

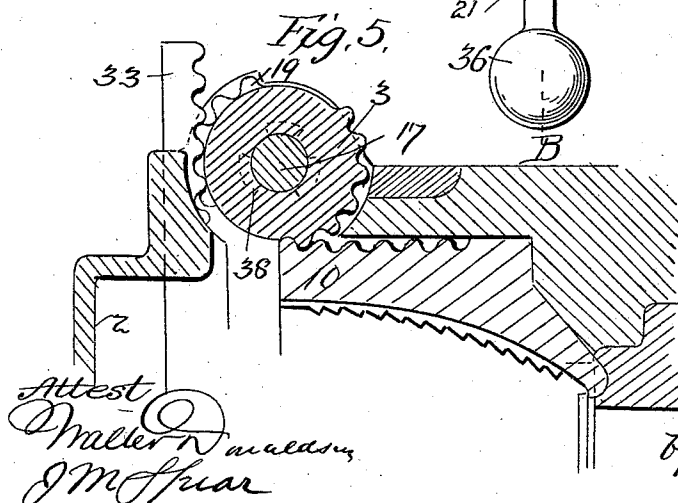
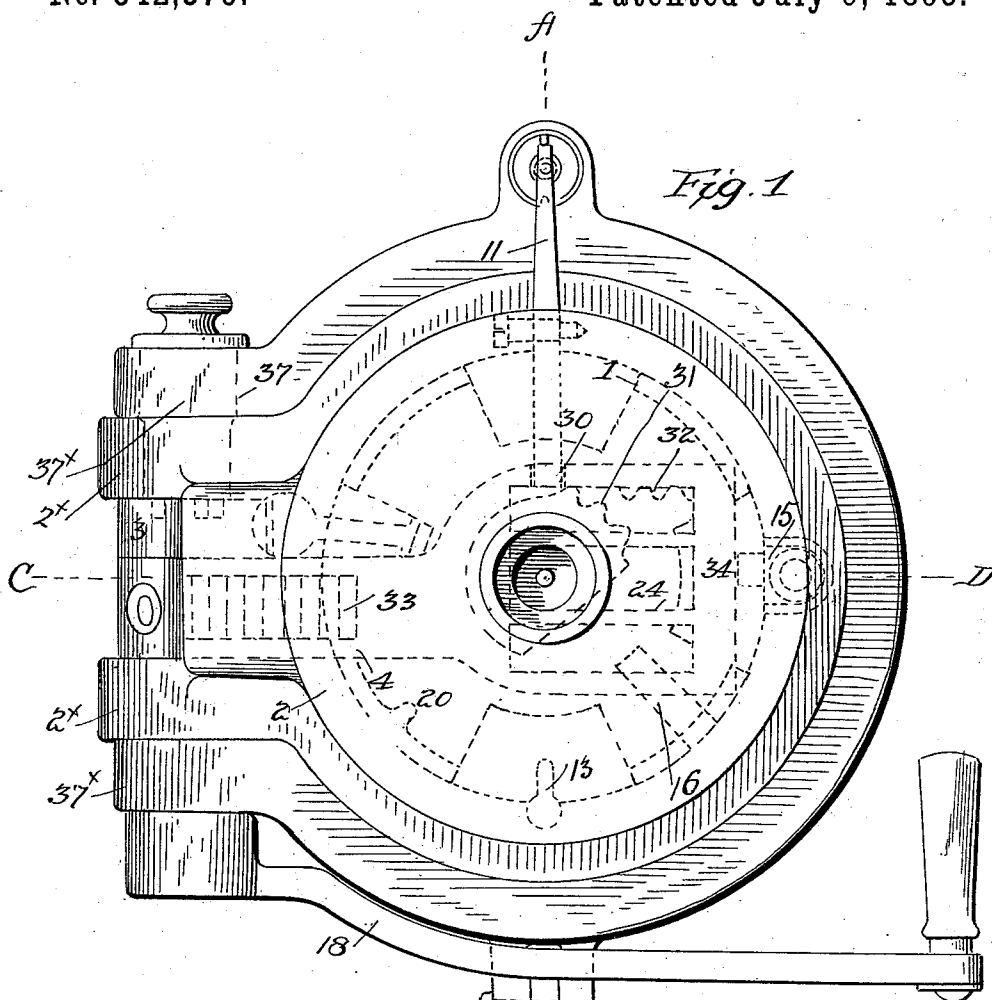
(No Model.)

5 Sheets—Sheet 1.

A. SILFVERSPARRE.
BREECH MECHANISM FOR ORDNANCE.

No. 542,379.

Patented July 9, 1895.



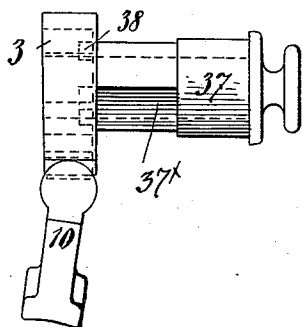
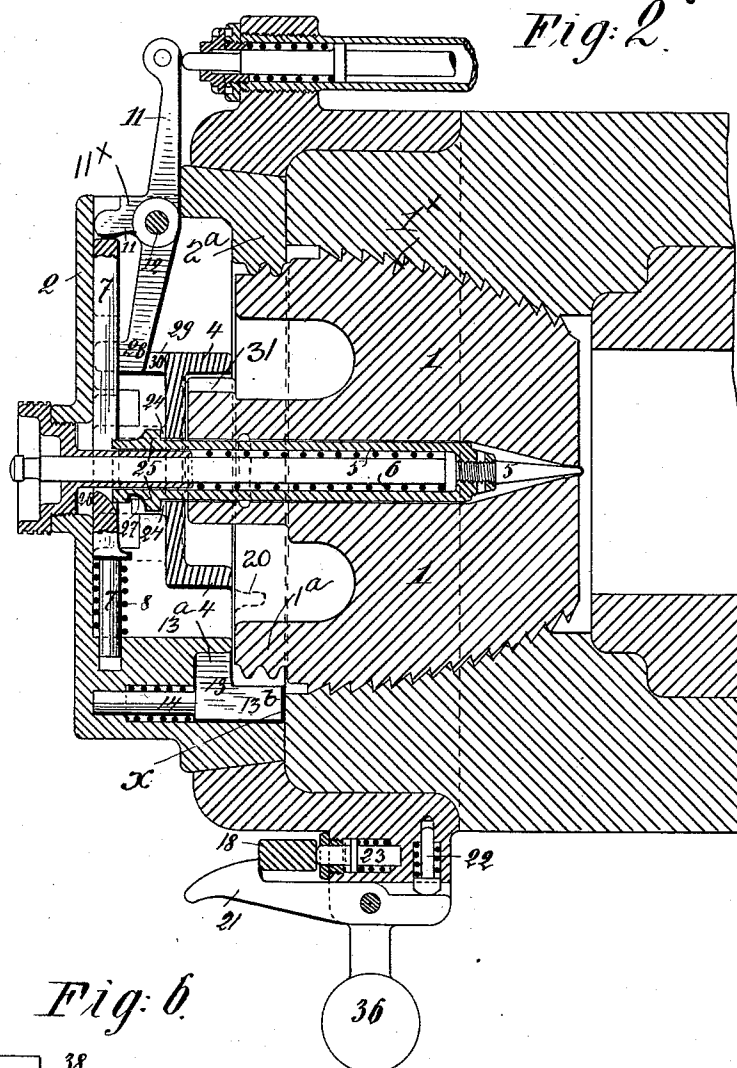
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5 Sheets—Sheet 2.

No. 542,379.

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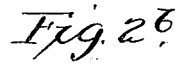
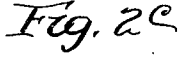
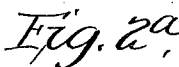
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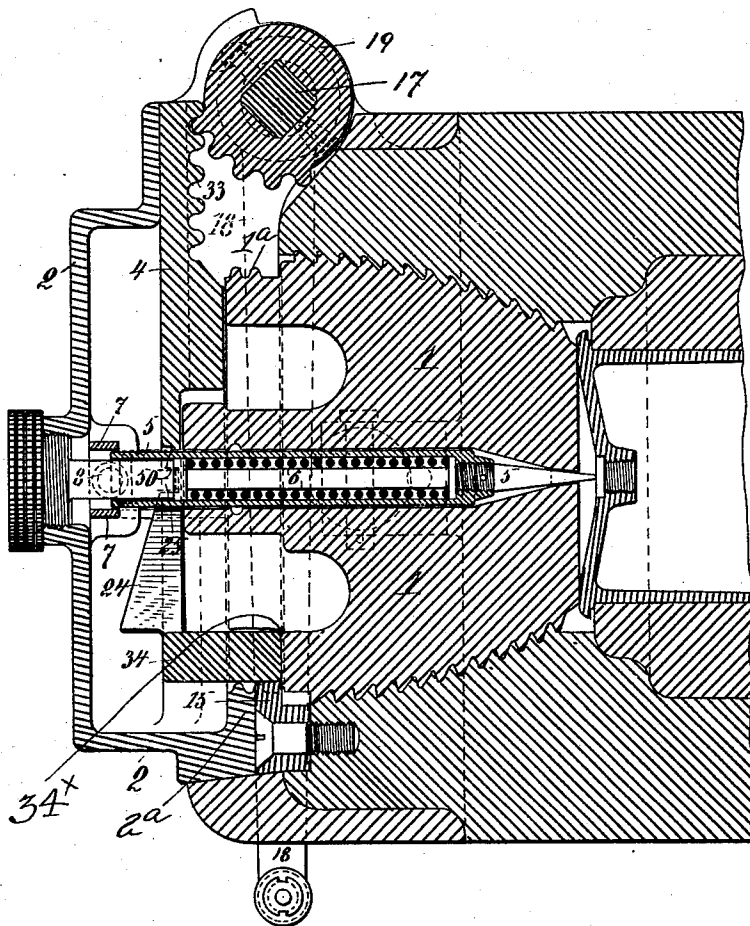


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No. 542,379.

Patented July 9, 1895.

Fig: 3.



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5 Sheets—Sheet 5.

A. SILFVERSPARRE.
BREECH MECHANISM FOR ORDNANCE.

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Fig: 4.

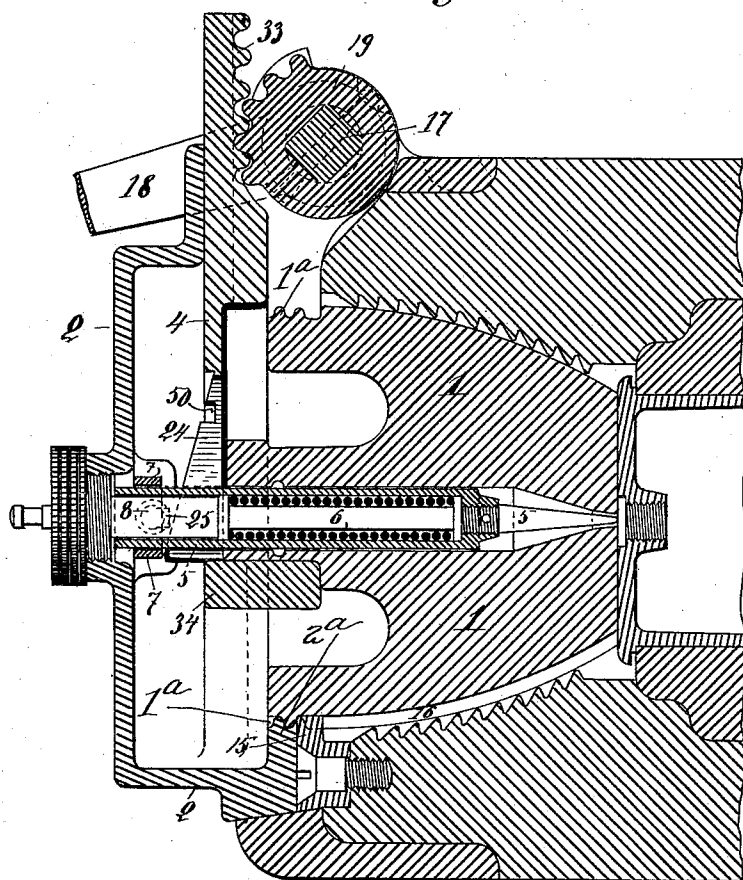
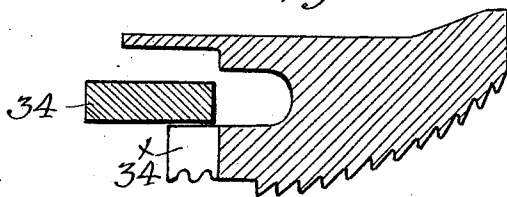


Fig. 4a



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UNITED STATES PATENT OFFICE.

ARENT SILFVERSPARRE, OF BOFORS, SWEDEN.

BREECH MECHANISM FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 542,379, dated July 9, 1895.

Application filed September 12, 1894. Serial No. 522,855. (No model.) Patented in Sweden December 3, 1892, No. 4,592; in Norway December 8, 1892, No. 2,960; in England January 6, 1893, No. 328, and in France January 11, 1893, No. 227,078.

To all whom it may concern:

Be it known that I, ARENT SILFVERSPARRE, engineer, a subject of the King of Sweden and Norway, and a resident of Bofors, county of Wermland, Sweden, have invented an Improved Breech-Loading Mechanism for Guns, (for which I have obtained a Swedish patent, No. 4,592, dated December 3, 1892; a Norwegian patent, No. 2,960, dated December 8, 1892; a French patent, No. 227,078, dated January 11, 1893, and an English patent, No. 328, dated January 6, 1893,) of which the following is a specification.

The gun comprises a rotary locking breech-block; a pivoted carrier therefor, a firing mechanism, and a laterally-movable bar controlling the locking of the rotary breech-block and the cocking of the firing mechanism. It includes, also, a firing-pin adapted to lock the said laterally-movable bar when the arm is fired and prevent its movement until the recoil of the firing-pin due to the explosive releasing it, or until it is released by hand.

On the annexed drawings the mechanism is shown applied to a gun.

Figure 1 is a rear view of the mechanism closed. Fig. 2 is a section along A B, Fig. 1. Fig. 2^a is a detail sectional view through the axis of the swinging carrier. Fig. 2^b is a detail view of the rack-bar and adjacent parts. Fig. 2^c is a side view of the breech-bolt; Fig. 3, a section along C D, Fig. 1; and Fig. 4, a section along C D, Fig. 1, with the mechanism partly open. Fig. 4^a is a detail view of part of the rotary breech-block, showing the recess therein to be engaged by the safety-block. Figs. 5 and 6 represent the extracting mechanism in section and elevation.

The breech-screw 1 is of an ogival shape, the generatrix of its curved surface being a circle with its center located on the axis of rotation of the carrier 2. The breech-screw is threaded or provided with threaded sectors, as at 1^x, Figs. 2^b and 2^c, from one end to the other, and its rear rim 1^a is screwed into the ring-shaped portion 2^a of the carrier 2, that is hinged on a pin 17 at the back end of the gun. On this pin there are located two toothed wheels or segments 3 and 19, Figs. 1, 50 and 2^a, the former being loose on the pin but

connected to the carrier to swing therewith, as will be described hereinafter, and the latter rigidly attached to the pin and movable independent of the carrier. At one end the pin has attached to it a lever 18 with a handle. This lever is grasped by a catch 21, which turns on a pin situated on the body of the gun and provided with a counterweight 36. The tail at the front end of the catch is acted upon by a spring device 22, and a similar device 23 is arranged in front of the rear end of the catch, so that the lever 18 can be locked between the latter spring device and the catch. In the carrier 2 there is arranged a slide 4, on the front side of which is a rack 33 engaging with the toothed wheel 19, by the turning of which the slide is drawn out through the edge of the carrier. The inner end of the slide embraces the back end of the central portion of the breech-screw 1. This central portion is shaped as a toothed segment 31, Figs. 1, 2, and 2^b, engaging with corresponding teeth 32 on the inside of the slide.

At the inner end of the slide a safety-block 34 is arranged, engaging with a recess in the back of the breech-screw and locking the latter in its position until the slide is drawn out. On the back of the slide there are also two wedge-shaped ridges 24, Figs. 3, 4, and 2^b, situated on each side of the firing-pin 5, which is concentric to the axis of the breech-screw and is acted upon in the usual manner by a surrounding mainspring 6.

Behind the ridges 24 of the slide the firing-pin 5 is provided with two projections 25, which at the outward movement of the slide are pushed back by the ridges, thus cocking the gun behind the projections. The firing-pin has a notch 27, forming a part of the firing mechanism. As usual the latter consists of a trigger 11, made in the shape of a bell-crank and movable about a stud 12. In firing one arm 11^x of the bell-crank acts upon a bar 7, movable at right angles to the axis of the gun. While the arm is cocked the bar 7 is pressed outward by a spring 8, causing a catch 26 on the bar to be pressed against the firing-pin and to engage with the notch 27. The trigger 11 is provided with an arm 28, projecting inward against the axis of the gun

and adapted to fit into a corresponding recess 30 in the flanges 29 at the back of the slide 4, Fig. 2.

In the part of the carrier 2 which adjoins the back end of the gun there is inserted a latch 13, that is pushed forward by a spring 14 and is pressed forward so that its lug 13^a enters a corresponding recess 20, Figs. 1, 2, and 2^b, at the back of the breech-screw as soon as the latter, while the mechanism is being opened, has been revolved and begins to be drawn out of the gun by the swinging of the carrier, the notch 20 now being opposite the catch-lug 13^a.

When the mechanism is closed, Fig. 2, the latch is kept back by forward arm 13^b of the catch abutting the rear end of the gun at *x*. In the circumference of the breech-screw there is also a longitudinal groove 16 and in the part of the gun surrounding the breech-screw there is a projecting guide-lug 15, which as soon as the breech-screw has been revolved into a certain position enters the groove and serves as a guide for the breech-screw while it is being drawn out.

The extractor 10, Figs. 5 and 6, is composed of an arm situated at the side of the breech-screw and at the front end provided in the usual manner with a jaw intended to grasp the rim of the cartridge-case. At the back of the arm there are arranged teeth engaging the toothed wheel 3 on the pin 17 in such a manner that the extractor is pulled out, together with the cartridge-case, at the revolution of the toothed wheel 3. The toothed wheel is connected to the carrier to move therewith by the clutch 37 38, hereinafter described, Fig. 2^a.

The mechanism operates as follows: When the shot has been fired the gun recoils, causing the catch 21 to swing on its pin, owing to the inertia of the counterweight. The lever 18 thereby is released from the catch and forced outward by the spring 23; which prevents the latter from grasping the lever again. If the lever is then pushed back the pin 17 will revolve, together with the gear 19, which by means of the rack 33 draws out the slide 4, thus removing the safety-block 34 carried by the slide from the corresponding recess 34^x in the back of the breech-screw 1. (See Fig. 4^a.) On the continued motion of the slide the teeth 32 engage the toothed segment 31 of the breech-screw, which is thereby revolved about its axis until the guide-lug 15 strikes against the bottom of the groove 16, the breech-screw being then unscrewed from the corresponding threads in the back part of the gun. During the motion of the slide the wedge-shaped ridges 24 slip in front of the lugs 25 of the firing-pin 5, causing the latter to be pulled back and allowing the catch 26 on the bar 7 to engage with the notch 27 in the firing-pin, which now remains cocked. By further rotating the pin 17 by means of the lever 18 the carrier 2 is turned

about the axis of the pin 17, at the same time swinging the breech-screw, which is thus pulled out from the surrounding cavity in the back of the gun. The breech-screw is guided in its motion by the lug 15, fitting into the groove 16, and simultaneously it is held firmly in place to the carrier by the lug 13^a of the latch 13, which, as soon as the breech-screw begins to recede from the gun, is pressed into the recess 20 by the action of the spring 14. The recess is so located that it will stop directly in front of this latch when the breech-screw has completed its rotation about the axis of the gun. At the movement of the carrier 2, the gear 3 connected thereto by the clutch 37 38 also is revolved, thus pulling out the extractor 10 and the cartridge-case, whose flange is grasped by the jaw-shaped end of the extractor.

When the cartridge-case has been subsequently removed by hand, a new cartridge is inserted, the lever 18 being then turned back into its original position, causing the carrier to approach the back end of the gun. As the breech-screw enters the latter, the lug 13^a of the latch 13 is pushed out of its recess by the arm 13^b contacting with the breech, and releasing the breech-screw when it has advanced sufficiently far into the cavity and the guide-lug 15 has reached the upper portion of the groove 16. During the continued rotation of the lever 18 the teeth 32 will engage the toothed segment 31, turning the breech-screw 1 and causing it to be screwed into the gun, while at the same time the wedge-shaped ridges 24 of the slide are pushed away from the corresponding lugs 25 of the firing-pin 5, which accordingly is free to move forward when the trigger is pulled. At the completion of the movement of the lever 18 the block 34 of the slide engages with the corresponding recess in the breech-screw. The slide then has been pushed in so far that the recess 30 will come just in front of the extremity of the arm 28 of the trigger 11, and consequently the trigger can be moved and the shot fired, which up to this instant has been impossible owing to the fact that the arm 28 of the trigger has been locked by the flange 29 at the back of the slide. As soon as the lever 18 has arrived at its foremost position, the catch 21 again clasps around it and retains it in its position until the shot is fired.

In case the gun should fail to go off or should hang fire, no recoil will take place and it will be impossible to open the mechanism until the lever 18 has been released by hand from the catch 21. The toothed wheel 3 of the extractor mechanism, which has previously been designated as rigidly attached to the carrier 2, conveniently may be arranged in such a manner that it can be separated from the door, if desired, in order that the mechanism may be opened without the extractor being put into action. For this purpose a clutch

37 with a hub 37^x of polygonal section may be employed, which is slipped over the end of the pin 17 and inserted into a corresponding angular opening in the carrier 2, Figs. 1 and 2^a, the polygonal part of the clutch passing through the arms 2^x of the carrier while the jaws 38 of the clutch engage corresponding recesses in the gear 3 and compel the latter to take part in the rotary motion of the carrier. On the other hand, when the clutch is disengaged from the gear the carrier may be turned without the gear participating in its motion, and consequently the extractor mechanism will remain inactive.

To prevent accidents when the gun hangs fire, the lever 18 and catch 21 may be replaced by notches 50 in the wedge-shaped ridges 24, so as to cause the lugs 25 of the firing-pin 5 to engage into these notches when the gun is fired off. In this case the face of the breech-screw 1 should be given such a shape with reference to the base of the cartridge-case, Figs. 3 and 4, that it will touch the latter at the outer edge only, in order that the central portion of the base of the cartridge-case may have a chance to move back under the influence of the pressure generated by the powder-gases. The firing-pin 5 will then be pushed back by the base of the cartridge and the lugs 25 will recede from the notches 50, thus releasing the slide 4 and making it possible to open the breech-loading mechanism. On the other hand, if the gun fails to go off the base of the cartridge does not recede, and consequently the lugs 25 of the firing-pin will remain in the notches 50, causing the slide 4 to remain locked until the firing-pin is pulled back by hand. The base of the cartridge may either be concave, in which event the face of the breech-screw is made flat or concave, or the base may be flat, the face of the breech-screw then being made concave.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In combination in a gun, the rotary breech block the carrier for the same, the firing pin, the locking piece for the rotary breech block, the sliding bar movable on the carrier with

connection to the firing pin for operating it, said sliding bar also operating the breech block lock and means for operating the sliding bar substantially as described.

2. In combination in a gun, the rotary breech block having the locking screw threads, the segment on the block, the sliding rack engaging the segment, means for operating the rack, the firing pin having lugs, the wedges carried by the sliding rack to engage the lugs, and cocking mechanism, substantially as described.

3. In combination in a gun, the rotary breech block having the locking screw threads, the segment on the block, the rack bar engaging therewith, the means for operating the rack bar, the firing pin having lugs, the wedges on the rack bar engaging the same, the said firing pin having also the notch 27, and the catch 26 movable to engage the notch of the firing pin and means for controlling the catch, substantially as described.

4. In combination in a gun the rotary breech block, the segment thereon, the rack bar engaging the segment, the firing pin having the lugs, the wedges on the rack bar engaging the same, the catch for holding the firing pin cocked, the trigger for releasing the catch, the flange 29 on the rack bar arranged to engage and lock the trigger when the mechanism is open and having a recess to release the trigger when the mechanism is closed, substantially as described.

5. In combination in a gun, the rotary breech block of ogival form, the carrier for said breech block and means for rotating the block, the axis of said carrier being the center from which the curve of the ogival block is struck.

6. In combination, the breech block, the carrier therefor, the sliding bar arranged to unlock the breech block, means for operating the sliding bar, the notches therein and the firing pin having spurs to enter the notches of the said sliding bar, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ARENT SILFVERSPARRE.

Witnesses:

JOHN EDBERG,
H. TCLANDER.