June 5, 1923. 1,457,961

J. M. BROWNING

FIREARM

Filed April 13, 1921 5 Sheets-Sheet 1

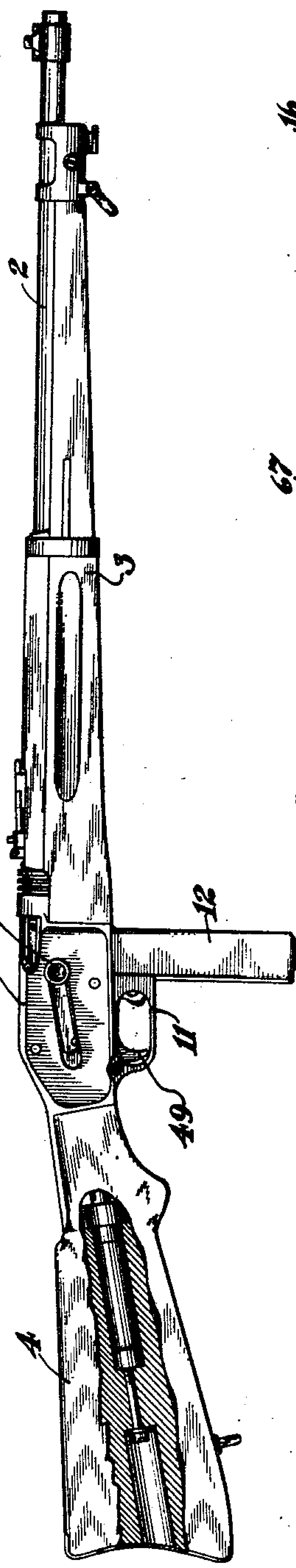

Fig. 1,

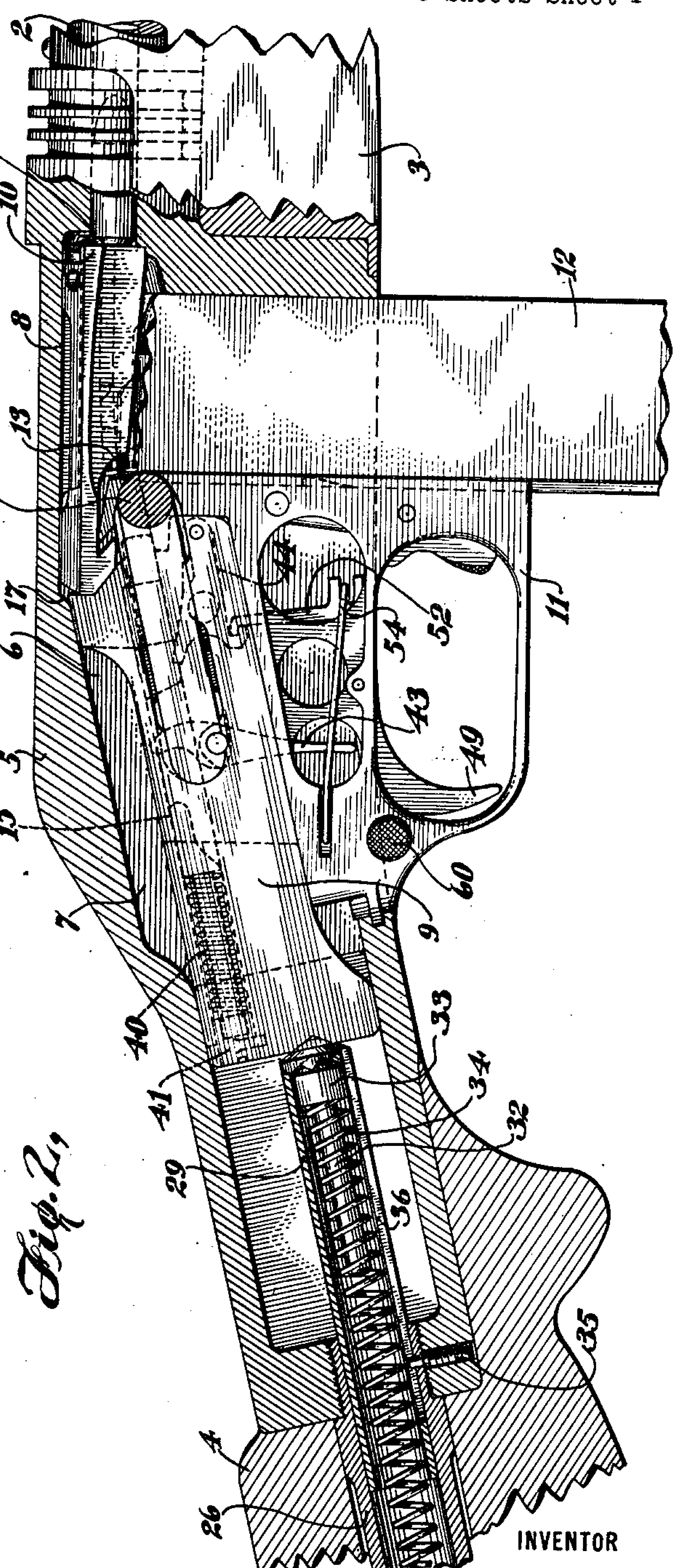

Fig. 2,

INVENTOR

BY J. M. Browning

ATTORNEYS

June 5, 1923.

J. M. BROWNING

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FIREARM

Filed April 13, 1921

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Fig. 13

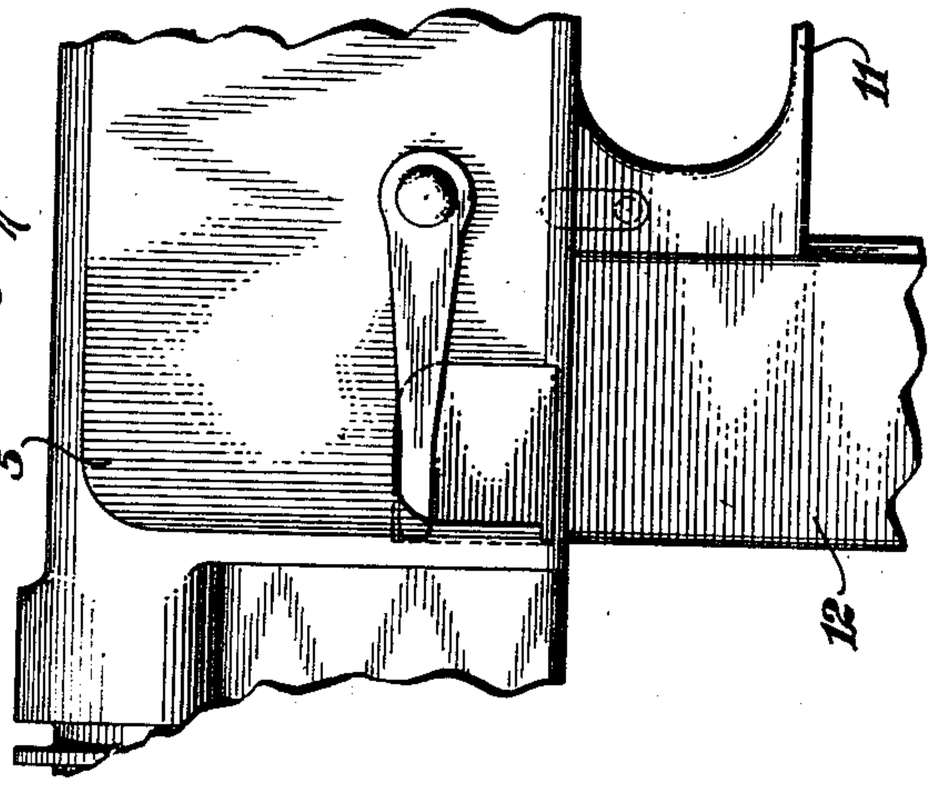

Fig. 3

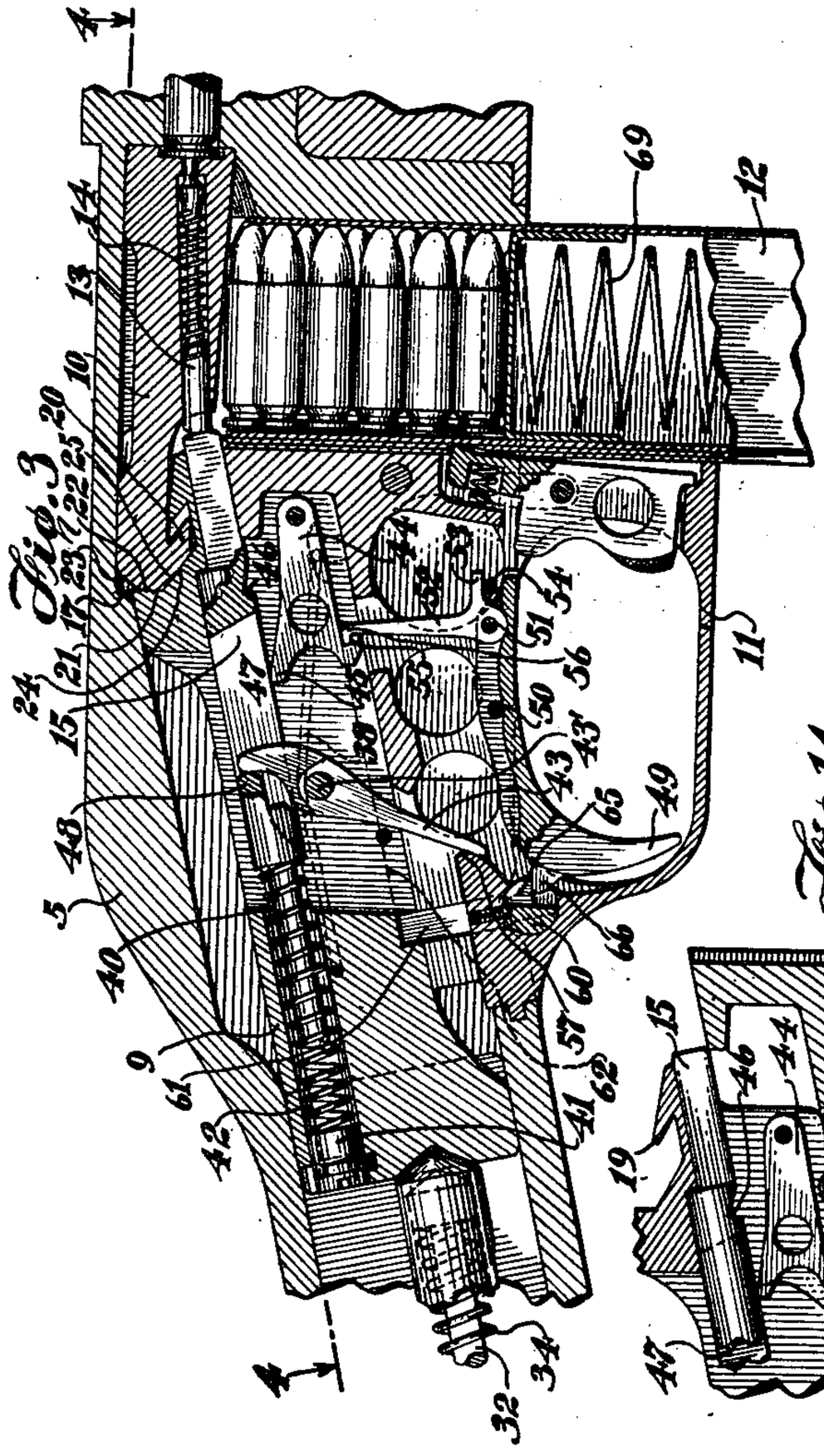

Fig. 4

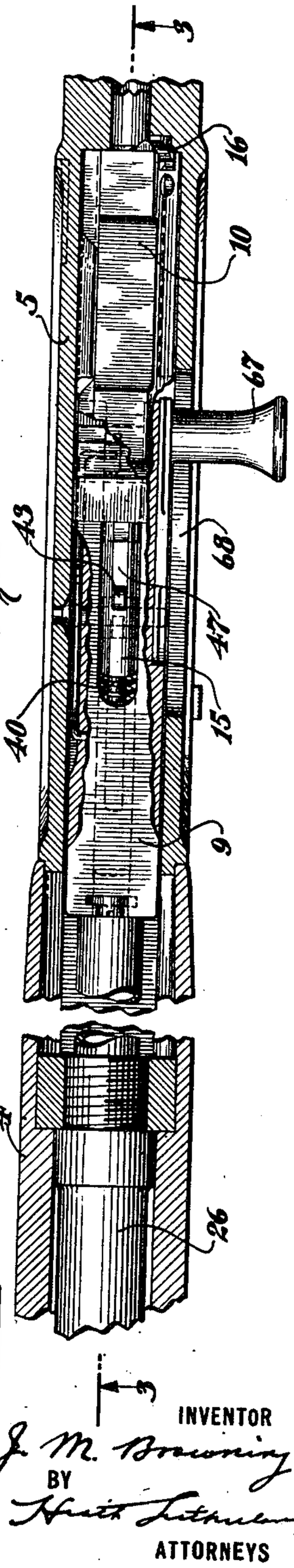

Fig. 14

INVENTOR

J. M. Browning

BY

Merritt Lothrop

ATTORNEYS

June 5, 1923.

J. M. BROWNING

FIREARM

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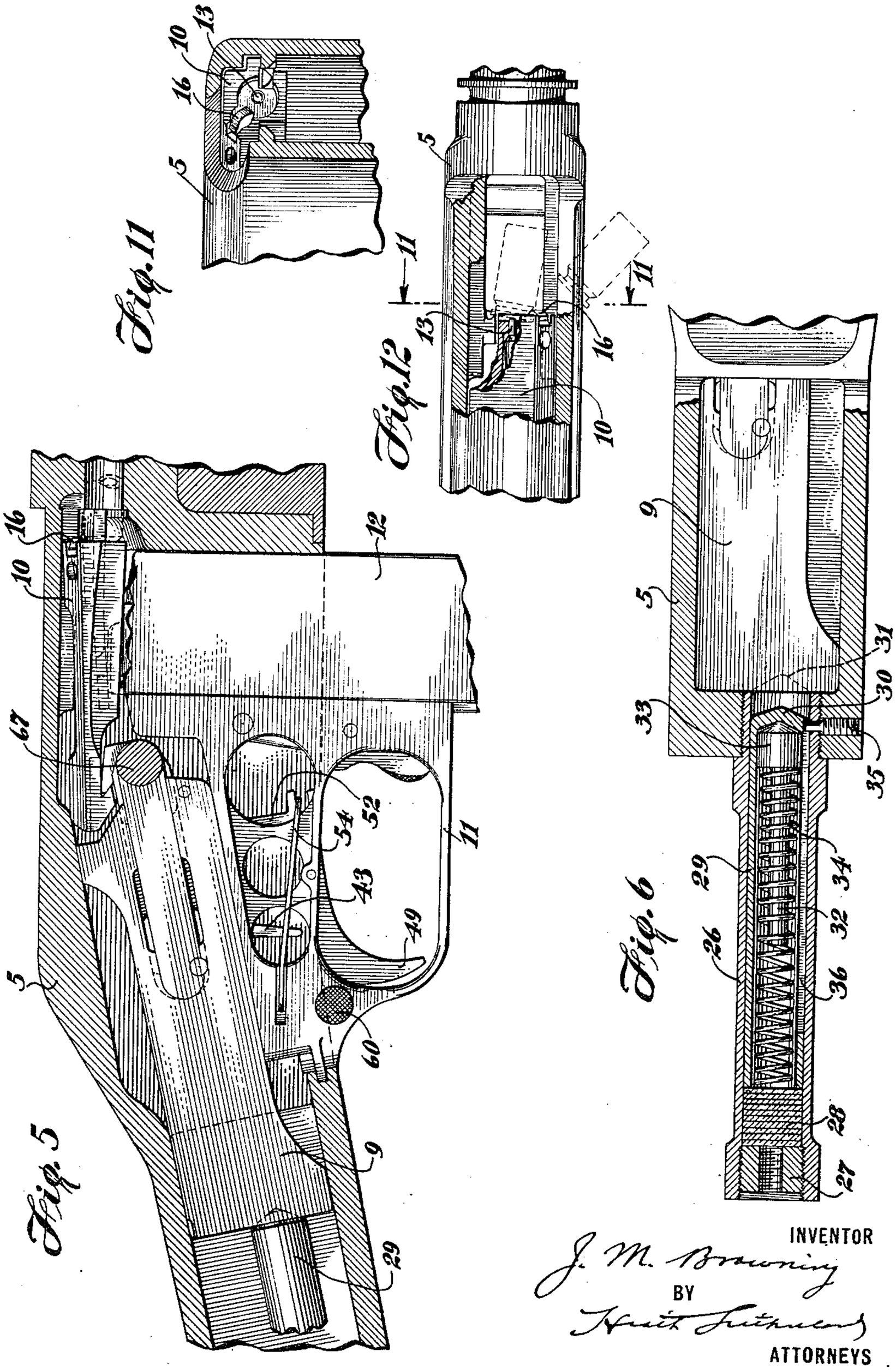

Fig. 5

Fig. 11

Fig. 12

Fig. 6

INVENTOR

J. M. Browning

BY

Merritt Fitzgerald & Sturtevant

ATTORNEYS

June 5, 1923.

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J. M. BROWNING

FIREARM

Filed April 13, 1921

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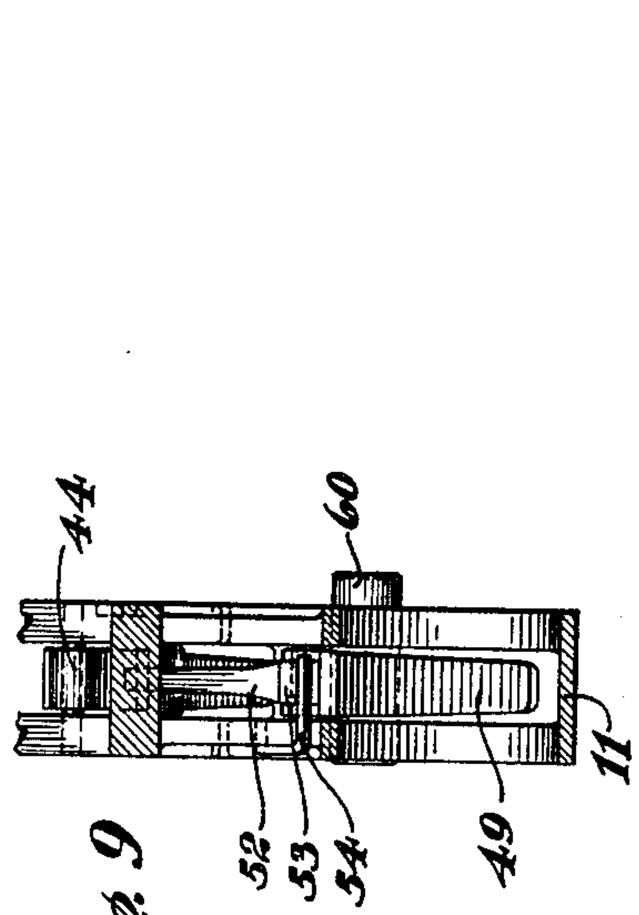

Fig. 9

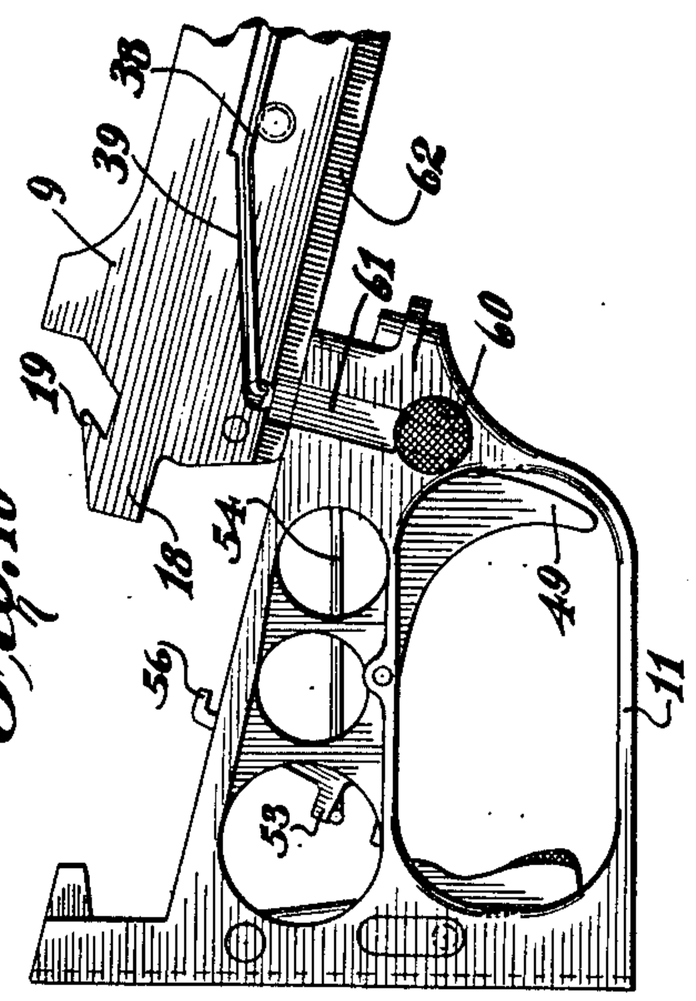

Fig. 10

Fig. 7

Fig. 8

INVENTOR

J. M. Browning

BY

ATTORNEYS

June 5, 1923.

J. M. BROWNING

FIREARM

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Fig. 17

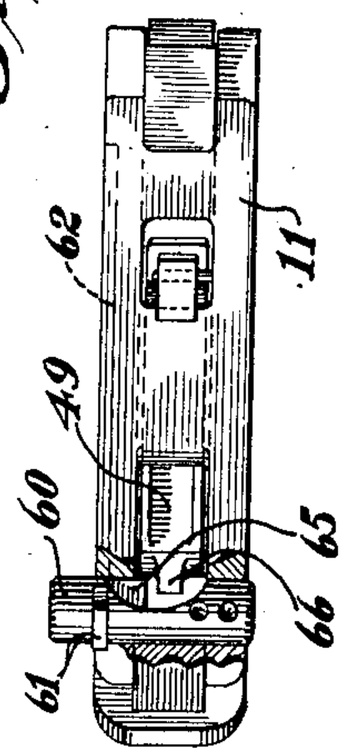


Fig. 15

Fig. 16

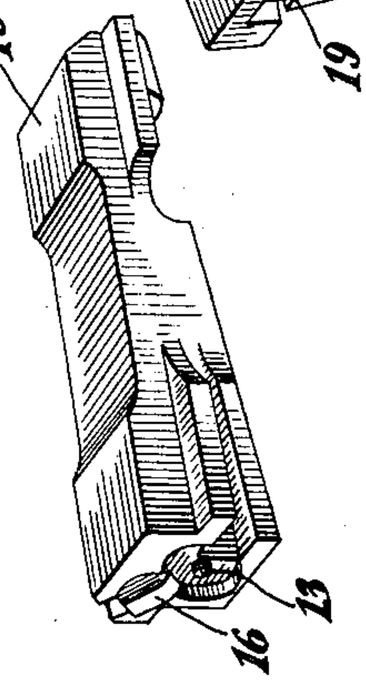
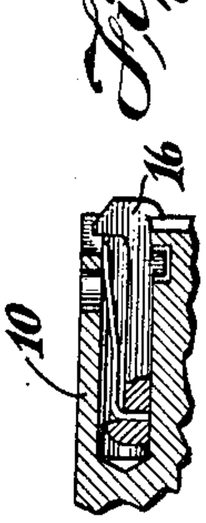


Fig. 18



INVENTOR

J. M. Browning

BY

Hunt Hutchinson

ATTORNEYS

Patented June 5, 1923. 1,457,961

UNITED STATES PATENT OFFICE.

JOHN M. BROWNING, OF OGDEN, UTAH.

FIREARM.

Application filed April 13, 1921. Serial No. 460,907.

To all whom it may concern:

Be it known that JOHN M. BROWNING, a citizen of the United States, residing at Ogden, in the county of Weber and State of Utah, has invented certain new and useful Improvements in Firearms, of which the following is a specification.

This invention relates to firearms and more especially to that class of firearms commonly designated as auto loading or automatic, in which the force of the expanding powder gases is utilized to automatically perform the various operations of loading, firing, ejecting the empty case and cocking. I have a number of objects in view, among them being the provision of means of an effective nature whereby the retractive movement of an inertia-block and a co-operative breech-block in a receiver, are sufficiently retarded to insure the expulsion of the gases arising from an explosion, forwardly through the front of the barrel.

Another object of the invention is to provide efficient plunger mechanism which acts properly in connection with the inertia-block of the arm and which is in effect supplemental thereto.

I also provide equally effective hammer, trigger, and cocking mechanisms. In fact all the novel features will be elaborated upon fully, in the following description.

In the drawing acompanying and forming part of the present specification, I have shown in detail one of the several forms of embodiment of the invention which to enable those skilled in the art to practice the same will be set forth fully in the following description. I may depart therefrom in a number of respects within the scope of the invention defined by the claims following said description.

Referring to said drawings:

Figure 1 is a side elevation of a firearm involving the invention with a portion of the stock removed and in section, to show the manner of attaching the stock.

Fig. 2 is a sectional side elevation of the receiver, and showing inertia and breech blocks in their advanced positions.

Fig. 3 is a longitudinal sectional side elevation on the line 3—3 of Fig. 4 looking in the direction of the arrows.

Fig. 4 is a sectional top plan view on the line 4—4 of Fig. 3 looking in the direction of the arrows.

Fig. 5 is a view corresponding somewhat to Fig. 3 with the main moving parts however in elevation, and the blocks having moved backward a short distance.

Fig. 6 is a sectional side elevation of the rear portion of the receiver, the plunger mechanism, the inertia block and certain associated parts, the block having been arrested while certain of the elements of the retarding mechanism are moved backward by inertia.

Fig. 7 is a sectional side elevation of the trigger-guard and the parts of the firing mechanism carried thereby.

Fig. 8 is a side elevation of the trigger mechanism with the inertia-block thereon partially retracted and partly broken away to show the sear.

Fig. 9 is a transverse section on the line 9—9 of Fig. 7 looking in the direction of the arrows.

Fig. 10 is an elevation of the trigger-guard appearing in Fig. 8 and from the opposite side thereof, the inertia block being shown in its extreme backward position and there locked by the safety.

Fig. 11 is a transverse section on the line 11—11 of Fig. 12 looking in the direction of the arrows but with the part swung around slightly.

Fig. 12 is a top plan view partly in section, of the forward portion of the receiver showing by dotted lines the path of an ejected shell.

Fig. 13 is a side elevation showing the trigger-guard retaining pin in its effective position.

Fig. 14 is a sectional elevation showing the relative positions of the hammer, the sear and the connector.

Fig. 15 is a perspective view of the inertia-block with the parts carried thereby.

Fig. 16 is a similar view of the breech-block.

Fig. 17 is a bottom plan view of the trigger plate with the rear portion broken away.

Fig. 18 is a sectional detail of the forward portion of the breech-block, showing a way of mounting the extractor.

Like characters refer to like parts throughout the several views which are on greatly different scales.

The invention constituting the subject matter of the present case, is of peculiar importance when incorporated in a shoulder arm or a piece that is fired from the shoulder. Certain of the features may be incorporated however in guns of different types. In Fig. 1, I have shown a shoulder rifle. This comprises in its structure the barrel 2, the front stock 3 and the butt stock 4, the front stock and the butt stock being generally of wood. Between the front stock 3 and the butt stock 4, is positioned the receiver or frame 5 usually obviously of proper metal. The assemblage between the barrel 2 and the front stock 3 is in the usual manner of firearms of this class. The barrel 2 is in rigid coupled relation with the forward upper portion of the receiver or frame 5 in some usual and well-known manner, which forms no feature in itself of the present invention. I might note at this point however that the operatively-associated inertia-block or momentum block and the breech-block have a compound movement of a novel character by virtue of which the receiver can be made much shorter than is possible at the present time.

It is not amiss to note that this compound movement which takes place in the receiver of course, is along straight lines, the initial movement generally being in a direction coinciding with the longitudinal axis of the bore of the barrel. After a certain retractive movement of the inertia-block and breech-block, the breech-block is momentarily or temporarily delayed in order to give the gases due to an explosion, ample time to escape to the atmosphere forwardly through the barrel and about the time or approximately at the time this function is accomplished, the backward motion of the two blocks in the receiver is continued, but while still along a right or straight line it is in a direction diagonal or oblique to the first movement of the breech-block. At the time the breech-block is momentarily or temporarily delayed, the backward movement of the inertia-block under the power of the gas, is an accelerated and proper one. By having this compound movement of the breech-block, it is clear that a very much shorter receiver or frame may be utilized which makes the gun more compact, obviously lightens it and reduces its cost of production. The inertia-block generally has but the one straight line movement which is the second path followed by the breech-block in its backward motion.

With these preliminary observations, I will describe somewhat in detail the receiver, or frame 5. This receiver 5 has in it the longitudinal chamber or space 6 divided into the rear portion 7 and the forward portion 8. In the present case, the inertia-block or momentum block is continuously or permanently situated in the part or portion 7 of the chamber 6, the breech-block however moving along both portions of the chamber, there being means to check the motion of the breech block just before its entrance into the portion 7 of said chamber, this portion 7 as shown best in Fig. 2 being longitudinally of greater extent than the portion 8. An inertia or momentum block which meets my condition is such a one as that denoted in a general way by 9. Forward of it is arranged a breech-block such as that denoted in a general way by 10. The inertia-block in its movements backwardly and forwardly moves at all times in the larger portion 7 of the chamber of the receiver.

The trigger plate 11 is set in the receiver 5 as shown best in Fig. 2 and its upper side supports the inertia-block and confines certain of the parts therein, the inertia-block having a retractive movement until its rear end abuts against the rear wall of the chamber 6, the upper surface of the trigger-plate 11 being diagonal to the longitudinal axis of the barrel 2 to properly support and guide the inertia block in its reciprocations. The inertia-block as I have explained, strikes the rear wall of the chamber 6, which is at the back of the portion 7 thereof, to arrest the movement of the said block while the plunger mechanism as I will hereinafter explain, continues its backward movement under the impetus given to it by the inertia-block.

The magazine shown best in Fig. 2, is denoted by 12, and it is removably set in a vertical slot in the forward portion of the receiver and has a tongue and groove slidable connection with the forward side of the trigger plate 11 as usual.

The breech-block 10 (see Fig. 16) encloses the firing-pin 13 with which is associated the firing-pin spring 14 for maintaining the firing-pin in its retracted position until the forward end of the hammer 15 strikes the butt end of the firing pin to secure firing. The forward end of the breech-block 10 is furnished with the extractor 16 (Fig. 18) which functions after the well-known fashion.

At the junction of the rear portion 7 and the forward portion 8 of the chamber 6 and as shown on the upper wall or surface thereof, is situated a checking portion 17 (Figs. 2 and 3 for instance) which as shown, is in the nature of a face oblique or angular to the longitudinal axis of the barrel and also oblique to the longitudinal axis of the forward portion 8 of said chamber. This checking portion or surface 17 is, in the construction shown, encountered by the breech-block

so as to retard in the manner I have alluded to, its backward motion.

The inertia-block 9 as shown has on its forward end the hook 18 (see for example Figs. 2, 3, 5 and 15), the hook in question opening inwardly and upwardly and its bill 19 being pointed or somewhat acute and facing rearwardly. The breech-block 10 has at its rear end the downwardly facing hook 20 (Figs. 2 and 3 for instance), the hooks 18 and 20 being constantly interengaged to thus present a convenient means for coupling the inertia-block and the breech-block. The inertia-block has on its forward upper side the abutment face 21 cooperative with a face 22 on the back end of the breech-block. On firing, the thrust is transmitted by the breech-block 10 to the inertia-block, by the engagement of the face 22 with the face 21, the respective faces being shown transverse to the axis of the barrel. The face 21 as represented, is at an acute angle to the transverse axis of the inertia-block 9 and the abutment face 22 is practically flat, the result being that the initial shock on explosion is taken by a surface at right angles to the longitudinal axis of the barrel, the position of the inertia-block insuring this.

It will be remembered that I have mentioned a checking portion 17 which is shown as being in the form of a face at the junction of the two portions 7 and 8 of the chamber 6, the surface 17 being as shown straight and in a plane at a downwardly-acute angle to the longitudinal axis of the barrel, this surface being engaged by a surface of the breech-block 10 to momentarily brake the motion rearwardly of the breech-block and accelerate the corresponding motion of the inertia-block to which the breech-block is coupled, the surface at the same time tipping downwardly the rear portion of the breech-block.

The rear end of the breech block has above the face 22 the inclined face 23 (Fig. 3 for example), the angle of inclination of the face 23 being practically the same as that of the checking face 17. Upon firing the breech block 10 is caused to recoil and the face 22 will in the manner I have noted, strike the face 21 in a substantial manner. After the breech block 10 has moved backward a short distance and necessarily after the inertia block has been correspondingly moved, the surface 23 will strike the surface 17 and the rear portion of the breech block will be cammed downwardly by the surface 17 until the breech block is vertically aligned with the inertia block and is thus positioned to enter the rear portion 7 of the chamber 6. The backward motion of the parts is naturally checked for a short time so that the gases instead of being discharged at the breech, will be discharged through the barrel to atmosphere from the front of the barrel. Below the abutment face 21 is a cam face 24, shown as being on an angle, the rear end of the breech block 10 having a co-operating cam surface 25. On firing the breech block 10 is given a rearward movement and the face 22 by engaging the face 21 gives to the inertia block an initial rearward thrust. Obviously the breech block is moved rearwardly but its rearward movement is momentarily slackened by the engagement of the face 23 with the face 17. The rear portion of the breech block 10 is cammed downward by the surface 17 and on the downward rock of the rear portion of the breech block the surface 25 rides down the cam surface 24 so as to accelerate the backward movement of the inertia block.

As I have stated the backward motion of the inertia block 9 is limited by the rear wall of the chamber 6 which as noted, is in the rear division 7 thereof. On arrest of the inertia block, buffing means associated therewith has a further backward movement, the buffing means when in its extreme forward position backing up the inertia block and this relation being maintained until the block strikes the back surface of said chamber 6. The buffing means is shown partly in Figs. 2 and 3 and completely separated from the butt stock 4, in Fig. 6. The buffing means involves in its structure a buffing-tube 26, the forward end of which is externally threaded to fit internal threads in an opening in the rear portion of the receiver 5, the front face of the buffing-tube being, when the parts are assembled, flush or in the plane of the back or rear wall of the chamber 6 as shown best in said Fig. 6. The buffing-tube receives in its rear end portion the block 27 which is ordinarily threaded to receive the customary bolt by which the butt stock is held in assembled relation with the other parts. As represented, the block 27 presents a convenient bearing for several engaging disks as 28 generally of fiber. The buffing-tube 26 encloses what I term a buffer plunger as 29 of tubular form open at its rear end and closed as at 30 at its forward end the closed end 30 being virtually of concavo-convex form in cross section, the concave face being in and the convex face out, the convex face at times, as I will hereinafter explain, occupying a concaved seat 31 in the rear end of the inertia block 9. The tubular plunger 29 encloses the recoil-spring guide 32 having a head 33 at its front end which fits the concaved surface of the head 30, and may or may not be rigidly secured thereto. The recoil spring guide 32 receives around its shank portion the coiled spring 34, the forward end of which engages the back of the head 33 and the rear of which engages the front one of

the disks 28. As shown in Fig. 2 the several parts including the inertia block 9 are in their advanced positions, the block being maintained in such relation by the power of the spring 34 which at this time is in expanded condition, the head 30 occupying the seat or concavity 31 at the rear of the inertia block 9. On firing as I have hereinbefore explained, the two blocks 9 and 10 are moved backward, the backward motion continuing until the inertia-block 9 strikes the rear surface of the chamber 6 which necessarily stops further backward motion thereof. On the rearward motion of the block 9, the buffer plunger 29 and the recoil spring guide 32 are thrust rearwardly thus contracting the spring 34, the motion continuing until the block 9 strikes the rear of the chamber 6 beyond which point however, the buffer plunger 29 and the recoil spring guide 32, can have a further but slight backward motion as shown best in Fig. 6, to thus further compress the spring 34 until the rear end of the plunger 29 strikes the disks 28. On the return or forward movement of the plunger 29 and spring guide 32, through naturally the expansion of the spring 34, the heads 30 and 33 will be concurrently moved forwardly until the head 30 enters its seat 31 thus as it were picking up the block 9 and block 10 and advancing them both to the positions they are shown as occupying in Fig. 2. As shown the receiver has threaded through it the screw 35 as seen best in Fig. 6 and also in Fig. 2, the front plain reduced portion of the screw extending through the buffer tube 26 and fitting a longitudinal slot 36 through the buffer plunger 29 which provides a simple way of preventing turning motion of said buffer-plunger and also prevents the plunger from being accidentally dismounted when the parts are separated.

The inertia-block 9 as shown carries the hammer 15 which moves longitudinally thereof, the operative or forward motion of the hammer being secured for instance by a spring 40 as shown in Fig. 3 and also in Fig. 2, the hammer having a movement through the longitudinal slot which is situated depthwise of the inertia-block 9 for the major part of the length thereof. The head of the hammer 15 of course strikes the rear end of the firing pin 13 as shown for example in Fig. 3 on firing. The necessary motion of the hammer 15 is accomplished for instance through the agency of the spring 40 of coiled type, surrounding the shank portion of the hammer, bearing at its forward end against the body of the hammer and at its rear end against the plug 41 fitted in the longitudinal bore of the inertia-block and in which the shank portion of the hammer 15 is situated.

Pivoted between its ends between the walls of the slot 39′ is a cocking lever 43 the pivot 43′ of which extends across the inertia-block and through the cocking lever between the upper and lower ends thereof. The sear is denoted by 44 and as represented it is pivoted at its tail between the side walls of the slot near the forward end thereof, the free end of the sear having on its upper side the tooth 45 to co-operate with a notch 46 in the forward portion of the hammer as shown in Fig. 3 and in other views for instance Fig. 14. It will be seen that the sear-spring 38 holds the cocking lever pivot 43′ in position against accidental withdrawal. The upper arm of the cocking lever 43 is situated in a longitudinal slot 47 in the body of the hammer 15 said upper arm co-operating with a shoulder 48 at practically the rear of said slot 47. The trigger is designated by 49 and it is practically of elbow form pivoted as at 50 through its longer branch, in the trigger-guard or plate 11. The trigger, it will be seen, has two arms, a back or angular one and a forward and comparatively straight one. To the short arm of the trigger is flexibly connected as by the pivot 51, the connector 52 which has an offset or projection 53 near its base to be engaged by the spring 54 to move the connector into coupling relation with the sear. The sear has at its lower portion near the back, the notch 55 to co-operate with the hook 56 at the upper end of the connector 52 as shown in Fig. 2 and as also appearing in Figs. 7 and 8. The trigger guard 11 has a shoulder or abutment 57 to be engaged as shown for example in Fig. 3 by the lower arm of the cocking lever 43.

It will be assumed that the gun has been fired. In such an event the inertia-block 9 moves backward and as a consequence of the lower arm of the cocking lever being against the abutment or shoulder 57, the cocking lever is rocked on its axis so that the upper arm of the cocking lever acts against the shoulder 48 drawing back the hammer 15, compressing at the same time the hammer spring 40, this motion continuing until the tooth or nose 45 is projected into the notch 46 by the sear spring 38. This sear spring 38 is longitudinally bowed and is disposed in a channel or groove 39 in the side of the inertia-block 9 as shown for example in Figs. 10 and 15, the rear end of the spring fitting somewhat loosely a transverse opening in the side of the inertia-block, the opposite end of the spring having an extension fitting under the sear. When therefore the hammer 15 is cocked or moved backward through the intervention of the cocking lever 43, and when the notch 46 is brought opposite the nose 45 of the sear 44, the sear-spring 38 by acting against the sear will project the tooth 45 thereof into the notch so as to hold the hammer in cocked condi-

tion to be released by the tripping of the sear which is brought about through the action of the trigger 49, and connector 52. It will be assumed that the sear is in position to hold the hammer cocked and that the trigger is pulled. On pulling the trigger the forward short arm thereof is drawn downward so that the trigger connector 52 pulls down the sear 44 and withdraws the tooth 45 from the notch 46 releasing the hammer 15 which is then advanced through the power of the compressed spring 40, the hammer on its advance striking the rear end of the firing pin 13 and the latter in turn striking the cartridge.

It will be assumed that the trigger 49 has been pulled thus in the manner I have described tripping the sear 44 and causing the advance motion of the hammer 15. This occurring when the two blocks are advanced, the hammer of course being cocked again on the backward motion of the blocks. As the inertia-block 9 moves forward, the sear 44 will strike the upper portion of the connector 52 and rock it slightly thus conditioning the spring 54 of the connector to cause the hook 56 to be projected into the notch 55, as soon as the trigger is released.

I provide a safety having means by which the inertia-block 9 can be positively locked in either its forward or backward positions the safety also, and what is possibly more important, functioning to lock the trigger against accidental discharge. The safety is denoted in a general way by 60 and it slides sidewise in an opening or bore extending transversely of the rear portion of the trigger guard. It has the arm 61 extending upwardly therefrom and a comparatively small distance above the trigger guard 11, the inertia block 9 having in its lower side portion the longitudinal channel or rabbet 62 which receives this arm 61 that is capable of lateral movement by the endwise movement of the safety. The inertia block has longitudinally separated notches 63 and 64 which intersect the channel 62. During normal action the locking arm 61 is out of both notches or slots 63 and 64 thus permitting the free and proper motion of the inertia-block 9. Should it be desired to lock the inertia-block in its backward position the latching or locking arm 61 will be projected into the notch or slot 63 by the endwise movement of the safety 60. To release the inertia-block from the condition mentioned, the locking arm 61 is withdrawn from the notch or slot 63. To lock the inertia block in the forward position the locking arm 61 is projected into the back slot 64 when the inertia block is in its forward position. The latching or locking arm or extension 61 performs in the present case an important function in that when the parts are in assembled relation, it holds the safety in such relation. I might also call attention to the fact that the spring 54 is a highly advantageous feature. It is more valuable than a coiled spring owing to its ease of assemblage and its other qualities. The rear end of the spring seats in a notch in the trigger guard rendering it quite easy to assemble.

It might be explained that the arm or extension 61 of the safety positively prevents the safety from being disassembled when the parts are in relation such as represented by Fig. 3, or when the trigger guard is in assembled relation with the receiver. Therefore, the extension 61 extends upwardly inside of the receiver so that the safety 60 cannot be dismounted from the trigger guard when the trigger guard is in assembled relation with the receiver. The trigger 49 as shown has on its rear side thereof the nose 66 and the safety 60 in turn is provided with a locking portion 65 which may be projected over the nose 65 as shown for instance in Fig. 3 to effectually prevent when desired the firing action of the trigger 49.

It is not amiss to describe the action of the firearm. It will be assumed that the magazine 12 is filled with cartridges and that the inertia-block 9, breech-block 10 and hammer 15 are in their advanced positions as shown best in Fig. 3. Obviously the operating handle 67 is in its forward position. I should explain that the operating handle is connected with the inertia-block 9 and extends through a longitudinal slot 68 in the receiver or frame 5, the operating handle being externally accessible as shown best in Fig. 4. It also appears in Fig. 5 and partly in other views. To cock the piece, the operating-handle is grasped and drawn back, thereby correspondingly moving the inertia-block 9 and breech-block 10 and parts sustained thereby. The inertia-block is retracted until it strikes the rear wall of the chamber 6. As the inertia-block 9 moves rearwardly and of course carries therewith the cocking lever 43, the cocking lever is rocked on its pivot by its engagement with the abutment shoulder 57, the lower arm of the cocking lever being swung to the right in Fig. 3 and the upper arm or branch to the left so that said upper arm will engage the shoulder 48 and draw back the hammer 15 in order to bring the notch 46 of the hammer opposite the nose or tooth 45 of the sear 44 at which point said tooth or nose is projected into the notch 46 by the power of the sear spring 38.

The inertia-block 9 on its backward travel, under the action of the hand, thrusts the plunger mechanism involving the tubular plunger 29 backward and as a result compresses the recoil-spring 34. The top cartridge of the series in the magazine, when

the parts are in the advanced position is in engagement with the under side of the breech-block 10 so that when the breech-block has moved rearwardly sufficiently to free the top cartridge the latter is elevated by the magazine spring 69 until the cartridge is in the path of the breech-block.

When therefore, the user releases the operating handle 67, the recoil or closing spring 34 advances the inertia-block 9 and the coupled breech-block 10 and when the parts have nearly concluded their advance or forward motion, the breech-block 10 can thrust the topmost cartridge into the chamber of the barrel. On the forward motion of the parts in loading, the trigger connector 52 is snapped into engagement with the sear 44 so that when the parts have concluded their forward movements the arm is ready to be fired. To accomplish this the trigger 49 is pulled thereby in the manner to which I have referred, drawing down the trigger-connector 52 and tripping the sear 44 and thus releasing the hammer 15 so that the hammer is at once projected forward by the spring 40 to fire the cartridge in the chamber of the barrel. After this the action becomes automatic excepting that the trigger must be manually pulled and released for each shot.

After the firing pin has encountered the cartridge in the breech of the barrel, the cartridge is exploded and at the breech are generated gases which force the breech-block 10 backwardly and as the breech-block is coupled to the inertia-block 9, the inertia-block also recedes. The rear part of the breech-block is as I have observed tipped downwardly about the time that its rearward motion is momentarily interrupted, in order to give an accelerated camming motion to the inertia-block to cause its quick backward movement. On the backward movement of the two blocks, the cocking lever 43 is rocked on its pivot 43′ and the spring 34 of the buffer mechanism is compressed to render it effective for imparting the forward movement to the two coupled blocks. On the rearward movement of the inertia-block 10 the sear 44 passes wholly free of the connector 52. The sear on the forward movement of the inertia-block 9 strikes and rocks the connector 52 the shouldered end of which is projected into the notch at the rear lower end of the sear when the trigger is freed.

I deem it desirable to call attention to the fact that in the construction shown, the rear portion of the receiver 5 constitutes a part of the grip of the gun, this particular part being diagonal or oblique, or at least sufficiently so, to be in itself diagonal or oblique to the longitudinal axis of the barrel. This permits the receiver not only to function in the manner which I have just noted, but enables the rear diagonal portion 7 of the interior of the receiver to receive the inertia-block.

What I claim is:

1. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia-block and occupying when in its forward position the forward portion of the chamber, and means for checking the retractive movement of the breech-block between the ends of its stroke.

2. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia-block and occupying when in its forward position the forward portion of the chamber, and means for checking the retractive movement of the breech-block approximately at the time it is about to enter the rear portion of the chamber.

3. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia-block and occupying when in its forward position the forward portion of the chamber, and means for automatically checking the retractive movement of the breech-block and then releasing the same, the breech-block acting to impart an accelerated motion to the inertia-block.

4. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber, the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia-block and occupying when in its forward position the forward portion of the chamber, and means for checking the retractive movement of the breech-block and approximately concurrently tipping down its rear end, the breech-block on its tipping movement acting against the inertia-block to impart an accelerated movement thereto.

5. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber, the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with

said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia-block and occupying when in its forward position the forward portion of the chamber, and means on the receiver, for checking the retractive movement of the breech-block and approximately concurrently tipping down its rear end, the breech-block on its tipping movement acting against the inertia-block to impart an accelerated movement thereto.

6. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber, the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia block and occupying when in its forward position the forward portion of the chamber, and cam means on the receiver, for checking the retractive movement of the breech-block and approximately concurrently tipping down its rear end, the breech-block on its tipping movement acting against the inertia-block to impart an accelerated movement thereto.

7. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber, the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block coupled to the inertia block and occupying when in its forward position the forward portion of the chamber, cam means for checking the retractive movement of the breech-block and at the same time tipping down its rear end, the breech-block having a cam action against the inertia-block on said tipping motion to impart an accelerated backward movement to the inertia block.

8. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber, the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber and having a hook, a breech-block occupying when in its forward position the forward portion of the chamber and having a hook to engage that on the inertia-block to couple the two blocks together, and means for checking the retractive movement of the breech-block.

9. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block located in the receiver, a breech-block coupled to the inertia-block, the inertia-block being adapted to travel in a direction diagonal to the axis of the barrel throughout its complete movement, the breech-block initially on its backward movement travelling along a path co-inciding with the longitudinal axis of the barrel, and means for changing the path of travel of the breech-block on its backward movement to coincide with that of the inertia-block and for causing through the action of the breech-block, an accelerated backward movement of the inertia-block approximately at the time the direction of rearward movement of the breech-block has been changed.

10. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block located in the receiver, a breech-block coupled to the inertia-block, the inertia-block being adapted to travel in a direction diagonal to the axis of the barrel throughout its complete movement, the breech-block initially on its backward movement travelling along a path co-inciding with the longitudinal axis of the barrel, and means on the receiver, for changing the path of travel of the breech-block on its backward movement to coincide with that of the inertia-block and for causing through the action of the breech-block, an accelerated backward movement of the inertia-block approximately at the time the direction of rearward movement of the breech-block has been changed.

11. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block located in the receiver, a breech-block loosely coupled to the inertia-block, the inertia-block being adapted to travel in a direction diagonal to the axis of the barrel throughout its complete rearward movement, the breech-block initially on its backward movement travelling along a path coinciding with the longitudinal axis of the barrel, the receiver having means to arrest the rearward movement of the breech-block and to tip down the rear portion thereof to cause the breech-block to follow the path of the inertia-block, the breech-block having means to impart an accelerated rearward movement to the inertia block about the time its direction of movement is changed.

12. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block, a breech-block coupled to the inertia-block and both blocks reciprocatory in the receiver, the receiver having associated with it means to guide the inertia-block in a direction diagonal to the axis of the barrel, and for also causing a compound motion of the breech-block respectively in a direction corresponding to the axis of the barrel and in a path following the inertia-block, and means by which the breech-block gives the inertia-block an impetus approximately at the time its direction of backward motion is changed.

13. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block, a breech-block coupled with the inertia-block and both reciprocatory in the

receiver, the latter having associated with it, means to guide the inertia-block in a direction diagonal to the axis of the barrel and for causing a compound motion of the breech-block respectively in a direction corresponding to the axis of the barrel and in a path following the inertia-block, and cam means on the breech-block acting against the inertia-block to give it an impetus approximately at the time the direction of motion of the breech-block is changed on its backward action.

14. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block reciprocatory in the receiver and disposed diagonally to the axis of the barrel, a breech-block in the receiver, coupled to the inertia-block for reciprocation therewith, and means for momentarily checking the breech-block at a predetermined point in the backward motion.

15. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block reciprocatory in the receiver and disposed diagonally to the axis of the barrel, a breech-block in the receiver, coupled to the inertia-block for reciprocation therewith, and means for momentarily checking the breech-block at a predetermined point in its backward movement, the breech-block, imparting an accelerated rearward motion to the inertia-block.

16. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block reciprocatory in the receiver and disposed diagonally to the axis of the barrel, a breech-block in the receiver, coupled to the inertia-block for reciprocation therewith, cam means on the receiver for momentarily checking the breech-block at a predetermined point in the backward movement, the breech-block having cam means to act against the inertia-block during the time it is momentarily checked to thus impart an accelerated backward movement to the inertia-block.

17. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block reciprocatory in the receiver and disposed diagonally to the axis of the barrel, a breech-block also in the receiver, the inertia-block and the breech-block having interengaging hooks, means in the receiver for momentarily checking the breech-block at a predetermined point in its backward motion, the breech-block having cam means which on such backward motion impart an accelerated corresponding motion to the inertia-block.

18. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block forward of the inertia-block, the inertia-block and the breech-block having interengaging hooks to couple them together, and cam means on the receiver for tipping down the rear end of the breech-block approximately at the time it is about to enter the rear portion of the chamber, the breech-block and the inertia-block having cam surfaces which engage on the tipping of the rear portion of the breech-block to thus impart an accelerated motion rearwardly to the inertia-block.

19. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located in the rear portion of the chamber, a breech-block forward of the inertia-block, the inertia-block and the breech-block having interengaging hooks to couple them together, and cam means on the receiver for tipping down the rear end of the breech-block approximately at the time it is about to enter the rear portion of the chamber, the breech-block and the inertia-block having cam surfaces which engage on the tipping of the rear portion of the breech-block to thus impart an accelerated motion rearwardly to the inertia-block, the inertia-block and the breech-block having engaging faces which are at approximately right angles to the axis of the barrel when the blocks are in their forward positions.

20. A firearm comprising a receiver, a barrel connected with the receiver, the receiver having a chamber the rear portion of which is diagonal to the axis of the barrel and the forward portion of which is coincident with said axis, an inertia-block located constantly in the rear portion of the chamber and having at its forward end a hook, a breech-block having a hook at its rear end in interengagement with that of the inertia-block and occupying when in its forward position the forward portion of the chamber, both the blocks being reciprocatory, a cam face in the receiver for engaging the breech-block to momentarily check and after checking release the backward motion of the breech-block and also to tip down the rear portion of the breech-block, the hook of the breech-block having a cam surface to engage the inertia block when the rear portion thereof is tipped downward to impart an accelerated rearward movement to the inertia-block.

21. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block reciprocatory in the receiver and disposed diagonally to the axis of the barrel, a breech-block in the receiver, coupled to the inertia-block, for reciprocation there-

with, means for momentarily checking the breech-block at a predetermined point in the backward motion, and buffing means co-operative with the inertia-block.

22. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block reciprocatory in the receiver and disposed diagonally to the axis of the barrel, a breech-block in the receiver, coupled to the inertia-block, for reciprocation therewith, means for momentarily checking the breech-block at a predetermined point in the backward motion, and buffing means co-operative with the inertia-block, and having a rearward movement beyond the rearward movement of the inertia-block.

23. A firearm comprising a receiver, an inertia block and a breech block, both slidable in the receiver, and provided with interengaged hooks to couple the blocks together, and means for checking the retractive movement of the breech block, said inertia block and said breech block having means which function to aid such checking action, the firearm having means to cause an angular motion of the breech block on the retractive action thereof.

24. A firearm comprising a receiver, an inertia-block and a breech-block both slidable in the receiver, the inertia-block having a hook at its forward end and the breech-block having a hook at its rear end, the hooks being interengaged to couple the two blocks together, the firearm having means to cause an irregular motion on the retractive movement of the breech-block.

25. A firearm comprising a receiver, an inertia-block, a breech-block both in the receiver and capable of reciprocation therein, the inertia-block and the breech-block having rigid interengaging hooks to couple the two blocks together, and means for retarding temporarily the backward motion of the breech-block, and the breech-block practically at the time it is retarded acting against the inertia-block to give to it an accelerated rearward movement.

26. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block and a breech-block in coupled relation in the receiver for reciprocation therein, the inertia-block having a motion which is constantly oblique to the axis of the barrel, firing means associated with the blocks, the inertia-block being of greater mass than that of the breech-block, the receiver having means to positively cause a tipping motion of the breech-block on the retractive movement of the inertia block.

27. A firearm comprising an inertia-block, a hammer on the inertia-block, a cocking lever for the hammer, pivoted to the inertia-block, a sear on the inertia-block, co-operative with the hammer, and a spring for operating the sear to cause it to engage the hammer, the spring acting against the pivot for the cocking lever to hold it in place.

28. A firearm comprising an inertia-block, a hammer on the inertia-block, a cocking lever, a pivot extending through the inertia-block and also through the cocking lever, a sear on the inertia-block, co-operative with the hammer, and a spring extending longitudinally of the inertia-block, the free end of the spring acting against the sear to cause it to engage the hammer, the spring between its ends acting against the pivot of the cocking lever to prevent accidental movement thereof.

29. A firearm comprising an inertia-block and a safety slidable transversely of the firearm, the safety having an upward extension and the inertia-block having longitudinally-separated slots into which the extension may be alternately projected on the movement of the safety laterally of the firearm, to hold the inertia-block respectively in its forward and backward positions, said upward extension acting to hold the safety against dismounting when the parts are in assembled relation.

30. A firearm comprising an inertia-block and a safety slidable laterally of the firearm, the safety having an upward extension and the inertia-block having a longitudinal channel in which said extension is disposed, the inertia-block having slots intersecting the channel and into which the extension may be alternately projected on the movement of the safety laterally of the firearm to hold the inertia-block respectively in its forward and backward positions, said upward extension acting to hold the safety against dismounting when the parts are in assembled relation.

31. A firearm comprising an inertia-block, a safety mounted for sliding movement laterally of the firearm and having an upward extension, the inertia-block having longitudinally-separated slots into which the extension can be alternately projected on the sliding movement laterally of the safety, to hold the inertia-block respectively in forward and backward positions, and a trigger, the safety having means to hold the trigger against action in one of the positions of the safety, said upward extension acting to hold the safety against dismounting when the parts are in assembled relation.

32. A firearm comprising a receiver, a barrel, an inertia-block in the receiver and yieldable buffing means diagonal to the barrel of the firearm engaging the inertia-block, the receiver having means to arrest the backward movement of the inertia-block, the buffing means having a rearward motion beyond the point at which the inertia-block is stopped in its backward movement, the buffing means on the continued backward movement involving means to store energy

to impart a return movement to the buffing means and also to impart a forward movement to the inertia-block when it is acted on by the buffing means, the barrel being stationary with respect to the moving parts during the action set forth.

33. A firearm comprising a receiver, a barrel, a reciprocatory inertia-block in the receiver, and yieldable buffing means diagonal to the barrel of the firearm engaging the inertia-block, the receiver having means to arrest the backward motion of the inertia-block and the buffing means having a rearward motion beyond the point at which the inertia-block is stopped in its backward movement said barrel being stationary during such buffing action.

34. A firearm comprising a receiver, a reciprocatory inertia-block in the receiver, adapted on recoil to be arrested by the receiver, and yieldable buffing means to engage the inertia-block, the buffing means comprising a fixed buffer tube, a tubular plunger slidably disposed in the buffer tube and engaging the inertia-block, a spring-guide plunger in the tubular plunger, and a recoil spring enclosed in the buffer tube and the tubular plunger, acting against the spring-guide plunger, and also against a fixed part of the firearm, the buffing means having a backward motion after the inertia-block is arrested.

35. A firearm comprising a receiver provided with a fixed barrel, the rear portion of the receiver being oblique to the axis of the barrel, a reciprocatory inertia-block in the receiver, adapted on recoil to be arrested by the receiver, and yieldable buffing means diagonal to the barrel of the firearm to engage the inertia-block, the buffing means extending into the diagonal portion of the receiver and comprising a fixed buffer tube, a tubular plunger slidably disposed in the buffer tube and acting against the inertia-block, and a recoil spring enclosed in the buffer tube and the tubular plunger acting against a fixed part of the firearm and also against the spring plunger, the buffing means having a backward motion after the inertia-block is arrested.

36. A firearm comprising a receiver, a fixed barrel connected with the receiver, an inertia block in the receiver, the rear portion of the receiver being oblique to the axis of the barrel, and yieldable buffing means engaging the inertia block, the firearm having means to resist the backward motion of the inertia block, and the buffing means having a rearward motion beyond the point at which the inertia block is stopped in its backward movement, the firearm having connections to positively cause diagonal movement of the inertia block on its backward stroke.

37. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block in the receiver, the receiver having means for positively causing a reciprocation diagonally to the axis of the barrel of the inertia block, said inertia-block adapted on recoil to be arrested by the receiver, and yieldable buffing means comprising a fixed buffer tube, a tubular plunger slidably disposed in the buffer tube, closed at its forward end, the inertia-block having a seat to receive the closed end of the tubular plunger, and a recoil spring enclosed by the buffer tube and the tubular plunger acting against the spring guide plunger and also against a fixed part of the firearm, the forward end of the spring guide plunger engaging the closed end of the tubular plunger.

38. A firearm comprising a receiver, a fixed barrel connected with the receiver, an inertia block in the receiver, reciprocative diagonal to the axis of the barrel, the firearm having means to arrest the backward motion of the inertia block and yieldable buffing means comprising a fixed buffer tube, a tubular plunger slidably disposed in the buffer tube, the inertia block being engaged by the tubular plunger, and a recoil spring enclosed by the buffer tube, the tubular plunger acting against a fixed part of the firearm, the buffer tube and the recoil spring enclosed thereby being disposed to conform to the motion of the inertia block.

39. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block in the receiver, reciprocative diagonal to the axis of the barrel, the firearm having means to arrest the inertia-block on its backward movement, and yieldable buffing means comprising a fixed buffer tube, a tubular plunger slidably disposed in the buffer tube, closed at its forward end, the inertia-block having a seat to receive the closed end of the tubular plunger, and a recoil spring enclosed by the buffer tube and the tubular plunger acting respectively against a fixed part of the firearm and also against the tubular plunger, the tubular plunger engaging the inertia-block, the buffer tube and the recoil spring inclosed thereby being disposed to conform to the motion of the inertia block.

40. A firearm comprising a receiver, a barrel connected with the receiver, a coupled inertia-block and breech-block, both reciprocatory in the receiver, the inertia-block being movable backwardly and forwardly diagonal to the axis of the barrel, buffing means engaging the inertia-block, and means for momentarily checking and then releasing the backward movement of the breech-block, the latter when released applying a rearward thrust to the inertia-block and the inertia-block in turn transmitting a rearward thrust to the buffing means, the receiver having means to arrest the backward move-

ment of the inertia-block, the buffing means having a backward movement after the backward movement of the inertia-block is arrested.

41. A firearm comprising a receiver, a barrel connected with the receiver, a coupled inertia-block and breech-block both reciprocatory in the receiver, the inertia-block being movable forwardly and backwardly in the receiver diagonal to the axis of the barrel, the receiver having means to positively arrest the backward movement of the inertia-block, buffing means acting against the inertia-block and means for arresting momentarily the backward movement of the breech-block, the breech-block on its backward movement applying a rearward thrust to the inertia-block and the inertia-block in turn transmitting a rearward thrust to the buffing means, the buffing means having a backward movement after the inertia-block is arrested.

42. A firearm comprising a receiver, a barrel connected with the receiver, a coupled inertia-block and breech-block both reciprocatory in the receiver, the inertia-block being diagonal to the axis of the barrel, buffing means co-operative with the inertia-block, and means for arresting and tipping downwardly the rear portion of the breech-block, the breech-block when tipped applying a rearward thrust to the inertia-block, the inertia-block transmitting in turn a rearward thrust to the buffing means, the latter having a backward movement after the inertia-block is arrested.

43. A firearm comprising a receiver, a barrel connected with the receiver, an inertia-block and a breech-block in hooked coupled connection with each other, both reciprocatory in the receiver, the inertia-block being diagonal to the axis of the barrel, buffing means co-operative with the inertia-block, and means for momentarily checking the rearward motion of the breech-block, tipping it downward, the breech-block on said tipping motion acting to apply a rearward thrust to the inertia-block which in turn is transmitted to the buffing means, the buffing means having a backward movement after the inertia-block is arrested.

44. A firearm comprising a receiver, a barrel connected with the receiver, the rear portion of the receiver being diagonal to the axis of the barrel to constitute a part of the grip of the arm, the receiver having interiorly a chamber, the forward portion of which coincides with the axis of the barrel and the rear portion of which conforms approximately with the oblique disposition of the grip part of the receiver, an inertia-block and a coupled breech-block both in the receiver, the breech-block being reciprocatory therein, the inertia-block being constantly reciprocative in the rear portion of the receiver, and means for momentarily checking the breech-block and tipping down the rear portion thereof, the breech-block when thus tipped, imparting an accelerated rearward movement to the inertia-block.

45. A firearm comprising a receiver, a barrel connected with the receiver, the rear portion of the receiver being diagonal to the axis of the barrel to constitute a part of the grip of the arm, the receiver having interiorly a chamber, the rearward portion of which conforms approximately with the oblique disposition of the grip part of the receiver, an inertia-block and a coupled breech-block both in the receiver, the breech-block being reciprocatory therein, the inertia-block being constantly reciprocative in the rear portion of the receiver, and means for momentarily checking the breech-block and tipping down the rear portion thereof, the breech-block when thus tipped imparting an accelerated rearward movement to the inertia-block, buffing means co-operative with the inertia-block, the arm having means to stop the backward motion of the inertia-block, and the buffing means having a rearward motion after the inertia-block is thus stopped.

46. A firearm comprising a reciprocatory inertia-block, a hammer on the inertia-block, a sear on the inertia-block, a trigger, a connector pivotally mounted directly on the trigger, and a spring to act against both the trigger and the connector, the spring functioning to project the connector into engagement with the sear.

47. A firearm comprising a reciprocatory inertia-block, a hammer on the inertia-block, a sear on the inertia-block, a trigger and its guard, a connector pivotally mounted on the trigger, and a leaf spring supported at its end in a notch in the trigger guard and acting against both the trigger and the connector, the spring functioning to project the connector into the engagement with the sear when the inertia-block is in a predetermined position.

48. A firearm comprising a receiver having a trigger-guard and also having a barrel and an inertia-block in the receiver, movable obliquely to the axis of the barrel and supported by the trigger-guard, the firearm having means to cause said oblique movement of the inertia block.

49. A firearm comprising a receiver having a trigger-guard and also having a barrel, an inertia-block in the receiver, movable obliquely to the axis of the barrel and supported and positively guided in said oblique direction by the trigger-guard.

50. A firearm comprising a receiver, an inertia block located in the receiver, a breech block forward of the inertia block, the inertia block and the breech-block having interengaging hooks to couple them together,

cam means on the receiver for tipping down the rear end of the breech-block, the breech-block and the inertia block having cam surfaces which engage on the tipping of the rear portion of the breech-block to thus impart an accelerated motion rearwardly to the inertia block, and said cam surfaces engaging during the forward motion of the blocks to elevate the rear end of the breech-block.

In testimony whereof I affix my signature.

JOHN M. BROWNING.

Witnesses:
V. A. BROWNING,
R. M. MARKLE.