Jan. 23, 1940. V. HOLEK 2,188,046

FIRING MECHANISM FOR AUTOMATIC FIREARMS

Filed Sept. 7, 1937

Fig.1.

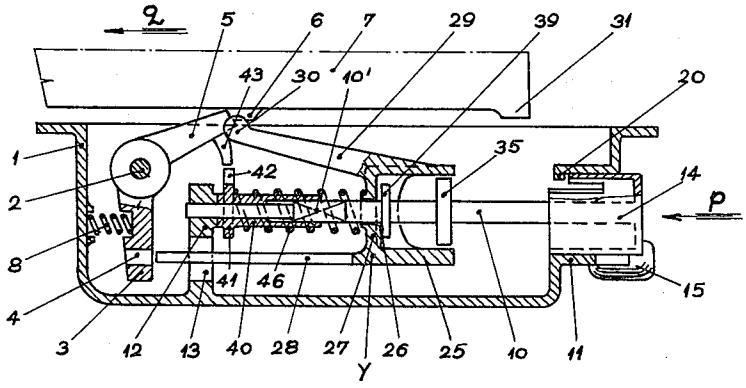



Fig.2

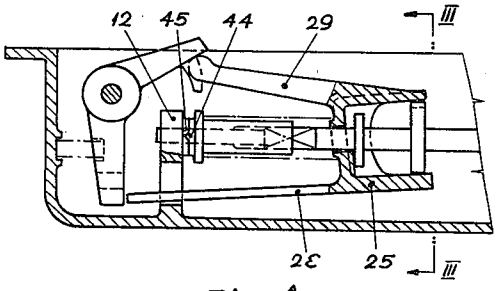



Fig.3

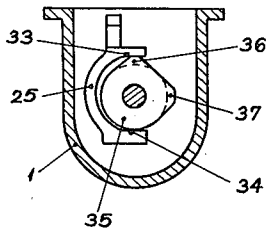



Fig.4

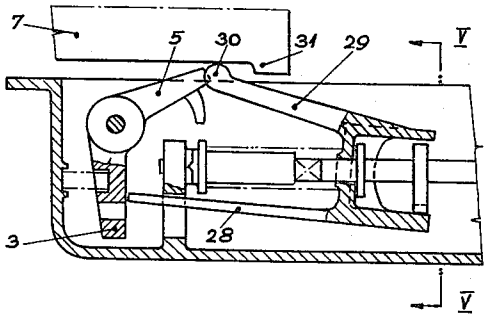



Fig.5

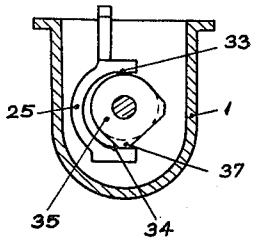



Fig.6

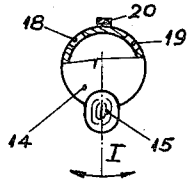



Fig.7

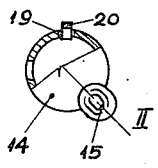



Fig.8

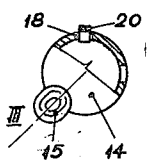
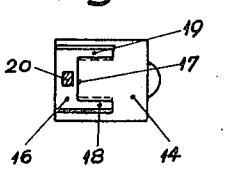



Fig.9




INVENTOR

V. Holek

BY E. H. Underdown

ATTORNEY

Patented Jan. 23, 1940 2,188,046

# UNITED STATES PATENT OFFICE

2,188,046

## FIRING MECHANISM FOR AUTOMATIC FIREARMS

Václav Holek, Zabovresky, Brunn, Czechoslovakia, assignor to Ceskoslovenska Zbrojovka, A. S., Brno, Brunn, Czechoslovakia, a company of Czechoslovakia

Application September 7, 1937, Serial No. 162,735
In Czechoslovakia September 24, 1936

8 Claims. (Cl. 89—27)

This invention relates to firing mechanism for automatic firearms which are adjustable for continuous firing and also for firing a single shot.

The chief object of the present invention is to provide an arrangement of the firing mechanism which will simplify the same not only with regard to its construction but also with regard to its manipulation.

According to the invention there is arranged on the trigger of the firing mechanism an adjustable device which co-operates with the sear and is operated by the trigger and controlled by means thereof on adjustment for continuous firing or for firing a single shot.

Owing to the utilisation of the trigger not only for the operation of the said adjustable device but also for adjusting the latter, the auxiliary devices, which have hitherto been used and are separately operated and require an independent member for this purpose, are dispensed with. In a further feature of the invention, the firing mechanism is specially simplified by an arrangement in which the device that operates the sear is arranged on the trigger which carries out pushing and rotary movements, and, in which arrangement, the sear-operating device is operated by means of the trigger during the pushing movement whilst, during the rotary movement, it is controlled in such manner that it is adjusted either to a position for continuous firing or to a position for firing a single shot.

In order that the invention may be clearly understood and readily carried into effect, the same will now be described more fully, by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a longitudinal sectional view of firing mechanism embodying the invention, the parts being shown in the safety position;

Figure 2 is a similar view to Figure 1 but showing the mechanism adjusted to a position for continuous firing;

Figure 3 is a cross-section taken on the line III—III of Figure 2;

Figures 4 and 5 are views similar to Figures 2 and 3, but showing the mechanism adjusted to a position for firing a single shot;

Figures 6, 7 and 8 show the trigger button in sectional elevation looking in the direction of the arrow *p*, Figure 1, the button occupying different positions; and

Figure 9 is a plan view of the button.

Referring to the drawing, 1 denotes the trigger casing, the said casing having mounted therein, on a pin 2, a two-armed sear, one arm 3 of which is provided with an aperture 4 and is loaded by a spring 8, whilst the other arm 5 of the sear extends into the path of the breech mechanism and, in the example shown, co-operates with a projection 6 on the breech block 7.

The trigger is constituted by a trigger rod 10 which is axially displaceable and rotatably mounted in bearings 11 and 12 in the casing 1. One end of the rod 10 is formed as a press-button 14 which is provided with a projection 15 and facilitates the operation of the trigger during the rotary movement thereof. The press-button 14 is provided on the periphery thereof with an opening 16, Figure 9, which merges into two longitudinal grooves 18 and 19 arranged on two sides of an end face 17 and disposed 90° apart. A tooth or projection 20 formed on the bearing 11 of the trigger button engages in the opening 16.

Rockably mounted on the trigger rod 10 is a device Y which co-operates, on the one hand, with the sear and, on the other hand, with the breech mechanism, the said device permitting the firing of a single shot to be effected. This device, which constitutes a so-called interrupter, consists of a yoke-like or other form of body 25 which is mounted concentrically on the trigger rod 10 and is provided with a transverse wall 26 having a bearing 27 for the trigger rod 10. The bearing 27 is formed in such manner that it enables the interrupter to be rocked. The body 25 is provided with arms 28 and 29. The arm 28 passes through an aperture 13 in the bearing 12 and co-operates with the arm 3 of the sear, whilst the arm 29, which terminates in a rounded head 30, projects into the path of the breech mechanism and co-operates with a projection 31 on the breech block.

Upon adjustment into a position for continuous firing or for firing a single shot, the interrupter is controlled by means which are arranged on the trigger rod 10 and come into operation during the rotary movement of the said rod. The interrupter then acts as a lever of the first order one arm of which is in two parts of which the part 28 co-operates with the sear and the part 29 co-operates with the breech mechanism, whilst the body 25, which co-operates with the controlling means arranged on the trigger rod, forms the second arm of this lever. The said controlling means consists of projections 36 and 37 which are formed on a disc 35 on the trigger rod and are disposed at 90° to each other. The projection 36 co-operates with a surface 33 on the body 25 and the projection 37 co-operates with a surface 34 also on the said body. The pushing

movement of the trigger rod is transmitted to the interrupter by means of a ring 39 on which the interrupter, which is loaded by the spring 46, bears by means of the wall 26.

On a square part 10' of the trigger rod 10 there is displaceably mounted a sleeve 40 or the like which is provided with a ring 41 having a projection 42 which, in the safety position of the firing mechanism, co-operates with a projection 43 on the sear. The sleeve 40 is provided with adjusting means for the firing mechanism and, for this purpose, has on its end face a radial tooth 44 which co-operates with radial grooves 45 formed on the adjacent end face of the bearing 12.

Bearing against the ring 41 on the sleeve 40 is one end of a spring 46 which, with its other end, loads the interrupter and thus forms not only the returning spring of the interrupter and of the trigger rod during the pushing movement of the recoil, but also a resilient stay for the interrupter during its rocking movement and restores the interrupter to its original position after it has been rocked.

The operation of the firing mechanism is as follows:

When the firing mechanism is in the position shown in Figures 1, 6 and 9, the tooth 20 is opposite the end face of the projection 17 on the button 14 on the trigger rod, so that the pushing movement of the trigger rod 10 and the operation of the sear are prevented. When the firing mechanism is in this position, the projection 42 on the sleeve 40 is located beneath the projection 43 on the arm 5 of the sear, so that the sear cannot be rocked. The firing mechanism is locked in this position.

On rotating the button 14 in the bearing 11 into the position II shown in Figure 7, the projection 36 on the disc 35 bears on the upper surface 33 of the body 25, Figure 3, and the interrupter is rocked so that the arms 28 and 29 thereof are lowered as shown in Figure 2. When the trigger button is in this position, the projection 20 is opposite the groove 19 so that there is no interference with the movement of the trigger rod 10 when the button 14 is acted upon in the direction of the arrow *p*, Figure 1. The trigger rod is displaced, compresses the spring 46 and takes with it the interrupter, the arm 28 of which strikes the arm 3 of the sear and thus rocks the sear. In this way, the breech mechanism is released and is moved in the direction of the arrow *q*, Figure 1, under the action of the compressed projecting spring and a shot is fired. The arm 28 of the interrupter keeps the sear in the rocked position as long as the finger of the operator presses on the trigger button. The arm 5 of the sear does not extend into the path of the breech block and therefore there is no interference with the movement of the said block. The gun is set with the firing mechanism for automatic firing (series firing).

When the trigger rod is located in the position shown in Figures 4, 5 and 8, the gun is adjusted for firing a single shot. The firing mechanism is adjusted in this position by rotating the button 14 on the trigger rod 10. Upon rotation of the button 14, the groove 18 comes opposite the tooth 20, so that the pressing of the trigger is rendered possible. During the rotary movement of the trigger rod 10, the projection 37 on the disc 35 presses on the lower surface 34 of the body 25, so that the interrupter is rocked in such manner that the head 30 on the arm 29 enters the path of movement of the projection 31 on the breech block 7. By pressing on the trigger, the trigger rod 10 is displaced and takes the interrupter with it, the arm 28 of which rocks the sear which in turn releases the breech block for forward movement and firing is effected. During the forward movement of the breech block, the projection 31 thereof strikes the rounded head 30 of the interrupter and presses it downwards in opposition to the action of the spring 46 so that the arm 28 comes opposite the aperture 4 in the arm 3 of the sear. Since the sear is pressed by the action of the spring 8, it is rocked back into the original position, the outer end of its arm 5 entering the path of movement of the breech block which it holds securely after the recoil has taken place. For firing the next shot, it is necessary first to release the trigger, during which movement the interrupter is, by the action of the spring 46, returned to the position shown in Figure 4, and then to press the trigger again.

What I claim is:

1. A trigger mechanism for automatic firearms having a reciprocating breech block, comprising a slidable trigger rod, a sear cooperating with said trigger rod, an interrupter pivotally mounted on said trigger rod cooperating with said sear and said breech block, means for rotating said trigger rod and cooperating means on said trigger rod and said interrupter to cause a pivoting of said interrupter upon a rotation of said trigger rod in order to set said trigger mechanism for continuous or single fire.

2. A trigger mechanism for automatic firearms having a reciprocating breech block comprising a slidable trigger rod, a sear cooperating with said trigger rod, an interrupter pivotally mounted on said trigger rod, an arm on said interrupter cooperating with said sear, a second arm on said interrupter cooperating with said breech block, means for rotating said trigger rod and cooperating means on said trigger rod and said interrupter to cause a pivoting of said interrupter upon a rotation of said trigger rod in order to set said trigger mechanism in position for safety, continuous or single fire.

3. A trigger mechanism for automatic firearms having a reciprocating breech block comprising a slidable trigger rod, a sear cooperating with said trigger rod, an interrupter pivotally mounted on said trigger rod, two control surfaces on said interrupter displaced substantially 180° from each other, cooperating with said sear and said breech block, means for rotating said trigger rod to said predetermined positions and cooperating means on said trigger rod and said interrupter to cause a pivoting of said interrupter upon a rotation of said trigger rod in order to set said trigger mechanism for safety, continuous or single fire.

4. A trigger mechanism for automatic firearms having a reciprocating breech block comprising a slidable trigger rod, a sear cooperating with said trigger rod, a sleeve loosely mounted on said trigger rod so as to pivot thereon, two control surfaces on said sleeve displaced substantially 180° from one another cooperating with said sear and said breech block, means for rotating said trigger rod and cooperating means on said trigger rod and said sleeve for pivoting said sleeve upon a rotation of said trigger rod in order to set said trigger mechanism in the safety position or for continuous or single fire.

5. A trigger mechanism for automatic firearms having a reciprocating breech block comprising a slidable trigger rod, a sear cooperating with said

trigger rod, an interrupter pivotally mounted on said trigger rod cooperating with said sear and said breech block, means for rotating said trigger rod, a disc fixed to said trigger rod having projections thereon relatively displaced about 90°, a pair of surfaces on said interrupter relatively displaced about 180° cooperating with said projection to cause a pivoting of said interrupter upon a rotation of said trigger rod in order to set said trigger mechanism for continuous or single fire.

6. A trigger mechanism for automatic firearms having a reciprocating breech block comprising a slidable trigger rod, a sear cooperating with said trigger rod, a sleeve member loosely mounted on said trigger rod so as to pivot within predetermined limits thereon, two arms mounted on said sleeve, one of said arms cooperating with said sear and the other arm cooperating with said breech block, a fixed ring on said trigger rod bearing against one face of said sleeve, resilient means bearing against the other face of said sleeve, means for rotating said trigger rod and cooperating means on said trigger rod and said sleeve to cause a pivoting of said sleeve and said arms upon a rotation of said trigger rod in order to set said trigger mechanism for continuous or single fire.

7. A trigger mechanism in accordance with claim 6 in which an abutment is provided for said resilient means so as to return said trigger rod to the initial position after a sliding movement thereof and said resilient means thereby forming a recoil spring for said trigger rod and a support for said sleeve.

8. A trigger mechanism for automatic firearms having a reciprocating breech block comprising a slidable trigger rod, a pivoted sear cooperating with said trigger rod having a recess therein, an interrupter pivotally mounted on said trigger rod, an arm on said interrupter cooperating with said sear, a second arm on said interrupter cooperating with said breech block, means for rotating said trigger rod, cooperating means on said trigger rod and said interrupter to cause a pivoting of said interrupter upon a rotation of said trigger arm in order to set said trigger mechanism for continuous or single fire and when said trigger mechanism is set for single fire said arm cooperating with said sear passes through said recess so as to interrupt the cooperation between said sear and said arm while said interrupter is pivoted by said breech block acting upon said second arm.

VÁCLAV HOLEK.