

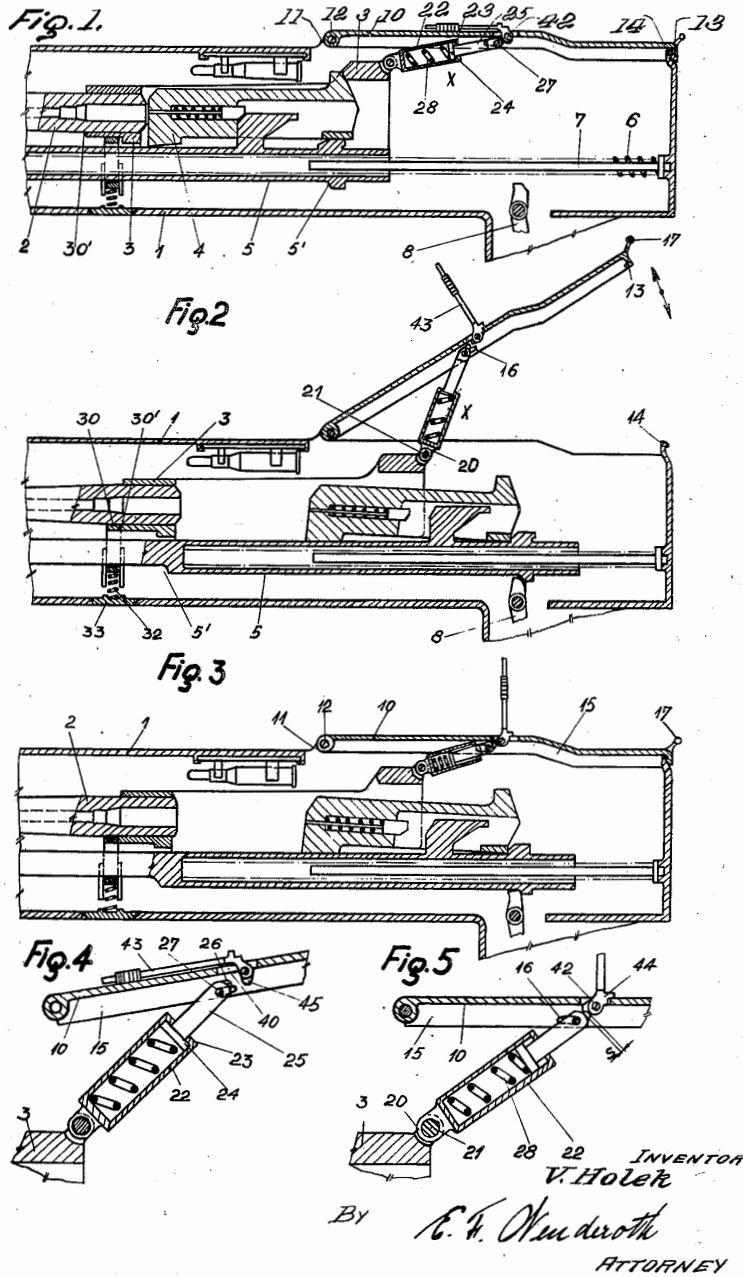
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AUTOMATIC FIREARM

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AUTOMATIC FIREARM

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This invention relates to automatic firearms and more particularly to automatic firearms of the kind provided with recoiling barrels and having a device adapted to cock the barrel prior to firing, the cocking of the barrel being necessary either on account of the particular functioning of the breech mechanism in view of the locking or for some other reason. Hitherto, the cocking of the barrel has been effected by means of a special automatic mechanism or directly by means of the breech mechanism. The construction of a special mechanism, however, complicated the firearm and rendered the working thereof difficult on account of the addition of further components which projected from the firearm. The cocking of the barrel by means of the breech mechanism is not advantageous, especially if the casing of the breech mechanism is connected with the barrel, since it is necessary to overcome great frictional resistances due to the considerable weight of the moving masses and the arrangement of the lever transmission of the breech mechanism is unsuitable for the transmission of great forces. In addition, the cocking of the barrel is not suitable for breech mechanism comprising swinging breech blocks, in which case the functioning of the breech block causes difficulties in the construction of the cocking device.

The above mentioned disadvantages are obviated by the present invention, in which there is provided an automatic firearm comprising a casing, a recoiling barrel, breech mechanism, an aperture in said casing, an openable closure for said aperture, and means connecting said closure and said barrel, said means permitting cocking of the barrel upon movement of the closure to open said aperture without interfering with the normal recoil movements of said barrel when said aperture is closed.

The firearm according to the present invention is considerably simplified, as, on account of the utilisation of the opening movement of the closure for the purpose of cocking the barrel, no further special cocking mechanism is necessary. In addition, the cocking of the barrel is readily effected, as the closure, which is of relatively large dimensions with a view to permitting, when desired, the removal of the firearm components, constitutes a substantial lever transmission. A further advantage is that, on opening the closure, substantially only frictional resistances are overcome on the recoil movement of the barrel with the casing of the breech mechanism, whilst the compression of the return

spring of the barrel is effected on the closing of the closure, so that the action of the forces is distributed over the two movements of the lid.

The device according to the invention is especially suitable for firearms of large calibre in which the barrel with the casing is of considerable weight and for the cocking of which considerable transmission of energy is necessary.

In order that the said 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 fragmentary longitudinal sectional view of an automatic firearm embodying the invention, with the operative parts at rest;

Figure 2 is a similar view to Figure 1 but showing the cocking closure opened and the barrel cocked;

Figure 3 is a similar view to Figure 2 but showing the cocking closure closed;

Figures 4 and 5 are fragmentary detail sectional views, on an enlarged scale, showing the cocking closure in two positions and having mounted thereon a sighting device.

Referring to the drawing, 1 denotes the firearm casing in which the barrel 2, which is rigidly connected with the casing 3 of the breech mechanism, is movably mounted. The breech mechanism includes a swinging breech block 4 which is operated and controlled by a breech-block carrier 5. The said carrier is extended forward in the form of a rod having a piston adapted to be acted upon in known manner within a cylinder to which the exhaust gases pass from the barrel after firing. The breech-block carrier 5 is loaded by a return spring 6 which rests against the back wall of the casing 1 or against a collar on a guiding rod 7 which is fixed in the casing and around which the return spring is concentrically arranged. 8 denotes the sear of the firing mechanism which co-operates with the breech-block carrier.

The casing 3 of the breech-block carrier co-operates with a device which permits firing to be effected during the forward movement of the barrel. The said device comprises a frame 30 which is displaceably mounted in the casing 1 of the firearm and is loaded by a spring 32 one end of which rests against a removable lid 33. Through the frame 30 is passed an extension of the breech-block carrier 5 a projection 5' on which, during the movement of the breech-block carrier, controls the movements of the frame 30 with which a stop face 30' of the casing 3 of the

breech mechanism co-operates in known manner.

The casing 1 is open at the top and covered by a closure or lid 10 which is rotatable on a pin 12 mounted in bearings 11 on the said casing. The other end of the lid is provided with a projection 13 which, when the lid is closed, engages with a counter-projection 14 formed on the back wall of the casing 1. Handles 17 permit the lid to be operated readily.

The lid 10 forms the cocking member for the barrel 2 which is rigidly connected with the casing 3 of the breech mechanism. For this purpose, the casing 3 is connected with the lid by means of a device x which is also constituted as a damping and returning device for the barrel. The said device comprises a hollow cylinder 22 which is hingedly connected with the casing 3 by means of a pin 21 and eyes 20. In the cylinder there is displaceably mounted a piston 24 provided with a rod 25 which terminates in an eye through which a pin 27 mounted in ribs 15 on the lid 10 passes for half the length of the lid in order that a suitable arm for efficient transmission may be obtained.

The piston 24 is loaded by a spring 28 located within the cylinder 22 and maintained therein by means of stops 23 on the cylinder 22, the said stops also affording means by which, when the lid is opened, the force of the lid is transmitted to the casing 3 and consequently also to the barrel 2.

On the lid 10 a frame sight 43 is arranged in a hinged or foldable manner so as to provide against its being an obstacle and also against being damaged in transit. The mounting of the foldable sight is such that the connecting device x forms the setting and securing device for the frame sight. For this purpose, the lid 10 is provided with an opening 40 through which passes the hub 44 of the sight 43, which hub is rotatably mounted on a pin 42 fixed in eyes on the lid. The hub 44 is provided with a projection 45 which co-operates with a counter-projection 26 at the outer extremity of the piston rod of the device x.

When the firearm is in the condition of rest, its individual components are in the position shown in Figure 1. The barrel 2 with the casing 3 and the breech mechanism are in the forward position. The frame 31 is out of engagement with the face 30' since it is kept in a bottom inoperative position by the thickened part of the breech-block carrier 5. The lid 10 is closed and the sight is folded down. Before firing is commenced, the breech mechanism is first cocked against the action of the return spring 6 by means of a cocking device which is not shown. On cocking the breech mechanism, the projection on the breech-block carrier releases the frame 30, which is pressed upwards by the action of the spring. In the cocked position, Figures 2 and 3, the sear 8 engages the breech-lock carrier and holds it until the sear is actuated by the trigger.

After the breech mechanism is cocked, the lid 10, Figure 2, is opened and during this movement the piston 24 of the device x strikes and stops 23 and the movement is transmitted by means of the cylinder 22 and the hinged connection to the casing 3 of the breech mechanism and consequently also to the barrel 2 which is rigidly connected with the said casing. The casing 3 then participates in a sliding movement with the barrel, during which movement the stop face 30' of the casing 3 of the breech

mechanism passes over the frame 30 which, under the action of the spring 32, is caused to be in the path of the casing, so that the barrel together with the casing is caught by the frame and retained in the position shown in Figures 2 and 3.

On folding down the lid 10 into the closed position, Figure 3, the spring 28 is compressed so that there is stored in the said spring the energy necessary to cause the forward movement of the barrel upon firing.

The foldable sight 43 is set into the operative position by being rotated about the pin 42. The rotation of the sight can be effected both when the lid is open and when it is closed. During the rotation of the sight from the folded down position, the projection 45 strikes the projection 26 on the piston rod which is displaced through a distance "s" and, during this displacement, compresses the spring 28. Owing to the pressure of the compressed spring, the projection 26 is caused to engage the projection 45 on the sight in such manner that the sight is locked in the upright position. The displacement of the piston rod 25 in the axial direction of the cylinder 22 during the action of the projection 45 on the projection 26 on the rotation of the sight is rendered possible by slots 16 which are formed in the ribs 15 of the lid 10 and in which the pin 27 of the piston rod 25 is mounted.

After the trigger is pressed, the sear 8 releases the breech-block carrier 5 which, under the action of the compressed return spring 6, is moved forward, the breech block being brought into the locked position during such movement. During the forward movement of the carrier 5, the projection 5' thereon strikes the frame 30 and depresses it, so that the path of the cocked barrel 2 with the casing 3 of the breech mechanism, which likewise are moved forward under the action of the compressed spring 23, is freed. During this forward movement, firing takes place with the breech block locked and the energy of the parts which are moving forward overcomes the energy of the recoil resulting from the firing. The barrel with the casing of the breech mechanism recoil without reaching the foremost fixed stops. Although the recoil energy, which is considerably smaller owing to the action of the energy imparted in the forward movement, is sufficient to open the breech mechanism, it is not great enough to produce harmful blows; on the contrary, as far as the barrel and the casing of the breech mechanism are concerned, it is so small that the comparatively weak spring 23 of the device x is sufficient for the accumulation of energy and for braking the components that recoil back. On series or continuous firing, the breech mechanism, after recoil, carries out the forward movement, during which the breech-block carrier controls the frame 30 in known manner and the operation is repeated. After firing, the sight is folded down into the normal position, in which it is retained by the action of the spring 28 when the lid is closed.

The firearm described and shown in the drawing is obviously only one example of an embodiment of the invention, and the details thereof, whether they are concerned with the cocking device or with the device for damping the recoil movements of the barrel may be modified in various ways without affecting the scope of the invention.

What I claim is:

1. An automatic firearm, comprising a casing, 75

said casing having an aperture therein, a recoiling barrel, breech mechanism including a breech casing rigidly connected with said barrel, an openable closure for said aperture and means including a device for damping the recoil of said barrel and the recoiling parts connected therewith connecting said closure and said breech casing, in such manner that said barrel may be cocked upon movement of the closure to open said aperture without interfering with the normal recoil movements of said barrel when said aperture is closed.

2. An automatic firearm, comprising a casing, a recoiling barrel, breech mechanism, said casing having an aperture therein, an openable closure for said aperture and means connecting said closure and said barrel, in such manner that said barrel may be cocked upon movement of the closure to open said aperture without interfering with the normal recoil movements of said barrel, when said aperture is closed and said means comprising a cylinder, a piston in said cylinder, and stop means on said cylinder to co-operate with said piston for transmitting force in one direction.

3. An automatic firearm, comprising a casing, said casing having an aperture therein, a recoiling barrel, breech mechanism including a breech casing rigidly connected with said barrel, an openable closure for said aperture, a cylinder hingedly connected with said breech casing, a piston in said cylinder hingedly connected with said closure, and stop means on said cylinder to co-operate with said piston for transmitting force in one direction, whereby the barrel is cocked upon movement of the closure to open said aperture but normal

recoil movements of said barrel are permitted when said aperture is closed.

4. An automatic firearm, comprising a casing, said casing having an aperture therein, a recoiling barrel, breech mechanism including a breech casing rigidly connected with said barrel, an openable closure for said aperture, a cylinder hingedly connected with said casing, a piston in said cylinder hingedly connected with said closure, a spring interposed between one end of said cylinder and said piston, and stop means on said cylinder to co-operate with said piston for transmitting force in one direction, whereby the barrel is cocked upon movement of the closure to open said aperture but normal recoil movements of said barrel are permitted when said aperture is closed.

5. An automatic firearm, comprising a casing, said casing having an aperture therein, a recoiling barrel, breech mechanism including a breech casing rigidly connected with said barrel, an openable closure for said aperture, a cylinder hingedly connected with said breech casing, a piston in said cylinder hingedly connected with said closure, a spring interposed between one end of said cylinder and said piston, stop means on said cylinder to co-operate with said piston for transmitting force in one direction, a sighting device hingedly mounted on said closure, means on said sighting device adjacent the hinge connection thereof with said closure and co-operating means adjacent the hinge connection of said piston with said closure for retaining said sighting device in operative or inoperative position.

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