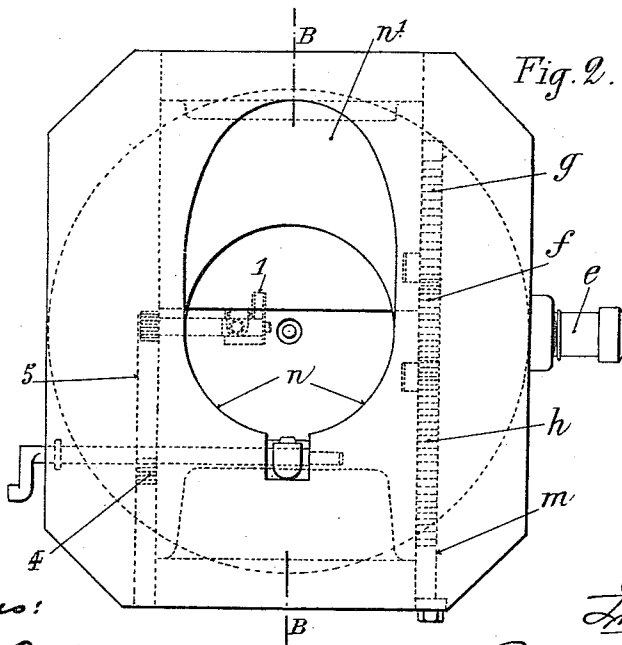
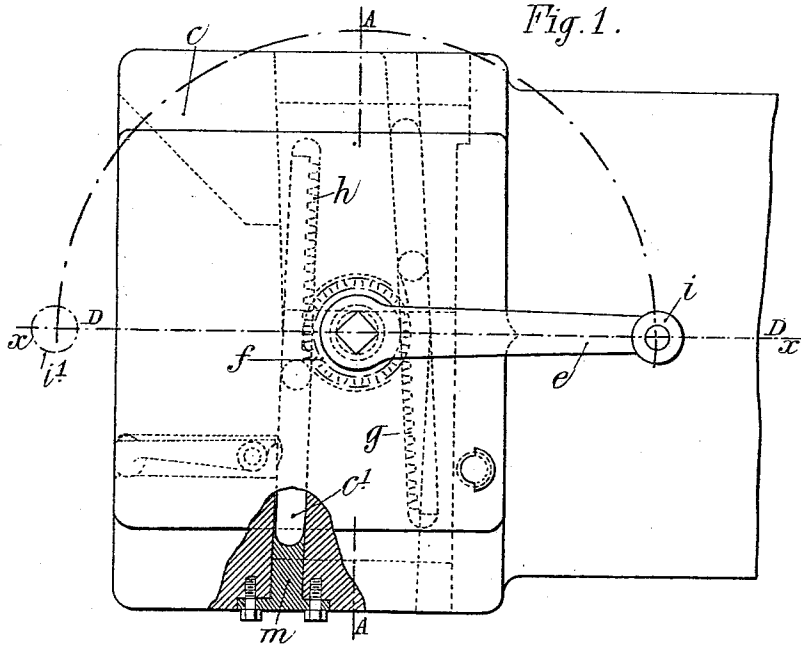


1,032,780.

E. SCHNEIDER.
BREECH MECHANISM OF GUNS.
APPLICATION FILED JULY 31, 1911.

Patented July 16, 1912.

11 SHEETS—SHEET 1.

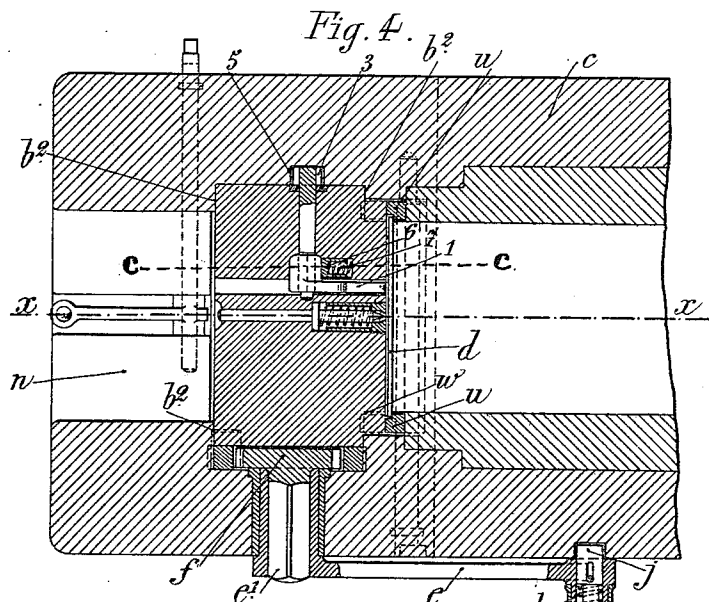
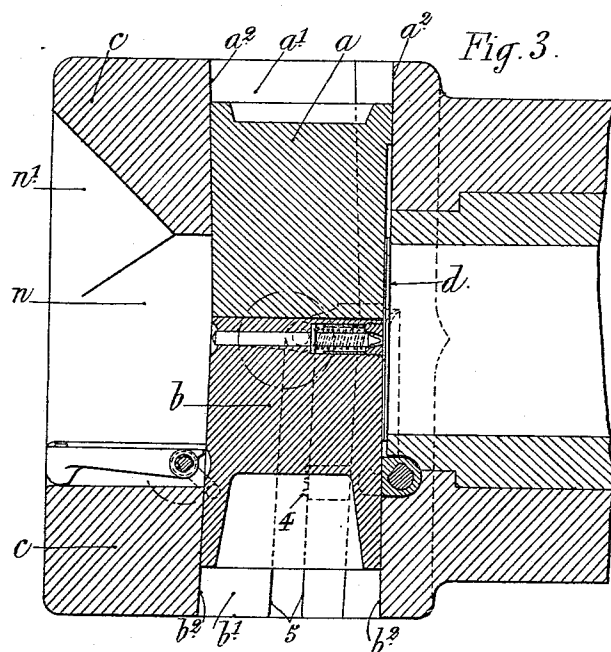


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Witnesses:
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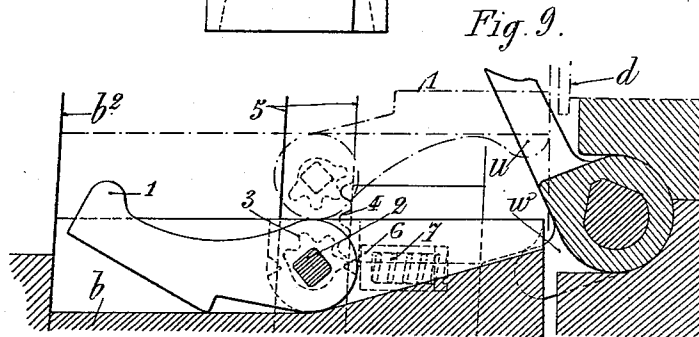
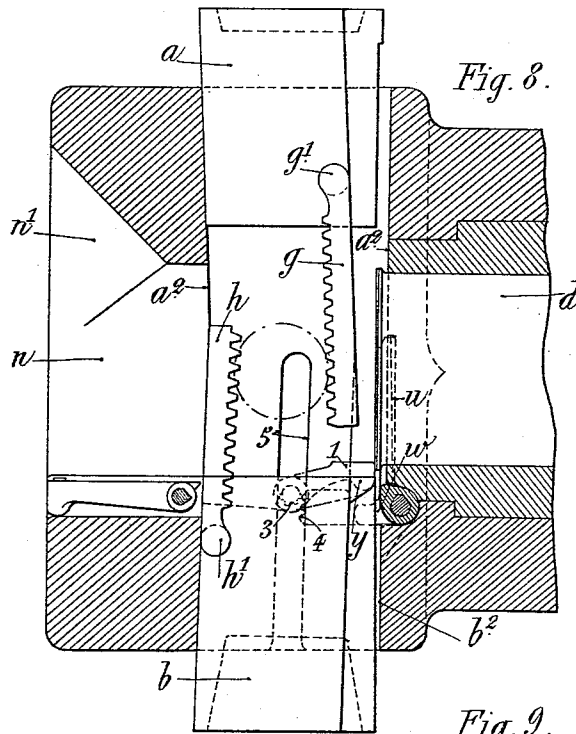
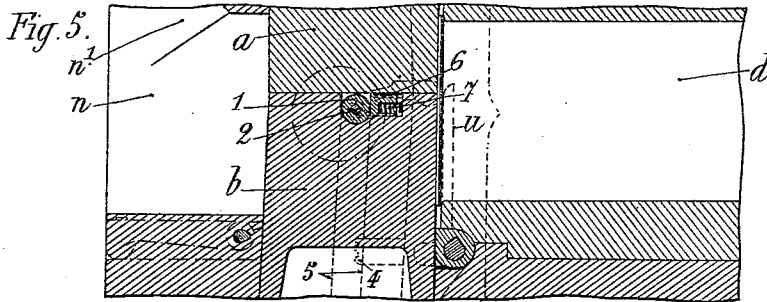
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APPLICATION FILED JULY 31, 1911.

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11 SHEETS—SHEET 3.



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1,032,780.

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Patented July 16, 1912.

11 SHEETS—SHEET 4.

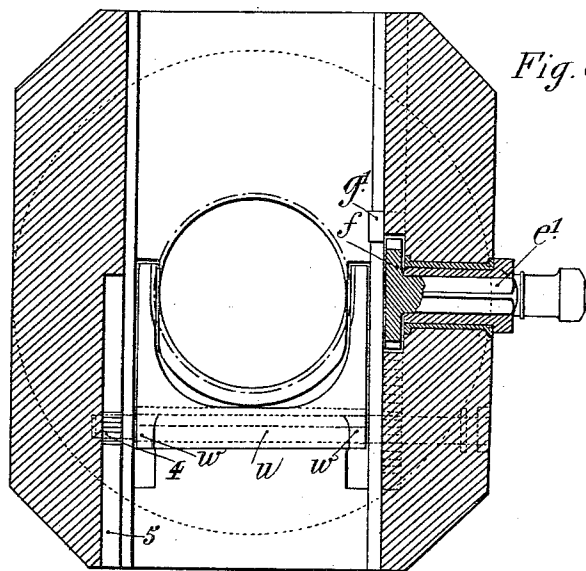


Fig. 6.

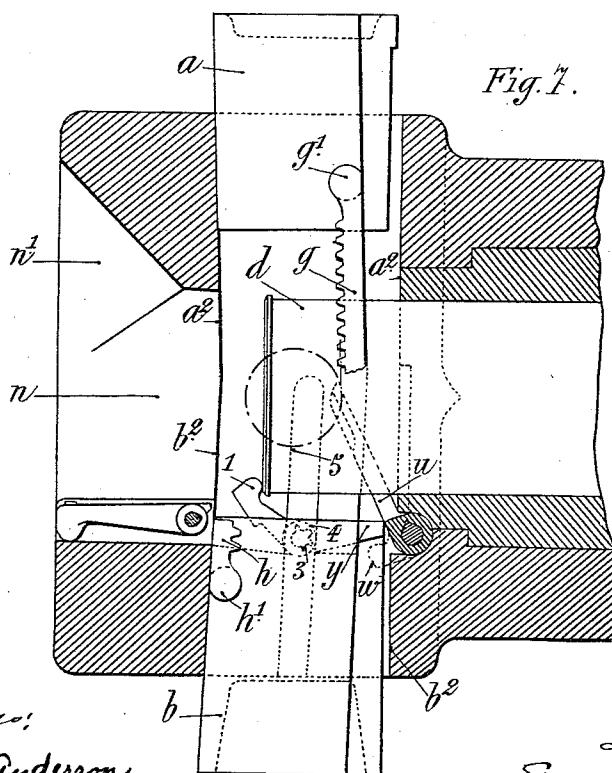


Fig. 7.

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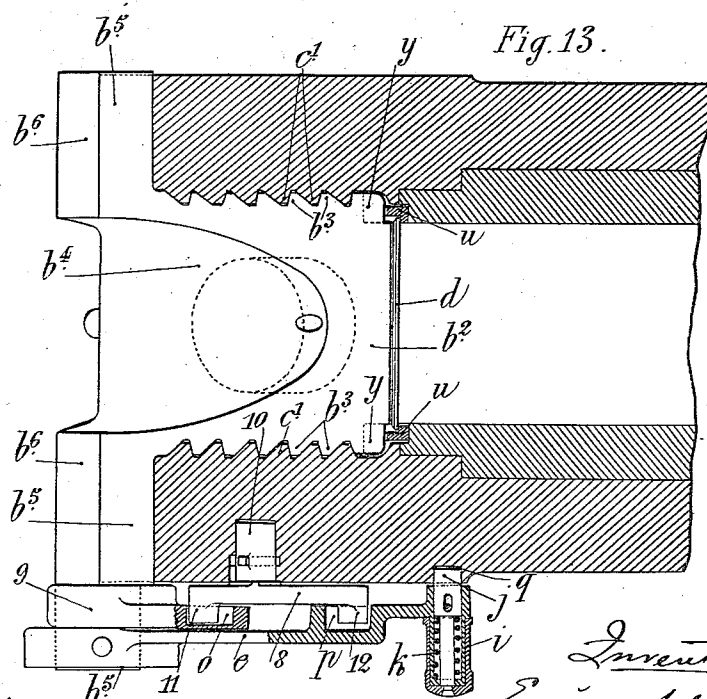
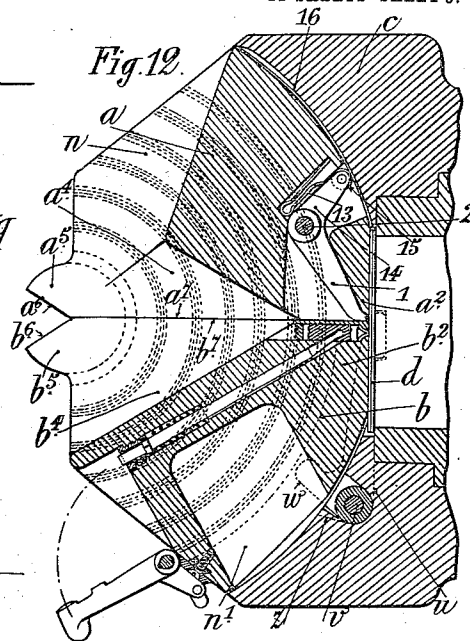
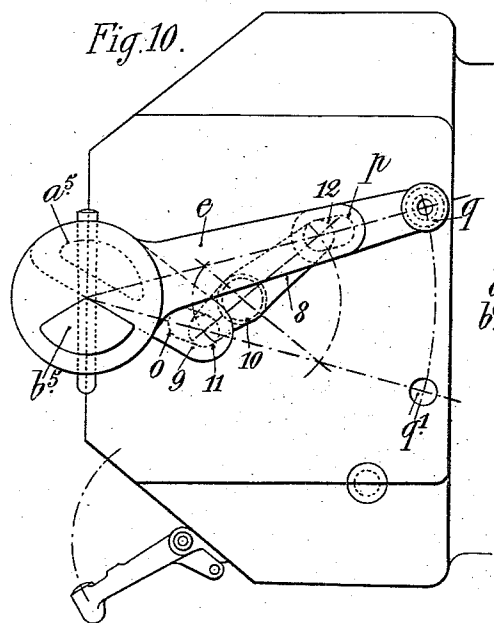
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11 SHEETS—SHEET 5.



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APPLICATION FILED JULY 31, 1911.

Patented July 16, 1912.

11 SHEETS—SHEET 6.

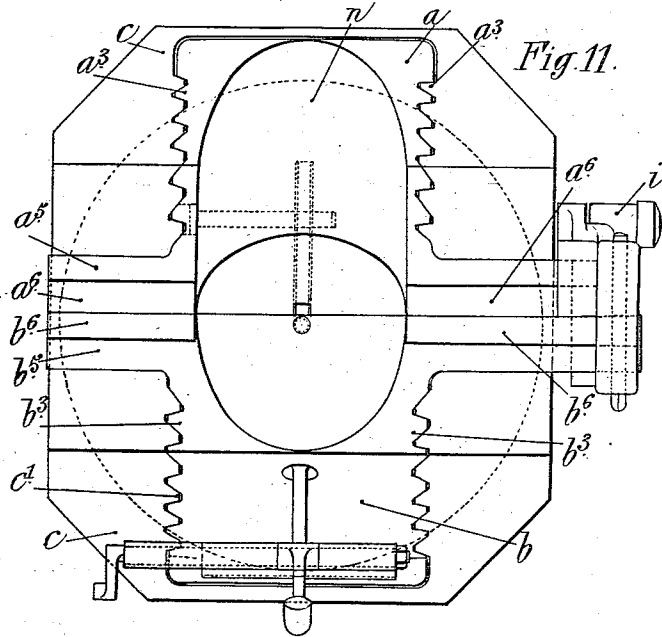


Fig. 11.

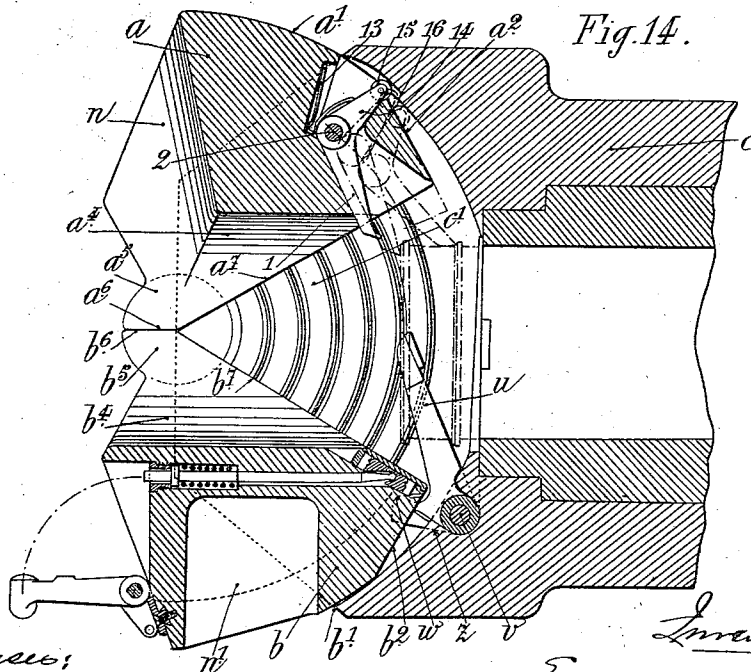


Fig. 14.

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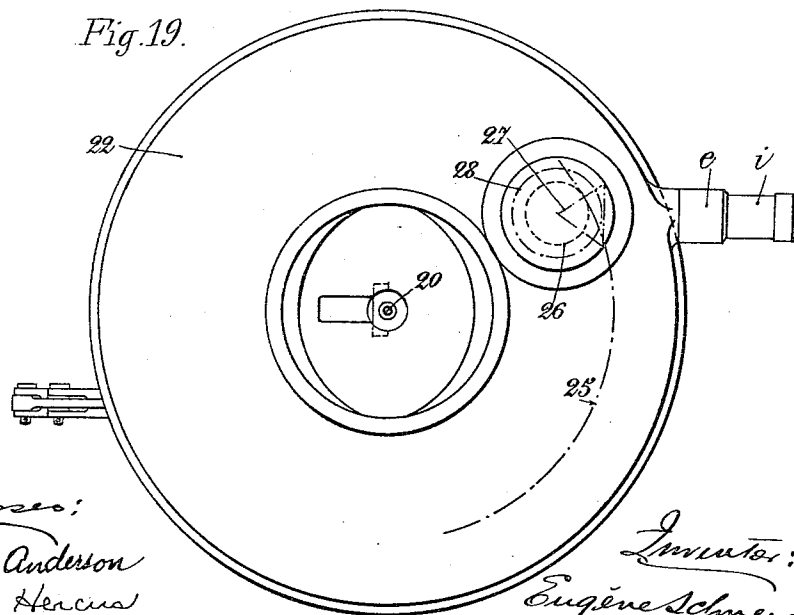
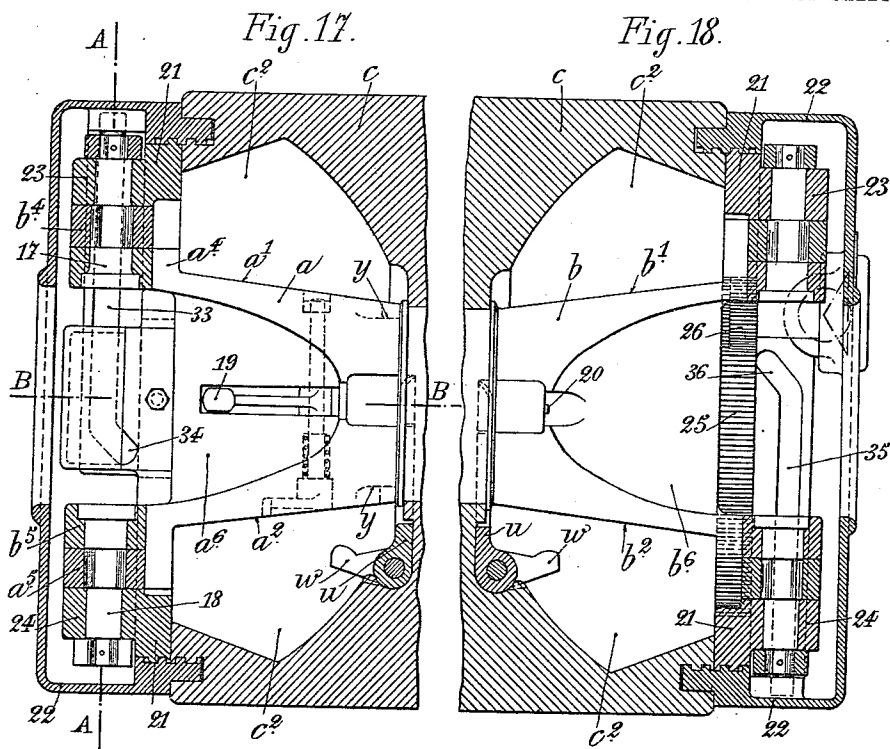
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APPLICATION FILED JULY 31, 1911.

11 SHEETS—SHEET 7.

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APPLICATION FILED JULY 31, 1911.

1,032,780.

Patented July 16, 1912.

11 SHEETS—SHEET 9.

Fig. 20.

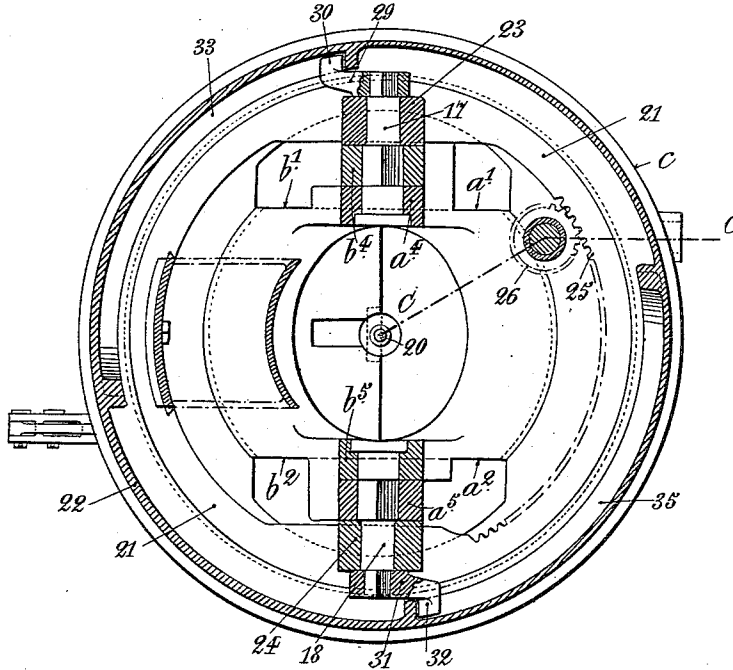
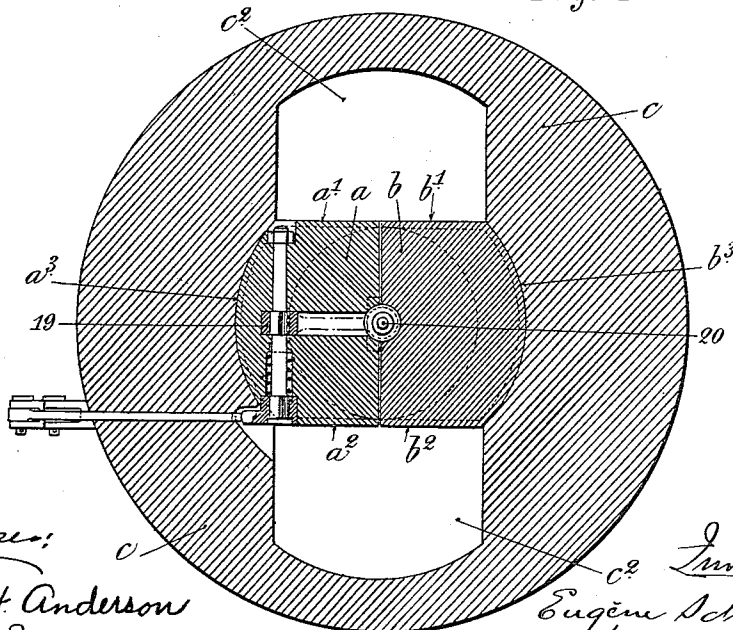


Fig. 21.



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APPLICATION FILED JULY 31, 1911.

Patented July 16, 1912.

11 SHEETS—SHEET 11.

Fig. 24.

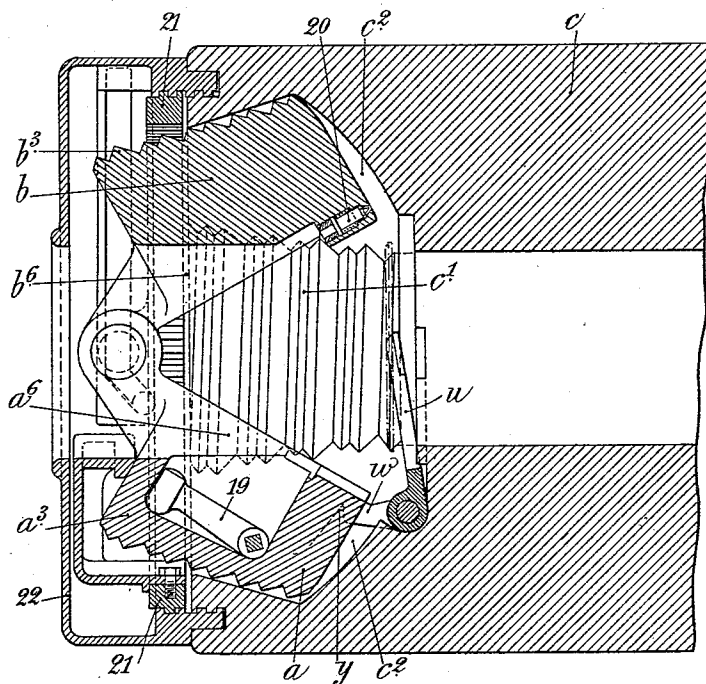
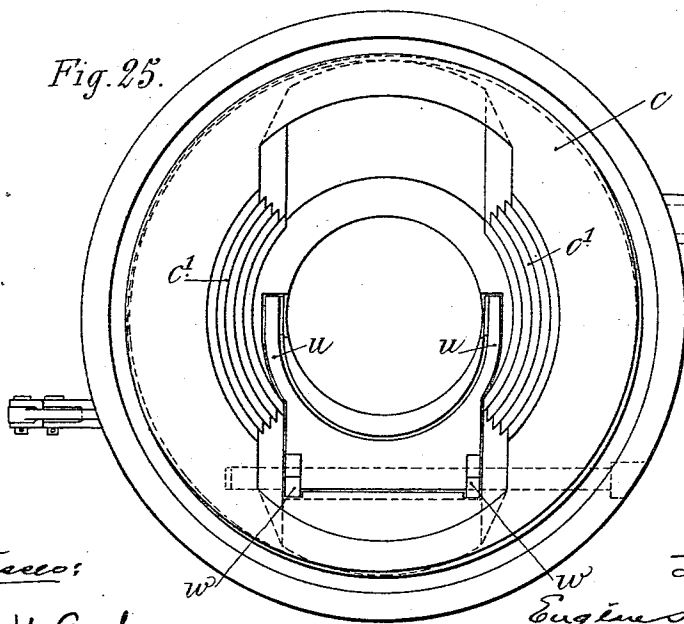


Fig. 25.



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UNITED STATES PATENT OFFICE.

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BREECH MECHANISM OF GUNS.

1,032,780.

Specification of Letters Patent.

Patented July 16, 1912.

Application filed July 31, 1911. Serial No. 641,561.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, of Le Creuzot, Saône-et-Loire, France, have invented a new and useful Improvement in or Relating to the Breech Mechanism of Guns, which is fully set forth in the following specification.

This invention relates to the breech mechanism of guns.

According to the present invention the breech block is formed of two similar elements that are separated one from the other for opening the breech and brought into contact for closing it. The two elements to be operated are given movements in opposite directions (both in opening and in closing the breech) and the total amplitude of the movement is reduced by one-half; at the same time the arrangement of the two elements and the arrangement of the operating mechanism common to them both is such that the two parts of the block mutually balance each other, which considerably reduces the effort required for operating them.

In order that the said invention may be clearly understood and readily carried into effect I will describe the same more fully with reference to the accompanying drawings in which:—

Figures 1 to 9 represent one constructional form of the invention in which the breech block is formed of two wedges which are given simultaneous rectilinear displacements in opposite directions. Figs. 1 to 5 show the breech block, respectively, in side elevation, rear elevation, longitudinal section on the line B—B in Fig. 2, horizontal section on the line D—D in Fig. 1, and partial section on the line C—C in Fig. 4; Fig. 6 is a section on the line A—A in Fig. 1, with the half blocks removed; Figs. 7 and 8 are longitudinal sections showing the breech open in two successive positions of the parts during the ramming of the cartridge case into its housing; and Fig. 9 is a detail view to a larger scale showing the control of the finger for ramming the cartridge cases. Figs. 10 to 16 illustrate a second constructional form of the invention in which the divided block is formed of two elements with concentric threads which are given simultaneous angular displacements by sliding in opposite directions. Figs. 10 to 13 show the breech closed, respectively, in longitudinal elevation, rear elevation, longi-

tudinal section and horizontal axial section; Fig. 14 is a longitudinal section showing the breech open; and Figs. 15 and 16 show a modification of the operating mechanism, respectively in elevation and in semi-sectional plan, the breech being closed. Figs. 17 to 25 represent a third constructional form of the invention in which the block is formed of two screw elements housed in a breech screw and which being brought together during the screwing and the unscrewing are given angular movements in opposite directions around a pivot common to them both for freeing the chamber after unscrewing or for obturating before screwing. Figs. 17 and 18 are sectional elevations viewed respectively from the right and left of the plane of the longitudinal axis of the gun; Fig. 19 is a rear elevation; Fig. 20 is a sectional elevation on the line A—A in Fig. 17; Fig. 21 is a sectional elevation on the line D—D—D in Fig. 22; Fig. 22 is a horizontal section on the line B—B in Fig. 17; Fig. 23 is a partial horizontal section on the line C—C in Fig. 20; Fig. 24 is a sectional elevation showing the breech open; and Fig. 25 is a rear elevation of the gun with the breech removed.

On each side of the horizontal plane xx passing through the axis of the gun a housing $a' b'$ is formed in the breech for the element a and the element b of the divided block $a-b$ respectively. In the example illustrated in Figs. 1 to 9 these elements are prismatic with plane longitudinal faces; in the breech closed position they fit one against the other in accordance with a plane horizontal base. The housings $a' b'$ which correspond in form to the longitudinal faces of a and b present front and rear walls $a^2 b^2$ which slightly incline rearward. This inclination enables the two blocks $a b$ to move rearward from the base d of the cartridge case during the opening of the breech; it likewise facilitates the wedging of the cartridge in the breech at the end of the closing.

The displacement of the blocks a and b in their housing in opposite directions can be obtained by means of various mechanisms. The mechanism represented by way of example comprises an operating lever e (Figs. 1, 2 and 4) journaled in the breech and rotating a shaft e' rigidly connected with a pinion f which is located in a plane parallel with the plane of oscillation of the

gun. At the ends of one and the same diameter the pinion *f* meshes with racks *g* and *h* respectively connected by cylindrical noses *g'* and *h'* with the half blocks *a* and *b* and guided in grooves *c'* in the breech (Fig. 1). Upon the lever *e* there is arranged a movable handle *i* by means of which a spring catch *j—k* can be operated; by its engagement in a notch in the gun this catch forms a bolt for locking the lever when the breech is closed.

In order to open the breech the bolt *j* is released from its notch by pulling on the handle *i*; then the lever is given a half turn upward and toward the rear of the gun in such a manner as to bring it to *i'* (Fig. 1). This operation requires only a small effort seeing that the weight of the half block *b* balances that of the half block *a* on the gear wheel *f*.

A stop *m* (Fig. 1) fixed to the gun limits the travel of the half blocks in opening by forming a support for the head of the rack *h*.

At the rear of the housing *a' b'* a cylindrical recess *n* beveled at its upper part *n'* affords a passage for the ammunition; the lower part of this passage *n* serves as a loading plate.

With a divided block such as has just been described it is of course necessary to provide special means for housing the firing members, for ramming the cartridge cases during the closing of the breech and for extracting the empty cases. As the branches *u* of the usual extractor might prevent the cartridge case *d* from being placed in position a ramming finger 1 pivoted at the upper part of the lower half block *b* is arranged in such a manner as automatically to ram the cartridge *d* into the gun at the commencement of the coming together of the half blocks *a* and *b*. Upon an extension of the shaft 2 of the finger 1 there is keyed a toothed sector 3 which in the movements of ascent and descent of the half block *b* moves in a groove 5 in the breech. At the commencement of the upward movement of the half block the sector 3 travels upon a rack 4 fixed to the gun. When the breech is open the rack 4 holds back the finger 1. As soon as the half blocks are operated for bringing them together the sector 3 in traveling on the rack 4 lifts the finger 1 which then bears against the base of the cartridge *d* so as to ram it into the gun. Fig. 7 shows the finger 1 lifted and beginning to act upon the cartridge case for ramming it. Fig. 8 shows the finger 1 at the end of its ramming stroke. At this moment a spring catch 6—7 (Figs. 4 and 5) arranged in the half block *b* opposite the hub of the finger 1 encounters a recess in this hub and engages therein; the finger 1 is then locked in the position shown in firm lines in Fig. 8 and in broken lines in Fig. 9. During the thrust move-

ment of the finger the rim of the cartridge case has forced back the branches *u* of the extractor. When the position shown in Fig. 8 has been reached the half blocks can approach each other freely completing the positioning of the cartridge case 4. Inversely when for opening the breech the semiblocks *a b* are separated one from the other the toothed sector 3 meshes with the rack 4, the finger 1 rises in becoming released from the spring catch 6—7 then stops *y* on the half block *b* in acting upon the noses *w* of the extractor cause the ejector branches *u* to rock.

In order to house conveniently the striker of a firing mechanism of any known type the bearing surface of the half blocks is formed outside the plane of the horizontal axis of the gun in the breech closed position in such a manner that the striker housed in the lower block for example can be located, in this position, in the axis of the gun as shown in Figs. 3 and 4.

In Figs. 10 to 16, as in the preceding example, the breech block is divided into two elements *a b*. These half blocks are limited in front by a cylindrical surface *a' b'* upon which a flat *a² a² b²* is cut for the support of cartridge cases with flat base *d*, on the sides by two parallel planes each carrying a series of concentric threads *a³ b³* engaging in corresponding threads *c'* in the breech *c*; at the rear by two concave cylindrical surfaces *a⁴, b⁴* arranged in such a manner as to afford a passage for the ammunition when the breech is open (Fig. 14), the surface *b⁴* then serving as loading plate. Each of the half blocks carries at the rear and projecting from either side a boss *a⁵ b⁵* cylindrical externally and concentric with the threads and engaging in a recess of corresponding form in the face of the breech. The bosses as a whole form trunnions so to speak around which the breech rocks in its movements. These bosses have plane faces *a⁶* and *b⁶* which serve as limiting stops for the opening of the breech. In the closed position the half blocks fit one against the other along a plane surface *a⁷ b⁷*. Upon the upper block and at the rear a cylindrical clearance *n* is provided for facilitating the introduction of the ammunition into the gun. As this clearance lightens the upper block *a* a cylindrical recess *n'* is formed in the lower block to obtain equilibrium. Opening and closing are obtained by separating and bringing together the half blocks by means of suitable operating gear.

In the example illustrated in Figs. 10 to 14 a lever *e* is fitted to the right hand side of the gun upon the trunnion *b⁵* of the lower half block. By means of a small double lever 8 (Figs. 10 and 13) this lever is connected with another lever 9 permanently fitted on the trunnion *a⁵* of the upper block *a*. The double lever 8 is pivoted by means of a

pivot 10 on the body of the gun and at its ends carries nipples 11 and 12 which engage respectively in the slots *o* and *p* formed in the levers 9 and *e*. Upon the operating lever *e* there is arranged a movable handle *i* furnished with a bolt *j* acted upon by a spring *k*. When the breech is closed the bolt *j* locks the breech by the aid of a recess *q* (Fig. 10) formed in the gun; when the breech is open the bolt engages in another recess *q'* likewise formed in the gun. In order to open the breech it is only necessary to release the bolt *j* and depress the handle *i* until the bolt enters the opening recess *q'*; in this movement the operating lever *e* effects approximately one-twelfth of a revolution in the downward direction. It actuates the block *b* and by means of the nipple 12 displaces the lever 8 which by means of the nipple 11 displaces the lever 9 and consequently the block *a*. In this displacement the weight of the block *a* balances the weight of the block *b*. The travel of the half blocks in the opening movement is limited as already stated by the faces *a''* and *b''* of the trunnions which form stops. The closing of the breech is effected by an inverse operation the travel being then limited by the contact of the blocks one with the other.

In the modification illustrated in Figs. 15 and 16 the double lever 8—11—12 is replaced by two sets of teeth *r s* carried by one and the same disk which is journaled upon a stud *t* fixed to the gun; these sectors mesh respectively with the toothed sectors *r'* and *s'* carried by the levers 9 and *e*.

The firing mechanism which may be of any known construction is let into the lower half block *b* as shown in Figs. 11, 12 and 14.

The automatic extraction of the cartridges is effected by means of an ordinary ejector with two symmetrical branches *u* (Fig. 14) mounted upon a pivot *v* fitted in the gun. The ejector carries two noses *w* which are likewise symmetrical and upon which two stops *y* (Fig. 13) cut in the lower half block *b* strike. The striking of the noses *w* against the stops *y* rocks the ejector and extracts the cartridge cases. The travel of the ejector is limited by bearing faces *z* formed in the gun and upon which the noses *w* strike.

At the moment of loading the positioning of the cartridge case is stopped by the branches *u* of the ejector upon which it strikes, these branches being retained by the bearing of the noses *w* upon the stops *y* of the lower half block *b*. In order to complete the introduction of the charge into the gun a pusher 1 is mounted on a pivot 2 arranged in the upper half block *a*. When the breech is open this pusher being drawn back by a spring 13 allows the ammunition to pass freely but as soon as the closing

movement of the breech begins a branch 14 of the pusher 1 provided with a roller 15 bears upon a cam 16 cut in the gun; this results in a movement of rotation of the pusher. The latter in then acting upon the base of the cartridge case completes the introduction of the cartridge into the gun being assisted in this operation by the two front ridges of the half blocks which are suitably rounded off for this purpose. As soon as the closing movement begins the lower half block *b* releases the ejector which follows the movement of the cartridge case and automatically resumes its position for the next extraction. During the opening of the breech the pusher 1 is held in place owing to the fact that the roller 15 bears on the body of the gun; it does not resume its place under the influence of the spring 13 until toward the end of the movement of the block and therefore cannot impede the extraction of the empty cases.

In the example disclosed by Figs. 17 to 25, the breech screw is divided into two elements *a* and *b* which are fitted one against the other when the breech is closed. The two half blocks when thus assembled present the form of a truncated straight cone with parallel bases upon which there are cut symmetrically relatively to the plane of the horizontal axis of the gun, two inclined plane faces *a'—b'*, *a''—b''* which limit the conical parts to two quarters of a circumference where the cylindrical threads *a³ b³* are cut in tiers. Each of the two half blocks *a* and *b* carries upon its rear face two lugs *a⁴ a⁵ b⁴ b⁵* one above, the other below. Through the upper lugs *a⁴ b⁴* a trunnion 17 passes and through the lower lugs *a⁵ b⁵* an identical trunnion 18 passes. It is around these trunnions that the half blocks rotate when coming together for closing the breech and separating for opening it; these movements take place in housings *c²* formed in the gun. Two concave cylindrical recesses *a⁶ b⁶* are formed in the half blocks *a* and *b* respectively; they afford a passage for the ammunition in the breech open position (Fig. 24); the lower recess *a⁶* then forms a loading plate. In the half block *a* a recess is formed for a firing hammer 19 and a recess is formed for a striker 20 in the half block *b*. The two half blocks are carried by a ring 21 threaded in correspondence with the screw breech on its outer face and engaging in an internal screw thread in a support 22 fixed to the gun. The latter envelops the whole of the closure system; in its center, however, an opening for the passage of the ammunition is cut. The ring 21 has two lugs 23, 24 in which the trunnion 17 and the trunnion 18 fit respectively; upon the inner surface of the said ring there is cut a rack 25 which meshes with a pinion 26 the shaft of which is journaled in

the fixed support 22 (Figs. 20 and 23). The breech is operated by means of a lever *e* the handle *i* of which acts by traction upon a spring bolt *j-k* which in the closed position engages in a recess *q* in the gun. The lever *e* is keyed upon a shaft *e'* turning in the fixed support 22 and rigidly connected with a bevel pinion 27 which meshes with a pinion 28 keyed upon the same shaft as the pinion 26. The rotation of the latter produces an angular displacement of the rack 25 and consequently that of the crown 21 and of the half blocks *a* and *b* that it carries. Before the latter have rotated through a quarter revolution they have become disengaged from the thread *e'* (Fig. 25) of the breech nut. Upon an extension of each of the trunnions 17 and 18 there are keyed respectively a crank 29 carrying at its end a nipple 30 and a similar crank 31 carrying a nipple 32. The nipples 30 and 32 are engaged respectively in helicoidal grooves 33-34, 35-36 formed in the cylindrical wall of the fixed support 22. These grooves present the same inclination as the screw thread in their part 33, 35 which the nipples traverse during the unscrewing of the blocks; at one end (34, 36) the said grooves present a greater inclination toward the gun. When after the unscrewing of the blocks the nipples engage in this part of greater inclination the lever *e* continuing to rotate the cranks 29, 31 displace the trunnions 17, 18 and cause the blocks *b* and *a* to pivot and separate one from the other, the effort necessary for this separation being reduced owing to the fact that the blocks balance each other. The breech is closed by operating the lever *e* in the opposite direction. The mechanism for extracting the cartridge cases is analogous to that described in the preceding examples. The half block *a* carries stops *y* acting upon corresponding noses *w* of the extractor levers *u*.

45 What I claim and desire to secure by Letters Patent of the United States is:—

1. In a gun, the combination of a breech, a breech block in two parts movable in said breech, and means moving said parts toward and from each other to close and open the breech.

2. In a gun, the combination of a breech, a breech block in two parts movable in said breech, connections between said parts, and common means for moving said parts toward and from each other to close and open the breech.

3. In a gun, the combination of a breech, a breech block in two balanced parts movable in said breech, and means moving said parts toward and from each other to close and open the breech.

4. In a gun, the combination of a breech, a breech block in two balanced parts movable in said breech, connections between said

parts, and common means for moving said parts toward and from each other to close and open the breech.

5. In a gun, the combination of a breech, a breech block in two parts movable in a vertical plane in said breech, and means moving said parts toward and from each other to close and open the breech.

6. In a gun, the combination of a breech, a breech block in two parts movable in a vertical plane in said breech, connections between said parts, and common means moving said parts toward and from each other to close and open the breech.

7. In a gun, the combination of a breech, a breech block in two balanced parts movable in a vertical plane in said breech, and means moving said parts toward and from each other to close and open the breech.

8. In a gun, the combination of a breech, a breech block in two balanced parts movable in a vertical plane in said breech, connections between said parts, and common means for moving said blocks toward and from each other to close and open the breech.

9. In a gun, the combination of a breech, a breech block in two parts movable in said breech, means moving said parts toward and from each other to close and open the breech, a firing pin carried by one of said parts, an extractor mounted on the gun, and extractor operating means carried by one of said parts.

10. In a gun, the combination of a breech, a breech block in two parts movable in said breech in a vertical plane, means moving said parts toward and from each other to close and open the breech, a firing pin carried by one of said parts, an extractor mounted on the gun, and extractor operating means carried by one of said parts.

11. In a gun, the combination of a breech, a breech block in two balanced parts movable in said breech in a vertical plane, means moving said parts toward and from each other to close and open the breech, a firing pin carried by one of said parts, an extractor mounted on the gun, and extractor operating means carried by one of said parts.

12. In a gun, the combination of a breech, a breech block in two parts movable in a vertical plane in said breech around horizontal axes, and means moving said parts toward and from each other to close and open the breech.

13. In a gun, the combination of a breech, a breech block in two balanced parts movable in a vertical plane in said breech around horizontal axes, connections between said parts, and common means for moving said parts toward and from each other to close and open the breech.

14. In a gun, the combination of a breech, a breech block in two parts movable in said

breech, means for ramming the cartridge home carried by one of said parts, and means moving said parts toward and from each other to close and open the breech.

5 15. In a gun, the combination of a breech, a breech block in two parts movable in said breech, a lever pivoted to one of said parts for ramming the cartridge home, and means moving said parts toward and from each
10 other to close and open the breech.

16. In a gun, the combination of a breech, a breech block in two parts movable in said breech, a two-armed lever pivoted to one of said parts for ramming the cartridge home,
15 a cam on the gun engaging one of said arms, and means moving said parts toward and from each other to close and open the breech.

17. In a gun, the combination of a breech, a breech block, concentric threads on one of
20 said elements and corresponding concentric grooves on the other, said breech block comprising two balanced parts movable in a vertical plane around horizontal axes, and means for moving said parts toward and
25 from each other to close and open the breech.

18. In a gun, the combination of a breech, a breech block, concentric threads on one of said elements and corresponding concentric
30 grooves on the other, said breech block comprising two balanced parts movable in a vertical plane around horizontal axes, connections between said parts, and common means for moving said parts toward and from each
other to close and open the breech.

35 19. In a gun, the combination of a breech, a breech block, concentric threads on one of said elements and corresponding concentric grooves on the other, said breech block comprising two balanced parts movable in a ver-
40 tical plane around horizontal axes, a firing pin carried by the lower part, an extractor pivoted on the gun, extractor-operating means carried by said lower part, and means for moving said parts toward and from each
45 other to close and open the breech.

20. In a gun, the combination of a breech, a breech block in two parts movable in said breech, means for moving said parts toward
50 and from each other to close and open the breech, said means comprising a lever se-

cured to the other part, and connections between said levers.

21. In a gun, the combination of a breech, a breech block in two parts movable in said
55 breech, means for moving said parts toward and from each other to close and open the breech, said means comprising a lever secured to one of said parts, a second lever secured to the other part, and pivoted con-
60 nections between said levers.

22. In a gun, the combination of a breech, a breech block in two parts movable in said breech, means for moving said parts toward
65 and from each other to close and open the breech, said means comprising a lever secured to one of said parts, a second lever secured to the other part, and a two-armed lever pivoted to the gun, one arm being connected to one lever and the other arm to the
70 other.

23. In a gun, the combination of a breech, a breech block composed of a plurality of parts movable in said breech in a vertical
75 plane, and means for moving said parts toward and from each other to close and open the breech.

24. In a gun, the combination of a breech, a breech block composed of a plurality of parts movable in said breech in a vertical
80 plane, connections between said parts, and common means for moving said parts toward and from each other to close and open the breech.

25. In a gun, the combination of a breech, a breech block in two parts movable in said breech in a vertical plane, one of said parts being cut away at its rear to facilitate the
85 introduction of the cartridge and the other part having a cut-away portion so that it will balance the first part, connections between said parts, and common means for moving said parts toward and from each
90 other to close and open the breech.

In testimony whereof I have signed this specification in the presence of two subscri-
95 ing witnesses.

EUGÈNE SCHNEIDER.

Witnesses:

DEAN B. MASON,
R. DE SEVELINGER.