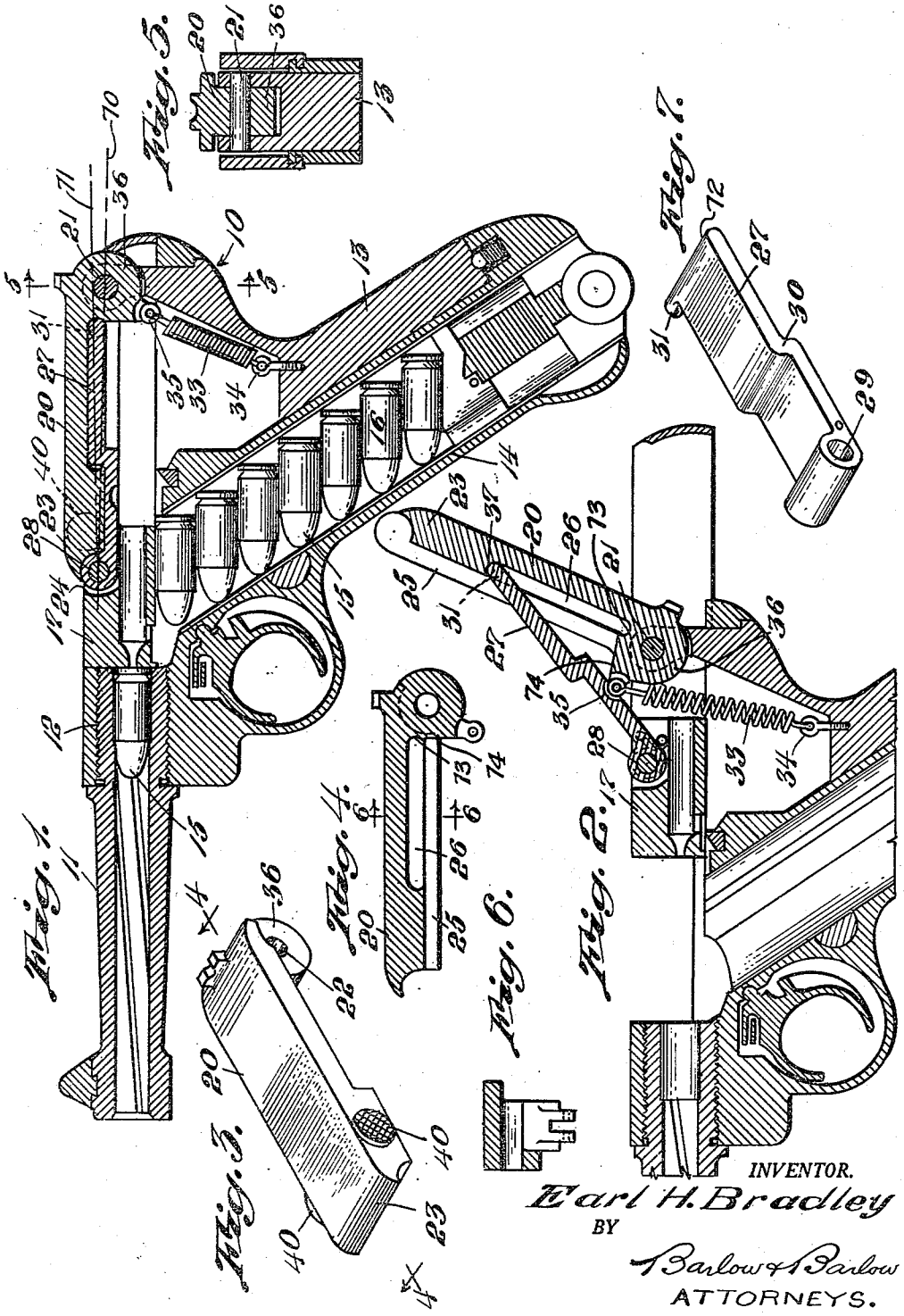
Oct. 9, 1956 E. H. BRADLEY 2,765,710

BREECH BLOCK CONTROLLING MECHANISM FOR A RETARDED BLOW BACK GUN

Filed Dec. 27, 1952 2 Sheets-Sheet 1



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Fig. 8.

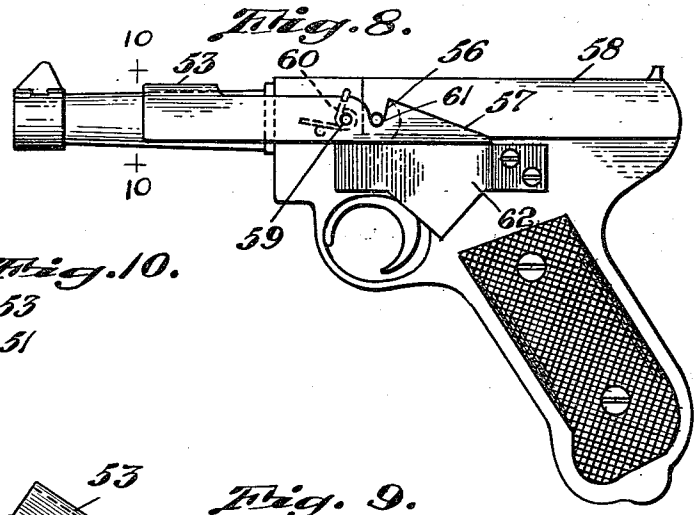


Fig. 10.

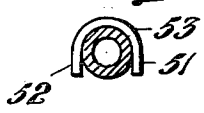


Fig. 9.

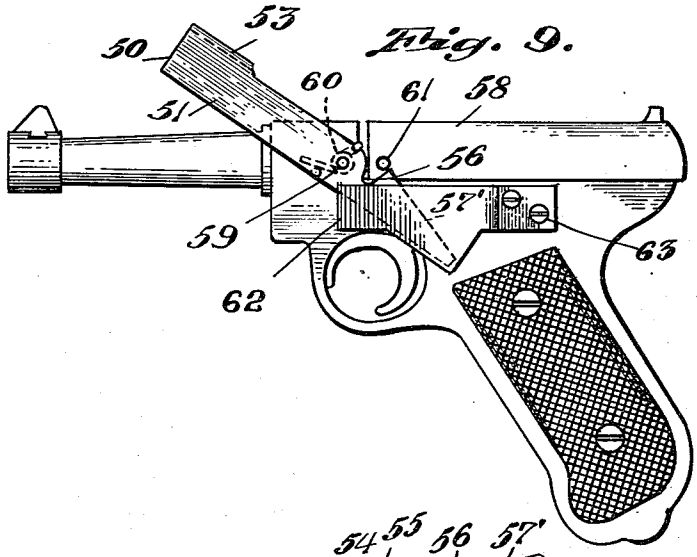
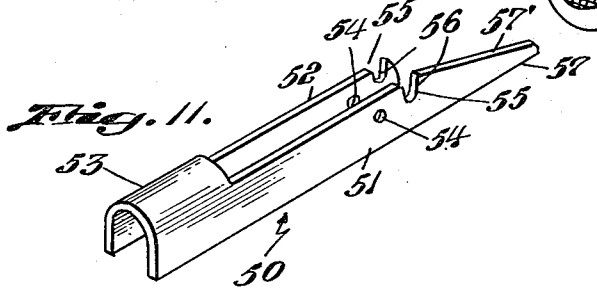


Fig. 11.



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BREECH BLOCK CONTROLLING MECHANISM FOR A RETARDED BLOW BACK GUN

Earl H. Bradley, Seekonk, Mass.

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12 Claims. (Cl. 89—195)

This application refers to a gun and more particularly to the control for a breech block for a semi-automatic piston or the like.

Experts find a fixed barrel type of construction as used in the semi-automatic pistons of a smaller calibre, such for instance as .22 calibre having a solidly fixed barrel, more accurate than a larger calibre piston where the barrel slides relative to the frame.

In arms of larger calibre having cartridges powerful enough to be of military value it is not practical to provide a slide heavy enough so that the gun can safely operate as a straight blow black weapon. Military pistols have therefore been made with locked breeches so that during the period when the bullet is moving through the barrel, the barrel and breech recoil together. This motion is usually used to unlock the breech, permitting the slide to continue its motion, removing the empty cartridge case.

This construction necessarily means that the barrel cannot be fixed in the frame and that the accuracy of the arm is substantially less than could be realized with a fixed barrel.

One of the objects of this invention is to provide in the larger calibre semi-automatic pistols or other guns a fixed barrel and still prevent detrimental motion of the slide during the initial period when gas pressures in the barrel are dangerously high.

More specifically an object of this invention is to multiply the inertia of a small weight by requiring that its movement occur through a mechanical disadvantage. Yet more specifically this mechanical disadvantage is provided by causing the small weight to move through a substantial distance.

Another object of the invention is to retard the movement of the breech block by adding to its effective inertia without increasing its weight or by utilizing a small additional weight in addition to the weight of the breech block itself.

Another object of the invention is to provide greater reliance upon inertia, which is constant, than upon friction, where the two are involved, the friction being more variable and thus to provide a more uniform operation of the breech block.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a sectional view showing the breech block in firing position;

Figure 2 is a fragmental view of the part shown in Figure 1 but showing the breech block in open position;

Figure 3 is a perspective view of the first link or the link pivoted to the frame of the gun;

Figure 4 is a sectional view on line 4—4 of Figure 3;

Figure 5 is a sectional view on line 5—5 of Figure 1 through the pivotal connection of this link to the frame;

Figure 6 is a section on line 6—6 of Figure 4;

Figure 7 is a perspective view of the other or second link which is pivoted to the breech block;

Figure 8 is a side elevational view of a modified construction;

Figure 9 is a similar view but showing the breech block just prior to its release from the retarding mechanism;

Figure 10 is a section view taken substantially along line 10—10 of Figure 8; and

Figure 11 is a perspective view of the breech block retarding mechanism.

In proceeding with this invention instead of using a toggle link connection between the frame and the breech block in which the pivots must be near a straight line in order to provide the resistance necessary and in which friction plays a large part, I have provided a linkage in which the pivots may be further from a straight line in the initial firing position with a greater proportion of the resistance provided by inertia, which is constant and therefore provides a more reliable operation, and in order to accomplish this, one means is to pivot one link on the frame at one end and pivot another link on the breech block at one of its ends, while providing a sliding connection by means of a slot and pin-like arrangement between the two links so that the resistance may be great due to the inertia and large movement required at the firing position when the forces are greatest, but one in which as the forces reduce, the mechanical advantage due to the swinging of the links will increase so that when the forces are weak, the movement of the slide may be the greatest in arriving at its full open position.

With reference to the drawings 10 designates generally the frame of a pistol of the retarded blow back semi-automatic type in which the barrel 11 is fixed to the frame such as being threaded as at 12 into a portion of the frame at its inner end. A handle is provided at 13 which receives a clip 14 of cartridges comprising bullets 15 and shells 16. A breech block 17 is slidable with reference to the frame 10 and is controlled by means which will add to its inertia at the initial or firing position but which towards the end of its movement will decrease its resistance and permit it to move to wide open position, as shown in Figure 2.

This mechanism in one form comprises a first link 20, as shown in perspective in Figure 3, which is pivoted to the frame by means of a pin 21 extending through the opening 22 at one end of the link. The end 23 of this link is partially received in the breech block which is recessed as at 24 to receive this and the other link which controls the breech block. By observation of Figures 3 and 4, the end 23 of link 20 will be seen to be thicker than the major portion of the link, thus increasing the weight of the link at this end 23. This first link 20 is recessed as at 25, and one of its walls is slotted as at 26.

The second link 27, as shown in Figure 7 in perspective, is pivoted as at 28 in a recess in the breech block 17 by the pin 28 extending through the opening 29 in one end of the link 27. This link 27 fits into the recess 25 in the link 20 and is stepped as at 30 so that its trunnion pin or other circular projection 31 will extend into the slot 26 and be pivoted as well as slidable in this slot. This ling 27, which is the second link, nests within the first link 20, as shown in Figure 1, when the parts are in firing position. Link 27 has a semi-circular end 72 which in the closed position engages a semi-circular groove 73 in link 20 which is located between the mid point of link 20 and its pivot 21. When in this nested position, the axis of the pivot 31 is outwardly of a line between the axes of the pivots 21 and 28 so that the angle between line 70 connecting pivots 21 and 28 and the line 71 connecting pivots 31 and 28 is less than 30° so that when pressure is applied on the axis 28 toward the axis 21, there will be a tendency of the link 20 to swing about

its pivot 21 clockwise to the position, as shown in Figure 2. A spring 33 is anchored as at 34 in the handle and is attached as at 35 on the bearing 36 at one side of the axis of the pivot 21 so as to tend to swing the link 20 downwardly into firing position.

Assuming the cartridge shown in Figure 1 is fired, the pressure of the gasses in the chamber tending to drive the bullet out of the barrel exerts a force upon the breech block 17 tending to move the breech block rearwardly. The pressure received by the breech block 17 will be applied through pivot pin 28 toward pivot pin 21 through the link 27 which applies pressure at bearing 72 along line 71 slightly outwardly from the center of the pivot 21. Thus there will be a tendency for link 20 to swing clockwise as shown in Figure 1 about the pivot 21. As these three pivots 28, 72, and 21 are nearly in line, there is a mechanical disadvantage so as to add resistance to the inertia of the breech block 17 against sliding rearwardly under the pressure of the gases. Thus this inertia causes the breech block to move very slowly from its firing position and sufficient so that there will be a retarding for a length of time to permit the bullet 15 to be discharged from the barrel. As the first link 20 swings about pivot 21, its surface 74 acts upon link 27 to shift the point at which it bears upon link 20 away from pivot 21. After the link 20 lifts at its end 23 to a point at which the angle between the link 27 and the wall of the slot 26 is greater than a right angle, the pivot 31 slides rapidly in the slot 26 and more rapidly increases the leverage at its point of application to the lever 20 by increasing its distance from the pivot 21, thus increasing the mechanical advantage which the reducing gas pressure applies to the link 20 which force tends to swing it about the pivot 21 until near the end of its stroke where the link 27 is applying its force at the end 37 of the slot 26, as shown in Figure 2, so as to give a maximum leverage on the link 20 in swinging it through its motion about the pivot 21. The spring 33 is increasing its resistance, however, to the motion of the links, it being shown as applying its maximum force in the open position in Figure 2. As soon as the breech block is withdrawn, as shown in Figure 2, another bullet from the clip will be advanced into position so that when the breech block again closes, the bullet will be in the barrel ready to again fire. By this arrangement I am able to maintain the barrel fixed and the breech block without substantial motion until the bullet has left the barrel. Thus the accuracy of the gun is materially increased.

If it is desired to open the breech block by hand, it is merely necessary to place the thumb and finger on opposite sides of the knurled portions 40, 40 of the first link 20 and swing this by hand about the pivot 21.

As the other parts of this gun are standard equipment, it is thought unnecessary to describe the same in detail.

In Figures 8–11, inclusive, there is shown a modification in which a lever 50 (see Figure 11) is arranged so as to provide for the delayed action in the opening of the breech block of the gun just subsequent to the firing thereof. This lever 50 comprises parallel arms 51 and 52 joined at one end thereof by an integral bridge 53 which is arcuate in substantially the curvature of the gun barrel or semi-circular as seen in Figures 10 and 11. These arms 51, 52 are each provided with aligned mounting openings 54 and each has a recess 55 extending inwardly from the upper edge thereof and in line with each other. One wall of each recess is of the form of a cam surface 56. The arm 51 is extended rearwardly beyond the recess 55 as at 57, the upper edge of which tapers downwardly as at 57′ so as to provide a rest arm as will presently appear.

The lever 50 is pivotally mounted on the gun body at a location adjacent the inner edge of the breech block 58 as by means of pivot pins or trunnions 59 which may be suitably secured on either side of the gun body to

project therefrom through the said openings 54 and with their ends upset in a manner of a rivet. The arms 51, 52 are sufficiently spaced from the gun body to permit free rocking motion thereof, and a torsion type spring 60 encircles each pivot pin 59 and is arranged to exert a yieldable force on said lever 50 to swing it in a counterclockwise direction as seen in Figures 8 and 9 to resiliently hold the bridge portion 53 in engagement with the gun barrel (see Figure 10). Pins 61 project from the breech block 58 to be received in said recess 55 to engage the cam surfaces 56 thereof. In the instant disclosure the pins 59, 61 are positioned to be in a plane extending axially of the gun barrel.

Referring to Figure 8, it will be apparent that upon a rearward movement of the breech block 58, the pin 61 will exert a force on the cam surface 56 in a direction tending to rock the lever 50 about its fulcrum 59. The surfaces of the cams 56 are made a little greater than a right angle to a plane passing centrally through pins 59, 61, and said force will act on said cam surfaces in a direction tending to move said lever 50 in a clockwise direction. When the gun fires, pressure of the shell on the breech block 58 will be transmitted through pins 61 on to cam surfaces 56 and rock lever 50 about its fulcrum 59. It is apparent that the motion of the lever at the bridge 53 is much greater than the rearward motion of the breech block 58 so that the inertia affect of the lever 50 is considerably greater than the corresponding weight in the breech block and causes a hesitation in the rearward movement of the said breech block 58. Thus, I am able to control the hesitation or retard the opening of the breech block 58 by a choice of length of lever arm forwardly of the fulcrum 59 or by increasing or decreasing the distance between the said fulcrum 59 and the cam surface 56. Also, as the angle of the surface 56 is increased, the turning component increases and the retarding effect of the inertia of the lever 50 decreases. A substantial part of the inertia of lever 50 is due to the weight of the bridge 53. In order to obtain sufficient multiplication of the inertia of the weight at the ends of arms 51, 52, the center of gravity of the lever arm on one side of the pivot should be a distance much greater from the pivots 59 than are the cam surfaces 56.

I have described the angle of the cam surfaces 56 as being made greater than a right angle, and in practice it will be found than an angle up to 100 degrees will be required depending upon the material of the lever 50 for the turning components of the force exerted upon the cam surfaces 56 to be sufficient to overcome the effect of the friction between the pin 61 and the surfaces 56 caused by the pressure of said pins 61 on said surfaces 56. I have shown the surfaces 56 as being linear. However, these surfaces may be varied to give a large initial delay and then an increasing angle above this delayed action to provide lesser delay at a subsequent period in the opening movement of the breech block 58.

Upon the lever 50 being rocked to position its cam surfaces 56 free of the pin 61, the breech block 52 will be free to continue its action in the usual manner. Upon the passing of the pin 61, which is adjacent to the arm 51, beyond the end of the reset arm 57, the lever 50 under urge of the spring 60 will be rocked in a counterclockwise direction toward the initial position, and the tapered edge 57′ will be at a position to be engaged by said pin 61 upon the return or forward motion of the breech block 58. The said pin 61 upon riding over the edge 57′ will cause said lever 50 to be moved clockwise a distance sufficient for the pin 61 to pass thereby and position each pin in its recess upon said lever rocking to initial position under urge of said spring 60.

The action of said breech block 58 and lever 50 is very sudden, and in order to prevent injury to the hand of the user by the reset arm 57, a guard 62 is provided. This guard 62 may be conveniently made of sheet ma-

terial cut to a form as shown (see Figures 8 and 9) to be positioned to cover the path of movement of said arm **57**. The shield may be secured in place in any convenient manner as by means of screw fastenings **63**.

I claim:

1. In a retarded blow back gun, a frame, a barrel fixed thereto, a breech block slidable relative to the frame, a first link pivoted to the frame, a second link pivoted to the breech block and means to connect said links together at a location between the pivot of the first link to the frame and the mid point thereof when in closed position by a sliding relationship movable along the first link away from its pivot to apply pressure above the pivot of the first link to the frame to lift the link upwardly against the force of gravity.

2. In a retarded blow back gun, a frame, a barrel fixed thereto, a breech block slidable relative to the frame, a first link pivoted to the frame and provided with a slot extending lengthwise thereof and a second link pivoted at one end to the breech block with the other end pivotally and slidably located in said slot at a location between the pivot of the first link to the frame and the mid point thereof when in closed position.

3. In a retarded blow back gun as in claim 1 wherein a spring acts upon the link pivoted to said frame urging the parts toward firing position.

4. In a retarded blow back gun as in claim 2 wherein a spring acts upon the link pivoted to said frame urging the parts toward firing position.

5. In a retarded blow back gun, a frame, a barrel fixed thereto, a breech block slidable relative to the frame, a lever pivoted to the frame and carrying a weight on one side of the pivot and a cam surface on the other, the distance of the center of gravity of the weight from the pivot being much greater than the distance of said cam surface from the pivot, means carried by the breech block engaging said cam surface to swing the lever about its pivot upon rearward movement of the breech block, the shape of said cam surface being such that the contact of the engaging means therewith increases its distance from the pivot as the lever swings about the pivot.

6. In a retarded blow back gun, a frame, a barrel fixed to the frame, a breech block slidable relative to the frame, and means retarding movement of the block comprising a fulcrumed lever and a member for applying the reactive force of the bullet to said lever at an angle slightly outwardly from the line connecting the centers of the pivots of said member and lever, said member sliding along said lever to apply its force at a greater distance from the fulcrum as the breech block moves, and at an intermediate position of movement of the block suddenly shifting its action to thereafter change its resistance to the movement of the block to open position.

7. In a retarded blow back gun, a frame, a barrel fixed thereto, a breech block slidable relative to the frame, a first link having a fixed pivot and a groove with a semi-circular cross section at a point between its mid point and its pivot, a second link having an end with a semi-circular cross section which in closed position bears in said groove of the first link with the line connecting the center of said semi-circular end with the pivot of the second link making an angle of less than 30° with the line connecting the centers of the pivots of the two links.

8. In a retarded blow back gun as in claim 7 wherein the first link is pivoted to the frame and the second link is pivoted to the breech block.

9. In a retarded blow back gun, a frame, a barrel fixed thereto, a breech block slidable relative to the frame, a first link pivoted to the frame having a groove with a semi-circular cross section at a point between its mid point and its pivot and having its end farthest from the pivot weighted, a second link pivoted to the breech block and having an end semi-circular in cross section which in closed position bears in said groove in the first link with the line connecting the center of said semi-circular end with the pivot of the second link making an angle of less than 30° with the line of centers of the first and second links when the linkage is closed with the weighted end of the first link close to the pivot of the second link.

10. In a retarded blow back gun as in claim 9 wherein the first link has a slot running lengthwise and said second link provided with cylindrical projection at its semi-circular end engaging the slot so that neither link may move without moving the other.

11. In a retarded blow back gun as in claim 10 wherein the point of bearing of the second link upon the first link is continually shifted until it reaches the end of its slot during the rearward movement of the breech block to increase its distance from the pivot of the first link.

12. In a retarded blow back gun as in claim 11 wherein a spring acts upon the link pivoted to said frame urging the parts towards firing position.

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