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 STRAIGHT-LINE BREECH LOCK
 FOR AUTOMATIC FIREARMS
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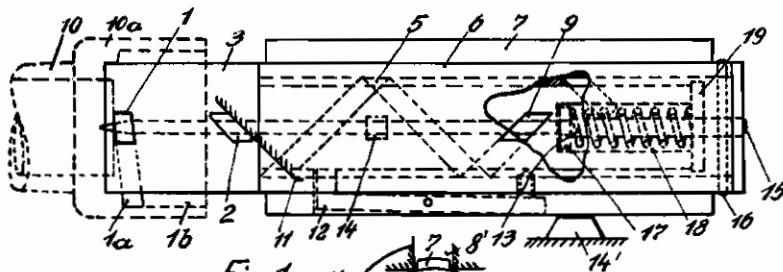


Fig. 1

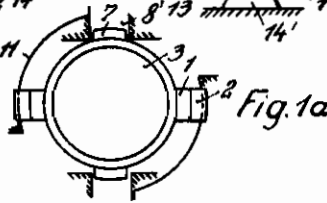


Fig. 1a

Fig. 2



Fig. 3

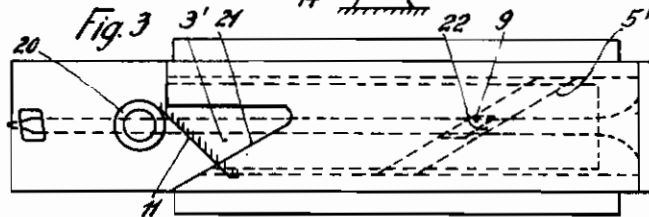


Fig. 4a

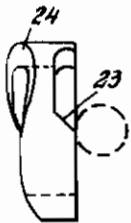


Fig. 4

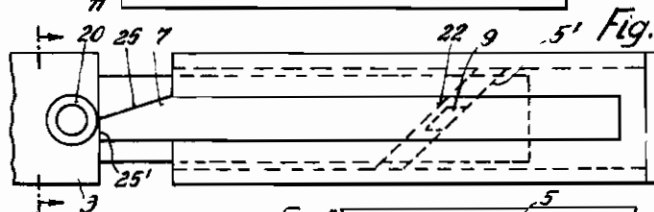


Fig. 4b

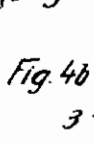


Fig. 5

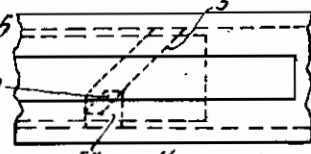
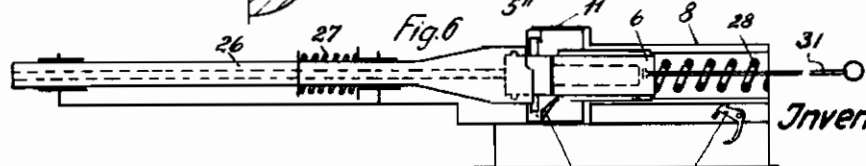


Fig. 6



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ALIEN PROPERTY CUSTODIAN

STRAIGHT-LINE BREECH LOCK FOR AUTOMATIC FIREARMS

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The invention relates to a straight-line breech lock for automatic firearms and has the purpose to use the known straight-line breech lock turned out very well in connection with small arms for automatic firearms.

An object of the present invention is the provision of a straight-line breech lock for automatic firearms which is simple in construction and safe and easy in its attendance.

According to the present invention the straight-line breech lock for automatic firearms consists substantially of a breech block guided in the casing of the firearm in a straight-line and of a bolt head or breech head axially guided in the said breech block by means of a steep thread portion and provided with locking lugs for securing the breech head in the sleeve of the barrel and with control members for the purpose of rotating or turning the said breech head in its breech block. These control members may be constructed in the form of cams or rollers which cause in cooperation with guide cams on the breech casing during the recoil movement of the breech a rotational movement or turning of the breech head and thereby an unlocking of the breech from the barrel of the firearm. A detent between the breech head and the breech block, which becomes effective after the unlocking of the breech from the barrel of the firearm and is released shortly before the locking of the said parts renders the steep thread portion between the breech block and the breech head ineffective, so that both parts are rigidly connected together for an axial movement.

The transfer of the impulse to the breech head and the rotational movement or turning thereof is effected in connection with recoil-operated automatic guns by the receding barrel by means of a guide cam or cams on the breech casing against which the cams on the breech head impinge and the throwing or pushing back of the breech block is effected entirely freely and only by means of the steep thread portion on the breech head stem.

A further object of the invention is the provision of means for preventing that differences in the movement of breech block and breech head or blows of force upon one of the said members cause on the way jointly covered by the breech block and the breech head after the unlocking thereof a rotational movement or turning of the said parts on account of the provided thread guides. On this common way breech head and breech block represent a single part and the locking lugs and the controlling cams preferably

run through the same guide path as the guiding ledges on the breech block. These means may comprise in the preferred embodiment a biased detent lever controlled by a suitable abutment.

5 In the simplest form the thread portions in the breech block may be provided on both sides with stepped or offset parts into which the control or guide members on the breech head stem are adapted to enter.

10 Forces having the tendency to shove together the two parts of the breech are prevented at this by the said offsetting of the thread portions in the breech block, whereas abutments or stops prevent a further separation of the parts. It is 15 easy and convenient to release such a lock for the reason that it is only necessary to turn back one of the said parts and in the present instance the breech head so far that the thread portions are in alignment with the control or guiding 20 members.

The shoving together both parts of the breech may be assisted by arranging in the breech a spring which is adapted to work against the axial separation of breech head and breech block and 25 whereby the effect is also increased.

A further special advantage of the present invention resides in the fact that in connection with recoil-operated automatic guns with recoiling barrel, the said barrel may immediately slide 30 forward into its fore-position or firing position so that counter-recoil springs or buffer springs may be used with advantage. Further the breech may be easily pulled up by hand by means of a draught member connected to the breech block.

35 In the preferred embodiment of the present invention the firing pin is rigidly connected to the breech block or breech casing so that in connection with the above explained spring an efficient locking-ignition and a strong and safe locking of the breech may be effected.

40 Of course, also an independent firing pin may be used which may be brought into its cocking position by twisting or worming out the breech head out of the breech block and which may be released from the said cocking position after locking the parts of the breech by means of a suitable abutment.

45 The invention consists in the novel construction and arrangement of parts to attain the ends above specified and in the details of construction and mechanism for other purposes, as will hereinafter more fully appear and which are defined in the claims forming part of this specification.

55 In the accompanying drawings, wherein cor-

responding parts are represented by like characters in the various views,

Fig. 1 is a side elevation of the breech with a part broken away for the purpose of clearer illustration.

Fig. 1a is a front elevation.

Fig. 2 is a side elevation of the parts shown in Fig. 1 in another position.

Fig. 3 illustrates in a side elevation a modification.

Figs. 4, 4a and 4b illustrate in a side elevation and in a face view, respectively another modification.

Fig. 5 is a fragmentary detail view of the breech block showing a further modification, and

Fig. 6 illustrates in a fragmentary view a recoil-operated automatic gun.

The breech lock made in two parts is movably guided in the usual manner in a longitudinal direction in the casing of the firearm and the counter-recoil spring which is tensioned during the recoil of the breech lock acts upon that end of the said breech lock which is opposite to the bottom of the cartridge. Before firing the breech head of the breech lock is locked with the barrel of the firearm.

The breech lock comprises the breech block or casing 6 and the bolt head or breech head 3 provided with one or more locking lugs 1 and cams 2 on its periphery and further with a stem-like extension or breech head stem 4. This stem-like extension 4 of the breech head 3 is guided by means of a steep thread portion 5 in a corresponding thread groove formed in the axial bore of the breech block 6. As shown especially in Fig. 1a the breech block 6 is further provided with guiding ribs or ledges 7 adapted to slide in corresponding grooves 8 of the arm casing so that a movement of the breech block 5 in a straight-line is ensured. In the preferred embodiment of the present invention the screw thread on the breech head stem is formed in the shape of a cam or thread cam 9.

The locking lugs 1 are adapted to rigidly connect in the usual manner the breech head 3 of the breech lock to the barrel 10 of the arm provided with a sleeve 10a having a transverse groove 1a and longitudinal releasing groove 1b as shown in Fig. 1 of the drawings. If the breech head 3 is inserted into the sleeve 10a of the barrel it is partially rotated or turned, whereby the locking lugs 1 resting in the transverse groove 1a of the sleeve 10a prevent a movement of the said breech head in an axial direction.

For the purpose of opening the breech lock and unlocking the breech head 3 from the sleeve 10a of the barrel a member moved by the recoil impulse and provided with one or more guide cams 11 is acting upon the cams 2 of the breech head in such a sense that by the cooperation of the said guide cams 11 and cams 2 a rotational movement or turning of the said breech head is enforced, whereby the locking lugs 1 of the breech head are turned round and brought into alignment with the releasing groove 1b of the barrel sleeve.

This rotational movement or turning of the breech head 3 results, however, a longitudinal movement of the breech block 6 on account of the engagement of the breech head stem 4 with its steep thread portion 5 in the thread groove of the axial bore in the breech block 6, so that the breech block 6 will carry away the breech head 3 in the longitudinal direction as soon as the lock-

ing lugs lie in the releasing grooves 16 of the barrel sleeve.

The above indicated member moved by the recoil impulse and adapted to effect a rotational movement or turning of the breech head 3 may be either a part moved by the gas-plunger as in a gas-operated rifle or it may be as in the present embodiment for a recoil-operated automatic gun the breech head itself carried away by the recoiled barrel. In this event the guide cam 11 is stationarily arranged on the casing of the arm. As shown in Figs. 1 and 2 a detent lever 12 is provided for locking the breech head 3 with the breech block 6 as soon as the said parts are unlocked. This detent lever 12 pivotally mounted in the breech block 6 and biased by a spring 13 is adapted to enter with its one end into a recess or groove 14 in the breech head stem 4. If the breech locked in this manner slides forward again the detent lever 12 runs over an abutment 14' and is automatically released by the said abutment in the final position of the breech head 3, so that the crowding breech block 6 by means of the steep thread portion effects a rotational movement and locking of the breech head 3.

The striker or firing pin 15 is rigidly connected to the breech block 6 by means of a stud 16 as shown in Fig. 1 of the drawings. A supporting disk 17 is fixed on the said firing pin 15 and a spiral spring 18 bearing upon the said disk with one end rests with its other end upon a cover plate 19 on the breech head stem 4. This spiral spring 18 is working against a separation of the breech head 3 from the breech block 6 and results a powerful and reinforced locking and ignition.

The cam or cams 2 shown in Figs. 1 and 2 of the drawing may be replaced by a roller 20 as indicated in Fig. 3 and for the purpose of controlling the two parts of the breech during the locking and unlocking operation there is cut into the envelope of the breech block a front thread portion 21 as shown in Fig. 3 of the drawings, with which cooperates an operatively acting cam 3' on the breech head. For the inner thread 5' of the breech block with which cooperates a thread cam 9 on the breech head stem there is provided a back lash or play 22 between the said thread cam 9 and the inner thread 5' only limiting the turning out of the breech head whereby a simple type of lock is obtained which replaces the detent lever shown in Figs. 1 and 2 of the drawings. In this case after unlocking the parts the two thread portions are displaced about a further rotational movement or turning of the breech head corresponding to the above mentioned back lash or play 22. This type of lock is released by the fact that during the run out of the breech to the firing position the roller 20 runs upon a starting cam path 23 on the sleeve 24 of the barrel whereby a rotational movement or turning of the breech head 3 is effected as shown in Fig. 4a of the drawings. As soon as the roller 30 glides off from the front face 25' of the inclined face 25 of the said rib the breech block 6 and the breech head 3 are adapted to shove together.

As shown in Fig. 4b of the drawings the controlling member is constructed in two parts 20, 30, the upper part 20 of which is adapted to cooperate with the guide cam 11 and with the starting cam path 23, whereas the lower part 30 is adapted to slide on the inclined face 25 at the end of the guiding ledge 7. In this event the said

inclined face 25 replaces the above mentioned front thread portion.

A further modification of the lock is shown in an example in Fig. 5 of the drawing.

In this modification the steep thread portion 5 on the breech block terminates into an offset part 5'' extending transversely to the longitudinal axis of the breech block 6. At the end of the unlocking movement the thread cam 9 on the stem of the breech head enters into the said offset part 5'', whereby the breech head 3 and the breech block 6 are locked together. Both parts of the breech are, therefore, prevented against turning during the backward movement by the fact that the rollers 30, the diameter of which being substantially the same as the width of the guiding grooves 8' of the casing of the firearm, enters into the said grooves.

In the embodiment of Fig. 6 a recoil-operated automatic gun is shown the barrel 26 of which is movably mounted. A counter-recoil spring 27 is adapted to immediately recuperate the barrel into the firing position. The breech block 6 is axially movable in the casing 8 of the automatic gun and a second counter-recoil spring 28 is adapted to act upon the said breech block. This breech block 6 may be caught and released for the shot by the firing lever 29. The rotational movement or turning of the breech head 3 for the unlocking is effected in this case by the guide cam 11 arranged in the casing of the automatic gun. The firing pin (not shown) is rigidly connected to the breech block.

The operation of the straight-line breech lock for automatic firearms according to Figs. 1 and 2 of the drawings is the following:

Immediately after the shot the barrel 26 and the breech head 3 locked with the said barrel and also the breech block 6 carry out jointly a short backward movement. At the end of this backward movement the cams 2 on the breech head 3 impinge upon the guide cams 11 on the stationary casing of the firearm and slide along the said guide cams. Therefore, the breech head 3 receives a rotational movement or turning and the locking lugs 1 on the said breech head are got out by turning from the grooves 1a and enter into the releasing grooves 1b. At the same time with this turning of the breech head the breech block 6 receives an impulse by means of the steep thread portion 5 and the thread cam 9 on the breech head stem, which throws backwardly the breech block with acceleration away from the breech head. In this movement the ribs or ledges 7 on the breech block slide in the grooves of the casing of the firearm. Hereby, the breech head 3 is pulled back with a high force by the breech block and withdrawn from the barrel which returns again by the action of its spring 27 (see Fig. 5) into its initial position. This peculiar kind of motion is highly important for the safe functioning of the firearm for the reason that the cartridge case is already loosened from the beginning of the unlocking rotation or turning of the breech head and thereupon wholly extracted by means of the rapidly receding breech block. Therefore, the extraction of the cartridge case is effected rapidly and safely.

As soon as the unlocking is obtained the detent lever 12 snaps into its groove or recess 14 (see Fig. 2) under the action of its spring 13, whereby the breech head 3 is connected to the breech block 6 and prevented against a rotation or turning. Both parts i. e. breech block and breech head jointly execute their backward movement up

to their final position and are then led forward by the locking spring. If the breech runs over the abutment 14' the detent lever is brought out of engagement from its groove or recess 14 and the locking lugs 1 enter again into the releasing grooves 1b of the barrel-sleeve, whereupon the breech head 3 is rotated by means of the steep thread portion 5 and the thread cam 9 under the action of the crowding breech block 6 and locked in the grooves 1a of the barrel-sleeve. At the end of this movement the firing pin 15 strikes upon the percussion cap of the cartridge (not shown) and the above described cycle of movements is repeated.

In the modification shown in Fig. 3 of the drawing the mode of operation is substantially the same. As above explained in this modification the steep thread portion on the breech block is divided into two parts, viz. a front thread portion 21 and an inner thread portion 5' which latter forming the geometric continuation of the first named front thread portion. Therefore, during the unlocking movement the prevailing portion of the impulse is transferred by means of the operatively acting cams 3' on the breech head and the cam faces or front thread portions 21 in the envelope of the breech block, whereas the inner thread portion 5' substantially performs only a controlling function limiting the screwing movement of the breech head.

The lock between the breech head and the breech block is effected in the two embodiments shown in Figs. 3 and 4 in a simple and convenient manner and without the use of separate movable members by the fact that the thread cam 9 on the breech head stem has a play or back lash in its inner thread portion 5'. At the end of the unlocking movement the breech head is, therefore, in the position to execute a relative rotational movement or turning without any longitudinal shifting with respect to the breech block 6, until the said thread cam 9 has moved so far with respect to the breech block that it engages the opposite side or flank of the inner thread portion 5' as shown in Fig. 4 of the drawings. The roller 30 has moved in the meantime before the front face 25' of the guiding ledge and simultaneously enters into the groove 8' of the casing 8 of the firearm. As the diameter of the roller 30 is substantially the same as the width of the said groove 8' the breech head cannot turn further with respect to the breech block and both parts of the breech are locked with the same result as in the example of Figs. 1 and 2. In the locking movement of the breech the roller 30 comes out of the groove 8' and impinges upon the starting cam face 23, whereby the rotational movement or turning of the breech head is initiated. The roller 30 glides off from the front face 25' of the guiding ledge 7, whereby the lock between the breech head and the breech block is released so that the said roller can arrive at the inclined face 25 of the ledge. The locking movement proper of the breech can now take place in the manner as above described in connection with Figs. 1 and 2.

As will be seen from the above description in connection with the accompanying drawing the straight-line breech lock according to the present invention is simple in its construction and ensures at reliable operation a high velocity of firing and a long duration of life.

The arrangement of all highly strained parts on the breech head gives rise a rigid and compact structure with the least expense of material

and room. In firing or discharging the firearm the breech head exposed to the firing impulse is directly operated and simultaneously by the rotation of the said breech head a throwing or pushing back of the relative heavy breech block and the entire breech is initiated and accomplished.

It will be further understood that I do not limit myself to the details of construction above set forth, but, on the contrary, that many modifications may be made within the broad scope of my invention.

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KARL SCHWEIKLE.