

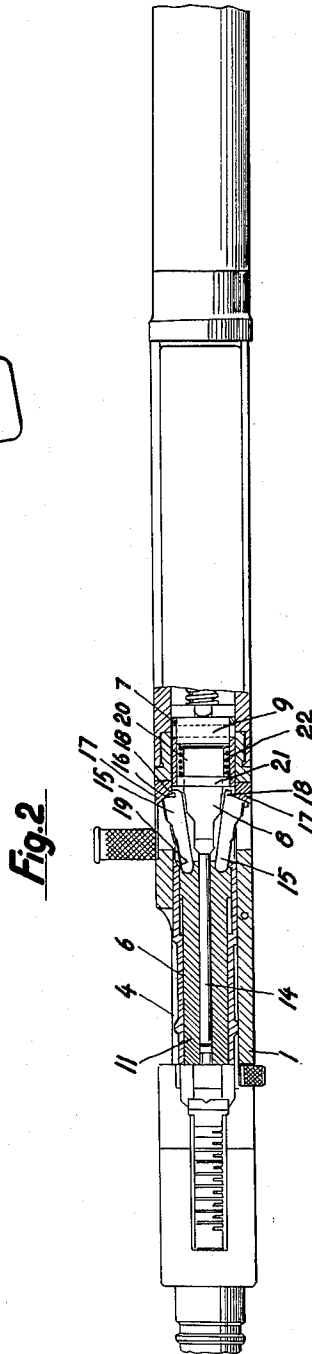
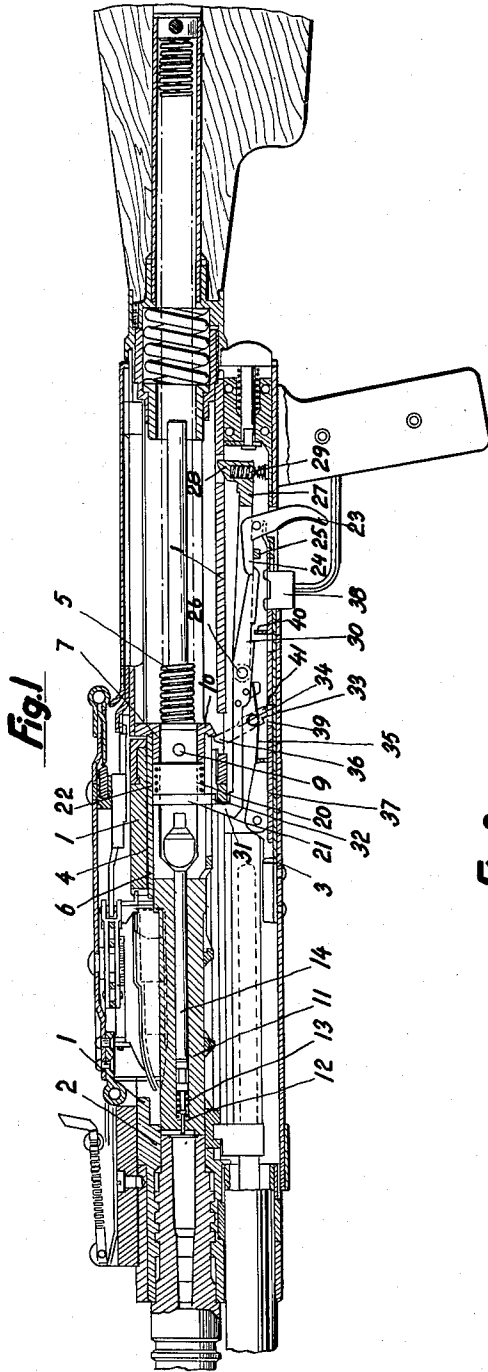
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MACHINE GUN

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MACHINE GUN

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The invention relates to a machine gun of the gas pressure type with firing during the forward movement of the recoiling parts, in which the reciprocating breech-body in the receiver contains a breech-block and a firing bolt with firing-pin longitudinally movable in relation to the breech-block, between which parts locking pawls are so arranged that when the breech-block is in its extreme forward position they will by the forward motion of the bolt in relation to the breech-block be forced outward and engage supporting surfaces in the receiver while at the same time they support the breech-block and thus lock it in its extreme forward position, locking position, whereas before the breech-block has reached that position they are prevented from being forced outward, thereby stopping the forward motion of the firing bolt in relation to the breech-block, and when locking position has been reached they will by the subsequent return movement of the firing bolt in relation to the breech-block by suitable guide surfaces be forced inwards and release the breech-block.

By this construction it has been endeavoured to ensure that the breech-block would always be firmly locked in the receiver when firing takes place, so that accidents due to faulty operation or casual irregularities in the function of the gun might be obviated.

Previous constructions of this kind suffer, however, from various defects, partly because the locking pawls as a rule are controlled and pivoted by means of tappets, which makes for a rather intricate construction and may give rise to breakdowns, and partly because the locking pawls during the reciprocating movement of the breech-block will slide on the guiding surfaces of the locking piece which will cause wear and increased friction.

These drawbacks are in whole or in part obviated by the present invention which besides makes it possible to achieve other advantages. According to the invention the breech-block is enclosed by and preferably resting in a tubular locking device in one with the firing bolt and extending in front of the locking pawls. This tubular locking device is provided with passages which when the firing bolt is in its forward position in relation to the breech-block will coincide with the locking pawls and permit them to be forced out to engage the supporting surfaces in the receiver, whereas when the firing bolt is in its rear position they are so situated that the locking pawls cannot be carried through them but will rest against the inner wall of the tube. Thereby it is avoided that the locking pawls during the reciprocating movement of the breech-body will slide against the guide surfaces of the receiver as they are entirely withdrawn into the tubular locking device and enclosed by its wall.

In an expedient embodiment, in which the locking pawls are pivoted in the breech-body, the locking pawls may according to the invention in manner known per se be loosely mounted in the breech-body with their rounded forward ends resting against corresponding recesses in the breech-block.

According to the invention the forward edges of the

passages in the locking device for the locking pawls may be provided with an inward slope corresponding to external surfaces on the locking pawls which will thereby be forced inwards and out of engagement with the supporting surfaces of the receiver when the striking bolt with the locking device by the locking of the breech-block is moved to the rear in relation to the latter. Thereby a reliable return of the locking pawls is attained in a simple manner so that they may be of simple and substantial construction. As the locking pawls when loosely inserted in the breech-body will by the reciprocating movement of the latter easily rattle and exert relatively heavy impact and compression stresses on the inner wall of the tubular locking device, which out of regard to weight economy and other considerations should preferably be of rather slender construction, friction between the parts will result with a certain risk of fracturing the tubular locking device.

According to the invention this disadvantage may be remedied by means of a spring-loaded stop, preferably a lock bushing encasing the head of the striking pin and shiftably mounted in the rearmost part of the locking device, which bushing when the locking pawls at the beginning of the recoil have been carried to their inward position will pass in over suitable parts of the locking-pawls and lock them in their inward position during the remainder of the recoil and the major part of the subsequent advance, the stop being at the end of the advance by a release organ actuated by the trigger removed from the position in which it locks the locking-pawls, most expediently by the bushing being prevented from participating in the rest of the advance.

This blocking device entails the further advantage that if the release operated by the trigger has not been actuated, for instance due to an incomplete operation of the charging handle without the trigger being pressed, the locking-pawls will remain blocked in their inward position and the locking device will be unable to complete its advance to the extent necessary for the protrusion of the firing-pin.

To ensure normal firing even if the grip on the trigger is released during the advance of the breech-body, the releasing organ, which may expediently be a release lever separately actuated by the trigger, and which by the trigger is carried into the position in which it will actuate the blocking device, may according to the invention by a spring-loaded latch be held in operative position even if the pressure by the trigger ceases, the said latch being provided with a beak so situated that at the beginning of the further advance of the locking device after the locking of the breech-block by the locking pawls it will by means of a stop on the locking device be actuated to release the release member, which thereby, preferably actuated by a spring, will be removed from its operative position unless prevented by the trigger from being so removed. The release member will thereby be kept in inactive position until the trigger is again pressed and the blocking device will therefore continue to keep the locking pawls blocked at all subsequent movements of the breech-body when no pressure has been exerted on the trigger, for instance by an imperfect recoil.

In order on the other hand to ensure against inadvertent firing if in the course of normal firing the breech-body is stopped in its advance for some reason, on the possibly uncontrollable removal of which the advance would be completed and the shot fired even if the trigger had been released, the locking of the release member by the latch may be released according to the invention by a safety mechanism comprising a shiftable or otherwise adjustable safety organ which during the first part of its transfer to safe position will actuate the latch engaging the release member and release that member while

during the latter stage of its motion it will block the release member in non-active position.

In connection with this safety mechanism the release member may according to the invention be so connected with the trigger that the latter will be blocked by the locked release member, whereas the bar mechanism normally actuated by the trigger and holding the breech-body in its rearmost position and releasing it by a pull on the trigger, will not be blocked.

It will thereby be possible when the safety mechanism is in safe position and the trigger is locked to pull the breech-body to its rearmost position without damaging the bar mechanism, as the latter in the normal way may let the beak of the lever slip in front of the recess in the breech-body after having been pressed back by a stop on the latter.

The accompanying drawing shows an embodiment of a machine gun according to the invention, in which:

Fig. 1 shows a vertical longitudinal section through part of the gun, and

Fig. 2 a corresponding horizontal section.

In the front part of a receiver 1 a barrel 2 is fastened and at its lower part a trigger furniture with trigger 3 and safety mechanism. In the receiver 1 a breech-body 4 is movably mounted and is in the usual manner actuated to advance by a recoil spring 5. Externally the breech-body 4 consists of a hollow, cylindrical locking device 6 closed at the rear by a closer head 7 in the form of a collar bushing into which is inserted the cylindrical base of a striking-pin head 8, which together with closer head is fastened to the locking device by means of a transverse striking-pin head bolt 9. The collar of the closer head is provided with a downward projecting tappet 10, which forms the stop on the breech-body engaging the bar of the trigger mechanism.

The locking device forms bearing for a shiftable cylindrical breech-bolt 11 provided with a central bore suitably tapering at front for the passage of the point of a striking pin 12 with reaction spring 13 mounted in the forward part of the bore. The head 8 of the striking-bolt has a far-shaped extension 14 projecting into the bore of the breech-bolt and capable of actuating the striking-pin 12 in the usual manner.

At its rear part the breech-bolt 11 is provided with two cavities serving as bearings for the forward ends of two loosely inserted locking pawls 15 which at their rear are provided with contact surfaces 16 to rest against corresponding surfaces of wearing blocks 17 mounted in the receiver, and on their inward sides with tappets 18 extending to the rear. In the position of the parts shown, the breech-bolt is in its extreme forward position with the firing-pin in advanced position. The locking-pawls 15 have by the forward slopes of the head of the striking-pin been forced with their rear ends out through slits in the locking device and are held in this position while the head of the striking-pin is advanced so that by resting against the wearing blocks 17 and the breech-bolt they hold the latter locked in its forward position.

By the return movement of the breech-body which may be caused by the action of the gas cylinder with recoil rod not otherwise mentioned or by the pulling back of the charging handle, the locking device will first move backwards whereas due to its locking the breech-bolt will remain in its forward position. When the locking device has moved some distance to the rear, rearward slopes 19 on the foremost edges of the recesses in the locking device will slide against the external surfaces of the locking-pawls 15 and during the further movement press the pawls into the interior of the locking device, the pawls turning into the cavities of the breech-bolt with their rounded forward ends. When the locking-pawls are free of the wearing blocks 17 the breech-bolt may accompany the locking device in its further rearward movement.

The cylindrical base of the striking-bolt head which

projects from the locking device head 7 is of smaller diameter than the internal cylindrical bore of the locking device and in the annular space thus formed a lock-bushing 20 has been loosely inserted over the striking-bolt head which bushing with a collar 21 rests against the internal wall of the locking device. Between the collar 21 and the head 7 of the locking device a compression spring, the lock bushing spring 22, has been inserted tending to press the lock bushing forward. When under the pressure of the slopes 19 the locking-pawls 15 have been forced all the way into the cavity of the locking device the lock-bushing 20 will by spring 22 be forced in over the tappets 18 of the locking-pawls and thus block the pawls in their withdrawn position.

The trigger furniture 3 contains the trigger 23 which with its arm 24 actuates a breast 25 on a bar 27 pivoted on a tappet 26 and formed as a one-armed lever, the beak 28 at the rear end of which by a spring 29 is kept pressed up into a recess in the receiver 1 in order to engage the stop 10 on the breech-body.

On tappet 26 is further pivoted a two-armed release lever 30, the rearward arm of which rests against the lower side of the beak-shaped end of the bar or seer 24 and is kept pressed up against it by a spring. The forward end of the release lever is shaped as a stop hook 31 which by depression of the rearmost end of the lever will be carried into the track of the downward projecting stop 3 on the collar 21 of the lock-bushing. A latch 34 pivoted on a tappet 33 will under the pressure of a spring 35 tend to turn into upright position. It is thereby in manner known per se made to catch and hold the release lever 30 when by a pressure on the trigger it is carried into the position with hook 31 raised. The latch is extended upwards in the shape of a beak 36 which is situated in the track of the stop 10 of the breech-body so that at the end of the advance of the breech-body the latch will be actuated to release the release lever 30.

The action is as follows:

When the breech-body is in its rearward position held by the beak 28 of the seer and the trigger is pressed the breech-body will be released and advance under the pressure of the recoil spring 5. By the pressure on the trigger the release lever will be tilted with the hook 31 upwards and will be locked in this position by the latch 34. When the cartridge has been inserted and the breech-bolt has reached its extreme forward position the locking device 6 will continue its advance and the head 8 of the striking-bolt will thereby press the locking-pawls 15 outwards, they having been released by the lock-bushing 20 which by means of tappet 32 has been kept back by the stop hook 31 of the release lever and thus does not participate in the last part of the advance. Immediately after the pressing out of the locking-pawls the breech-body has advanced so far forward that stop 10 will actuate the beak 36 on the latch 34 and release the release lever 30. The latter will, however, remain with its hook 31 in front of the tappet 32 as long as the trigger is kept pressed back. When the locking device continues its advance the rod-shaped extension 14 of the striking-bolt head will actuate the striking-pin to fire the cartridge. During the recoil the breech-bolt will be released and the locking-pawls blocked by the lock-bushing in the manner previously described and by automatic firing the breech-body will again be carried forward by the recoil spring or by the firing of single shots be held in its rearmost position by beak 28.

By an advance of the breech-body without the trigger having been pulled and thus caused the release lever to be locked by the locking-hook in active position, the locking-pawls will also at the end of the advance remain blocked in their withdrawn position and thereby prevent the locking device with the striking-bolt to make the latter part of the advance and fire the cartridge.

Along the lower part of the trigger furniture and on the inside thereof a plate-shaped safety organ 37 with

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handle 38 is shiftably mounted. Plate 37 is provided with a hole 39 and a flange 40.

Into hole 39 projects a heel 41 on the latch 34 and when plate 37 is pushed back the edge of the hole 39 will strike the heel of latch 34 and tilt it forward so that it will release the release lever 30 if the latter has been held in active position by the latch and the lever will then actuated by its spring assume non-active position. During the further shifting of plate 37 the latch will remain on a forward slope, the plate sliding in under the heel 41. During this further movement of plate 37 the flange 40 will enter under the release lever 30 and lock it in non-active position and thereby at the same time block the trigger 23, the arm 24 being prevented from turning downwards by the blocked release lever. Thereby the gun is secured against firing. It will be observed that this securing of the trigger will not prevent the bar 27 from turning by a withdrawal of the breech-body inasmuch as the stop 10 will pass back 28 which will thereby be pressed down and then again forced upwards by spring 29 in front of the stop.

I claim:

1. A recoil-operated machine gun having a trigger, a receiver having supporting surfaces, a recoiling slidably system and being adapted to be held in its rearmost retracted position and released therefrom by the action of said trigger, comprising a substantially tubular jacket and, slidably mounted in said jacket, a breech-block, a striking bolt and a striking pin longitudinally movable in relation to said breech-block, laterally swingable locking pawls mounted to the rear of the breech-block in said jacket and at their front ends supporting said breech-block and being adapted to be swung from a retracted position inside said jacket to a locking position wherein their rear ends engage the supporting surfaces of said receiver outside said jacket, thus locking said breech-block in its foremost position, said pawls in their retracted position being positioned in the path of said striking bolt, said bolt being rigidly connected to said jacket so that by moving forwards relatively to said breech-block it forces the rear ends of said pawls to their locking position through coinciding apertures having inwardly sloping surfaces at the foremost edges thereof and provided in said jacket, said locking pawls being loosely mounted in said jacket and being rounded at their fore ends so as to fit correspondingly rounded recesses provided in said breech-block and presenting lateral external surfaces cooperating with said inwardly sloping surfaces at the foremost edges of said apertures in the jacket in order to swing said pawls from their locking to their retracted position when said striking bolt with said jacket are retracted relatively to said breech-block, spring-loaded lock-member longitudinally slidably mounted within said jacket, said lock-member being situated to the rear of the locking pawls and spring means for pressing said lock-member forwards towards said pawls, said pawls being provided with parts adapted, when said pawls are in their respective retracted positions, to engage said lock-member, thereby locking the pawls in their retracted position, a trigger-operated release lever having a surface and movably mounted in the receiver and cooperating with the lock-member, said release lever being, by the normal operation of the trigger, brought into an

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active position, a catch member located in the path of said lock-member so as to catch said lock-member shortly before the termination of the advance of the recoiling system, and thereby preventing the lock-member from participating in the remainder of said advance, said remainder being predeterminedly made large enough to ensure unlocking of the locking-pawls from engagement with said lock-member.

2. Machine gun according to claim 1, wherein a spring-loaded latch is arranged to cooperate with said release lever so as to lock the release lever in its operative position, said jacket having a pin fixed thereto and latch being provided with a beak so situated that at the beginning of the further advance of the jacket together with the striking bolt, following the locking of the breech-block by the locking-pawls, said latch will, by the action of said pin fixed to said jacket, be actuated so as to unlock the release lever, and a spring actuating said release lever so as to remove said release lever from its active position, pressure on the trigger preventing said removal of said release lever.

3. Machine gun according to claim 2, including safety mechanism and wherein said release lever and said latch are adapted to cooperate with said safety mechanism, said mechanism including a stepwise operated movable member which during the first part of its operation will actuate the latch as to unlock the release-lever and by a subsequent stage of operation will lock said release-lever in a non-active position.

4. Machine gun according to claim 3, wherein said trigger-operated release-lever is positively connected with the trigger so that a locking of said release lever in its non-active position will lock the trigger itself in its inoperative position, and whereby the sear operated by the trigger will be unaffected by said locking operation.

5. Machine gun according to claim 3, wherein the latch cooperating with the release lever is a two-armed lever, one end of said lever being provided with a beak whereby to lock said release-lever and the other end of said lever being shaped as a heel, a slidably mounted plate having a hole into which said heel projects, said plate forming said movable member of the safety mechanism and being so arranged that, when the plate is moved towards its safety position, said heel will be actuated by the edge of said hole so as to move the latch and thereby to unlock said release-lever, the heel remaining during the further shifting of the plate resting on the part of the plate outside the hole therein, and thereby holding the latch in inoperative position, said plate being further provided with a partly cut-off flange, said flange, during the further shifting of the plate, being bushed in under said surface of said release lever, so situated that the lever will be locked in the non-active position thereof.

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