

Aug. 25, 1936.

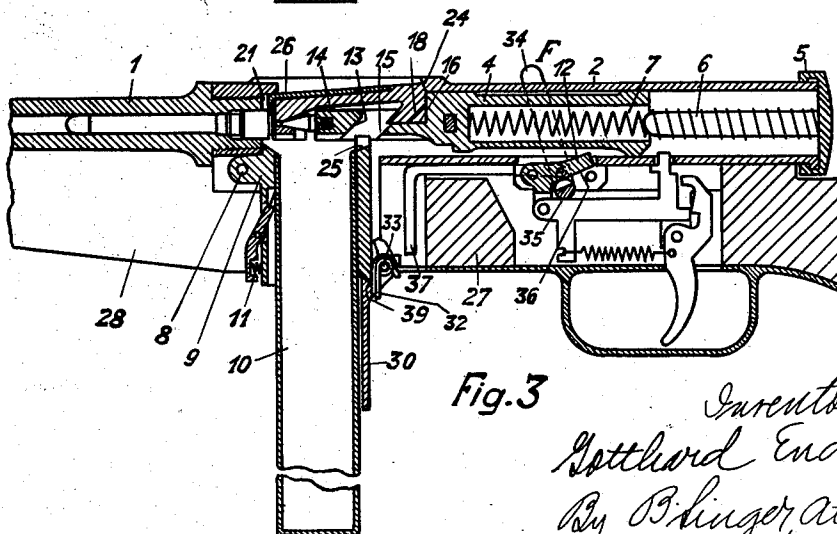
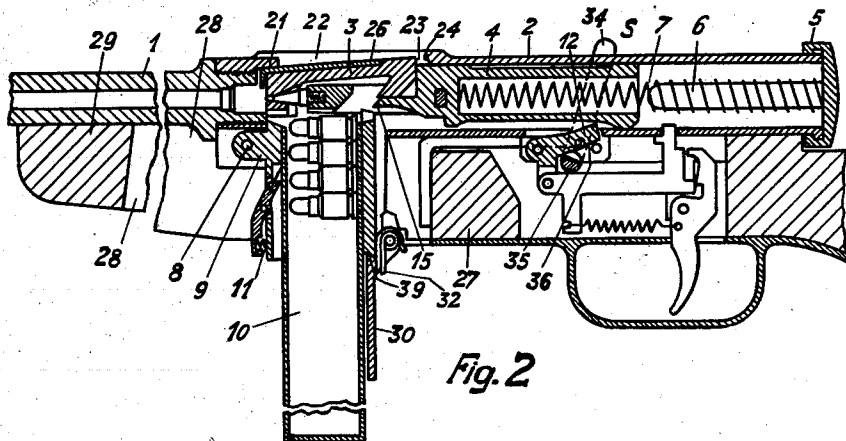
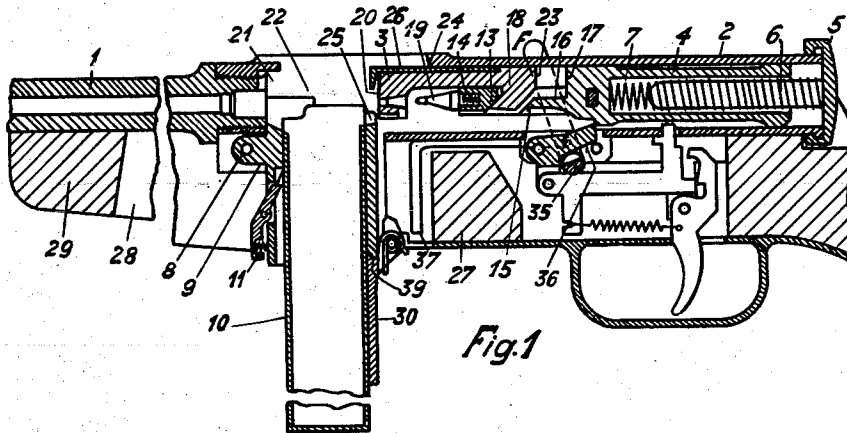
G. END

2,052,287

AUTOMATIC FIREARM

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2 Sheets-Sheet 1



Inventor
Gottfried End
By B. Singer, atty.

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Fig. 4

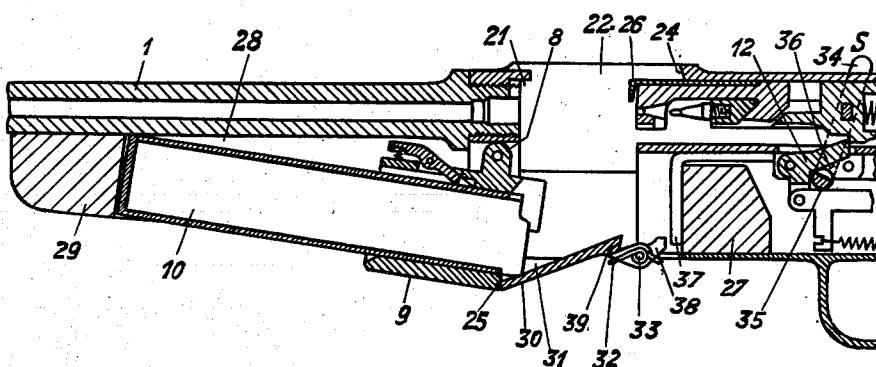
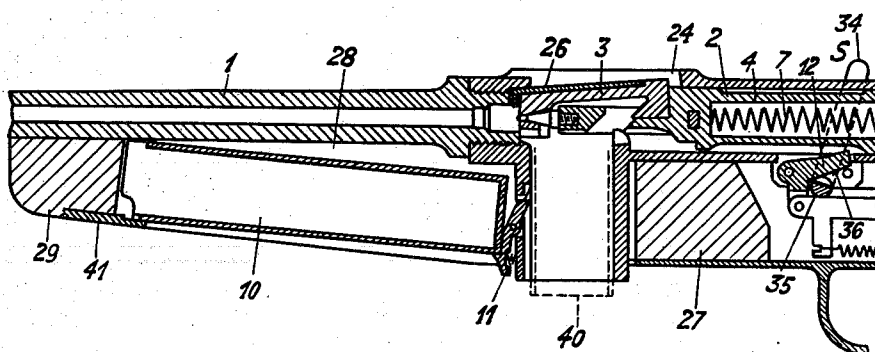


Fig.5



Inventor
Kotthard, End
By B. Singer, atty.

UNITED STATES PATENT OFFICE

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AUTOMATIC FIREARM

Gotthard End, Schaffhausen, Switzerland, assignor to Schweizerische Industrie-Gesellschaft, Neuhausen, Switzerland, a corporation of Switzerland

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5 Claims. (Cl. 42-3)

The main object of the invention is to provide an automatic fire-arm of great firing power and extreme accuracy even at a long distance.

A further object consists in the provision of an automatic fire-arm being suitable for transport and capable of being quickly set ready for action.

A further object is the provision of a fire-arm which is reliable and of simple mechanism and operation.

It is well known that increased initial velocity and therewith increased range and accuracy of a fire-arm necessitate a long barrel, a barrel which for instance is longer than that used in the known automatic pistols. In known constructions having short barrels, it is sufficient to use an inertia breech closure in which a large mass, constructed as a breech closing piece rests on the bottom of the cartridge to be fired and is driven back by the gas pressure. During this rearward movement, the inertia mass carries the cartridge case with it by means of an extractor and removes it from the cartridge chamber of the barrel. As long as the shot is in the barrel and the gas pressure therein is high, the amount of this rearward movement must not exceed a certain maximum, in order to avoid splitting the cartridge case and the consequences connected therewith. The inertia weight must therefore be made large with the length of barrel hitherto usual, while a lengthening of the barrel would, however, bring with it a further and very considerable increase of the inertia weight. The known form of breech closure is consequently not suited for a weapon having a long barrel.

A further object of the invention consists now in providing a breech action which permits the use of a locked breech closing piece, while retaining the simplicity of the inertia breech closure.

A further feature of the invention resides in the particular construction of the magazine.

According to the present invention an automatic fire arm is provided with a large pivoted magazine which for use can be moved into a position substantially at right angles to the barrel and when not required for use can be moved into a position substantially parallel to the barrel in front of or behind the charging opening.

The increased firing power of an automatic fire arm necessitates a large interchangeable magazine. The want of handiness in transport hitherto caused thereby is obviated as the magazine is pivotally mounted on the fire arm and

is adapted to be folded into the stock when not in use.

The invention consists in certain novel features of construction and combinations of features to be hereinafter described fully and particularly pointed out in the claims, reference being had to the accompanying drawings in which:

Fig. 1 shows the automatic fire-arm in section with opened breech block and ready for firing;

Figs. 2 and 3 are longitudinal sections through the closed weapon.

Figs. 4 and 5 are sectional elevations of part of the fire arm with open and closed breech respectively and with the magazine in its inoperative position.

The fixed barrel 1 is secured to a casing 2 in which a breech closing block 3 and a bolt 4 are slidably arranged. The casing 2 is closed by the breech closure cap 5, which carries pin 6 on which a closing spring 7 is arranged. The closing spring 7 projects in a bore of the bolt 4 and acts in known manner on the bolt 4; it tends to close the breech. On the casing 2 is hinged by means of the pin 8 a bush 9 in which is detachably inserted the magazine 10; 11 is a pawl mounted on the sleeve 9 which prevents by projecting under a nose the magazine 10 from falling out of the bush 10 accidentally.

In the position shown in Fig. 1 the bolt 4 is prevented from being moved by the spring 7 by the catch 12 of the sear. At the front end the bolt 4 has a horizontal supporting surface 14, an inclined surface 13 adjacent to face 14 serving for unlocking the block 4 and an inclined surface 15 serving for the locking of the block 3. The surfaces 13 and 15 co-operate with a coupling tooth 18 of the breech closing block 3, the tooth 18 of the breech closing block 3 serving to connect the latter to the bolt 4 when the latter recoils and moves in the longitudinal direction of the casing 2. At its front end, the bolt 4 carries a firing pin 19 rigidly connected with it. The front face 20 of the breech closing block 3 is, in the position shown in Fig. 1 behind the magazine 10. On the release of the bolt 4 by moving the sear 12 by the trigger the bolt 4 and the breech closing block 3 are moved as a unit along the casing 2 by the spring 7 until the front face 20 of the breech closing block 3 bears against the end of the barrel. The bolt 4 then moves further forward alone, and lifts the tooth 18 of the breech closing block 3 by means of the inclined surface 15 and thus the breech closing block 3 itself; the supporting surface 16 of the bolt 4 then slides under the tooth 18 until the

latter comes into contact with the surface 17 of the bolt 4 (Fig. 2). The breech closing block 3 is supported by the tooth 18 on the surface 16 and takes up an inclined position. The upper part of the breech closing block 3 is lifted by the bolt 4 into the ejection opening 22 of the casing 2, so far that the rear face 23 of the breech closing block 3 may strike against the surface 25 of the ejection opening 22 as shown in Fig. 3. The length of the ejection opening 22 and that of the breech closing block 3 is so dimensioned that there is a free space between the surfaces 23 and 24 with closed breech (Fig. 2).

Under the action of the closing spring 7, the bolt 4 bears with the surface 17 against the rear end of the breech closing block 3.

When firing the cartridge, the breech closing block 3 by reason of the pressure of the gas is moved back until it bears with its surface 23 against the surface 24 of the casing 2. The bolt 4 holds the breech closing block 3 in this locked position (Fig. 3), as the supporting surface 16 holds the tooth 18 in the raised position. When withdrawing the bolt 4 the breech closing block 3 remains in the position shown in Fig. 3 until the supporting surface 16 passes from under the tooth 18 and the inclined surface 13 of the bolt 4 engages with the front inclined surface of the tooth 18 on the breech closing block 3. The breech closing block 3 bearing against the surface 24 cannot at first follow the bolt but is first drawn downwards, and only when the surface 23 is disengaged from the surface 24 the block 3 is retracted. The breech closing block 3 has then taken up a horizontal position and is coupled with the bolt 4 in the longitudinal direction by the tooth 18; it then follows the further backward movement of the bolt 4 into the open position. The bolt 4 moves the breech closing block 3 quickly with it into the rear position. During this movement it also withdraws the cartridge case by means of an extractor 25 fixed to the block 3 and engages with its fore end a recess in the cartridge chamber, the cartridge being then ejected by the ejector 26. The unlocking operation is such that it does not take place until after the bullet has left the barrel, which is particularly suitable with the present lengthened barrel. By the time the breech closing block 3 reaches the supporting surface 24, the bullet has already passed a certain distance; moreover the bolt 4 requires a certain time to move its surface 16 from under the tooth 18 of the breech closing block 3, whereupon only the unlocking takes place. The bolt 4, in consequence of its mass and velocity of recoil, is enabled to carry the breech closing block 3 back with it and to tension the closing spring 7.

The distance between the surfaces 23 and 24 in Fig. 2 can be regarded as the permissible amount by which the cartridge case can move back under gas pressure in the cartridge chamber without splitting.

With known inertia breech closing arrangements, its mass must be so large that it does not pass beyond this position at the moment of the exit of the cartridge. This result can be obtained with a large mass and short length of barrel and the use of so-called pre-ignition. The effect of the latter is that the inertia breech closure only takes up its forward position from which it is then thrown back, when the cartridge has already passed over a certain distance, the firing pre-ignition distance. The distance recognized

as permissible for the recoil of the cartridge case under gas pressure is in such a case reached during the passage of the cartridge in the barrel over the total distance minus the pre-ignition distance. A lengthening of this distance, that is, of the length of the barrel, consequently has, other conditions being the same, a more than proportional effect on the corresponding amount of travel of the cartridge case. Owing to the construction according to the invention of the breech closure it has become possible to select freely the length of the barrel to an extent which is quite impracticable with the known inertia breech closure arrangement, and this greatly increases the value of the present breech closure.

The gas pressure acting on the cartridge is utilized in a novel manner. Contrary to known constructions, the gas pressure brings the breech closing block into its locking position. The breech closing block first passes into the locking position during the passage through the free space between the surfaces 23 and 24 in Fig. 2. The breech closure remains in the unlocked position only during the first part of the movement of the cartridge, whereupon it moves into the locked position shown in Fig. 3 in which it then remains during the further movement of the cartridge through the barrel, the exit of the cartridge from the barrel, and the outflow of the gases had previously transmitted the impulse necessary for this purpose. With this object, the supporting surface 16 is provided on the bolt, the extension in length thereof giving the desired period of retardation before the unlocking.

The choice of the length of barrel is no longer restricted by consideration of the reliability of operation but can be as desired.

The tooth 18 may be arranged on the bolt 4, in this case a recess is to be formed in the breech closure block 3.

In place of the wall 24 another abutment for the breech closure block 3 may be formed within the casing.

The magazine 10 when not required for use lies along the barrel and the recess 28 of the stock 27 of the weapon. The magazine 10 which by means of the bush 9 rocks about the pin 8, fits snugly into the recess 28 in the stock 27 in the swung-in position (Figs. 2, 3) lying approximately parallel to the barrel 1, the portion 29 of the stock covering it at the front. The magazine 10 is easily interchangeable for the use of cartridges of different calibres, e. g. 7.63, 7.65 and 9 mm. The magazine is held in the recess 28 by a cover 30 pivoted at 33. The cover 30 is provided with two lateral pieces 31 for closing the rear end of the recess 28. The cover is pressed into the closing position by a spring 32.

In Fig. 4 the fire-arm is shown with open breech and at "safety". When the safety catch 34 is moved to the released position (position F, Fig. 1), it rotates about its axis 35 and by means of a pin 36 thereon pushes a cover bar 37 towards the magazine. During this movement the bar 37 engages a projection 38 on the cover 30 thus rocking the latter downwardly and releasing the bush 9. The latter drops under the action of gravity or of a spring, not shown, together with the magazine 10 rocks about its pivot 16 opening the cover 30, and assuming the position shown in Fig. 1. In this position the bush 9 engages with a hook 39 on the cover 30. By moving the safety catch 34 from "safe" (position S) to "fire" (position F), the rifle is ready for firing.

The magazine 10 and the bush 9 can, according to a modified construction, be arranged to rock laterally or in another direction under the influence of a suitable spring.

5 The empty magazine 10 may be replaced readily by a full one. The magazine 10, when the safety catch 34 is in the position S "safe" may be left in the extended operating position or be
10 rocked into the recess 28. For the latter purpose, the cover 30 must be drawn slightly backwards so that its hook 39 releases the bush. When the bush has been moved into the recess 28, the upper end is engaged by the cover 30, thus locking it. This locking, however, cannot occur until the
15 safety catch 34 has been moved to the position S "safe". When the magazine is in the recess 28 the locking pawl 11 cannot be disengaged accidentally, so that the magazine 10 cannot be lost.

When it is not desirable to make the cover 30
20 independent of the position of the safety catch, or if the safety catch is arranged in such a manner that the cover 30 is independent thereof, the cover bar 37 may be omitted. The side pieces 31 then serve as a grip for moving the cover 30 which can then be moved independently of the safety catch
25 34.

In the example of construction according to Fig. 5 the bush 9 is not arranged to rock but is fixed in position. When the magazine 10 is not
30 required for use it also in this case rests in a recess 28 of the stock. One end thereof rests on a support 41 secured to the portion 29 whilst its other end is engaged by a projection on the locking catch 11.

35 When the magazine is to be placed into the bush the catch 11 is pressed so as to disengage its projection from the magazine. The latter is thus released and can be inserted into the bush 9. If desired the catch 11 could be associated with the
40 safety catch 34 in the same way as the cover 30 in the example of construction shown in Figs. 1 to 4.

A cover may be fitted in a similar manner to the previous arrangement but simply for closing the magazine opening. The arrangement according
45 to Fig. 5 has the advantage that in addition to the long magazine 10 in the recess of the stock, a short magazine 40 may be fitted into the bush 9 as shown by dotted lines, without affecting the portability of the rifle. Independently of the position
50 of the safety catch and breech block, this short magazine may be replaced by the long magazine and placed in the butt stock when not required for use.

What I wish to secure by U. S. Letters Patent
55 is:—

1. In an automatic fire arm, a fixed casing having a cartridge ejection opening provided with a locking face, a fixed barrel connected with the casing; and a breech mechanism comprising a
60 post movable longitudinally in an axial direction of the barrel to and from the rear end of the same, and a breech closing block carried by said post to be movable therewith and also adapted to move independently relatively to the post; said post and said breech block being provided
65 with coacting means to cause the breech block to assume an inclined position with its rear end raised into said ejection opening and its front end engaging the rear end of the barrel when the post executes its forward stroke to close said breech mechanism, said coacting means upon firing causing a simultaneous rearward movement of
70 said post and said breech block until the latter engages said locking face on said ejection opening whereby said breech block is locked in its closing
75

position and is maintained in this position until the bullet has left the barrel, by the post which continues its rearward movement, whereupon during the remaining portion of the rearward
5 movement of said post said coacting means causing unlocking of said breech block and rearward movement of the same together with said post.

2. In an automatic fire arm, a fixed casing having a cartridge ejection opening provided with a locking face, a fixed barrel connected with the
10 casing; and a breech mechanism comprising a post movable longitudinally in an axial direction of the barrel to and from the rear end of the same, and a breech closing block carried by said post to be movable therewith and also adapted
15 to move independently relatively to the post; said post and said breech block being provided with coacting inclined faces to cause the breech block to assume an inclined position with its rear end raised into said ejection opening and its front
20 end engaging the rear end of the barrel when the post executes its forward stroke to close said breech mechanism, a firing pin on the front end of said post adapted to reach its firing position just after the breech mechanism has been closed, 25 said coacting inclined faces upon firing causing a simultaneous rearward movement of said post and said breech block until the rear end of the latter engages said locking face on said ejection opening whereby said breech block is locked in
30 its closing position and is maintained in this position until the bullet has left the barrel, by the post which continues its rearward movement, whereupon during the remaining portion of the rearward movement of said post said coacting
35 inclined faces causing unlocking of said breech block by moving its rear end downwardly away from said locking face and then rearwardly together with said post to open the breech mechanism.

3. In an automatic fire arm, a fixed casing
40 having a cartridge ejection opening provided with a locking face, a fixed barrel connected with the casing; and a breech mechanism comprising a post movable longitudinally in an axial direction of the barrel to and from the rear end of the same, and a breech closing block carried by
45 said post to be movable therewith and also adapted to move independently relatively to the post, said post and said breech block being provided with coacting means to cause the breech block to assume an inclined position with its rear end raised into said ejection opening and its front
50 end engaging the rear end of the barrel when the post executes its forward stroke to close said breech mechanism, the rear end of said breech block being moved past said locking face during the forward stroke of said post, said rear end when raised and when the front end of the breech block engages the rear end of the barrel being
60 spaced a predetermined distance from said locking face, said coacting means upon firing causing a simultaneous rearward movement of said post and said breech block until the rear end of the latter engages said locking face, whereby said
65 breech block is locked in its closing position and is maintained in this position until the bullet has left the barrel, by the post which continues its rearward movement, whereupon during the remaining portion of the rearward movement of said post
70 said coacting means causing unlocking of said breech block and rearward movement of the same together with said post.

4. In an automatic fire arm, a fixed casing having a cartridge ejection opening and a locking
75

face, a fixed barrel connected with the casing; and a breech mechanism comprising a post movable longitudinally in an axial direction of the barrel to and from the rear end of the same, a
 5 breech closing block carried by said post to be movable therewith and also adapted to move independently relatively to the post, and a spring acting on said post and adapted to move the same together with said breech block forwardly, said
 10 post and said breech block being provided with coacting inclined faces to cause the breech block to assume an inclined position with its rear end raised into said ejection opening and its front end engaging the rear end of the barrel when
 15 the post executes its forward stroke to close said breech mechanism, the rear end of said breech block being moved past said locking face during the forward stroke of said post to lie a predetermined distance away from the same when the
 20 front end engages the rear end of the barrel, said coacting inclined faces upon firing causing a simultaneous rearward movement of said post and said breech block until the rear end of the latter engages said locking face whereby said
 25 breech block is locked in its closing position and is maintained in this position until the bullet has left the barrel, by a horizontal surface on the post which continues its rearward movement, whereupon during the remaining portion of the rearward movement of said post said coacting inclined
 30 faces causing unlocking of said breech block by moving its rear end downwardly away from said locking face and then rearwardly to-

gether with said post to open the breech mechanism and tensioning said spring.

5. In an automatic fire arm, a fixed casing having a cartridge ejection opening provided with a locking face, a fixed barrel connected with the casing; and a breech mechanism comprising a
 5 post movable longitudinally in an axial direction of the barrel to and from the rear end of the same, and a breech closing block carried by said post to be movable therewith and also adapted
 10 to move independently relatively to the post; said post and said breech block being provided with abutting faces at right angles to the direction of movement and also with coacting inclined faces causing the breech block to assume an inclined
 15 position with its rear end raised into said ejection opening and its front end engaging the rear end of the barrel when the post executes its forward stroke to close said breech mechanism, said coacting faces upon firing causing a simultaneous
 20 rearward movement of said post and said breech block until the latter engages said locking face on said ejection opening whereby said breech block is locked in its closing position and is maintained in this position until the bullet has left the
 25 barrel, by the post which continues its rearward movement whereupon during the remaining portion of the rearward movement of said post said coacting means causing unlocking of said breech block and rearward movement of the same together with said post.

GOTTHARD END.