

Sept. 3, 1957

J. GANNON

2,804,620

GUN FOR DRIVING FASTENERS AND THE LIKE

Filed Dec. 6, 1951

5 Sheets-Sheet 1

Fig. 1.

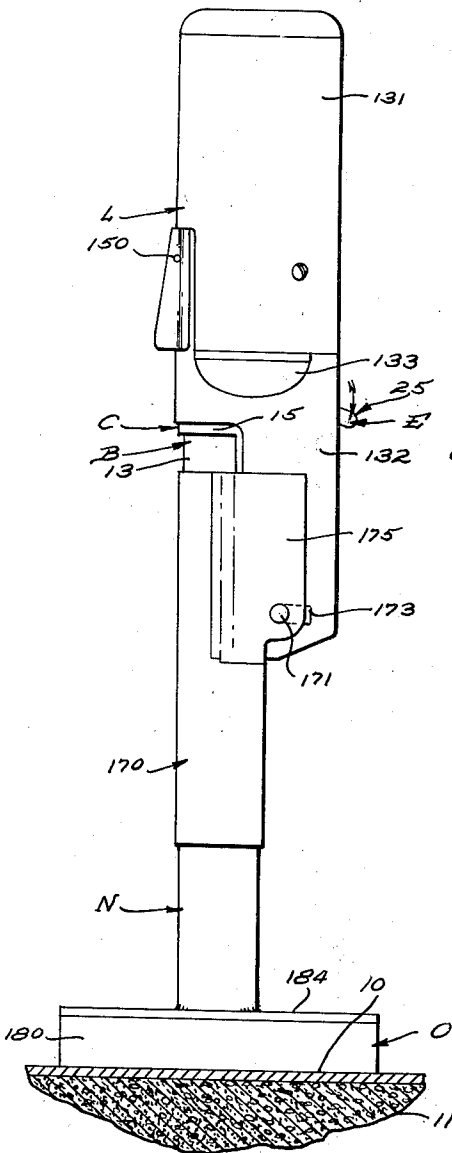


Fig. 2.

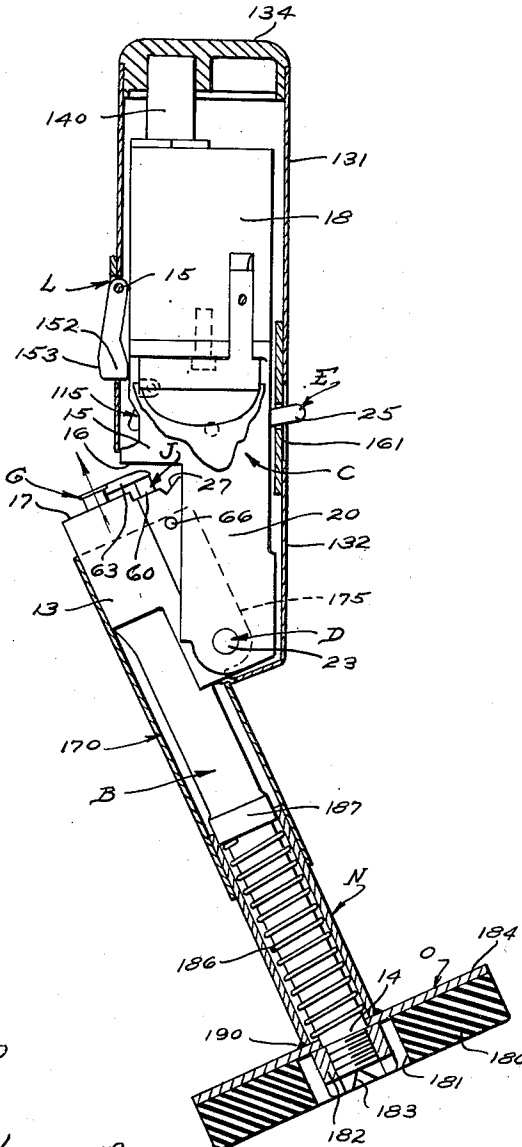
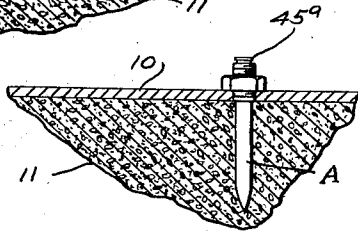


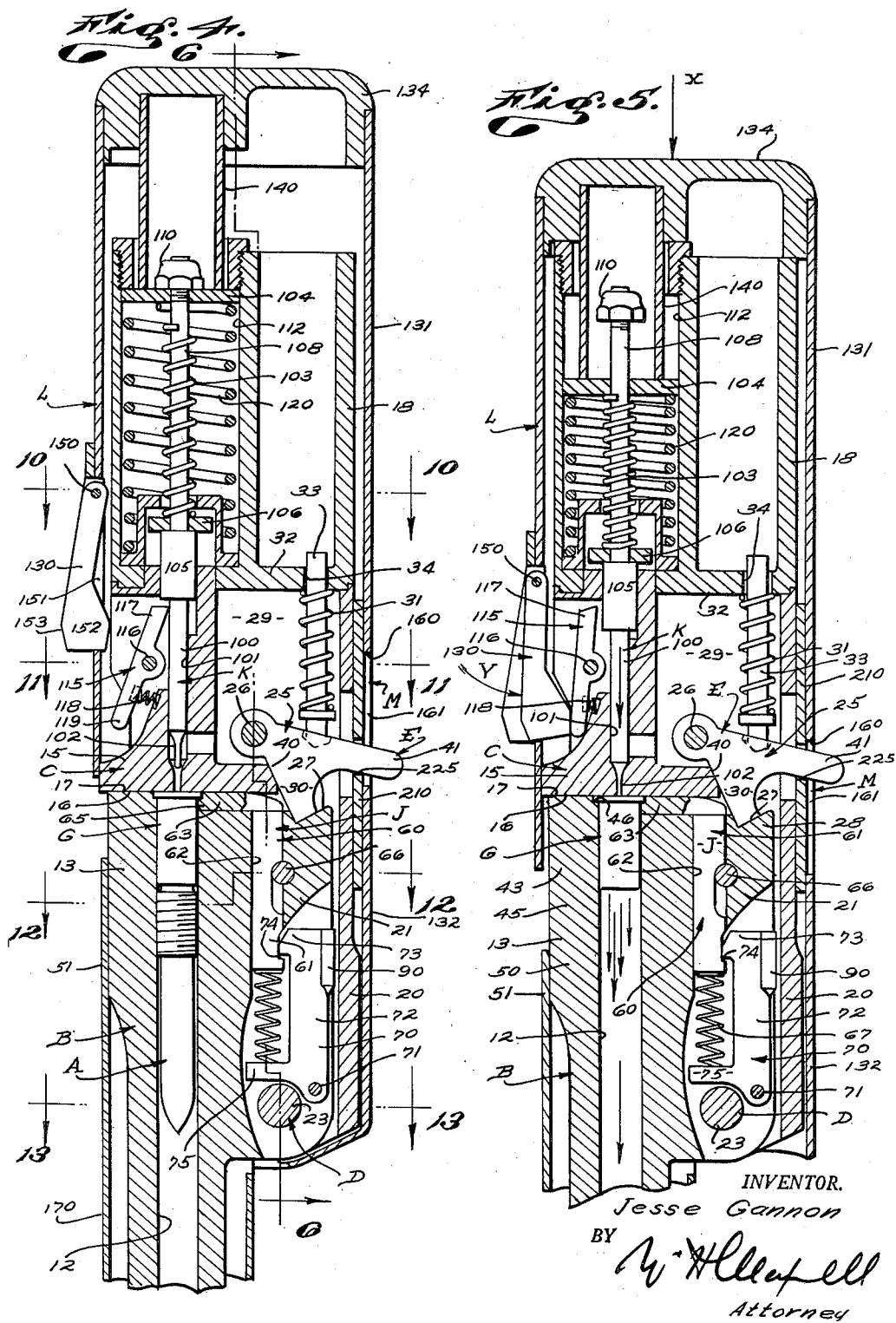
Fig. 3.



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5 Sheets-Sheet 2



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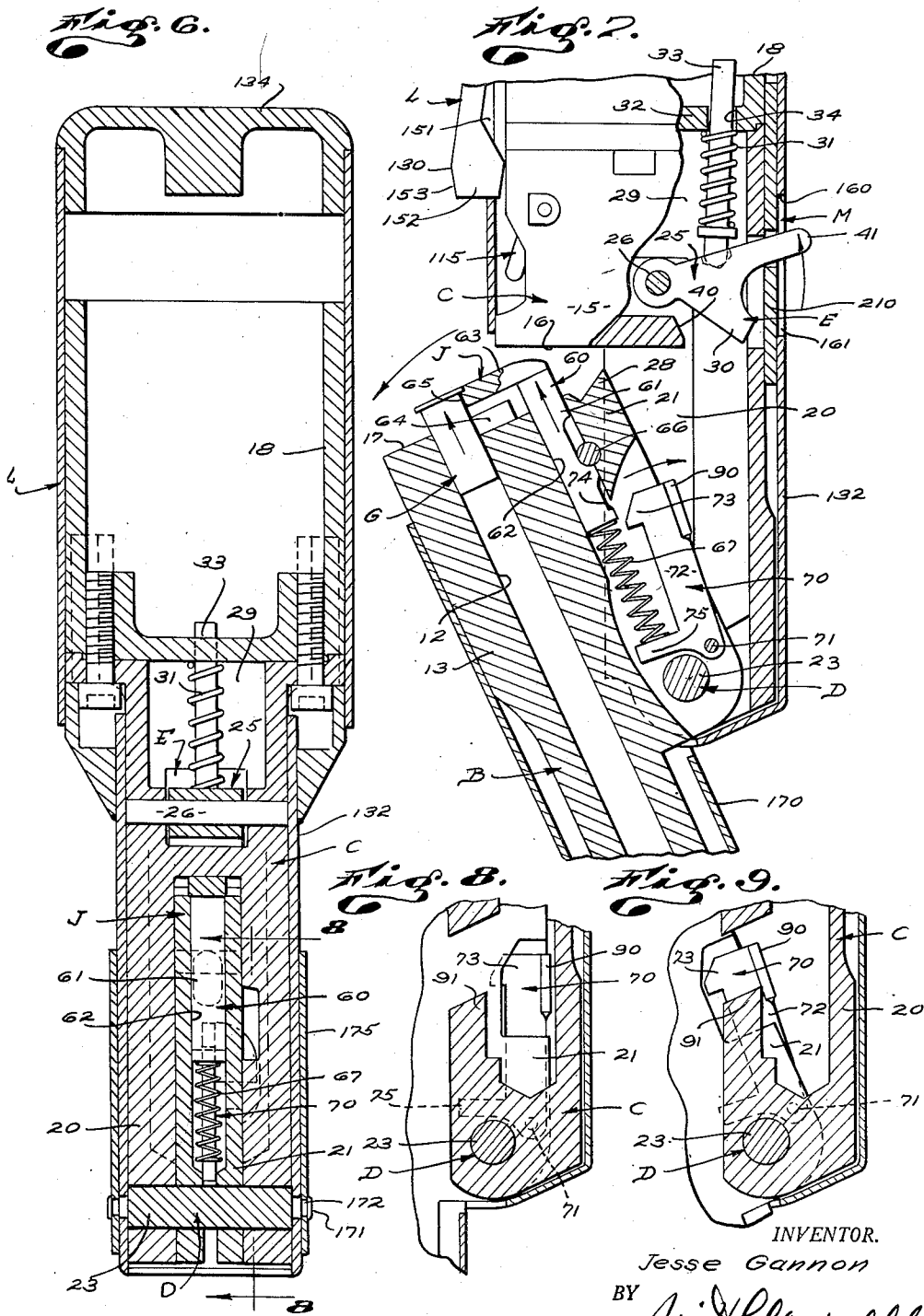
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GUN FOR DRIVING FASTENERS AND THE LIKE

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5 Sheets-Sheet 3



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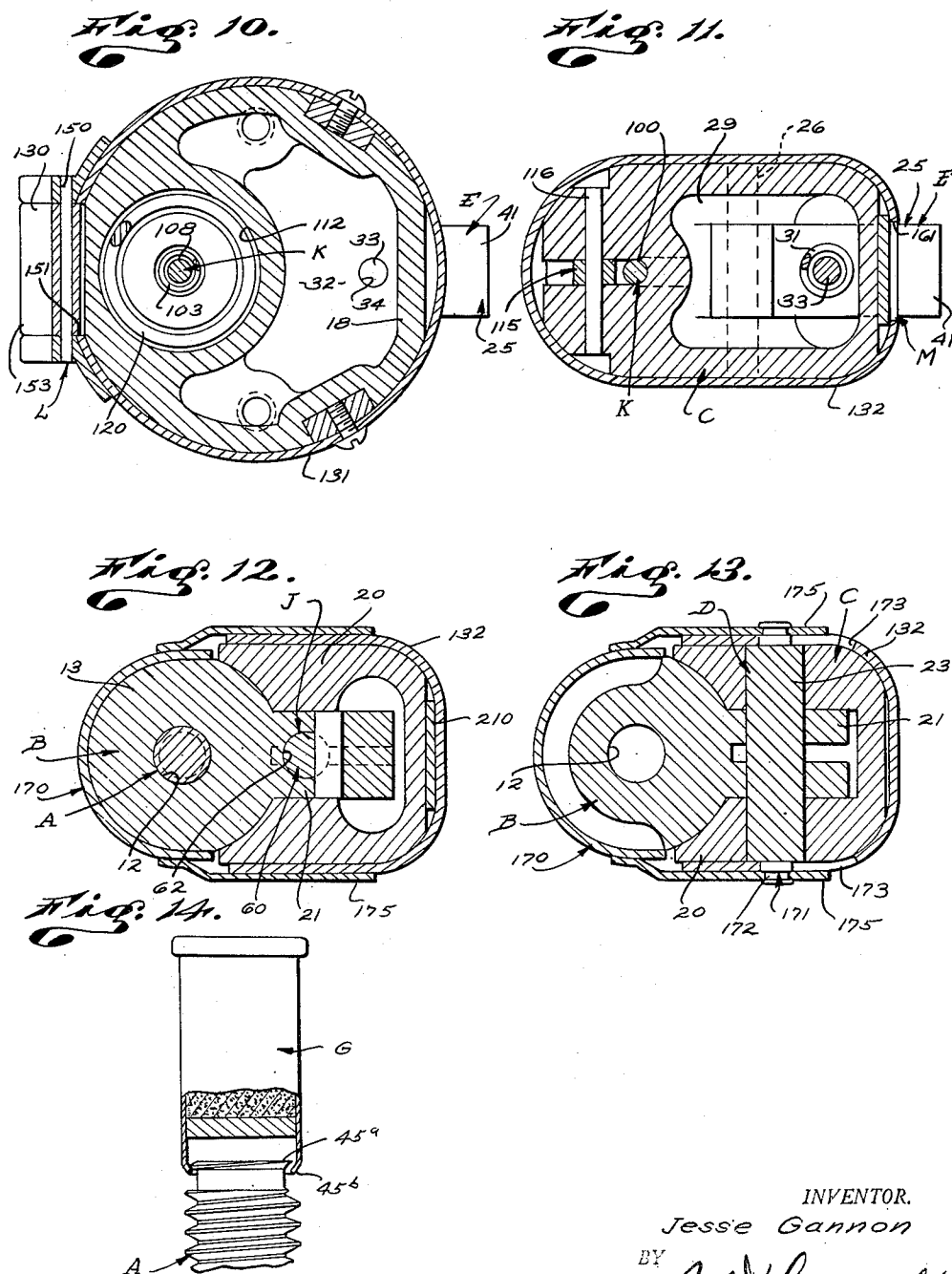
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GUN FOR DRIVING FASTENERS AND THE LIKE

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5 Sheets-Sheet 4



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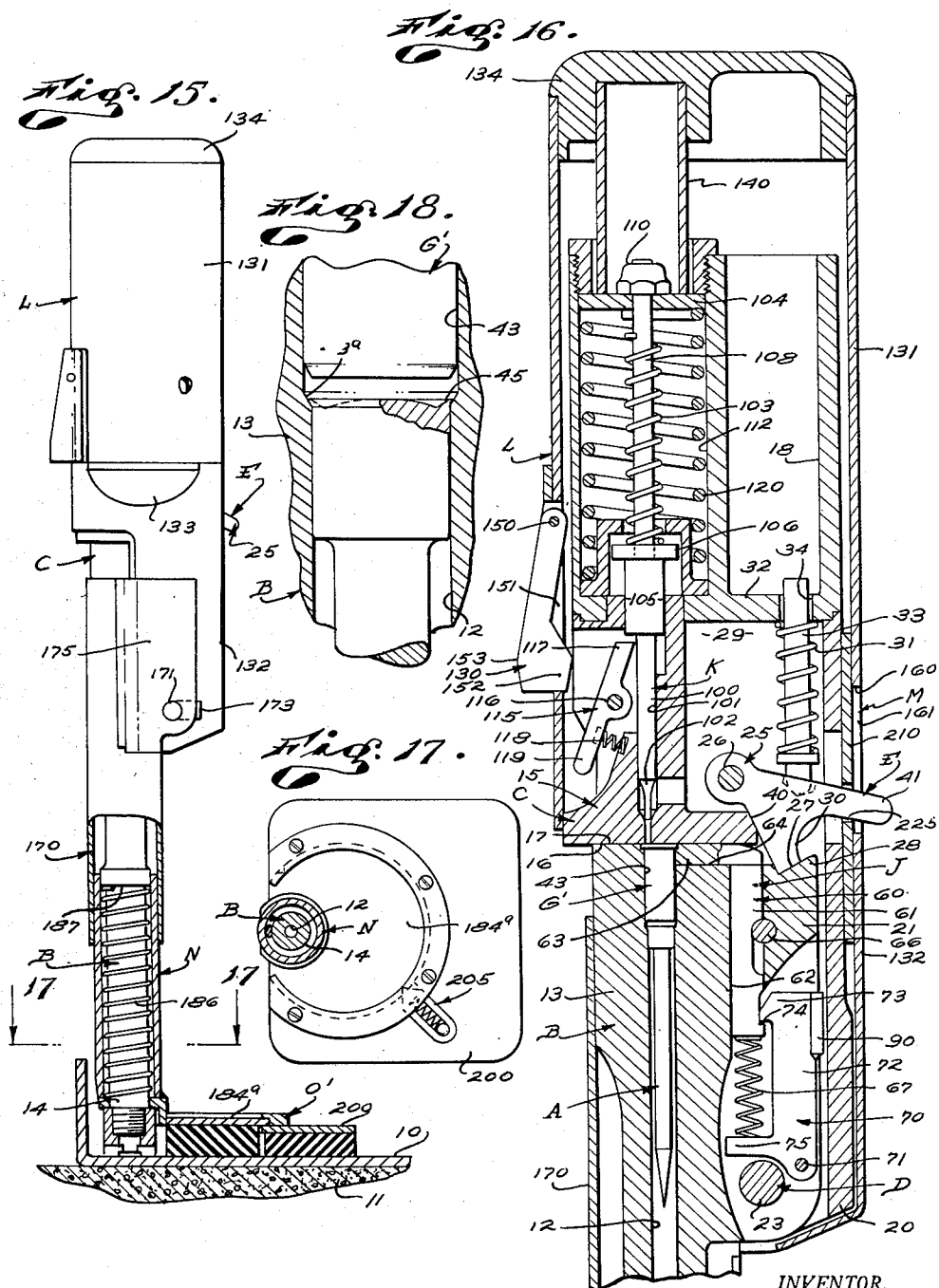
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GUN FOR DRIVING FASTENERS AND THE LIKE

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5 Sheets-Sheet 5



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GUN FOR DRIVING FASTENERS AND THE LIKE

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Application December 6, 1951, Serial No. 260,153

13 Claims. (Cl. 1—44.5)

This invention has to do with a gun or gun-type mechanism for handling fasteners, or the like, and it is a general object of the invention to provide a mechanism of this character that is of simple, practical, dependable construction which is convenient and safe to operate and which is highly effective in action.

Gun-like mechanisms are commonly employed for the driving or handling of fasteners, or like devices, and since mechanisms of this character involve the propelling of units such as fasteners by explosive charges it is highly important that they be safe to operate. Various forms or types of mechanisms have been proposed and used for this class of work, and various safety features, as well as arrangements for holding fasteners, or the like, prior to firing, have been incorporated in such mechanisms. However, in many cases the resulting structures are cumbersome or costly of manufacture, or somewhat difficult or slow of operation, or possess other characteristics that limit their use or practical application.

It is a general object of this invention to provide a gun-type mechanism of the general character referred to wherein the principal elements, namely, the barrel and breech block, are permanently coupled, as by a pivotal connection, so that these elements are shiftable relative to each other between a loading position and a firing position by the mere swinging of one relative to the other. With the present invention, when the breech block and barrel are related to be in the loading position, the portion of the barrel that receives the element to be driven, as well as the charge for driving such element, is exposed and readily accessible so that the loading operation can be carried out quickly and easily.

Another object of this invention is to provide a mechanism of the general character referred to characterized by a simple, effective shell ejector that serves to eject an expended shell from the barrel as the barrel and breech block are moved to the loading position, the mechanism being such that the shell is ejected when the breech block is clear of the barrel so that the ejected shell does not contact the breech block.

Another object of the invention is to provide a mechanism of the general character referred to wherein a control element is combined with the above-mentioned essential parts and is related to a manually operable trigger so that the control element must be manually shifted before the trigger can be operated to effect firing of the gun.

A further object of the invention is to provide a mechanism of the general character referred to incorporating a releasable latch serving to hold the breech block and barrel in the firing position where the block closes the breech end of the barrel and wherein there is a lock means responsive to the control element positively locking the latch against being released when the trigger of the mechanism is operable to effect firing.

Another object of the invention is to provide a mechanism of the general character referred to wherein the

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projectile or fastener to be delivered is loosely carried by the shell in which the explosive charge is packed.

Another object of the invention is to provide a construction of the general character referred to wherein the projectile or fastener is of such form as to so engage the barrel of the mechanism as to remain against the charge until such time as the charge is ignited to cause the fastener to be driven from the barrel.

The mechanism of the present invention is characterized by two main elements, namely, a barrel and a breech block, and these elements are joined by a pivotal connection to swing relative to each other between a loading position where the breech end of the barrel is exposed and a firing position where the block closes the barrel. A releasable fastening means, preferably a spring fastener, serves to hold the breech block in the firing position. A finger projects from the latch to the exterior of the structure to be manually operable. The barrel receives a shell carrying a suitable explosive charge and a projectile or fastener is initially located in the barrel, preferably adjacent the shell, and may have a flange releasably retaining it in the bore, or it may be releasably coupled to the shell. A shell ejecting means is provided and involves a spring-actuated shell lifter which operates as the barrel swings to the loading position to eject the expended charge from the barrel clear of the breech block. A firing means is provided for actuating the shell and includes a firing pin with a head cooperating with a latch and with a stem carrying a spring that actuates the pin. When the pin is retracted the latch holds it in that position. A control means is provided and involves a manually operable control element on the breech block, preferably a case or jacket surrounding the block. The control element is shiftable relative to the block and is normally held in an unactuated position by a spring. A trigger is related to the control element, being preferably pivoted thereto, and the parts are related so that when the control element is depressed or operated the trigger is in position so that it can be operated to release the latch that holds the firing pin retracted. A lock means, preferably a shoulder, on or in connection with the control element cooperates with the latch holding the breech block in closed position relative to the barrel so that this latch is locked against release when the trigger is in position to effect firing. In a preferred construction a housing is provided on the barrel, preferably to slide thereon, and is urged down by a spring and is related to a shoe retained on the barrel by a nut, or like retaining element.

The various objects and features of my invention will be fully understood from the following detailed description of typical preferred forms and applications of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevation of a structure embodying the invention, showing the mechanism in firing position and engaged with a structure to which a fastener is to be applied. Fig. 2 is a view of the structure of the present invention, showing it in loading position, certain parts being shown in section. Fig. 3 is a sectional view of a base with a part thereon held by a fastener applied to the structure of the present invention. Fig. 4 is an enlarged longitudinal detailed sectional view of the upper end portion of the mechanism provided by the invention, showing the breech end portion of the barrel and the breech block with the barrel and block in firing position. Fig. 5 is a view similar to Fig. 4, showing the control element related to the breech block actuated, and the trigger operated to release the firing pin to effect firing of the shell carried in the barrel. Fig. 6 is a longitudinal sectional view taken substantially as indicated by line 6—6 on Fig. 4. Fig. 7 is a sectional view similar to a

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portion of Fig. 5, showing the parts in open or loading position. Fig. 8 is a sectional view of a portion of the structure shown in Fig. 7, being a view taken as indicated by line 8—8 on Fig. 6. Fig. 9 is a view similar to Fig. 8 showing the parts as they occur when the mechanism is positioned as shown in Fig. 7. Fig. 10 is an enlarged transverse sectional view taken as indicated by line 10—10 on Fig. 4. Fig. 11 is an enlarged transverse sectional view taken as indicated by line 11—11 of Fig. 4. Fig. 12 is an enlarged transverse sectional view as indicated by line 12—12 on Fig. 4. Fig. 13 is an enlarged transverse sectional view taken as indicated by line 13—13 on Fig. 4. Fig. 14 is a view of a shell showing it carrying the projectile, showing these parts alone and with a part of the shell in section. Fig. 15 is a view similar to Fig. 1, illustrating another slightly different form of construction and showing certain of the parts in section. Fig. 16 is a view similar to Fig. 4, illustrating the structure shown in Fig. 15. Fig. 17 is a plan section taken substantially as indicated by line 17—17 on Fig. 15, and Fig. 18 is a view showing a portion of the barrel shown in Fig. 16 with a fastener therein held by a flange on the fastener.

The mechanism provided by this invention can be used to handle fasteners or devices of various kinds, and it is to be understood that in practice details of the mechanism may be varied, depending upon the particular type or form of projectile to be handled and upon the character of the service to be performed. For the purpose of example the projectile will be referred to as a fastener. In the drawings I have illustrated a simple form of fastener A, and in Fig. 3 I have illustrated such a fastener applied so that it secures an element or plate 10 to a base 11.

The gun or mechanism of the present invention is characterized generally by a barrel B, a breech block C, means D pivotally connecting the barrel and the block, releasable fastening means E adapted to hold the block and barrel in firing position where the block closes the barrel, shell ejecting means J, firing means K for the shell, preferably characterized by a firing pin carried by the block C, control means L through which operation of the firing means is controlled, and lock means M related to the control means and serving to lock the means E against operation when the means L is operable to effect firing of the mechanism. The mechanism may further include various other features or accessories, such as a housing N on or in connection with the barrel, and a shoe O related to the housing N, etc.

The barrel B is preferably a simple elongate unit of suitable length and provided with a central longitudinal bore 12 extending from the breech end portion 13 of the barrel to the muzzle end portion 14 thereof.

The breech block C is adapted to close the breech end of the barrel, and in accordance with the invention it is coupled to the barrel by the means D, which provides for pivotal movement or shifting between the barrel and block so that these elements operate between, what I will term, a firing position where the block closes the barrel and a loading position where the block is clear of the breech end of the barrel, as shown in Fig. 2 of the drawings.

The breech block C may, in practice, vary considerably in form and construction. However, in general it is preferred that it be characterized by a main portion 15 having a face 16 that engages or abuts the breech end 17 of the barrel when the parts are in firing position, as shown in Figs. 4 and 5 of the drawings. In the construction illustrated, the breech block has, what may be termed, an upper portion or extension 18 and the block is formed to have various parts or features of construction, all of which will appear from the following description:

The means D pivotally connects the barrel B and the block C so that these principal elements are maintained

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connected or inseparable. In the case illustrated, the means D involves generally a yoke-like extension 20 (Figs. 4 and 12) of the breech block C, which extension normally depends or projects downwardly from the block. A rib 21 is provided on or projects from the breech end portion 13 of the barrel and is received between the spaced parts of the projection or extension 20. A pivot pin 23 pivotally connects the parts 20 and 21. The axis of the pivot pin 23 is in a plane normal to the longitudinal axis of the barrel and is offset laterally from the bore 12 of the barrel so that the means D provides a connection between the barrel and block allowing for free relative movement or pivoting of these parts between a firing position as shown in Figs. 4 and 5 and a loading position as shown in Figs. 2 and 7.

The releasable fastening means E is adapted to hold the block C in the firing position or engage with the end of the barrel B. The means E (Fig. 4) is preferably a latch type means and, as shown in the drawings, it is characterized by a fastener 25 pivoted to one of the elements and cooperating with a lug or shoulder 27 on the other element.

In the case illustrated the fastener 25 is connected to the breech block by a pivot pin 26, and it cooperates with a shoulder 27 on a lug portion 28 of the rib 21 provided on the barrel B. The main portion 15 of the breech block C is provided with a chamber or recess 29 (Fig. 11) that accommodates the fastener 25, and the fastener is characterized by an arm portion 30 that normally projects out of the recess 29 to depend from the block C and engage the shoulder 27.

A spring 31 normally yieldingly urges the fastener 25 into working or lug engaging position. In the case illustrated the spring 31 is a helical spring located in the recess 29 and operating between the fastener and a wall 32 of the recess. The spring 31 is shown carried on a guide stem 33 that engages the fastener and which is slidable in a guide opening 34 in the block C.

A stop shoulder 40 (Figs. 4 and 5) on the breech block limits the downward movement of the fastener 25 under the influence of the spring 31. The lug portion 28 of the rib 21 is formed on or projects at the upper portion of the rib and is such that as the breech block is moved from the loading position (Fig. 7) to the firing position (Fig. 4) the fastener is engaged and lifted or moved upwardly so that it passes over the lug 28 and drops into working or latched position where it engages the shoulder 27.

When the arm 30 of the fastener 25 engages the shoulder 27, the barrel and block are secured in firing position and cannot be moved therefrom until the fastener 25 is released or elevated. A finger 41 is provided on the fastener 25 and projects to the exterior of the structure. The finger 41 is adapted to be manually operated to effect lifting of the fastener 25 when it is desired to release the barrel and block for movement to the loading position shown in Figs. 2 and 7.

The shell may, in practice, be an ordinary or conventional charge-carrying shell loaded with a suitable powder or explosive, and the cap portion of the shell may be of any suitable form or construction. In the case being described the cap of the shell is adapted to be centrally engaged by the firing pin.

In the case shown in Figs. 16—18 of the drawings the shell is held in a counterbore 43 at the breech end of the barrel and the projectile or fastener has a thin deformable flange 45 that rests on the shoulder 43^a formed by the counterbore or fits snug in the bore of the barrel holding the projectile in place until it is driven from the barrel.

In the case shown in Fig. 14 the fastener or projectile has a threaded head portion with a flange 45^a and the shell has a lip 45^b that engages the flange and holds the fastener loosely coupled to the shell until the shell is

fired. This construction or the one first described can be used as desired.

The ejecting means J (Figs. 4 and 5) is characterized by a shell lifter 60, which element is slidably carried by the breech end portion 13 of the barrel B. The lifter illustrated is shown as having an elongate shank 61 slidably carried in a longitudinal guideway 62 provided in the breech end portion of the barrel or in the rib 21 on that portion of the barrel. The shell lifter has a head 63 on the upper end of the shank 61, which head normally seats in a socket 64 provided in the breech end of the barrel. The head has a lip 65 that engages under the flange or rim of the shell G, as clearly shown in Fig. 7 of the drawings.

A suitable stop means, such as a stop pin 66, is carried by the breech end portion of the barrel and cooperates with the shank 61 of the lifter to limit movement of the lifter between the positions shown in Figs. 4 and 5 and that shown in Fig. 7. A spring 67, preferably a helical spring, engages the shank 61 and normally yieldingly urges it upwardly or outwardly to the position shown in Fig. 7.

In accordance with the present invention, a latch 70 controls the lifter 60 and catches the lifter when it is depressed or moved into the positions shown in Figs. 4 and 5, and it holds the lifter in that position until the barrel and block are moved to a position where the breech end of the barrel is clear of the block, as shown in Fig. 7. In the case illustrated, the latch 70 is carried by a pivot pin 71 supported by the rib portion of the barrel, and it has an arm 72 with a head 73 that engages or latches with a shoulder 74 on the shank 61 of the lifter 60. A lug 75 projects from the arm 72, and the spring 67 reacts against or bears on the lug 75 so that the spring 67 normally yieldingly urges the latch 70 to a position where it engages and catches the lifter while at the same time it normally yieldingly urges the lifter upwardly toward the position shown in Fig. 7.

With the parts constructed and related as just described it will be apparent that as the lifter 60 is depressed or moved down from the position shown in Fig. 7 to that shown in Figs. 4 and 5, the latch 70 operates to catch the lifter and hold it in the down position. As the structure is moved from a position such as is shown in Fig. 7 to that shown in Fig. 4 the lifter 60 is engaged by face 16 of block C and is depressed thereby.

When a fastener has been driven or fired and the connection between the barrel and breech block is broken, as the block and barrel are moved toward the position shown in Fig. 7, the latch 70 remains engaged with the shank 61 holding the lifter down. A finger 90 projects from the arm 72 of the latch 70 and engages a stop member 91 on the depending portion or extension 20 of the block. The finger 90 engages the stop 91 as the block and barrel reach the position shown in Fig. 7, stopping the latch 70 so that it does not move further relative to the block. When the latch 70 is thus stopped, slight or continued movement of the barrel relative to the block causes the latch 70 to release the shank of the lifter 60 whereupon the spring 67 operates or advances the lifter causing the shell G to be ejected from the barrel.

The firing means K provided for firing the shell G or igniting the cap of the shell is carried by the breech block C and is characterized by a firing pin 100 slidably carried in a guide opening 101 in the main portion 15 of the breech block C. The guide opening 101 is located in the block so that the cap engaging tip 102 of the pin 100 strikes the center of the cap of the shell when the pin is actuated or driven downwardly. In the form of the invention illustrated on sheets 1 to 4, inclusive, the firing pin 100 is centrally located relative to the shell G.

A spring 103 is provided for operating or driving the pin 100 downwardly and it acts between an abutment 104

and a head 105 provided on the upper end portion of the pin 100. In the particular case illustrated, a washer-like collar 106 rests on the head and receives the spring. In the case illustrated, the spring 103 is guided by a stem 108 projecting upward from the head 105 and slidable through the abutment 104. The stop 110 on the upper end of the stem 108 may engage the abutment 104 when the parts are positioned as shown in Fig. 4. The abutment 104 is shiftable, that is, it is slidably carried in a guideway 112 provided in the upper end portion 18 of the breech block. When the abutment 104 is depressed by operation of the control means L, as hereinafter described, spring 103 is compressed.

The firing means K includes a latch 115 controlling the pin 100. The latch 115 is carried on a pivot pin 116 supported by the block C. One arm 117 of latch 115 is adapted to engage under the head 105 on pin 100 to hold the pin up or unactuated, and a spring 118 normally presses on arm 119 of the latch to urge the arm 117 to the operating position shown in Fig. 4 of the drawings.

The parts of the mechanism of firing means K are related, as will be apparent from consideration of Figs. 4 and 5 of the drawings, so that when the abutment 104 is elevated as by a spring 120, which will be hereinafter referred to, the stem 108 is lifted, positioning the parts so that the arm 117 of latch 115 engages under the head 105. When the abutment 104 is depressed, as to a position such as is shown in Fig. 5, the spring 103 is compressed by the pin 100 and will not be operated to actuate the shell G until the latch 115 is released by depressing its arm 119 against spring 118.

The control means L through which operation of the firing means is controlled is characterized by a control assembly carried by and shiftable relative to the block C. The control assembly of means L is preferably in the form of a jacket or case surrounding block C and slidable longitudinally thereof. The releasable fastening means E further includes a trigger 130 preferably carried by the control assembly and such that it is in position to operate the latch 115 when the control assembly has been operated to a predetermined position relative to the head.

The control assembly in the form illustrated involves an upper section 131 which is tubular in form and which surrounds the round upper end portion or extension 18 of block C and a lower section 132 which surrounds the flat-sided main portion 15 of block C, as shown in Figs. 11, 12, and 13. Intermediate parts or sections 133, as shown in Figs. 1 and 6 of the drawings, connect the sections 131 and 132, and a top or cap section 134 is carried by and closes the upper end of the upper section 131. The sections 133 may be secured to the section 132 by brazing or the like and fastened to the section 131 by screws, as shown.

The various parts or sections of the control assembly above referred to are preferably separable from one another and are normally secured together by any suitable construction or by suitable fastening means so that they form a rigid unit or assembly shiftable longitudinally relative to the block C which they in effect surround or house. That is, the sections of the control means L form a case which encloses the block C. The spring 120 hereinabove mentioned in connection with the firing means K and serving to elevate the abutment member 104, serves to normally yieldingly maintain the control assembly formed of the sections above mentioned in a lifted position, such as is shown in Fig. 4. In the case illustrated, a tubular push rod 140 is carried by the cap section 134 of the operating element and depends therefrom within section 131 to bear upon the upper side of the abutment 104. The tubular rod 140 is of such size and length as to receive or accommodate the stem 108 and the part 110 thereon when the parts are operated to a position such as is shown in Fig. 5.

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The trigger 130 is connected to the section 131 of the control assembly by a pivot pin 150 and is operable in a slot-like opening 151 provided in the section 131 at one side thereof. In the case illustrated the trigger 130 has its upper end held by the pivot pin 150, and the trigger normally depends from the pivot pin and has a lower end portion 152 adapted to be moved inwardly when the outer portion 153 of the trigger is engaged and pressed as by means of the operator's finger. The trigger 130 is shaped and proportioned so that when the control assembly formed of the several sections, as hereinabove described, is in the normal elevated position shown in Fig. 4 the trigger is above the arm 119 of latch 115 and has no connection therewith.

When the control assembly is depressed to an actuated position, such as shown in Fig. 5, which operation requires the application of pressure as indicated by the arrow X in Fig. 5, the lower end portion 152 of the trigger becomes located opposite the arm 119 of the latch 115. With the parts thus related manual operation or depression of the trigger, as indicated by the arrow Y in Fig. 5, results in operation of the latch 115 so that the firing pin 100 is released with consequent discharge of the shell, causing the projectile or fastener A to be driven from the barrel.

The lock means M for locking the means E is related to the control means L and may in a general way be considered a part thereof. Means M, as shown, involves a portion of the upper section 131 of the control assembly, which portion of section 131 has a downwardly facing shoulder 160 constituting the upper end of a slot 161 which slot passes the finger 41 of the latch 25. The slot 161 is such as to allow the control assembly to be operated between the positions shown in Figs. 4 and 5 without interfering with the finger 41. When the control assembly is in the actuated or down position where the trigger 130 is located, so that the firing pin can be released, the shoulder 160 is located immediately above the finger 41 and thus forms a positive stop for the finger, locking the latch 25 in the engaged position where the block C is held in firing position relative to barrel B. It is only after the firing operation has been completed, or after the control assembly has been released and allowed to return to a position such as is shown in Fig. 4, that the latch 25 can be manually operated, releasing the barrel and block for movement to the loading position shown in Fig. 7.

In the preferred form of the invention, a shield 210 is provided where the finger 41 of the fastener 25 issues through the slot 161 in the control assembly. The finger 41 projects through an opening 225 in the shield and the shield moves with or is held by the finger 41 and slides at the inside of the slotted part of the control assembly and serves to normally close or seal the slot so that foreign matter is excluded from the mechanism within the slotted element.

In the preferred form of the control means, the control assembly, as hereinabove described, has an extension 170 which is in effect carried by or mounted on the barrel B and is coupled to the assembly or unit formed by the sections 131, 132, 133, but is shiftable relative to that unit. The extension 170 of the control assembly is preferably tubular in form and in effect houses or engages the barrel B except at the lower end portion thereof. The extension 170 is coupled to the lower section 132 of the control assembly by pivot pins or pivotal connections 171. Each pivotal connection 171 involves a pivot pin 172 carried by the extension 170 and engageable in a slot 173 in the portion of section 132 which is overlapped by a part 175 of the extension 170. The construction just described provides a pivotal connection between section 132 and extension 170 on an axis coincidental with the pivot pin 23 and the slotted construction facilitates assembly of the structure. It is

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to be understood that pivot pins 172 are independent of pin 23 and are not secured in any manner to pin 23.

By providing the control means with the extension 170 the portion of the barrel B that would otherwise be exposed is encased and no part of the barrel is accessible to be engaged and operated in a manner to effect accidental discharge of the mechanism.

The housing N on the lower end portion of the barrel is a tubular member surrounding the portion of the barrel that is not enclosed by the extension 170. The housing N combined with the extension 170 forms a structure completely or thoroughly encasing the barrel B so that it cannot be engaged for accidental moving to effect firing of the mechanism.

The shoe O is fixed to or on the lower end of housing N and is shown as involving a plate with a pad 180 at the lower side thereof, which pad has a central opening 181 accommodating the tip end 14 of the extension which carries a stop or nut 182. The nut 182 projects somewhat below the barrel and is serrated as at 183. The nut 182 retains the shoe or plate 184 of the shoe on the tip portion of the barrel and a spring 186 acts between a shoulder 187 on the barrel and the plate 184 to normally yieldingly hold the shoe in a down or projecting position and against the nut 182, as shown in Fig. 2. The upper end portion of the housing N slides in the lower end portion of extension 170 so that these parts are telescopically related and are always lapped one over the other. In the case illustrated, the plate 184 of the shoe is shown fixed to the lower end of the housing N by welding 190.

From the foregoing description it will be apparent that if the mechanism is in the position shown in Fig. 2 it can be readily and conveniently loaded with a fastener A and a shell G above the fastener. When this has been done the barrel is swung relative to the breech block to the position shown in Fig. 4 of the drawings whereupon the fastener 25 engages to retain the parts in this position. The control assembly formed of the several sections hereinabove described is elevated by the spring and the latch 115 is in position to prevent downward movement of the firing pin.

The mechanism can be handled bodily with the parts positioned as shown in Fig. 4 and is ordinarily manipulated relative to the object which is to receive the fastener until the shoe O is in the desired position, as shown in Fig. 1. Force or manual pressure is then applied to the control assembly in the direction indicated by the arrow X in Fig. 5. This force causes the control element or control assembly on the block C to move downwardly against the resistance of the spring 120, compressing spring 103 and locating the locking shoulder 160 so that the fastener 25 cannot be released.

When the control assembly has been depressed to a position such as is shown in Fig. 5 the trigger 130 is positioned so that it can be operated or moved inwardly as indicated by the arrow Y. This operation of the trigger operates the latch 115, releasing the firing pin 100 so that the spring 103 drives the firing pin down causing the shell to be ignited. The fastener A is driven downward through the barrel and may be lodged in a position such as is shown in Fig. 3.

With the firing operation completed pressure is relieved from the control assembly so that spring 120 returns the control assembly with the trigger thereon to the position shown in Fig. 4 whereupon the finger 41 of fastener 25 can be swung up to release the fastener 25 and thus free the barrel and block so they can be swung to the loading position shown in Fig. 7. In the course of operating the parts to the position shown in Fig. 7 and when the barrel reaches the position relative to the block shown in Fig. 7, the ejecting means operates to eject the discharged shell from the barrel. The mechanism is then ready for reloading and repetition of the cycle of operation.

In the form of the invention illustrated in Figs. 15-18 of the drawings, the mechanism is such as to handle a shell G' of a type having a rim-firing cap as distinguished from a center firing cap such as has been hereinabove described. To handle a rim-firing cap the barrel B, proportioned somewhat differently from the one first described relative to the breech block C, is employed with the result that the firing pin 100 carried by the breech block is in alignment with the rim of the cap of the shell, as shown in Fig. 16, rather than being aligned with the center of the cap. In all other respects the mechanism may be the same as that hereinabove described. In Figs. 15 and 17 the shoe O' illustrated is somewhat different from that illustrated in Figs. 1 through 14. The plate 184^a of the shoe is shown provided with an extension 200. The plate 184^a is round in plan configuration and the extension 200, which is rectangular in plan configuration, is coupled to the plate 184^a to be rotatable thereon. A suitable spring actuated detent 205 is provided for releasably securing the extension 200 in various rotative positions relative to the plate 184^a. The mechanism just described will serve to illustrate the fact that in carrying out the invention, shoe constructions of various shapes or forms can be employed or provided, as circumstances require.

Having described only typical preferred forms and applications of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, manually operable control means carried by the block including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means to engage and lock the fastener against release when the control means is operated to release the latch, the control means including a manually operable trigger carried by the control assembly and movable therewith into and out of position where it effects release of the pin by operation of the latch.

2. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and movable relative thereto to ignite the shell, a spring engaged with and tending to move the pin toward the barrel to ignite the shell, a releasable latch engaging the pin to releasably hold the pin against movement by the spring, manually operable control means for the latch including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means

and locking the fastening means against release when the control assembly has been moved to the position where the latch is operable, the control means including a trigger pivotally carried by the control assembly and movable therewith into and out of position where it is manually operable to release the latch, and a spring yieldingly holding the control assembly in a position where the trigger is out of position where the latch is operable.

3. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel coupling the barrel and block to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly urging the pin relative thereto to ignite the shell, a releasable latch holding the pin against movement by the spring, a manually operable control means including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means to lock the fastening means against release when the control means is manually operated to free the pin for operation, the control means including a control assembly forming a case surrounding the block and slidably thereon.

4. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, manually operable control means controlling operation of the latch including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means to lock the fastening means against release when the control means is in the latch operating position, said control assembly being operable to slide on the block, the control means including a lock means having a shoulder on said assembly engageable with the fastening means when the control means is in the latch operating position.

5. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, a shell ejector carried by the barrel and engaging the shell to eject the shell therefrom as the barrel is moved relative to the block and to the loading position, manually operable control means holding the latch against operation including a control assembly shiftable from an

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inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means to lock the fastening means against release when the control means is in the manually operable position to free the latch for operation.

6. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a spring actuated firing pin slidably carried by the block and movable relative thereto to ignite the shell, a spring actuated pivoted latch carried by the block releasably retaining the pin against movement, manually operable control means for the latch carried by the block including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means and locking the fastening means against release when the control means is in the latch operating position.

7. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a spring actuated firing pin slidably carried by the block and movable relative thereto to ignite the shell, a spring actuated pivoted latch carried by the block releasably holding the pin against movement, manually operable control means for the latch carried by the block including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means to lock the fastening means against release when the control means is in latch operating position, the control means including a manually operable trigger pivotally carried by the control assembly and positioned to move and release the latch when the control assembly has been actuated to the position where the latch is manually operable.

8. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, a shell ejector carried by the barrel and engageable to eject the shell from the opening as the barrel is moved relative to the block and to the loading position, manually operable control means holding the latch against operation including a control assembly shiftable from an inoperative position to a position where the latch is manually operable to release the firing pin, and lock means operated by the control means to lock the fastening

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means against release when the control means is in the position where the latch is manually operable, the ejector including a spring actuated shank slidably carried by the barrel, a head on the shank engaging the shell when the shank is in a retracted position, and a latch pivotally carried by the barrel releasably holding the shank retracted and cooperating with the block to be released as the loading position is reached.

9. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, and manually operable control means controlling operation of the latch carried by the block and manually shiftable from an inoperative position to a position where the latch is manually operable, the control means including a control assembly encasing the block and slidable thereon, a spring normally yieldingly holding said assembly in an inoperative position, and a trigger carried by said assembly and moved by said assembly into and out of manual latch operating position, the trigger being in said manual latch operating position when said assembly is actuated against the spring.

10. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, and manually operable control means for the latch carried by the block and manually shiftable from an inoperative position to a latch controlling position, the control means including a control assembly encasing the block and slidable thereon longitudinally of the barrel, a spring normally yieldingly holding said assembly in an inoperative position, and a latch controlling trigger pivotally carried by said assembly and manually accessible at the exterior of the assembly and moved by said assembly to position for manual operation and control of the latch when said assembly is actuated against the spring.

11. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, and manually operable control means for the latch carried by the block and manually shiftable from an inoperative position to a latch operating position, the control means

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including a control assembly encasing the block and slidable thereon longitudinally of the barrel, a spring normally yieldingly holding said assembly in an inoperative position, and a trigger pivotally carried by said assembly and manually accessible at the exterior of the assembly and carried by said assembly to the latch operating position when said assembly is moved from the inoperative position against the spring, the fastener being pivoted in the block and having a manually operable finger projecting at the exterior of the control assembly.

12. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, manually operable control means controlling operation of the latch and carried by the block and adapted to be manually shiftable from an inoperative position to a latch controlling position, and lock means operated by the control means to lock the fastening means against release when the control means is positioned to effect manual operation of the latch, the pin being carried by the block to engage the center of the shell.

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13. In combination, a gun barrel, a breech block, means pivotally connecting the barrel and the block for relative movement between a firing position where the block engages and closes the breech end of the barrel and a loading position where the block is clear of the breech end of the barrel, the breech end portion of the barrel having an opening to support an object to be fired and a charged shell for propelling the object, releasable fastening means carried by the block and having a fastener engaging the barrel to hold the barrel and block in firing position, a firing pin slidably carried by the block and a spring yieldingly engaging the pin to operate the pin toward the barrel against the shell, a latch carried by the block and operable to release the firing pin to ignite the shell, manually operable control means controlling operation of the latch and carried by the block and adapted to be manually shifted from an inoperative position to a latch controlling position, and lock means operated by the control means to lock the fastening means against release when the control means is positioned to effect manual operation of the latch, the pin being carried by the block to engage the shell at the rim thereof.

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