger bar and biased toward said hammer which pawl releasably connects the trigger bar with the hammer to enable the trigger bar to move the hammer toward said cocked position in opposition to said main spring upon forward movement of said trigger bar and which pawl permits said trigger bar to move rearwardly independently of said hammer, an arm on said pawl operable to release said pawl from said hammer to enable the hammer to be returned to its neutral position under the action of said main spring, a sear pivotally movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said pawl arm to operate the same upon forward movement of said reciprocable trigger bar to a predetermined extent, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer which stop means is selectively movable between a first position at which said sear is permitted to releasably engage said hammer and at which said abutment is ineffective to operate said pawl arm and a second position at which said stop means holds said sear away from said hammer to prevent said sear from holding said hammer and at which said abutment is effective to engage and operate said pawl arm to release said pawl from said hammer.

10. The combination in a firearm of: a frame having a grip portion, a hammer pivotally movable relative to said frame between a neutral and a cocked position, a main spring for opposing the movement of said hammer toward said cocked position and for thereafter imparting a return movement thereto, a trigger bar reciprocable longitudinally of said frame and located generally below said hammer, a pawl on the trigger bar releasably connecting the trigger bar with the hammer to enable the trigger bar to move the hammer toward said cocked position in opposition to said main spring upon forward movement of said trigger bar and permitting said trigger bar to move rearwardly independently of said hammer, an arm on said pawl for releasing the same from said hammer to enable the hammer to be returned to its neutral position under the action of said main spring, a sear pivotally movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said pawl arm to operate the same upon forward movement of said trigger bar to a predetermined extent, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer which stop means is selectively movable between a first position at which said sear is permitted to releasably engage said hammer and at which said abutment is ineffective to operate said pawl arm and a second position at which said stop means holds said sear away from said hammer to prevent said sear from releasably engaging said hammer and at which said abutment is effective to engage and operate said pawl arm to release the pawl from said hammer, and a selector lever connected with said stop means for moving the latter between said first and second positions, said selector lever being constructed and arranged to be moved by the thumb of the hand of a user engaged with said firearm.

11. The combination defined in claim 10 further characterized by means engageable with said selector lever to prevent movement of said stop means from said first to said second position while said sear holds said hammer in its cocked position.

12. The combination in a firearm of: a frame having a cavity and a side wall adjacent said cavity provided with a transverse bore, a hammer in said cavity and pivotally movable relative to said frame between a neutral and a

cocked position and biased toward said neutral position, said hammer having a cam surface on the side thereof adjacent said side wall, means for moving said hammer from said neutral to said cocked position, a sear movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the same in its cocked position, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer which stop means is selectively movable between a first position at which said sear is permitted to releasably engage said hammer and a second position at which said stop means holds said sear away from said hammer to prevent said sear from holding said hammer in its cocked position, an operating lever adjacent the outer surface of said side wall and connected with said stop means for normally moving said stop means between its first and second positions, and a pin slidably received in said transverse bore and biased laterally toward said hammer and which pin engages said hammer cam surface and is moved outwardly by said cam surface from an unexposed to an exposed position beyond the outer surface of said side wall when said hammer is moved from its neutral to its cocked position, said pin in its exposed position being located in the path of said operating lever to prevent movement of said stop means from its first to its second position.

13. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position, a main spring for opposing the movement of said hammer toward said cocked position and for thereafter imparting a return movement thereto, a trigger bar reciprocable longitudinally of said frame and located generally below said hammer, a pawl pivotally mounted on the trigger bar and engageable with the hammer to enable the trigger bar to move the hammer toward said cocked position in opposition to said main spring upon forward movement of said trigger bar and permitting said trigger bar to move rearwardly independently of said hammer, a depending arm on said pawl, a curved spring having one end portion secured to said frame below the lower end of said depending pawl arm, said spring normally curving rearwardly and upwardly and then forwardly from said one end portion to its other end portion which other end portion engages the rear of said depending pawl arm throughout the full extent of its reciprocable movement so as to urge the pawl arm forwardly and in turn urge the pawl upwardly into engagement with said hammer, a sear pivotally movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said pawl arm to arrest the same and cause said pawl to be moved downwardly and out of engagement with said hammer upon forward movement of said trigger bar to a predetermined extent, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer which stop means is selectively movable between a first position at which said sear is permitted to releasably engage said hammer and at which said abutment is ineffective to arrest said pawl arm and a second position at which said stop means holds said sear away from said hammer to prevent said sear from engaging said hammer and at which said abutment is effective to arrest said pawl arm and cause the release of said pawl from said hammer.

14. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral or fired and a cocked position, a main spring for opposing the movement of said hammer toward said cocked position and for thereafter imparting a return movement thereto, a member movable relative to said frame, latch means on said member releasably connecting the member with the hammer to enable the member to move the hammer toward said cocked position in opposition to said main spring upon movement of said member

in one direction and permitting said member to move in the opposite direction independently of said hammer, trip means on said latch means for releasing the same from said hammer to enable the hammer to be returned to its neutral position under the action of said main spring, a sear movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said trip means to operate the same upon movement of said first-mentioned member to a predetermined extent in said one direction, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer, said stop means being selectively movable between a single action position at which said sear is permitted to engage said hammer and to hold the same in the cocked position and at which said sear abutment is ineffective to engage said trip means, a safety position at which said stop means holds said sear away from said hammer to prevent engagement of sear with said hammer and at which said sear abutment is ineffective to engage said trip means, and a double action position at which said stop means holds said sear away from said hammer to prevent engagement of said sear with said hammer and at which said sear abutment is effective to engage said trip means to release said latch means from said hammer, whereupon the main spring forces the hammer to the neutral or fired position.

15. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position, a main spring for opposing the movement of said hammer toward said cocked position and for thereafter imparting a return movement thereto, a member reciprocable longitudinally of said frame and located generally below said hammer, a pawl on said reciprocable member releasably connecting the member with the hammer to enable the member to move the hammer toward said cocked position in opposition to said main spring upon forward movement of said member and permitting said member to move rearwardly independently of said hammer, an arm on said pawl operable to release said pawl from said hammer to enable the hammer to be returned to its neutral position under the action of said main spring, a sear pivotally movable relative to said frame and biased toward said hammer which sear is engageable with said hammer to releasably hold the hammer in its cocked position and which sear includes an abutment engageable with said pawl arm to operate the same upon forward movement of said reciprocable member to a predetermined extent, stop means adjacent said sear and engageable therewith to limit the movement of said sear toward said hammer, said stop means being selectively movable between a single action position at which said sear is permitted to engage said hammer and to hold the same in the cocked position and at which said sear abutment is ineffective to engage said pawl arm, a safety position at which said stop means holds said sear away from said hammer to prevent engagement of sear with said hammer and at which said sear abutment is ineffective to engage said pawl arm, and a double action position at which said stop means holds said sear away from said hammer to prevent engagement of said sear with said hammer and at which said sear abutment is effective to engage said pawl arm to release said pawl from said hammer, whereupon the main spring forces the hammer to the neutral or fired position.

16. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, a sear movable relative to said frame which sear is biased toward said hammer and is releasably engageable therewith to hold the same in its cocked position, a releasing arm which is movable to release said sear from said hammer to enable the return of said hammer from its cocked to its neutral position under the action of its bias, a trigger bar reciprocable in said frame, latch

means mounted on said trigger bar for movement between first and second positions relative to said trigger bar and biased toward said first position, the said latch means in its first position being releasably engageable with said hammer to enable said trigger bar to move said hammer from its neutral position to its cocked position upon movement of said trigger bar in one direction and to enable said trigger bar to return to its original position independently of said hammer, and means for holding said latch means in its second position when said hammer is in its cocked position and said trigger bar is in its said original position, said latch means in its second position being engageable with said releasing arm to move the same to effect the release of said sear from said hammer upon a subsequent movement of said trigger bar in said one direction.

17. In a firearm the combination of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, a sear movable relative to said frame which sear is biased toward said hammer and is latchably engageable therewith to releasably hold the same in its cocked position, a releasing arm connected with said sear and extending therefrom which releasing arm is movable to release said sear from said hammer to enable said hammer to return from said cocked to said neutral position under the action of its bias, a trigger bar reciprocable in said frame, a pawl on said trigger bar which pawl is latchably engageable with said hammer to move said hammer from said neutral position to said cocked position upon a first movement of said trigger bar and to permit said trigger bar to thereafter return to its original position independently of said hammer and which pawl is engageable with said releasing arm to move the same to cause the release of said sear from said hammer upon a second movement of said trigger bar from said original position, an abutment on said releasing arm, and a stop on said frame engageable with said abutment to limit the movement of said releasing arm and said trigger bar on said second movement of said trigger bar from said original position.

18. In a firearm the combination of: a frame, a hammer movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, a member movable relative to said frame, pawl means on said member engageable with said hammer to move the same from said neutral to said cocked position upon movement of said member in one direction and permitting said member to be moved in the opposite direction independently of said hammer, a sear located adjacent said hammer and movable relative thereto which sear is biased toward said hammer and is releasably engageable therewith to hold said hammer in its cocked position, trip means operable to release said pawl means from said hammer, an abutment on said sear engageable with said trip means to operate the same to cause the release of said pawl means from said hammer upon movement of said member to a predetermined extent in said one direction, a releasing arm connected with said sear which releasing arm is engageable with said trip means when said hammer is held in cocked position by said sear and said member is moved in said one direction to cause said releasing arm to move said sear out of engagement with said hammer, and a stop for limiting the movement of said sear which stop is selectively movable between a first position at which said sear is permitted to engage said hammer and at which said abutment is ineffective to engage and operate said trip means to release said pawl means from said hammer so that on a first movement of said member in said one direction said hammer is moved from said neutral to said cocked position and is held there by said sear for subsequent release by subsequent movement of said releasing arm upon a second movement of said member in said one direction and a second position at which said sear is held from engage-

ment with said hammer by said stop and at which said abutment is effective to engage and operate said trip means to release said pawl means from said hammer so that said hammer is moved from said neutral to approximately said cocked position and released for return to said neutral position during each movement of said reciprocable member in said one direction.

19. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said hammer having a cocking notch and a sear notch and having a hold down portion, a reciprocable trigger bar located adjacent said hammer, a pawl movably mounted on said trigger bar and biased toward said hammer and said cocking notch, said pawl being engageable with said cocking notch to move said hammer from said neutral toward said cocked position upon movement of said trigger bar in one direction and said pawl permitting said trigger bar to move in the opposite direction independently of said hammer, a sear pivotally movable relative to said frame and biased toward said hammer and engageable with said sear notch to releasably hold said hammer in cocked position after the latter is moved to such position by said pawl, said hammer hold down portion being engageable with said pawl to hold the same in a position to clear said cocking notch when said hammer is held in cocked position by said sear and said trigger bar is returned to its original position, and a releasing arm on said sear which releasing arm is engageable with said pawl when the latter is in said clearing position to effect the release of said sear from said sear notch upon subsequent movement of said trigger bar and pawl in said one direction.

20. The combination in a firearm of: a frame, firing means movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said firing means having a cocking notch and a sear notch therein and having a hold down portion, movable cocking means adjacent said firing means, a pawl movably mounted on said cocking means and biased toward said firing means, said pawl being engageable with said cocking notch to move said firing means from said neutral toward said cocked position upon cocking movement of said cocking means, said pawl including an operating arm, a sear movable in said frame and biased toward said firing means and engageable with said sear notch to releasably hold said firing means in cocked position after the latter is moved to such position by said pawl, adjustable means on said frame limiting the extent of engagement of said sear in said sear notch thereby regulating the frictional engagement therebetween to determine the force necessary to effect their disengagement, an abutment on said sear engageable with said pawl operating arm to move said pawl from said cocking notch upon cocking movement of said cocking means to a predetermined extent to enable said firing means to return to said neutral position under the action of its bias, said hold down portion being engageable with said pawl to hold the same in a position clearing said cocking notch when said firing means is held in cocked position by said sear and said cocking means is returned to its original position, a cam adjacent said sear and engageable therewith to limit the movement of said sear toward said firing means, said cam being selectively movable between a single action position at which said sear is permitted to engage said sear notch to hold said firing means in a cocked position and at which said sear abutment is ineffective to engage said pawl arm and a double action position at which said cam holds said sear away from said firing means to prevent engagement of said sear with said sear notch and at which said sear abutment is effective to engage said pawl operating arm and to move said pawl from said cocking notch, and a releasing arm on said sear which releasing arm is engageable with said pawl when the latter is in said cleared position

to effect release of said sear from said sear notch upon movement of said cocking means.

21. The combination in a firearm of: a frame, firing means movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said firing means having a cocking notch and a sear notch therein and having a hold down portion, movable cocking means adjacent said firing means, a pawl movably mounted on said cocking means and biased toward said firing means, said pawl being engageable with said cocking notch to move said firing means from said neutral toward said cocked position upon cocking movement of said cocking means, said pawl including an operating arm, a sear movable in said frame and biased toward said firing means and engageable with said sear notch to releasably hold said firing means in cocked position after the latter is moved to such position by said pawl, an abutment on said sear engageable with said pawl operating arm to move said pawl from said cocking notch upon cocking movement of said cocking means to a predetermined extent to enable said firing means to return to said neutral position under the action of its bias, said hold down portion being engageable with said pawl to hold the same in a position clearing said cocking notch when said firing means is held in cocked position by said sear and said cocking means is returned to its original position, a cam adjacent said sear and engageable therewith to limit the movement of said sear toward said firing means, said cam being selectively movable between a single action position at which said sear is permitted to engage said sear notch to hold said firing means in a cocked position and at which said sear abutment is ineffective to engage said pawl arm and a double action position at which said cam holds said sear away from said firing means to prevent engagement of said sear with said sear notch and at which said sear abutment is effective to engage said pawl operating arm and to move said pawl from said cocking notch, and a releasing arm on said sear which releasing arm is engageable with said pawl when the latter is in said cleared position to effect release of said sear from said sear notch upon movement of said cocking means, said cam having a surface which is positioned to engage said releasing arm and thereby arrest further movement of said releasing arm and cocking means after the release of said sear from said sear notch by said cocking means when said cam is set at said single action position.

22. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said hammer having a cocking notch and a sear notch in the bottom thereof, a reciprocable trigger bar located generally below said hammer, a pawl pivotally mounted on said trigger bar and biased upwardly toward said hammer, said pawl being engageable with said cocking notch to move said hammer from said neutral toward said cocked position upon forward movement of said trigger bar and said pawl including a depending operating arm, an L-shaped sear pivotally movable relative to said frame and having one arm extending generally upwardly and the other arm extending generally rearwardly, the upper end of said upwardly extending arm being engageable with said hammer sear notch to releasably hold said hammer in cocked position after the latter is moved to such position by said pawl and the rear end of said rearwardly extending arm being engageable with said pawl operating arm to arrest the same and cause said pawl to be moved out of engagement with said cocking notch upon forward movement of said trigger bar and pawl to a predetermined extent, means for biasing the upwardly extending arm of said sear rearwardly toward said hammer, and cam means engageable with said sear to limit the rearward pivotal movement of said upwardly extending arm, said cam means being selectively movable between a position at which said up-

wardly extending sear arm is free to engage said sear notch and at which said rearwardly extending sear arm is positioned out of the path of said pawl operating arm and a position at which said upwardly extending sear arm is held forwardly away from said hammer and prevented from entering said sear notch and at which said rearwardly extending sear arm is held in a raised position and in the path of said pawl operating arm.

23. In a firearm the combination of: a frame, firing means movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said firing means having a single action sear notch therein, means engageable with said firing means in one direction of its movement to move said firing means from said neutral to said cocked position, a sear biased toward said firing means and having a face engageable with one wall of said single action sear notch to releasably hold said firing means in cocked position, manually operable means including a trigger for pulling said sear from said sear notch to release said firing means, and an adjustable stop on said frame engageable with the sear to limit its movement and the extent of engagement between said sear face and notch wall, said stop being adjustable to vary the extent of frictional engagement between said sear face and said one wall of said sear notch so as to control the trigger pull poundage required to release said firing means.

24. The combination in a firearm of: a frame, a cylinder rotatable relative to said frame and having a plurality of cartridge chambers, a firing pin in said frame movable between first and second positions relative thereto and biased toward said first position, said firing pin having a part which moves into and out of one of said cartridge chambers as said pin is moved to its second and first positions respectively, a hammer having a head portion and which hammer is pivotally movable relative to said frame between a neutral position at which said head portion engages said firing pin and holds the same in its first position and a cocked position at which said head portion is spaced rearwardly from said firing pin means, means for biasing said hammer toward said neutral position, means for moving said hammer from said neutral to said cocked position against the action of said biasing means and for thereafter releasing said hammer to allow it to be returned toward said neutral position by said biasing means, and a hammer block pivotally mounted on said frame and movable into and out of a position at which said block is engageable with said hammer to limit the forward travel of said head portion and to prevent the same from engaging said firing pin and moving the same from its first position, said hammer block including a thumb actuatable operating lever on the outside of said frame.

25. The combination in a firearm of: a frame defining an enclosed cavity, firing pin means in said frame, a hammer located in said cavity and pivotally connected to said frame, said hammer including a head portion and being movable relative to said frame between a neutral position at which said head engages said firing pin means and a cocked position at which said head portion is spaced rearwardly from said firing pin means, means for biasing said hammer toward said neutral position, means for moving said hammer from said neutral to said cocked position against the action of said biasing means and for thereafter releasing said hammer to allow it to be returned toward said neutral position by said biasing means, a pin slidably received in a frame wall which pin is movable between an exposed position at which said pin extends through said frame wall and beyond its outer surface and an unexposed position at which substantially none of said pin extends beyond the outer surface of said wall, and a spring separate from said means for biasing said hammer for urging said pin to its unexposed position and resisting its movement to its exposed position, said pin being arranged to be out of engagement

with said hammer throughout the initial portion of the movement of said hammer from its neutral position to its cocked position and to be engaged by said hammer and moved thereby to its exposed position throughout the final portion of the movement of said hammer to its cocked position.

26. The combination in a firearm of: a frame defining a cavity, firing means including a hammer located in said cavity and connected to said frame, said firing means being movable relative to said frame between a neutral position and a cocked position, a pin secured to said frame adjacent said firing means, a generally U-shaped main spring positioned in said cavity with its closed end wrapped around said pin by an angle no greater than 360 degrees and having one arm extending from said pin and engaging said frame and having its other arm extending from said pin and engaging said firing means, the arms of said spring being normally spread apart so as to normally hold said firing means in its neutral position and to oppose movement of said firing means from its neutral position toward its cocked position, and means for moving said firing means from said neutral to said cocked position against the action of said spring and for thereafter releasing said firing means to allow it to be returned toward said neutral position by said spring.

27. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said hammer having a cocking notch and a sear notch and a heel portion, a trigger bar movable relative to said frame, a pawl pivotally mounted on said trigger bar for movement between first and second positions, means for biasing said pawl toward its first position, said pawl being engageable in its first position with said cocking notch to move said hammer from said neutral to said cocked position upon movement of said trigger bar in one direction, the said pawl permitting movement of said trigger bar and pawl in the opposite direction independently of said hammer, a sear movable relative to said frame and engageable with said sear notch to releasably hold said hammer in cocked position after the latter is moved to said position by the movement of said trigger bar and pawl in said one direction, said hammer heel portion being engageable with said pawl to hold the pawl in its second position when said hammer is held in cocked position by said sear and said trigger bar is returned to its original position, a releasing arm pivotally mounted on said sear for movement about a pivot axis that is fixed with respect to said sear and which releasing arm includes two portions extending in different directions from said pivot axis, one of said releasing arm portions being engageable with said pawl in its second position to effect the release of said sear from said sear notch upon movement of said trigger bar and pawl in said one direction and being engageable with said trigger bar to limit the pivotal movement of the releasing arm, and a spring associated with the other of said releasing arm portions and operable to urge said latter portion in such a direction as to cause said sear to be biased toward said hammer and said first mentioned releasing arm portion to be biased toward said trigger bar.

28. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, said hammer having a cocking notch and a sear notch in the bottom thereof and having a heel portion to the rear of said cocking notch, a trigger bar reciprocable longitudinally of said frame and located generally below said hammer, a pawl pivotally mounted on said trigger bar for movement between raised and lowered positions, means for biasing said pawl upwardly toward its raised position, said pawl being engageable in its raised position with said cocking notch to move said hammer from said neutral to said cocked position upon forward movement of said trigger bar, the said pawl per-

mitting rearward movement of said trigger bar and pawl independently of said hammer, a sear pivotally movable relative to said frame and engageable with said sear notch to releasably hold said hammer in cocked position after the latter is moved to said position by the forward movement of said trigger bar and pawl, said hammer heel portion being engageable with said pawl to hold the pawl in its lowered position when said hammer is held in cocked position by said sear and said trigger bar is returned to its rearward position, a releasing arm pivotally mounted on said sear for movement about a pivot axis that is fixed with respect to said sear and which releasing arm includes a portion extending rearwardly from said pivot axis and a portion extending forwardly from said pivot axis, said rearwardly extending releasing arm portion being engageable with said pawl in its lowered position to effect the release of said sear from said sear notch upon forward movement of said trigger bar and pawl and being engageable with the bottom of said trigger bar to limit the pivotal movement of the releasing arm, and a spring urging said forwardly extending releasing arm portion forwardly and downwardly to cause said sear to be biased rearwardly toward said hammer and said rearwardly extending releasing arm portion to be biased upwardly toward said trigger bar.

29. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position, means for moving said hammer from said neutral to said cocked position and for permitting said hammer to return to said neutral position independently of said means, a sear adjacent said hammer which sear is movable relative to said frame and biased toward said hammer, the said sear being latchably engageable with said hammer to hold the same in its cocked position, a releasing arm on said sear which releasing arm is movable to release said sear from latching engagement with said hammer, a stop adjacent said sear and engageable with said sear to limit its movement toward said hammer, said stop being selectively movable between a first position at which said sear is free to latchably engage said hammer and a second position at which said sear is held out of engagement with said hammer, and means defining an abutment on said releasing arm which abutment is so arranged as to be engageable with said stop when the latter is in its first position to arrest the movement of said releasing arm and the first mentioned means after the sear has been disengaged from said hammer.

30. The combination in a firearm of: a frame, a hammer pivotally movable relative to said frame between a neutral and a cocked position, means for moving said hammer from said neutral to said cocked position and for permitting said hammer to return to said neutral position independently of said means, a sear located generally forwardly of said hammer and pivotally movable relative to said frame and biased rearwardly toward said hammer, the said sear being latchably engageable with said hammer to hold the same in its cocked position, a rearwardly extending releasing arm on said sear which releasing arm is movable forwardly to release said sear from latching engagement with said hammer, a stop adjacent said sear and engageable with said sear to limit its rearward movement toward said hammer, said stop being selectively movable between a first position at which said sear is free to latchably engage said hammer and a second position at which said sear is held out of engagement with said hammer, and means defining a forwardly facing abutment surface on said releasing arm which abutment surface is so arranged as to be engageable with said stop when the latter is in its first position to limit the forward movement of said releasing arm and the first mentioned means after the sear has been disengaged from said hammer.

31. The combination is a revolver type firearm of: a frame, a cylinder rotatably movable relative to said frame about an axis extending longitudinally of the frame

and which cylinder includes means defining an annular series of ratchet teeth at its rear face, a hammer pivotally movable with respect to the frame between a neutral and a cocked position and which hammer has a forward portion that swings generally upwardly as the hammer is moved from its neutral to its cocked position, the said forward hammer portion having a bore therein and a slot on one side thereof which communicates with said bore, a hand pivotally connected to said forward hammer portion adjacent said bore and having an upper portion which is engageable with said ratchet teeth, a transverse pin fixed to the lower end of said hand and extending through said slot and into said bore, and spring means in said bore and abutting against said transverse pin for biasing said hand into engagement with said ratchet teeth, said hand serving to engage and lift a different one of said ratchet teeth each time the hammer is moved from its neutral to its cocked position to rotate said cylinder a predetermined distance about its axis.

32. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position, a trigger movable relative to said frame between first and second positions, first means connected with said trigger and moved thereby relative to said frame between first and second positions in response to movement of said trigger between its first and second positions respectively, said first means being engageable with said hammer during movement in one direction thereof to move said hammer from said neutral to said cocked position and thereafter being movable in the opposite direction independently of said hammer, a sear movable relative to said frame and engageable with said hammer to releasably hold the same in said cocked position, and a releasing means connected with said sear and operable when moved in a given direction to release said sear from said hammer, said first means being engageable with said releasing means during movement of said first means in said one direction and while said hammer is held in said cocked position to impart such hammer releasing movement to said releasing means.

33. The combination in a firearm of: a frame, a hammer movable relative to said frame between a neutral and a cocked position, a trigger movable relative to said frame between first and second positions, longitudinally reciprocable means engageable with said hammer on a first forward stroke thereof to move said hammer from said neutral to said cocked position and thereafter being movable rearwardly independently of said hammer, said longitudinally reciprocable means being connected with said trigger so as to be moved by the latter between first and second positions relative to the frame in response to movement of said trigger between its first and second positions respectively, a sear connected with said frame for generally rearward and forward movement and engageable in its rearward position with said hammer to releasably hold the same in said cocked position, and a rearwardly extending releasing arm connected with said sear and movable forwardly to cause forward movement of said sear and the release of said sear from said hammer, said longitudinally reciprocable means being engageable with said releasing arm on the second forward stroke thereof to impart such forward hammer releasing movement to said releasing arm.

34. The combination defined in claim 33 further characterized by means for adjusting the length of said releasing arm to control the length of the second forward stroke of said longitudinally reciprocable means required to effect the release of said hammer.

35. The combination defined in claim 33 further characterized by said releasing arm comprising a forward part connected with said sear, and a rearward part having an abutment which is engageable with said longitudinally reciprocable means, the said forward and rearward parts of said releasing arm being threadably connected so that the position of said abutment relative to

said sear may be adjusted by threading one of said parts relative to the other to control the length of the second forward stroke of said longitudinally reciprocable means required to effect the release of said hammer.

36. The combination in a firearm of: a frame having means defining a mechanism cavity, a trigger movable relative to said frame, a firing mechanism in said mechanism cavity and including a part movable to various positions relative to said frame for causing said firing mechanism to operate in a single acting manner, a double acting manner or a deactivated manner in response to pulls of said trigger, a bushing in press fitted relation with said frame and having a bore which communicates with said mechanism cavity and the outer surface of said frame, a cam located in said mechanism cavity and adapted to move said part of said firing mechanism between said various positions in response to angular movement of said cam, an extension on said cam which extension is received in said bushing bore so as to rotatably support said cam for said angular movement, and a lever fixed to the outer end of said extension adjacent the outer surface of said frame which lever is adapted for operation by the thumb or finger of a user to selectively vary the angular position of said cam.

37. The combination of a firearm of: a frame, and a firing mechanism connected with said frame, said firing mechanism including a sear movable into and out of a cocked position whereat said seal has frictional contact with at least one other part of said firing mechanism, said frictional contact tending to oppose movement of said seal out of said cocked position and by itself holding said sear in said cocked position, means including a trigger for moving said sear out of said cocked position, and adjustable stop means engageable with said sear to positively limit the movement of said sear toward said one other part to vary the area of permissible frictional contact between said sear and said at least one other part of said firing mechanism and to thereby adjust the trigger pull poundage required to move said sear out of said cocked position.

38. The combination in a firearm of: a frame, and a firing mechanism connected with said frame, said firing mechanism including a spring biased sear movable into and out of a cocked position at which cocked position said gear engages at least one other part of said firing mechanism and has frictional contact therewith tending to oppose its movement out of cocked position and by itself holding said sear in said cocked position, means including a trigger for moving said sear out of said cocked position, and adjustable stop means engageable with said sear to positively limit the movement of said sear toward said one other part to vary the area of permissible frictional contact of said sear with said at least one other part of said firing mechanism whereby the trigger pull poundage required to move said sear out of cocked position may be varied from approximately one-half pound to nine pounds.

39. The combination in a firearm of, a frame, a hammer movable relative to said frame between a neutral position and a cocked position and biased toward said neutral position, means movable relative to said frame between a first and a second position and which means in movement from its first to its second position is releasably engageable with said hammer to drive the same from said neutral to said cocked position, a sear movable into and out of holding relation with said hammer after said hammer is moved to its cocked position, means selectively operable or inoperable for holding said sear against moving into holding relationship with said hammer, and means connected with said sear and movable therewith which means when said sear is held against moving into holding relationship with said hammer is so positioned as to be engageable with said cocking means to release the latter from said hammer as said cocking means is moved to its second position whereby said ham-

mer may thereafter return to its neutral position under the action of its bias and independently of said cocking means.

40. The combination in the firearm of, a frame, a hammer movable relative to said frame between a neutral and a cocked position and biased toward said neutral position, a trigger movable relative to said frame between a first and a second position, a first member movable relative to said frame between a first and a second position in response to movement of said trigger between its first and its second position, a sear movable into and out of holding relation with said hammer after said hammer is moved to its cocked position, releasing means connected with said sear for moving the latter out of holding relationship with said hammer, a second member connected with said first member which second member is movable relative to said first member between first and second positions and is biased toward said first position, said second member in its first position being engageable with said hammer to drive the latter from its neutral to its cocked position as said first member is moved from its first to its second position and said second member in its second position being engageable with said releasing means to move said sear out of holding relation with said hammer as said first member is moved from its first to its second position, and means on said hammer for holding said second member in its second position relative to said first member after the hammer is moved to its cocked position.

41. The combination in a firearm of, a frame, a cylinder rotatable relative to said frame and having a plurality of cartridge chambers, a firing pin in said frame movable between first and second positions relative thereto and biased toward said first position, said firing pin having a part which moves into and out of one of said cartridge chambers as the pin is moved to its second and first positions respectively, a hammer movable relative to said frame and biased toward a neutral position at which it engages said firing pin and holds the latter in its second position, and a hammer block pivotally mounted on said frame and movable into and out of a position at which said block is engageable with said hammer to hold the same some distance away from its neutral position to permit said firing pin to move to its first position and out of interference with said cylinder.

42. The combination in a firearm of, a frame, a hammer pivotally connected with said frame for movement between a neutral position and a cocked position and biased toward said neutral position, said hammer having a portion which extends outwardly beyond the rear portion of said frame and which outwardly extending portion has a spur thereon which is engageable by the thumb or finger of the user to move said hammer from said neutral to said cocked position, a trigger movable relative to said frame and biased toward a forward position, means for normally locking said hammer in its neutral position which means is connected with said trigger and operable upon rearward movement of said trigger to a predetermined extent to free said hammer for movement to said cocked position by a force applied to said spur.

43. The combination in a firearm of, a frame having means defining a mechanism cavity, a trigger movable relative to said frame, a firing mechanism in said mechanism cavity and including a part movable to various positions relative to said frame for causing the firing mechanism to operate in a single acting manner, a double acting manner or a deactivated manner in response to pulls of said trigger, a cam located in said mechanism cavity and adapted to move said part of said firing mechanism between its various positions in response to angular movement of said cam, a lever connected with said cam located adjacent the outer surface of said frame which lever is adapted for operation by the thumb or finger of the user to selectively vary the angular position of said cam

and to thereby vary the manner of operation of said firearm.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,163,951

January 5, 1965

Karl R. Lewis

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 27, for "doubel" read -- double --; line 40, for "piston" read -- pistol --; line 47, for "mechanisms" read -- mechanism --; column 2, line 48, after "of" insert -- the --; column 5, line 73, before "the", second occurrence, insert -- beyond --; column 7, line 13, for "24" read -- 124 --; column 10, line 63, for "clocking" read -- clockwise --; column 16, line 31, strike out "be", first occurrence; column 17, line 27, for "connectting" read -- connecting --; column 22, line 70, for "interefere" read -- interfere --; column 35, line 73, for "is" read -- in --; column 36, line 25, for "betmeen" read -- between --; column 36, line 37, and column 37, lines 28 and 31, for "seal", each occurrence, read -- sear --; column 37, line 45, for "gear" read -- sear --.

Signed and sealed this 11th day of May 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents

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