

K. KRKA,
AUTOMATIC FIREARM.

APPLICATION FILED JULY 12, 1909.

Patented Feb. 27, 1912

2 SHEETS—SHEET 1.

1,018,914.

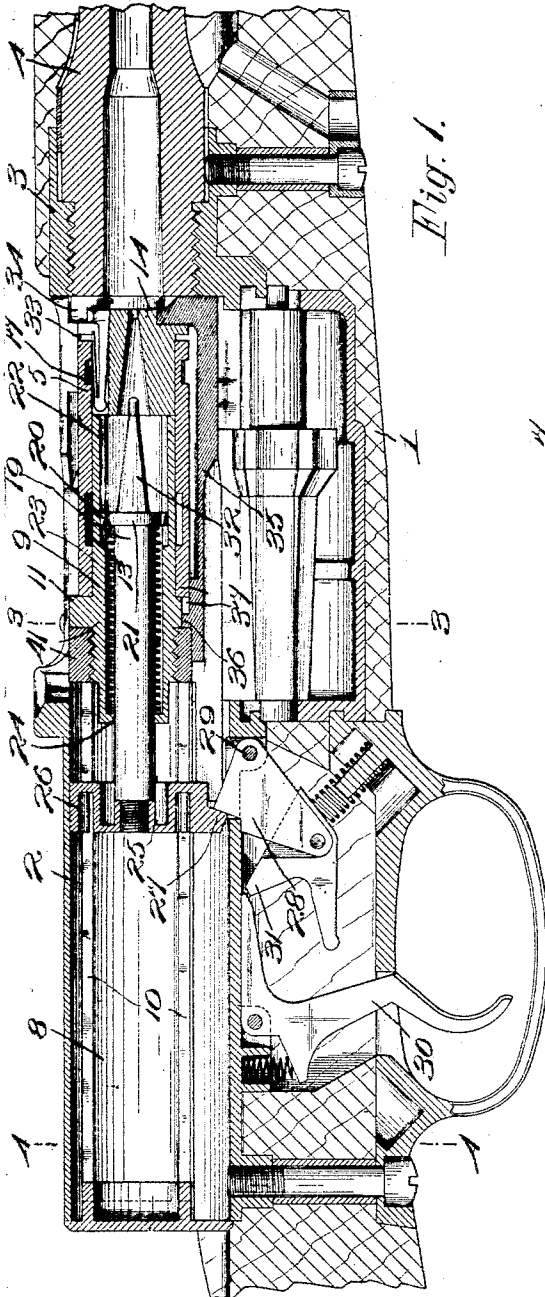


Fig. 1.

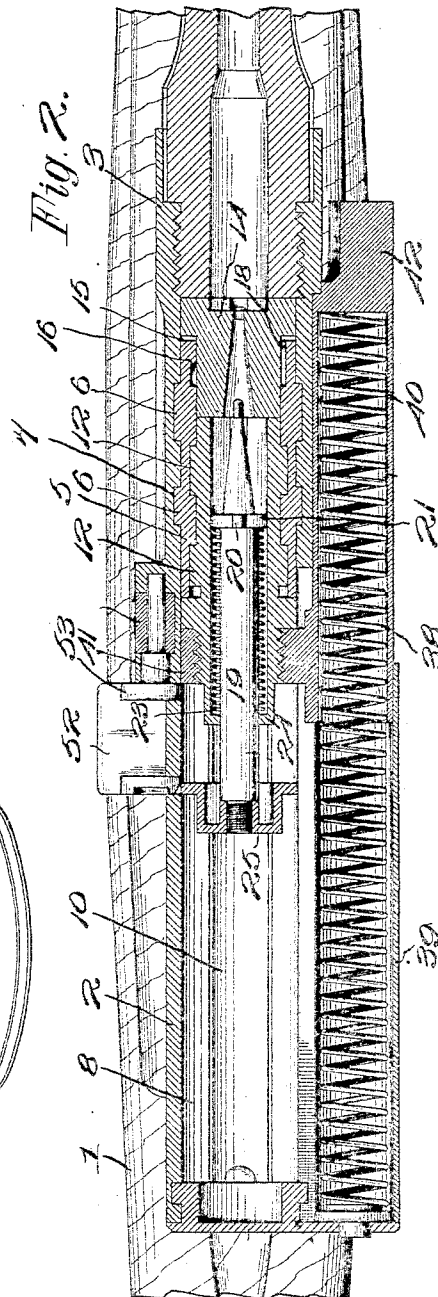


Fig. 2.

Witnesses.
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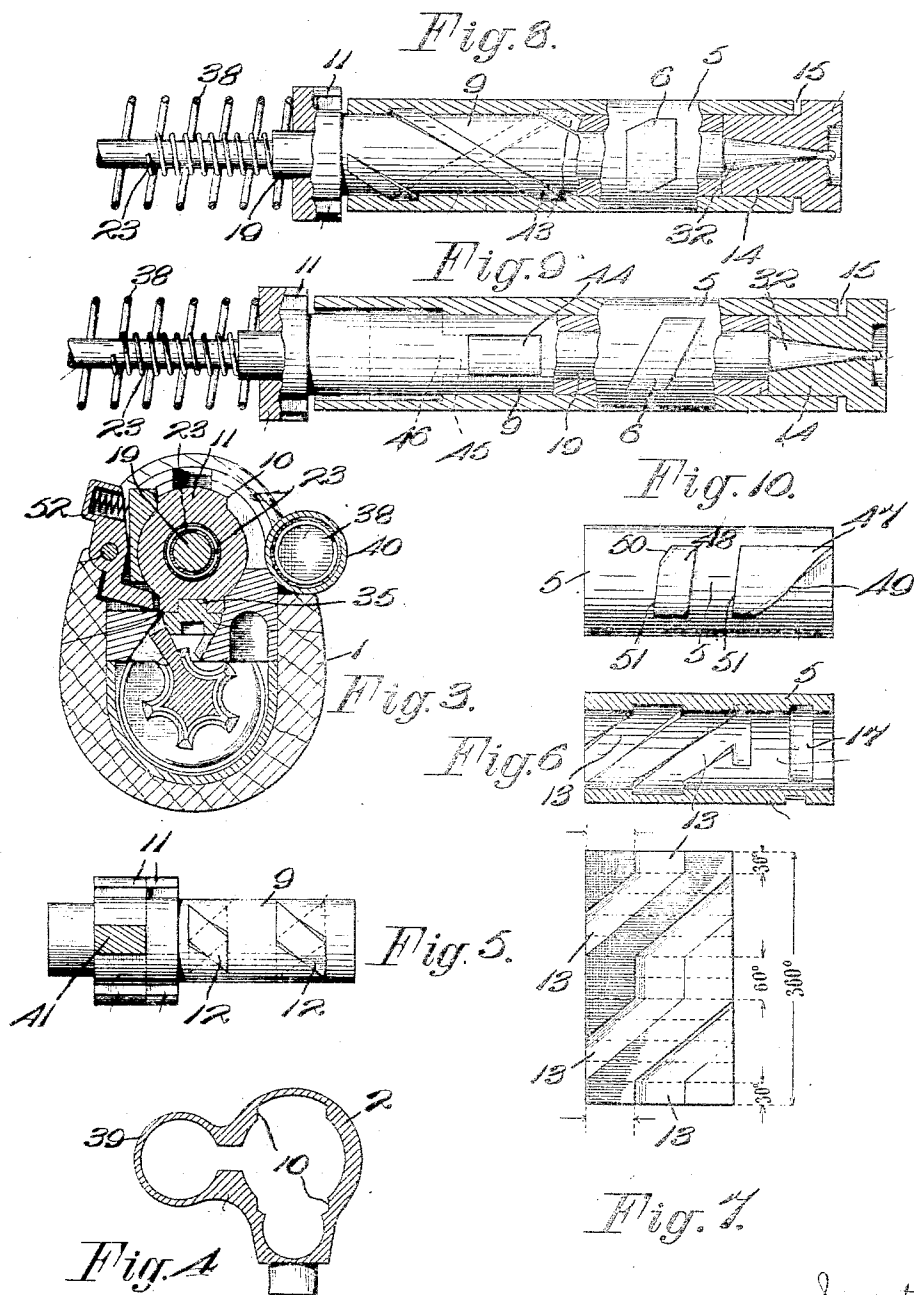
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

KARL KRNKA, OF HIRTENBERG, AUSTRIA-HUNGARY.

AUTOMATIC FIREARM.

1,018,914.

Specification of Letters Patent.

Patented Feb. 27, 1912.

Application filed July 12, 1909. Serial No. 507,157.

To all whom it may concern:

Be it known that I, KARL KRNKA, engineer, a subject of the Emperor of Austria-Hungary, residing at Hirtenberg, in the Province of Lower Austria, Empire of Austria-Hungary, have invented certain new and useful Improvements in Automatic Firearms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improved breech block for automatic firearms, which is designed by its simplicity and by the small number of parts for producing automatic operation, and which also enables a firearm of this character to be made with a relatively short and self-contained breech casing.

Automatic firearms are known, in which a very short backward movement is imparted to the breech block by the explosion of the cartridge, said backward movement being transmitted to a momentum block which is in contact with the breech block, the momentum block, owing to the energy imparted to it, being thereby actuated for operating an unlocking member to open the breech and operating the firearm.

The object of this invention is to apply this principle to a breech mechanism having a rotary lock.

The invention consists in an improved breech block, comprising a sliding and rotary locking breech bolt sleeve, a breech bolt for locking and unlocking the breech bolt sleeve, and a breech bolt plug capable of having a relatively small independent movement for effecting the initial unlocking movement of said breech bolt sleeve, and immediately thereafter effecting the complete unlocking movement and opening the breech bolt sleeve through the gas pressure produced in the gun barrel.

The invention further proposes to utilize an accumulator, as in heavy ordnance, to the end of storing energy through the opening movement of the breech bolt sleeve, and utilizing said energy to close and lock the breech bolt sleeve, and cock the firing pin under tension.

With these and other objects in view the invention consists in the novel details of construction and combinations of parts more

fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 is a central longitudinal section of a firearm, with parts in elevation, showing the application of the present invention. Fig. 2 is a horizontal longitudinal sectional view of Fig. 1. Fig. 3 is a transverse sectional view of Fig. 1, taken on the line 3—3. Fig. 4 is a transverse sectional view of the breech casing, taken on the line 4—4 of Fig. 1. Fig. 5 is a detail elevational view of the breech bolt shown in Fig. 1. Fig. 6 is a longitudinal sectional view of the breech bolt sleeve. Fig. 7 is a partial view of the developed breech bolt sleeve. Fig. 8 is a central longitudinal sectional view, partly in elevation, of a modified construction of breech bolt sleeve and breech bolt. Fig. 9 is a view similar to Fig. 8, of a further modified construction, and Fig. 10 is a detail elevational view of a further proposed construction of breech bolt sleeve.

Referring to the construction in detail, 1 designates the stock of a rifle, and 2 a breech bolt casing therefor, and which has a screw-threaded connection 3 with the rifle barrel 4, as in the usual manner. The breech casing 2 contains the breech bolt sleeve 5, which has rotary locking engagement with the casing 2 through the medium of oppositely disposed pairs of lugs 6 (see Fig. 2). The lugs 6 fit within suitable slots 7 of the casing 2 to effect rotary locking engagement therewith, and through the medium of longitudinal slots, not shown, in the casing, said lugs have longitudinal movement, whereby the breech bolt sleeve may slide within the casing chamber 8 for opening the breech, as will be readily understood.

The slots 7 are of the required pitch to effect a turning action upon the lugs 6 to the end of tightly closing the breech bolt sleeve by a rotary movement thereof, as will now be explained: The breech bolt sleeve locking and unlocking member comprises a breech bolt 9 that is movable rectilinearly in the breech casing 2 through the medium of straight guideways 10, within which travel the shoulders 11 of said bolt. The bolt 9 is designed to effect a rotary movement of the breech bolt sleeve 5, and to this

end is provided with two pairs of oppositely disposed and inclined lugs 12, which move within spiral guideways 13 of the breech bolt sleeve 5, as shown in Figs. 6 and 7. Since the breech bolt 9 can have only a rectilinear movement within the breech casing 2, it will be apparent that when such movement is imparted to the breech bolt that the breech bolt sleeve 5 will be given a rotary movement to be unlocked or locked, accordingly as said breech bolt is moving in a forward or rearward direction.

The breech bolt 9 is designed to be actuated to impart an initial unlocking movement to the breech bolt sleeve 5 instantaneously with the firing of the cartridge, and to this end a breech bolt plug 14 is provided. The breech bolt plug 14 is mounted within the forward end of the breech bolt sleeve 5, and is designed to have a relatively short axial movement independently of said breech bolt sleeve. The extent of this independent movement, as indicated by the character 15, is designed to be about 0.5 or 3.0 millimeters. The plug 14 is secured against axial displacement in the breech bolt sleeve 5 through the medium of lugs 16, fitting within an annular groove 17 on the inner face of the breech bolt sleeve 5 (see Figs. 1, 2, and 6). The dimensions of the lugs 16 with respect to the groove 17 are such that the plug 14 may have axial movement independent of the breech bolt sleeve 5, but is thereafter carried rectilinearly by the bolt plug, as will be understood. The annular groove 17 permits of the breech bolt sleeve 5 having rotary movement independently of the plug 14.

The plug 14 is at all times in abutment with the breech bolt 9, to effect, as above stated, the initial unlocking movement of the breech bolt sleeve, but immediately thereafter said breech plug 14 contacts with the breech bolt sleeve 5, and on its further recoiling movement causes the breech bolt 9 to unlock the breech bolt sleeve 5 from the casing 2, and move the breech bolt sleeve to fully open position to eject the shell of the spent cartridge.

The firing pin 19 is mounted within the breech bolt 9, and is guided rectilinearly therein by a pair of oppositely disposed projections 20, of a collar 21, within straight guideways 22 in said breech bolt. The actuating spring 23 of the firing pin is contained within the bolt 9, and has its ends abutting, respectively, against a seat 24 of the bolt 9, and the collar 21 of the firing pin. A head 25 secured to one end of said firing pin is constructed with guides 26 movable within the guideways 10 of the breech casing 2, and also assists in guiding the firing pin rectilinearly within the bolt 9. The head 25 is constructed with a shoulder 27 for engaging with a sear 28, that is piv-

otally mounted at 29 to the breech casing 2, for holding the firing pin cocked and under tension of the spring 23. The sear 28 is designed to be released from the shoulder 27 by the trigger 30 through the medium of an intermediate piece 31. The forward end of the firing pin 19 is designed with a conical head 32 that enters within and projects through a similarly designed recess 33 in the breech bolt plug 14.

The cartridge extractor 34 has the usual form of a forked spring, and is mounted in a groove in the bolt plug 14 in such manner that it shares the independent movement of said plug, in order that its claws shall not be raised toward the front by the recoil when cartridges having grooved rims are used. The shell extractor 34 serves to guide the plug 14 rectilinearly, and this movement of said plug 14 is further governed by the cartridge ejector rod 35, which engages within a slot in said plug. The ejector rod 35 has a projecting lug 36 movable within a relatively short slot 37 in the lower guiding member 11 of the bolt plug 9. Through the medium of this lug and slot engagement (36 and 37), the ejecting end of the rod 35 is permitted to protrude the necessary distance beyond the plug 14 to engage with the base of the spent cartridge shell and with the help of the extractor head 34, to eject said shell from the breech casing. In the present construction, the cartridge ejector rod 35 has also the purpose of enabling the entire breech mechanism to be made relatively short, since its rear fork allows the firing pin shoulder 27, after the pulling of the trigger, to move forward into the magazine without coming in contact with the cartridges therein.

The arrangement for feeding the cartridges is more fully described and shown in my application Serial No. 507,402, dated July 13, 1909, and entitled "Improvements in drum magazines for firearms."

The means for closing and locking the breech bolt sleeve following its recoil under gas pressure, consists in an accumulator spring 38 contained within a telescoping cylinder, one section 39 of which is secured to the breech casing 2, and the other section 40 is connected with the breech bolt 9 through the medium of an arm 41, into which arm said bolt has screw-threaded engagement. The cylinder section 40 is provided with an inertia body 42, for obvious reasons. With this arrangement of the accumulator, *i. e.*, having the same disposed substantially exteriorly of the breech casing 2, the breech bolt sleeve may be manually unlocked and the breech opened merely by moving the cylinder section 40 with the hand.

In the arrangement shown in Fig. 8, the construction is substantially the same as that disclosed in Figs. 1 and 2, differing only in

that the locking engagement between the breech bolt sleeve 5 and the breech bolt 9 consists in two spiral flanges 43 in lieu of the lugs 12.

5 In the construction shown in Fig. 9, the locking connection between the breech bolt sleeve 5 and the bolt 9 consists in a pair of rectangular lugs 44, one being shown, engaging within straight guideways 45. Said
10 guideways 45 enter into a cylindrical recess 46, which permits of the breech bolt sleeve 5 being turned to lock or unlock when the lugs 4 enter therein.

15 In the arrangement shown in Fig. 10, the means for locking with the breech casing consists of lugs disposed on opposite sides of said bolt sleeve, and each comprising two sections 47 and 48. The section 47 has a relatively steep spiral surface 49 for en-
20 gaging with a like surface on the breech casing for effecting the locking engagement, and the section 48 has a relatively small surface 50, which engages with a similar element in the breech casing for terminating
25 the unlocking operation. Each of said sections has a relatively square surface 51 that engages with a like element in the breech casing and provides shoulders or abutments, to the end of holding the breech bolt sleeve
30 against resistance or shock incident to firing.

The safety device 52 combined with the cartridge holder 53, forms the subject-matter of another application, and need not, therefore, be described or further disclosed in
35 the present case.

It is obvious that those skilled in the art may vary the details of construction and arrangement of parts without departing from the spirit of my invention, and therefore I
40 do not wish to be limited to such features except as may be required by the claims.

What is claimed is:—

1. In a firearm having a breech casing, the combination of a breech bolt sleeve mounted
45 within said casing and having a rotary locking connection therewith; a breech bolt; means for guiding the breech bolt rectilinearly within said breech casing; a rotary locking connection between the breech bolt sleeve and breech bolt; a breech bolt plug
50 mounted within the breech bolt sleeve and having limited movement therein, said breech bolt plug having a portion in contact with the breech bolt and having a shoulder nor-

55 mally spaced forward from the end of the breech bolt sleeve; said contacting portion operable to impart movement to the breech bolt to effect initial unlocking movement of the breech bolt sleeve, and said breech bolt plug coöperative with the breech bolt to
60 completely unlock and open the breech bolt sleeve through gas pressure; and an accumulator for automatically closing and locking the breech bolt sleeve, substantially as described.

2. In a firearm having a breech casing, the combination of a breech bolt sleeve mounted within said casing and having a rotary locking connection therewith; a breech bolt
70 mounted within and carried by the breech bolt sleeve; means for guiding the breech bolt rectilinearly in the breech casing; a rotary locking connection between the breech bolt sleeve and breech bolt operable to lock and unlock the breech bolt sleeve; a firing
75 pin rectilinearly movable within the breech bolt; a breech bolt plug mounted within the breech bolt sleeve and providing a base for the cartridge, said breech bolt plug movable axially independently of the breech bolt
80 sleeve and operable to impart the initial unlocking movement thereto; a cartridge shell extractor carried by said breech bolt plug; said plug operable to effect the complete un-
85 locking and opening of the breech bolt sleeve through gas pressure; and an inertia body and accumulator for automatically closing and locking the breech bolt sleeve, substantially as described.

3. In a firearm having a breech casing, the
90 combination of a breech bolt sleeve having rotary locking connection with said casing; a breech bolt operable to unlock and open said breech bolt sleeve through gas pressure; an accumulator spring for automatically
95 closing and locking said breech bolt sleeve; and a telescoping casing inclosing and connected with said accumulator spring, and connected with the breech bolt; said casing
100 disposed externally of the breech casing and adapted to be actuated manually to open the breech bolt sleeve, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

KARL KRINKA.

Witnesses:

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ROBERT W. HEINGARTNER.