April 26, 1938. V. HOLEK 2,115,526

AUTOMATIC FIREARM

Filed Sept. 6, 1935

Fig. 1

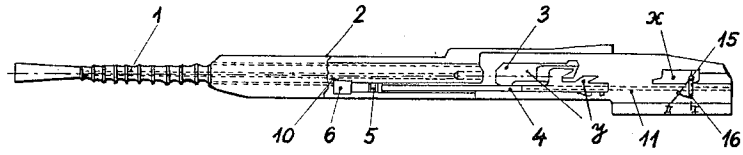


Fig. 2

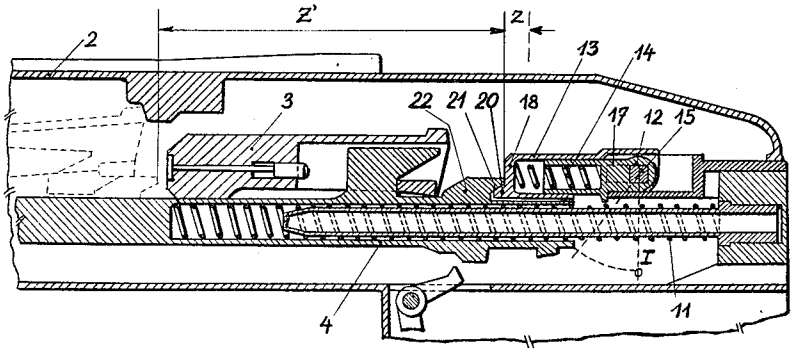
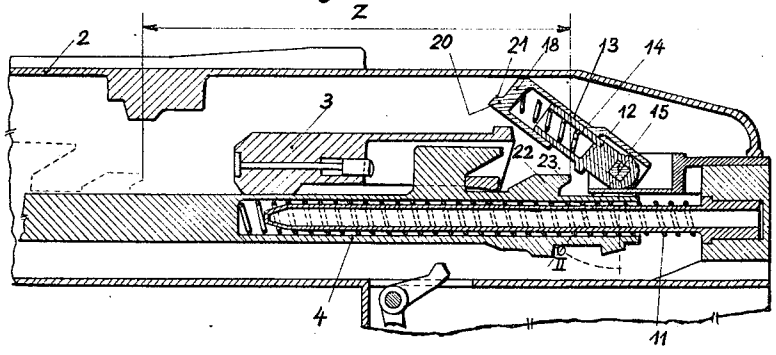


Fig. 3



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AUTOMATIC FIREARM

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9 Claims. (Cl. 42—3)

This invention relates to automatic fire-arms, and has for its main object to provide a regulating device by which the rate of firing can be altered in a simple and reliable manner independently of the principle of action of the fire-arm. A further object is to provide means of this nature which permit of setting the fire-arm for a certain definite rate of firing without regulating the pressure of the gases generated in firing. Still further objects of the invention will become apparent in the course of the ensuing description.

With one type of the hitherto known regulating devices of this description the rate of firing is regulated by the arrangement that during a certain period of time some part of the breech mechanism, for example the breech-block or its carrier, is kept back in the open position, and is released again, after the lapse of the said predetermined length of time, for restoration into the firing position. The releasing mechanism in this case either makes use of the inertia of the moving masses of the device or is dependent on the action of resilient members, so that the rate of firing is determined by the duration of oscillation of a certain system of masses.

Another mode of regulating the rate of firing in automatic fire-arms consists in altering the inertia of the moving parts of the breech mechanism, and in the suitable selection of the resilient or spring elements employed for restoring the breech mechanism into the locked position. One disadvantage of the devices working on this principle consists in the fact that the functioning of the regulating device, and therefore also the rate of firing, is affected by the angle of incidence of the longitudinal axis of the fire-arm to the horizontal, that is to say by the angle of elevation or depression of the fire-arm in use. A further disadvantage of these known devices consists in their complicated design and their consequent liability to give trouble, more particularly in prolonged firing, thus rendering the fire-arms to which they are fitted, or in which they are used, less effective.

According to the present invention, the above-mentioned drawbacks are obviated by providing the fire-arm with an adjustable device for varying the length of the recoil of the breech mechanism and with it the rate of firing.

A form of construction embodying the invention, in connection with a fire-arm acting on the gas pressure loading principle, is shown, by way of example, in the accompanying drawing, in which:

Fig. 1 shows the fire-arm with regulating device according to the present invention, diagrammatically, in part longitudinal section.

Fig. 2 is a longitudinal section taken through the breech casing and breech mechanism showing the regulating device in the operative position.

Fig. 3 is a corresponding section showing the regulating device in the inoperative position relatively to the breech mechanism. In both of Figs. 2 and 3 the forward end position of the breech mechanism, that is to say the position occupied by this mechanism at the moment of firing, is indicated in broken lines.

Referring to the drawing, the fire-arm consists of the barrel 1 firmly mounted within the casing 2, and of the breech mechanism *y* (Fig. 1) comprising the breech 3 and its carrier 4. To the breech carrier 4 there is connected a piston 5 against the end surface of which, in the gas chamber 6, there act the gases which are generated by the explosion of the charge and which expel the projectile from the barrel, these gases being admitted to the gas chamber 6 through the port 10. Against the rear end of the breech carrier 4 there bears a fetching up spring 11 (Figs. 2 and 3) which restores the carrier 4 together with the breech 3 into the forward position.

According to the invention there is provided in the casing 2 the device *x* which serves for regulating the rate of firing. This device *x* is adjustably disposed in the recoil path of the breech mechanism *y*, in the case of the constructional example shown in the drawing in the recoil path of the breech carrier 4, in such a manner that the length of the recoil movement of the breech mechanism (breech carrier) can be varied (shortened or lengthened). This device consists of two telescoped parts 12 and 13 which are movable relatively to each other and forced apart by means of a spring 14. The inner of these two parts, constituting the arm 12, is mounted on a pin 15 which is polygonal, for example rectangular, in cross-section, for the purpose of more firmly mounting the arm 12. The pin 15 passes through the side walls of the casing 2, and is provided at one end, outside the casing, with a thumb-latch 16 (Fig. 1) provided with suitable retaining means for securing it in a set position.

Upon the arm 12 there is mounted the sleeve-like member 13 (hereinafter called the abutment member) the internal recess of which, together with the hollow socket portion of the arm 12,

forms a space for the reception of the spring 14. The extent of the possible displacement of the abutment member 13 is limited by a longitudinal recess 17 (Fig. 2) in the side walls of this member. At the forward end 18 of the abutment member 13 there is provided a projecting lug 20 with a sloping surface 21.

The position II of the regulating device x, shown in Fig. 3, represents its neutral position. In this position the arm 12, together with the abutment member 13, is inclined upwards out of the recoil path of the breach mechanism y, so that neither the breech carrier 4 nor the breech 3 can come in contact with the regulating device x during the recoil over the distance Z.

When the regulating device x is laid over into position I, as shown in Fig. 2, the distance through which the breech carrier recoils is reduced to $z'+z$. The breech carrier 4, which is driven back after firing by the pressure of the gases upon the piston 5, compresses the restoring spring 11, and, after recoiling through the distance z', strikes with its nose 22 against the forward end of the regulating device x. It is particularly advantageous to provide the forward end of the abutment member 13 with a projecting lug 20 having an oblique abutting surface 21, and to shape the nose 22 of the breech carrier 4 to correspond, in order to prevent the regulating device x from jumping out of the path of the breech mechanism by the impact of the breech carrier. During the portion z of the recoil, adjoining the portion z', the kinetic energy of the recoiling masses is also stored up in the spring 14, so that the breech carrier 4 reaches the rearward turning point of its course in a comparatively short time and is then forced forward by the force of the two compressed springs 11 and 14. Thus the recoil path Z of the breech mechanism y is shortened to the distance $z'+z$. The time required for the forward movement of the breech carrier 4 into the locked position of closure is consequently also shortened, and at the same time the velocity of movement of the breech carrier increased, since the spring 14 acts additionally in forcing the breech carrier forward. The additive result of these two factors is responsible for the increase achieved in the rate of firing. The regulating device x thus acts on the one hand as an abutment device, and on the other hand as an accelerator for accelerating the movement of the breech mechanism during its forward movement.

The above described regulating device illustrated in the accompanying drawing represents only one possible embodiment of the invention, and its details, as also the design of the fire-arm in which it is used, can be varied at will without departing from the scope and essential nature of the invention as claimed in the appended claims. In the example given, the regulating device consists essentially of an abutment element of a certain length. It will be clear that there can equally well be associated with the pivoted arm of the regulating device an abutment member having a plurality of stepped abutment surfaces or a plurality of abutment elements of different or graduated length, for the purpose of obtaining a number of different rates of firing with one and the same regulating device. Similarly, the particular manner in which the regulating device is interposed in the recoil path of the breech mechanism is not necessarily limited to that shown in the drawing and described above. The described pivotal movement of the regulating device could be replaced for example by sliding movement, or by a combination of sliding and pivotal movement.

I claim:

1. In a firearm, the combination with a movable breech mechanism, of a movable abutment to receive the impact of the recoiling breech mechanism, said abutment being arranged to be moved selectively into and out of the recoil path of the breech mechanism, to shorten and lengthen said path, respectively.

2. In a firearm, the combination with a casing and a movable breech mechanism disposed therein, of an abutment to receive the impact of the recoiling breach mechanism, said abutment being movably mounted in said casing and adapted to be moved into and out of the recoil path of the breech mechanism to selectively shorten and lengthen said path, whereby the rate of firing is increased and decreased, respectively.

3. The combination claimed in claim 2, which comprises control means associated with the said abutment and projecting outside said casing for regulating the position of said abutment.

4. The combination claimed in claim 2 in which said breech mechanism includes a breech carrier, and in which said abutment cooperates with said carrier to displace the rearward turning point of the recoil movement of the breech.

5. In a firearm, a casing, a movable breech mechanism mounted therein, an arm adjustably mounted in said casing and carrying at least one abutment element to receive the impact of the recoiling breech mechanism, and spring means interposed between said arm and said element, the latter being adapted to be moved into and out of the recoil path of the breech mechanism to selectively shorten and lengthen said path.

6. The device claimed in claim 5, in which said element is provided with a cavity and said spring means is disposed in said cavity bearing against the said arm which supports the said element.

7. In an automatic firearm, the combination with a casing and a movable breech mechanism disposed therein, of a regulating device comprising a pivot pin extending through at least one wall of said casing, an arm mounted on said pivot pin, a hand operating element attached to one end of said pivot pin, an abutment element to receive the impact of the recoiling breech mechanism, said abutment element being associated with said arm and adapted to be moved into and out of the recoil path of the breech mechanism to selectively shorten and lengthen the same, and means associated with said element and the breech mechanism for preventing unintentional displacement of the regulating device.

8. The combination claimed in claim 7, in which said means for preventing unintentional displacement consists of a plurality of elements provided with interengageable oblique surfaces, said elements forming part of the breech mechanism and the said abutment element respectively.

9. In a firearm the combination with a casing and a movable breech mechanism disposed therein, of an abutment to receive the impact of the recoiling breech mechanism, said abutment being pivotally mounted in said casing and adapted to be moved into and out of the recoil path of the breech mechanism to selectively shorten and lengthen said path whereby the rate of firing is increased and decreased respectively.

VÁCLAV HOLEK.