

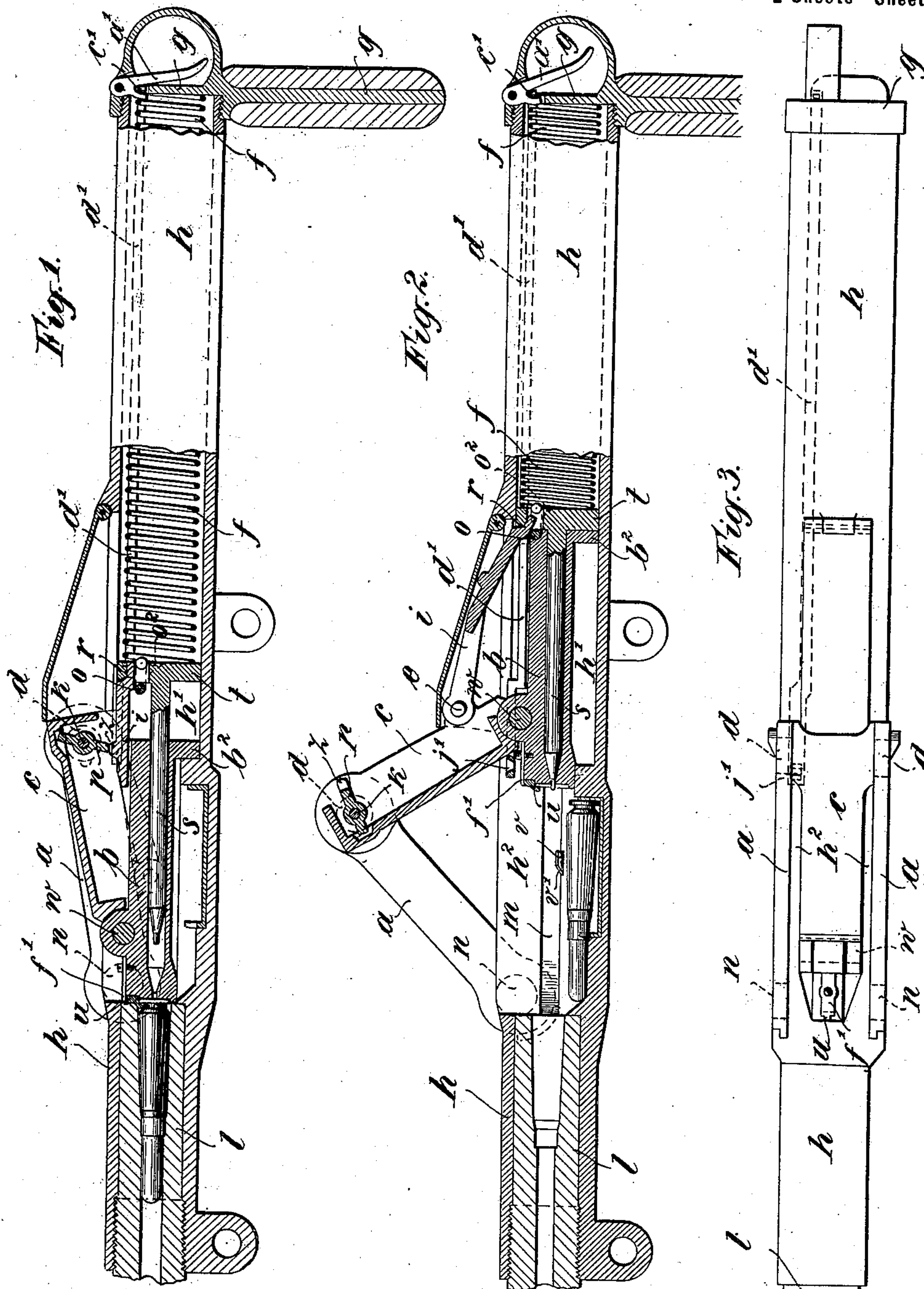
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A. W. SCHWARZLOSE.
AUTOMATIC FIREARM.
(Application filed Oct. 30, 1900.)

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(No Model.)

2 Sheets—Sheet 1.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC FIREARM.

SPECIFICATION forming part of Letters Patent No. 712,972, dated November 4, 1902.

Application filed October 30, 1900. Serial No. 34,919. (No model.)

To all whom it may concern:

Be it known that I, ANDREAS WILHELM SCHWARZLOSE, engineer, a citizen of the Kingdom of Prussia, and a resident of Suhl, Thuringia, Germany, (whose post-office address is Herrenstrasse 162,) have invented certain new and useful Improvements in Automatic Rapid-Firing Firearms, of which the following is a specification.

10 The present invention relates to a firearm in which the opening of the breech mechanism, the removing of the empty cartridge-shell, the inserting of the new one, the closing of the breech mechanism, and the firing
15 are completely automatically done by means of the preceding discharge.

An essential part of the present invention forms the particular articulated breech mechanism which has already been employed in
20 automatic firearms with fixed barrel.

In different constructions of automatic firearms the toggle-link breech mechanism of the American repeating pistol of 1854 has been employed. The articulations of the breech
25 mechanism are situated in line, and the expanding gases act by means of the rear end of the frame. Mechanisms of this kind are very long, and the frame being exposed in its whole length to the heavy strains by the
30 force of the exploding gases must be constructed very long and strong. In the present construction, on the contrary, the articulations are put one to the side of the other, and the recoil of the gases is transmitted immediately from the back end of the barrel to the breech mechanism. The whole mechanism is consequently very short, and the frame
35 is completely protected from the strains of the exploding gases. In arms with a sliding barrel no frame at all is wanted.

The new breech mechanism is in the first line designed for automatic arms with fixed barrel, and in these cases the breech mechanism is opened by the gases pressing on the
45 bottom of the empty cartridge-shell. The strain, which in ordinary firearms is received by the breech-block and which acts compressing or bending on the same, causes in the present invention the opening of the breech.
50 The breech mechanism is constructed in such a way that the empty cartridge-shell suffers no strains superior to those in arms with fixed

breech mechanism. It also may be employed for machine-guns with fixed barrel.

In the accompanying drawings, Figure 1 is
55 a longitudinal vertical section through the closed breech mechanism in the moment of firing. Fig. 2 shows the same, but the breech open. Fig. 3 is a top view of same, and Figs. 4 to 9 are details of the mechanism.
60

To the rear end of the barrel *l* is fastened the frame *h*, the bore *h'* of which contains the breech mechanism. The frame has on its upper side an opening for inserting the breech-block *b*, Fig. 7, which slides in the
65 bore of the frame *h*. Said breech-block is provided with an axial bore for receiving the striking-pin *s*, Fig. 8. Two lateral ribs *b'b'*, guided by grooves *m* in the walls *h²* of the frame, prevent the breech-block from turning
70 around its axis. The striking-pin is provided at its rear end with a disk *t*, fitting the bore of the frame. *f* is a coiled spring inserted into the closed rear part of the frame *h*, its fore end bearing against the disk *t* of the
75 striking-pin and its rear end against a bottom piece *g*, screwed onto the frame. Said spring *f* acts simultaneously as mainspring, locking-spring, and trigger-spring, and it always tends to bring the striking-pin into its
80 foremost position. In its fore part the frame has on both sides two coaxial cylindrical pins *n*, Figs. 1, 2, and 3. Said pins serve as pivots for the outer links *a*, Fig. 4. The inner link *c*, Fig. 5, is connected to the rear ends
85 of the outer links *a* by means of cylindrical pins *d*, whereas its other end is articulated to the fore end of the breech-block *b* by means of a pin *w*. On firing the cartridge the pressure of the gases acting on the bottom of said cartridge is transmitted to the breech-block *b*,
90 and from there by means of the pin *w* to the link *c*, from where the pins *d* transmit it to the outer links *a* and to the pins *n* on the frame. If, as shown in the drawings, the described mechanism is to be employed in an
95 automatic gun with fixed barrel, the pins *d* must be when the mechanism is closed above the plane through the centers of the pins *n* and *w*. The described mechanism not only
100 takes up the back pressure of the gases, but under the influence of the described connection of the outer and inner links swings upward and opens the breech. From Fig. 10 it

is easily understood that the force with which the breech-block is moved backward by the gas-pressure largely depends on the angle formed by the link *e* and a plane through the centers of pins *n* and *w*. The greater the angle the greater the force will be which throws the breech-cylinder backward.

It is evidently of the highest importance for the regular working of the device that the common link *d* describe a very long way as long as the pressure in the barrel lasts or as long as the bullet did not yet leave the barrel. On the other hand, it is necessary that the cartridge-shell move as little as possible as long as the bullet is still in the barrel in order to avoid its bursting. Of essential influence on these two diametrically-opposed conditions the links are to fulfil is the distance of the pins *n* and *w* with regard to the whole distance *w* and *d*. The smaller the distance between *n* and *w* the higher is the common link to rise in order to remove the breech-cylinder a given distance back from the barrel.

In order to bring the pins *n* and *w* close to each other independently of the other parts of the breech mechanism and in order to obtain the most favorable proportion in the dimensions of the parts forming the link, the inner link *c* is arranged so as to lie between the walls *h*² of the frame, whereas the pivots *n* of the outer links *a* are arranged on the outside of the frame. The described arrangement allows of the use of the new breech mechanism for any gas-pressure and any bore of the barrel, as the pins may be brought together to any desired degree, even so far that the center line of *w* exactly coincides with those of *n*.

A trigger-bar *i*, Fig. 6, is articulated to the link *c* by means of screws *e*. Its free end may penetrate into the opening provided in the disk *t* of the striking-pin. When the breech is completely opened, a shoulder *r* of said trigger-bar comes in front of said disk and catches the same, Fig. 2. An intermediate piece *o*, Fig. 9, presses the disk into the notch. It rests with two corresponding pins *o' o'* in corresponding notches *t'* of the disk *t*.

The coiled spring *f* presses against flaps *o*², projecting from the piece *o* and over the pivot-pins *o' o'*. In opening the breech the part *o* is depressed by the trigger-bar, and thereby compresses the coiled spring *f*, whereas it presses the shoulder *r* upward, thereby catching the disk of the striking-pin as soon as the same leaves the opening in said disk. As soon as the recoil ceases the spring *f* presses the disk again toward the fore end of the frame, and as the disk is caught by the shoulder of the trigger-bar this bar must follow the forward motion, transmitting the same by means of the described connection to the breech-block. It is easily understood that in equal intervals of time and in consequence of the described particular connection the breech-block will travel over a longer path than does the strik-

ing-pin, and therefore the latter will be cocked when the breech-block reaches its foremost position. A new discharge may then take place. If in this cocked position the trigger-bar be depressed, the shoulder *r* releases the disk of the striking-pin and the spring *f* throws the latter forward, thereby exploding the cartridge. As the firing is to be done automatically, means must be provided for depressing the trigger-bar as soon as the breech is completely closed. For that purpose there is arranged a plate *p* in the inner link *c*, the lower end of said plate being able to depress the trigger-bar as soon as the breech-block comes to its foremost position, thereby setting free the striking-pin. With the described arrangement of the plate *p* the firing would continue incessantly. In order to enable the gunner to stop and restart the fire at will, the plate *p* is not made fast to the link *c*, but is able to oscillate to a certain degree on horizontally-arranged pins *h*, and means are provided for giving the plate an inclination in one or the other direction, so that its lower edge may or may not be able to depress the trigger-bar. This inclination is imparted to the plate by means of the trigger *a'* and a bar *d'*, Figs. 1, 2, and 3. On pressing down the trigger *a'* the bar *d'*, which is guided in proper way within the frame *h*, is moved toward the fore end of the frame. Said bar has near its fore end a slot *j'*, provided with slanting fore and rear edges. The plate *p* has laterally arranged a shoulder *z*, arranged in such a way that in closing the breech it enters the slot *j'*. If the trigger is in its position of rest, said shoulder strikes against the fore edge of said slot. Thereby the plate is turned so that its lower edge does not come into contact with the surface of the trigger-bar, and therefore cannot depress the same. If, on the contrary, the trigger *a'* is depressed, the shoulder *z* freely enters the slot *j'* and the lower edge of plate *p* presses on the trigger-bar, depressing it and setting free the striking-pin. For firing the first round or restarting firing when all parts are in their position of rest and when the lower edge of the plate *p* does not act on the trigger-bar the trigger is simply depressed. Thereby the bar *d'* is pressed forward, and the rear edge of its slot *j'* presses the plate *p* into its foremost position, and on reaching same the lower edge of the plate *p* depresses the trigger-bar, thereby starting the fire.

u, Figs. 1, 2, 3, is the extractor for the empty cartridges. It is dovetailed to the breech-block, and a spring *f'* presses it toward the interior of the barrel. Its form and construction, as well as its action, differ widely from any known form of extractor. The ejection of the empty cartridge-shell takes place as soon as it is completely removed from the interior of the barrel. The frame, the opening for the breech-block *b*, and both sides of the chamber are each provided with an ejector *v*, Fig. 2, formed by simple projections distant

from the hind end of the barrel exactly the length of the empty cartridge-shell. The breech-block *b* has two grooves *b*³, Fig. 7, and therefore slides freely over the ejectors.

5 When it is withdrawn from the barrel, the cartridge meets the stationary ejectors *v*, and the empty shell is thereby ejected from the frame. Ball-cartridges being considerably longer than empty shell, special means must
10 be provided to eject both of them as the special case requires. They consist simply in a chamfered front surface of each ejector, on which the bottom of the retired cartridge mounts.

15 As told above, the energy stored in opening the breech mechanism depends largely on the angle between *a* and *b* and the line through *n* and *w* or from the way described by the link. This quality offers a means for
20 employing the arm with cartridges of different length. The barrel is not, as ordinarily, provided with a shoulder limiting the attachment of the frame *h*; but the barrel may be screwed up to any desired point into the
25 frame. In any desired position both are fixed by means of press-screws or the like. The deeper the barrel enters the frame the greater will be the elevation of the link above its position of rest. In employing cartridges
30 with less powder charge, causing, consequently, less recoil, the barrel *l* is screwed deeper into the frame *h*, and the breech then opens completely, even with a much smaller recoil.

35 What I claim is—

1. An automatic gun, comprising a frame fastened to the rear end of the barrel, said frame being provided at its upper side with an opening, a breech-block contained in said
40 frame, a coiled spring tending to press said block forward, a link articulated to said breech-block, and other ones hinged by means of pins to the outside of the frame, the free ends of both links being pivotally connected

to each other by means of a pin, a trigger- 45 bar hinged to said link, a striking-pin resting in the central bore of the breech-block, a disk on the end of the pin, said trigger-bar penetrating into an opening of the disk of said striking-pin, and means for depressing said 50 trigger-bar, substantially as, and for the purpose described.

2. An automatic gun comprising a frame, a breech-block a striking-pin contained in a central bore of same, a coiled spring inserted 55 into said frame pressing the breech-block toward the rear end of the barrel, pins arranged on the outside of said frame, links hinged thereto, another link arranged between the aforesaid links and articulated to the same, 60 said link being hinged to the breech-block, an oscillating plate arranged near the connection between the aforesaid links, and a trigger-bar, hinged to said breech-block, substantially as shown and described. 65

3. An automatic gun, comprising a frame, a breech-block, a striking-pin, said breech-block being articulated to said frame, a coiled spring inserted into said frame, a trigger-bar having a notch, being arranged so as to pene- 70 trate into an opening of a disk arranged at the end of said striking-pin, a plate arranged at the inner toggle-link, acting on said trigger-bar, said plate being able to turn to, a certain extent on horizontal pivots, a bar, 75 guided in said frame and actuated by means of a trigger having in its fore part an opening with slanting fore and rear edges, arranged so that a shoulder of the aforementioned plate may penetrate into said open- 80 ing, substantially as and for the purpose hereinbefore described.

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

ANDREAS WILHELM SCHWARZLOSE.

Witnesses:

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