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T. RAKULA ET AL

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AUTOMATIC FIREARM

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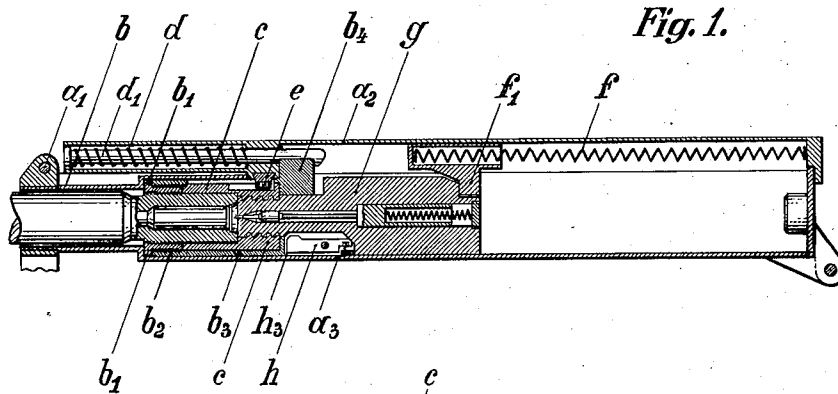


Fig. 1.

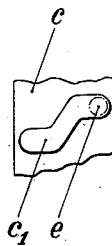


Fig. 3.

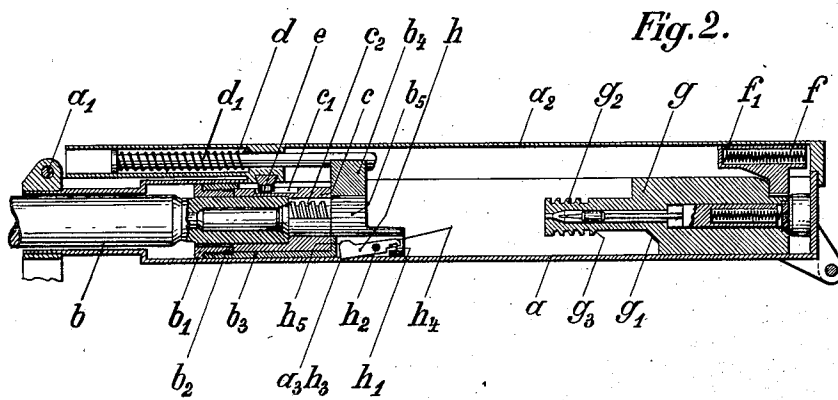


Fig. 2.

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AUTOMATIC FIREARM

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6 Claims. (Cl. 42-4)

The invention relates to automatic firearms having means for locking the breech block to the barrel in breech closing position, said means comprising lugs on these parts interlocked by longitudinal and rotative movements of one of them relatively to the other. An object of the invention is to provide means operative in dependence on the forward movement of the breech block relatively to the barrel suitable for this interlocking, to automatically couple these two parts with each other in order to ensure the subsequent rotation to complete the interlocking. Another object of the invention is to ensure that the barrel and the breech block shall remain together until the locking lugs engage with one another and so that they cannot be separated prematurely from one another, for instance by recoil.

This arrangement is particularly advantageous for firearms having a sliding barrel which, after a shot is fired, is first held firmly in a rear retracted position and afterwards moves along with the breech block while the lugs are being interlocked. The coupling device according to the invention prevents the barrel (which in the case of large calibre weapons is generally provided with a special recuperative device) from flying forward relative to the breech block, in which event the inter-engagement of the locking lugs which is positively effected in dependence on the movements of the barrel and the breech would not be possible. A further object is to provide a coupling device, which on the initial preparation and loading of the weapon by hand ensures that the breech and the barrel shall be held together for a period exceeding that required for the unlocking of the breech from the barrel, whereby the necessity of timing the action of the barrel retaining catch very exactly with the completion of the unlocking operation is avoided.

It is advantageous, in order to ensure that the breech be locked, to utilize the coupling device at the same time as a catch for the barrel in its rear position. The device is then actuated by the breech block when it runs out, the barrel being in its rear locked position, into a position in which it couples the barrel with the breech block, after which both parts move forwardly together to effect the locking operation under the simultaneous action of the barrel running-out spring and the closing spring. Consequently a relatively weak closing spring is sufficient and this, particularly in the case of machine guns of 2 cm. calibre and more, is an advantage in the initial preparation and loading of the weapon by hand. Moreover, those surfaces of the members which con-

trol and effect the above-mentioned movements of the catch, are so organized that the held barrel is set in motion somewhat before the breech block arrives at the end of its forward movement relative to the barrel. The impact of the breech is thus softened and the catch which already provisionally couples the barrel and the breech ensures that these two parts shall be held together until the inter-engaging lugs, which come into operation on the succeeding common running out movement, assume this function.

The accompanying drawing shows a weapon of the type referred to constructed according to the invention, in which

Fig. 1 is a longitudinal section with the barrel and the breech block in their forward end position,

Fig. 2 is a longitudinal section with the barrel and the breech block in the rear position, the barrel being held, and

Fig. 3 shows a detail of the locking sleeve on an enlarged scale.

The barrel *b* slidably mounted in the housing *a* is firmly connected by a bayonet catch with the female screw threaded member *b*₁ and by way of its thread *b*₂ with the barrel casing *b*₃. In the casing *b*₃ is rotatably mounted a locking sleeve *c*. The rear end of the barrel casing *b*₃ is provided at the top with a projection *b*₄ which is embraced by the guide bolt *d*₁, this bolt being subject to the influence of the barrel running-out spring *d*. The bolt *d*₁ is displaceably mounted in a recess in the housing cover *a*₂ hinged about a pin *a*₁. The cover carries, on a projection which forms the abutment for the running out-spring *d*, a roller *e* engaging in a cam groove *c*₁ formed in the locking sleeve *c*. In the cover *a*₂ there is also accommodated the closing spring *f*, the spring guide member *f*₁ supporting the breech block *g*. The head of the breech block *g* can move forward into a correspondingly shaped boring *b*₅ in the barrel casing *b*₃ and its locking lugs *g*₂ engage in the corresponding members *c*₂ on the locking sleeve *c*.

The end of the barrel casing is L-shaped as shown more clearly in Fig. 2 and in a recess formed in the foot of the closure there is accommodated the coupling device according to the invention which forms at the same time the barrel retaining catch. It consists of a lever *h* adapted to pivot about a pin *h*₂ under the influence of a spring *h*₁, which lever is adapted to co-operate alternately, either, by means of the engagement of the front edge *h*₃ of its lower surface, in a notch *a*₃ in the housing, to retain the barrel in its rear

end position, or, by the impact of the inclined surface g_1 on the breech block g with the rear bevelled surface h_4 on the lever which swings it out of the notch a_3 and thereby swings its bevelled front end h_3 behind a projection g_3 on the breech block, to couple the barrel b , by way of the female nut b_1 , the barrel casing b_3 , the pin h_2 and the lever h , with the breech block g .

After a shot has been fired, all the sliding parts (barrel b , barrel casing b_3 , locking sleeve c , and the breech g) move back together against the action of the barrel running-out spring and the closing spring, until the locking sleeve c , turned by the action of the fixed roller e in the cam groove c_1 , unlocks the breech block g . Shortly afterwards the barrel b and the parts connected therewith in consequence, for instance, of impact with a projection on the housing, come to rest and in this position the notch a_3 in the housing a is opposite the front edge h_3 of the lever h which engages therein under the influence of the spring h_1 . The already unlocked breech block g is thereby completely freed. The breech block now moves further backward alone (Fig. 2). With the expansion of the closing spring f the breech block g , if necessary after disengagement of a catch holding it in the rear end position, is then moved forward, feeding a cartridge into the barrel now held in the rear end position until by the impact of the inclined surface g_1 with the lever surface h_4 , the lever h is disengaged from the notch a_3 in the housing and swings its head h_5 behind the breech block projection g_3 . The barrel is thereby liberated and at the same time is coupled to the breech block g in the longitudinal direction. These parts now move forward together under the influence of the barrel running out spring d and closing spring f , and during this continued movement the roller e engaging in the cam groove c_1 causes the locking sleeve c to turn and the locking lugs c_2 to engage with the corresponding members g_2 on the breech block g . Shortly after the complete locking, the barrel and the breech reach their front end position in the housing of the weapon.

The barrel retaining and coupling lever h is of such dimensions that the surface g_1 of the breech block which co-operates with the inclined surface h_4 , disengages it from the notch a_3 of the gun housing shortly before the breech members strike against the abutment surfaces of the barrel casing b_3 . Thus the barrel b under the influence of the barrel running out spring d begins its movement into the forward end position before the breech block strikes it, and the impact effect is further softened by the co-operation of the inclined surfaces g_1 — h_4 , and the forward drive thereby exerted on the barrel. In order that the locking lugs g_2 of the breech block may always find room for swinging in laterally between the counter lugs c_2 on the barrel locking sleeve c the leading ends of the lugs are bevelled.

We claim:—

1. In an automatic firearm the combination with a housing, of a barrel, a barrel casing slidably with the barrel in the housing, a breech block slidably mounted in the housing, a spring urging the breech bolt towards the breech end of the barrel, lugs on the barrel casing, lugs on the breech block arranged to interlock with the

casing lugs to close the barrel breech by successive movements of the casing and breech block relatively to each other, a coupling device separate from said lugs for automatically engaging the casing with the breech block on completion of the first of their said successive movements in a position permitting the following movement, and means for then completing said successive movements.

2. In an automatic firearm the combination with 10 a housing, of a barrel, a barrel casing slidably with the barrel in the housing, a breech block slidably mounted in the housing, a spring urging the breech block towards the breech end of the barrel, lugs on the barrel casing, lugs on the breech block arranged to interlock with the casing lugs to close the barrel breech by an axial and a rotary movement in succession of the casing and breech block relatively to each other, a coupling device separate from said lugs for automatically engaging the casing with the breech block on completion of such axial movement, and means for then effecting said rotary movement.

3. In an automatic firearm according to claim 1, the arrangement that the coupling device in addition to automatically engaging the casing with the breech block also comprises a catch for retaining the barrel in the position of recoil.

4. In an automatic firearm according to claim 2, the arrangement that the coupling device in addition to automatically engaging the casing with the breech block also comprises a catch for retaining the barrel in the position of recoil.

5. In an automatic firearm the combination with a housing, of a barrel, a barrel casing slidably with the barrel in the housing, a breech block slidably mounted in the housing, a spring urging the breech bolt towards the breech end of the barrel, lugs on the barrel casing, lugs on the breech block arranged to interlock with the casing lugs to close the barrel breech by successive movements of the casing and breech block relatively to each other, a lever pivoted in the barrel casing and cooperating with a notch in the housing to lock the barrel in recoiled position, and means on the breech block to swing said lever out of the notch and into engagement with the breech block to couple the barrel casing therewith in position permitting their final relative movement to complete the interlocking of the lugs.

6. In an automatic firearm the combination with a housing, of a barrel, a barrel casing slidably with the barrel in the housing, a breech block slidably mounted in the housing, a spring urging the breech bolt towards the breech end of the barrel to interlock with the casing lugs to close the barrel breech by an axial and a rotary movement in succession of the casing and breech block relatively to each other, a lever pivoted in the barrel casing and cooperating with a notch in the housing to lock the barrel in recoiled position, and means on the breech block to swing said lever out of the notch and into engagement with the breech block to couple the barrel casing therewith in position permitting the said relative rotary movement to complete the interlocking of the lugs.

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