March 14, 1944. W. ROSSMANITH 2,344,109

AUTOMATIC GUN HAVING SLIDING BARRELS

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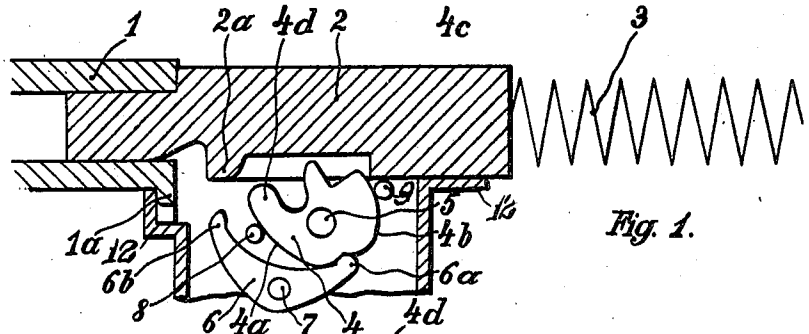


Fig. 1.

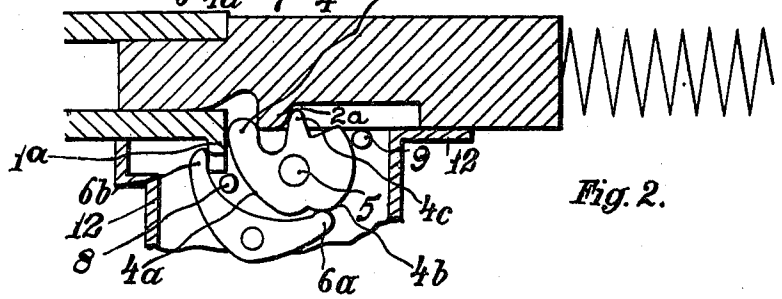


Fig. 2.

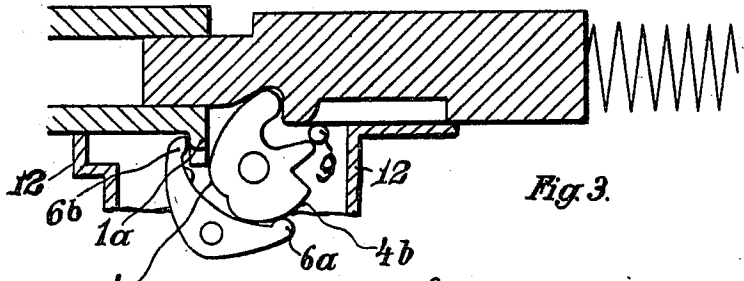


Fig. 3.

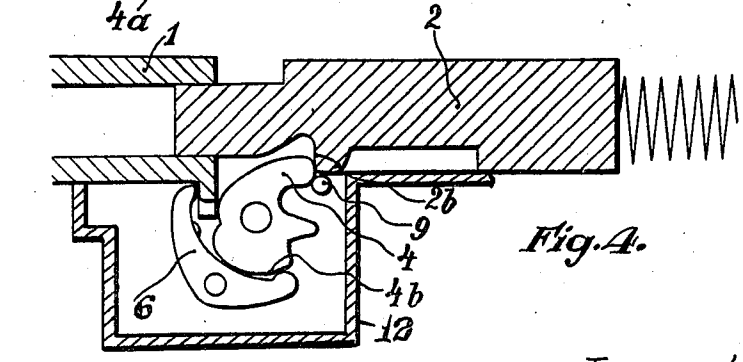


Fig. 4.

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AUTOMATIC GUN HAVING SLIDING BARREL

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In Germany July 16, 1937

4 Claims. (Cl. 42—4)

In automatic guns having a sliding barrel and a longitudinally movable breech block which is adapted to be locked thereto, devices are known for arresting the barrel in its rear end position until the return movement of the breech block, which block moves further back relatively to the barrel than the position in which the barrel and block are locked together.

These known arresting devices are generally locking levers mounted on the barrel and which, when the barrel is in its rear end position, drop into corresponding notches in the casing and fix the barrel in its rear position until the lever is swung out of the notches by the breech block during its return movement. If these locking levers are not positively actuated the reliability of their action is doubtful, while known positively actuated arresting devices cause friction and stoppages by bearing against the rearwardly running breech block.

Thus, an automatic gun having an arresting device controlled positively by a driving lever which consists of an arresting lever connected rigidly with the driving lever has been proposed, in which case the lever and the breech block act directly on each other and maintain constantly their engagement with each other during the entire period of action of the gun, that is to say during both the recoil and the return movements. If the barrel is subjected to a forward driving action, for instance by the barrel return spring or the effect of the weight of the moving parts when firing downwards, then the driving lever will be pressed against the backwardly running breech block with a resulting checking and frictional effect.

The invention, by means of an arresting device controlled positively by the driving lever, which, without friction or checking the movement of the breech block, ensures that the barrel shall be held reliably in the position necessary for locking with the breech block by an automatic checking action between the driving lever and the arresting device. According to the invention, with this object in view, the driving lever is arranged to actuate a separately mounted arresting lever into its arresting position by means of a control cam surface. By means of a suitable form of construction of the control cam surface it is ensured that the period of engagement of the arresting lever in the barrel persists during a part of the recoil path shortly before the beginning of the unlocking operation and until the end of the recoil movement of the barrel. Furthermore, checking action of the control cam surface of the driving lever on the arresting lever, ensures that in all circumstances a premature return of the barrel into its front end position is prevented and the arresting lever in its turn prevents accidental return of the driving lever, while during the return movement of the breech block the arresting lever cannot move away before the locking position is reached. In order, when the breech block is initially withdrawn by hand for the cocking and loading of the gun, that the barrel and the driving lever shall make the same movement as when a shot is fired and the barrel shall join in the return movement into its rear end position, it is advisable to provide a separate projection on the driving lever which is carried along by the withdrawn breech block.

In the accompanying drawing, which shows diagrammatically as an example of construction, an arresting device for automatic guns according to the invention:

Figure 1 is an elevation in part section of the barrel, breech bolt and associated parts of a firearm equipped with the device,

Fig. 2 is a similar view showing the parts when the unlocking of the barrel commences,

Fig. 3 is a similar view showing the parts during the acceleration of the breech block, and

Fig. 4 is a similar view showing the parts at the end of the acceleration of the breech block.

Referring to the drawing, the breech block is connected, in known manner, with the barrel 1 which is slidingly mounted in a gun casing 2, for example by the usual locking sleeve which is adapted to turn during the common rearward movement of both parts. The barrel 1 and the breech block 2 may be arranged to run back against the action of special return devices or, as shown in the drawing, against the action of a common closing spring 3.

Pivotally mounted in the gun casing on a pin 5 is a driving or actuating lever 4. This driving lever co-operates with a barrel arresting lever 6 which is adapted to pivot about a pin 7 in the gun casing and has projection 6*a* which slides on a cam surface 4*b* of the driving lever 4. Stops 8 and 9 limit the rotation of the lever 4 in both the clockwise and anti-clockwise directions.

The barrel or the end of the barrel casing 1 has a projection 1*a* the rear surface of which strikes, during the rearward movement of the locked-barrel and breech block, against a surface 4*a* on the lever 4 and thereby causes the lever-arm nose 4*d* to swing into position in front of a shoulder 2*a* on the breech-block 2. These movements occur immediately prior to the unlocking of the breech-block 2 from the barrel 1, the parts being then in the position shown in Fig. 2. The breech-block is thereafter moved rearwards by the driving lever, while at the same time the barrel projection 1*a* slides on the surface 4*a* which is so shaped that the effective leverage of the barrel about the pivotal support of the driving lever is continuously reduced, whereas

the lever-arm nose 4*d* acts upon the shoulder 2*a*, with constantly increasing leverage, so as to ensure an increasingly accelerated rearward movement of the breech-block 2 relatively to the barrel 1.

When the driving lever 4 is engaged between the end surface of the barrel and the shoulder 2*a* on the breech block (as shown in Fig. 2), the nose 6*a* of the arresting lever 6 slides on the cam surface 4*b* of the driving lever 4 and is positively adjusted thereby in such a manner that the nose 6*b* engages behind the projection 1*a* on the barrel. During the continued movement of the driving lever 4, the diameter of the part of the cam surface 4*b* which is engaged by the nose 6*a* increases after the manner of a spiral to continue the cam face along a line substantially concentric to the pin 5, and so the nose 6*b* is more and more lifted onto the barrel-arresting surface (Fig. 3) until finally the lever 4 turns into its end position (as shown in Fig. 4) and the barrel 1 has arrived in its rear end position, also shown in Fig. 4. The barrel 1 will now be held securely in its rear end position by the lever 4 while the breech block, owing to the kinetic energy transmitted thereto by the barrel 1 by way of the lever 4, runs back alone. A reversed motion, i. e. anti-clockwise motion, of the lever 4 and, therefore, a forward movement of the barrel 1 is prevented by the automatic checking effect due to the fact that the pitch of the cam surface 4*b* at the point of contact with nose 6*a*, when the parts are in the position shown in Fig. 4, is so slight as in effect to lock the lever 6 against rotation in counter-clockwise direction. When the breech block 2 runs back into the barrel 1 which is arrested in its rear end position it swings the lever 4 which allows the arresting lever 6 to swing gradually out of its barrel-locking position. The duration of the period of engagement of the lever 6 until the final release of the barrel occurs is, in this case, so selected that a sliding of the arresting lever nose 6*b* from the barrel projection 1*a* is not completely ended until the locking of the barrel and block has already begun. The barrel 1 and the breech block 2, the locking having in the meantime taken place, then move together into the firing position shown in Fig. 1.

In order, during the initial cocking of the gun by the withdrawal of the breech block 2, that the barrel 1 be returned into its rear end position, the lever 4 is provided with the projection 4*c* against which the projection 2*a* on the breech block 2 bears when it is withdrawn, so that the lever 4 and the arresting lever 6 are adjusted in the same way as is the case during automatic firing.

I claim:

1. An automatic gun comprising a sliding barrel, a sliding breech bolt capable of being locked and unlocked with respect to said barrel and longitudinally movable with respect thereto, a casing in which said barrel and breech bolt are movable, a lever arranged to arrest the barrel at the end of its rearward movement, said lever being pivoted in said casing, and an actuating lever pivoted in said casing independently of the arresting lever and having a cam surface thereon co-operating continuously with the arresting lever to move it into and out of operative position, said actuating lever having means engaged by the recoiling barrel for swinging said actuating lever in one direction and means engaged by the sliding breechbolt for swinging said actuating lever, in the opposite direction, the cam surface on the actuating lever having an operative portion for moving the arresting lever into barrel holding position towards the end of the barrel recoil movement, and a holding portion for retaining the arresting lever in such position during the subsequent movements of the breech bolt until the latter returns to locking position on the barrel.

2. An automatic gun according to claim 1, in which the cam surface on the actuating lever has a substantially concentric holding portion forming a positive obstruction to reverse movement of said actuating lever while said cam portion engages the arresting lever.

3. An automatic gun comprising a sliding barrel, a sliding breech bolt capable of being locked and unlocked with respect to said barrel and longitudinally movable with respect thereto, a casing in which said barrel and breech bolt are movable, a lever arranged to arrest the barrel at the end of its rearward movement, said lever being pivoted in said casing, and an actuating lever pivoted independently of the arresting lever and having a cam surface thereon cooperating continuously with the arresting lever to move it into and out of operative position, said actuating lever having means engaged by the recoiling barrel for swinging said actuating lever in one direction and means engaged by the sliding breechbolt for swinging said actuating lever, in the opposite direction, the cam surface on the actuating lever having an operative portion for moving the arresting lever into barrel holding position towards the end of the barrel recoil movement and a holding portion for retaining the arresting lever in such position during the subsequent movements of the barrel, and a heel on said actuating lever lying in the path of the breech bolt movement away from the barrel.

4. An automatic gun comprising a sliding barrel, a sliding breech bolt capable of being locked and unlocked with respect to said barrel and longitudinally movable with respect thereto, a casing in which said barrel and breech bolt are movable, a lever arranged to arrest the barrel at the end of its rearward movement, said lever being pivoted in said casing, and an actuating lever pivoted in said casing independently of the arresting lever and having a cam surface thereon contacting continuously with the arresting lever to move it into and out of operative position, said actuating lever having means engaged by the recoiling barrel for swinging said actuating lever in one direction and means engaged by the sliding breechbolt for swinging said actuating lever, in the opposite direction, the cam surface on the actuating lever having an operative portion for moving the arresting lever into barrel holding position towards the end of the barrel recoil movement, and a holding portion for retaining the arresting lever in such position during the subsequent movements of the breech bolt until the latter returns to locking position on the barrel.

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