E. SCHNEIDER.

SAFETY MECHANISM FOR USE WITH GUN BREECH BLOCKS COMPRISING REMOVABLE FIRING TUBE HOLDERS.

APPLICATION FILED AUG. 21, 1918.

1,336,093.

Patented Apr. 6, 1920.

10 SHEETS—SHEET 1.

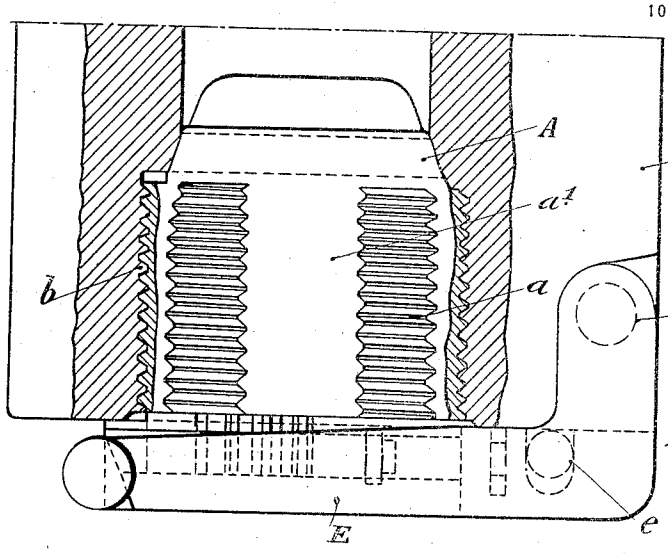


Fig. 1.

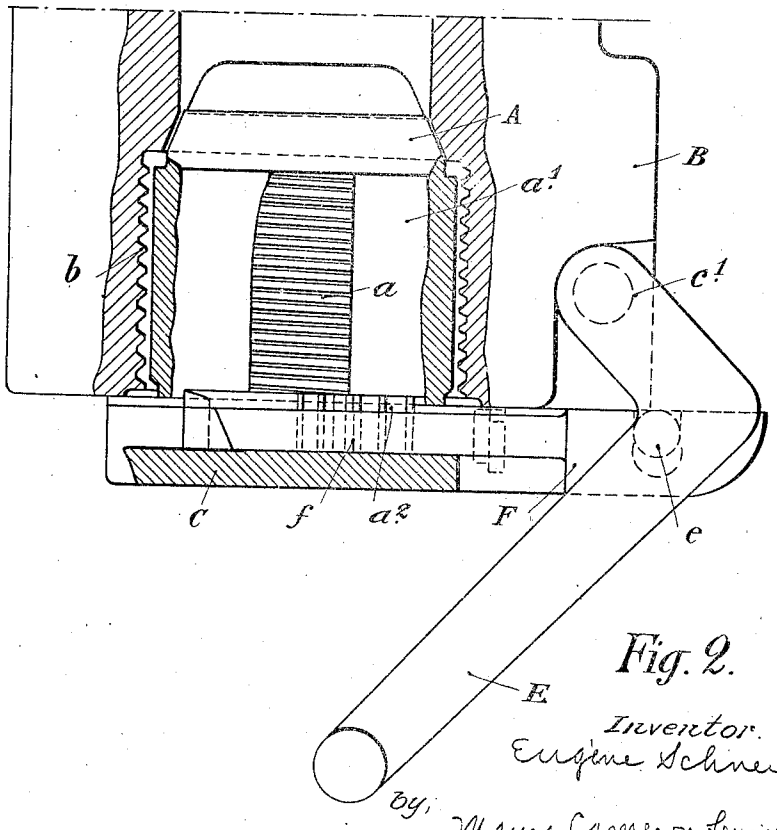


Fig. 2.

Inventor.
Eugène Schneider,
by,
Mann, Cameron, Lewis & Mann
Attorneys.

E. SCHNEIDER.

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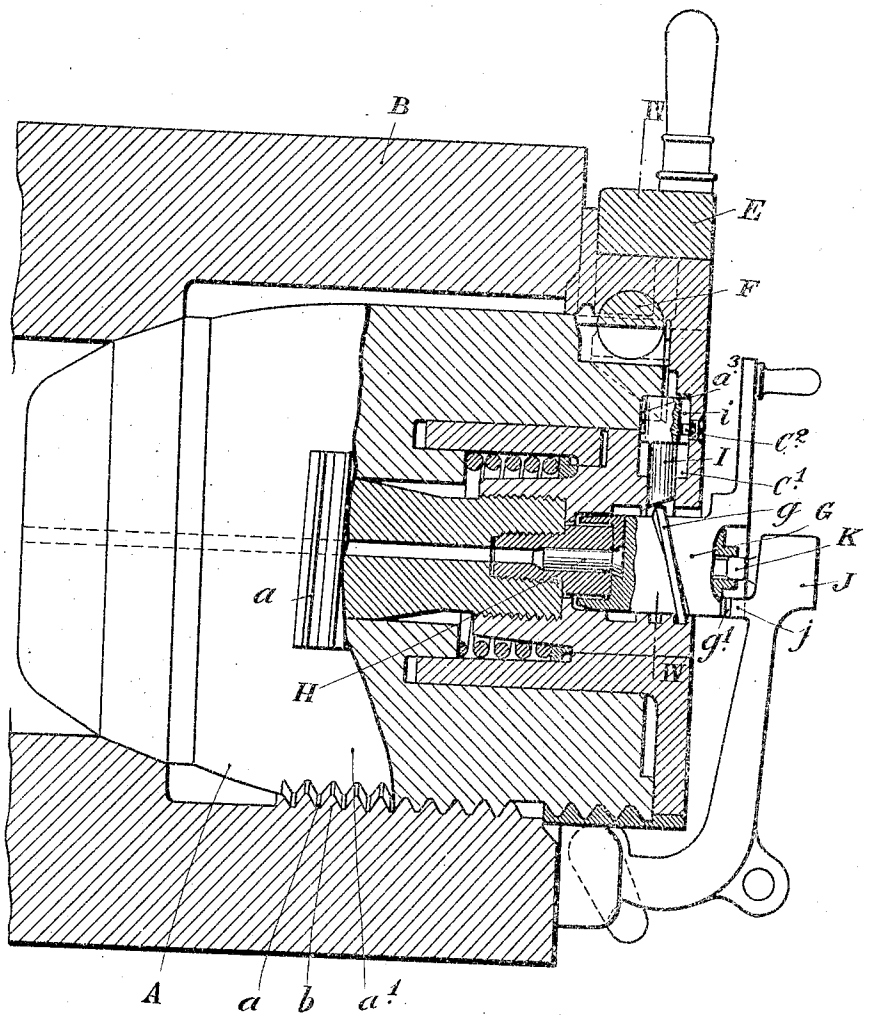
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10 SHEETS—SHEET 2.

Fig. 3.



Inventor.
Eugène Schneider,
by,
Mann, Cameron, Lewis & Massie
Attorneys.

E. SCHNEIDER.

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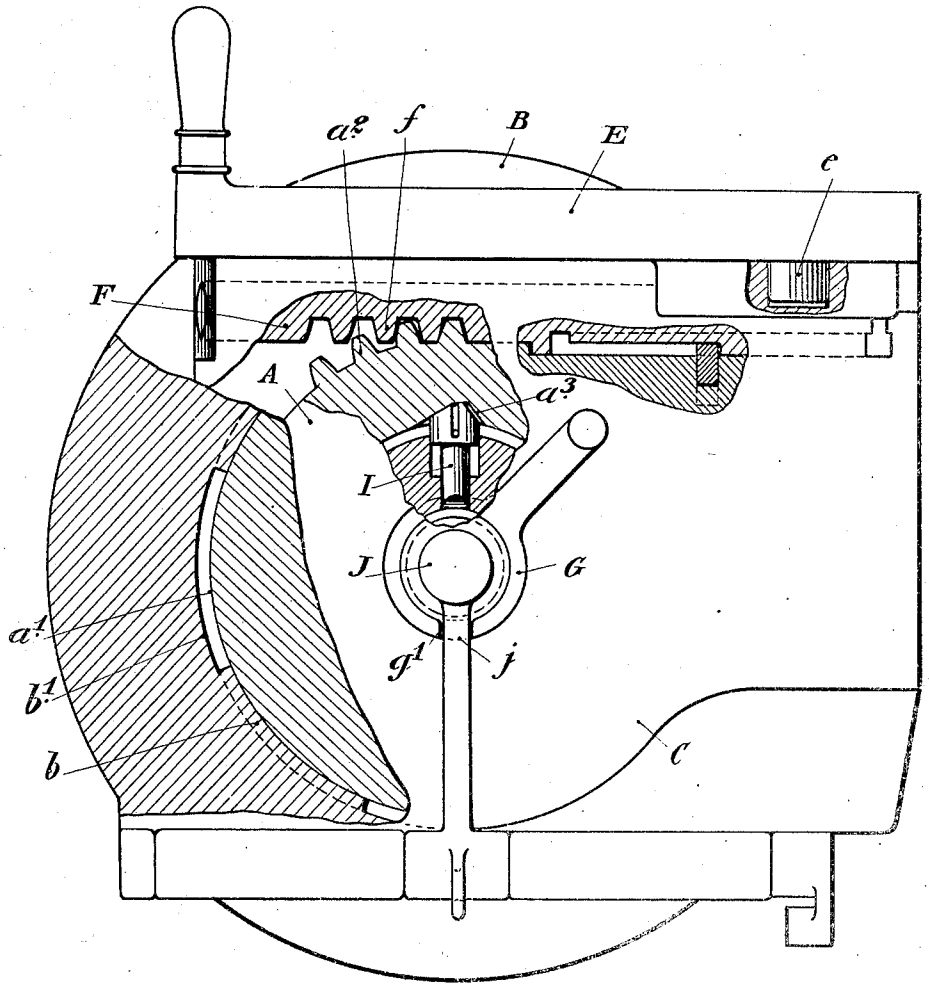
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10 SHEETS—SHEET 3.

Fig. 4.



Inventor.
Eugène Schneider,
by,
Mann, Cameron, Lewis & Mann
Attorneys.

E. SCHNEIDER.

SAFETY MECHANISM FOR USE WITH GUN BREECH BLOCKS COMPRISING REMOVABLE FIRING TUBE HOLDERS.

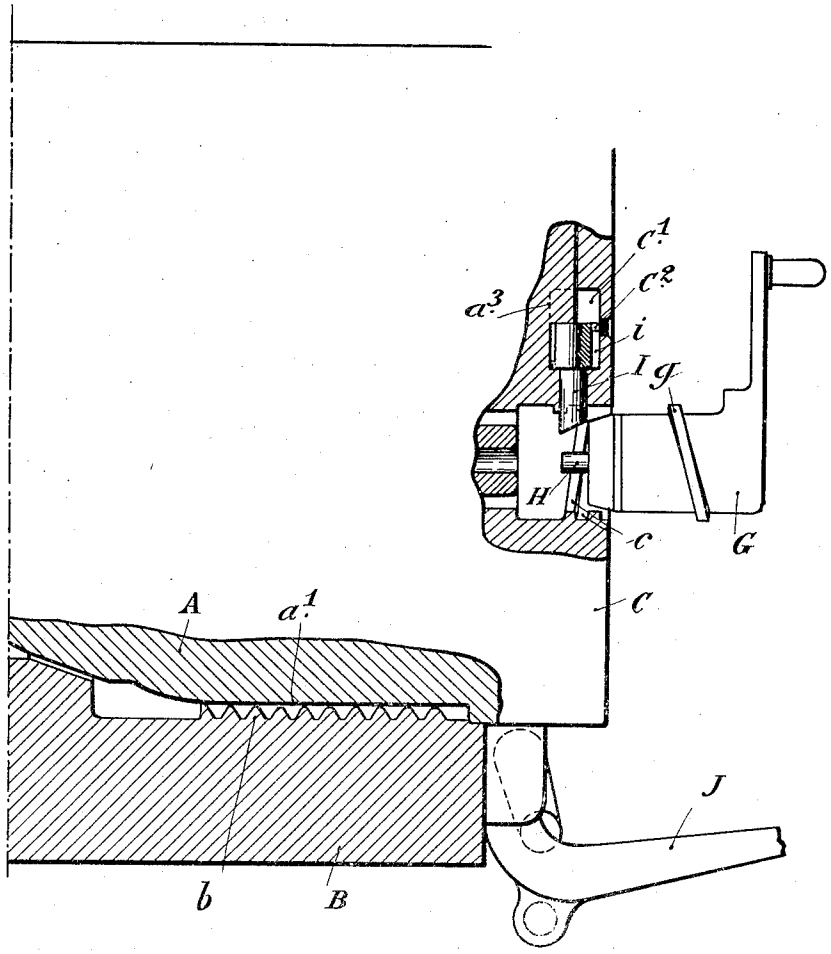
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Patented Apr. 6, 1920.

10 SHEETS—SHEET 4.

Fig. 5.



Inventor.
Eugène Schneider,
by, Mann, Cameron, Lewis & Massie
Attorneys.

E. SCHNEIDER.

SAFETY MECHANISM FOR USE WITH GUN BREECH BLOCKS COMPRISING REMOVABLE FIRING TUBE HOLDERS.

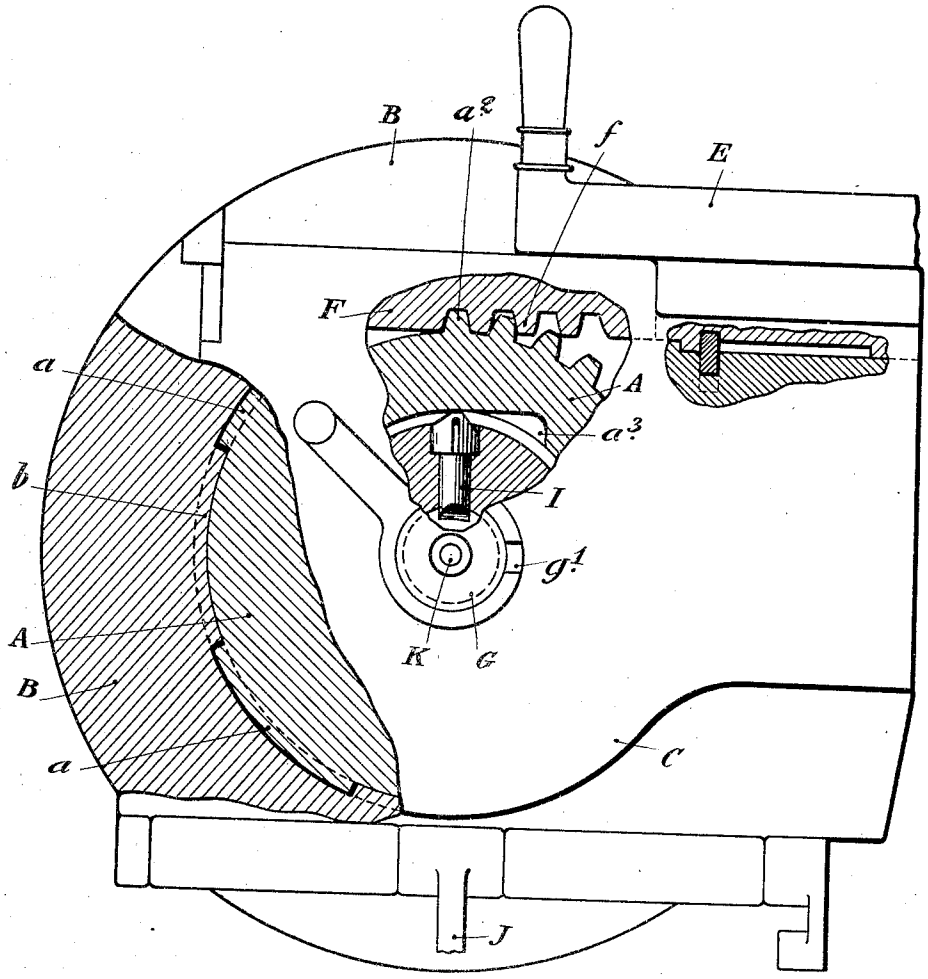
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10 SHEETS—SHEET 5.

Fig. 6.



Inventor.
Eugene Schneider,
by,
Mann, Cameron, Lewis & Massie,
Attorneys.

E. SCHNEIDER.

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Fig. 9.

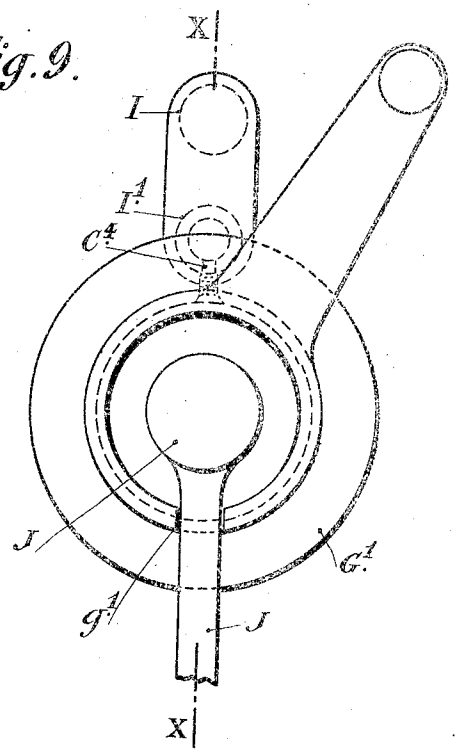


Fig. 7.

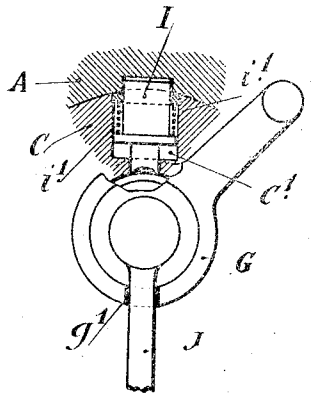
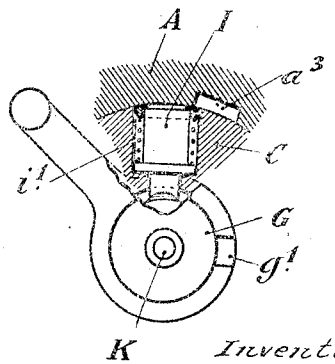


Fig. 8.



Inventor.

Eugene Schneider

by.

Mann Cameron Lewis & Massie

Attorneys

E. SCHNEIDER.

SAFETY MECHANISM FOR USE WITH GUN BREECH BLOCKS COMPRISING REMOVABLE FIRING TUBE HOLDERS.

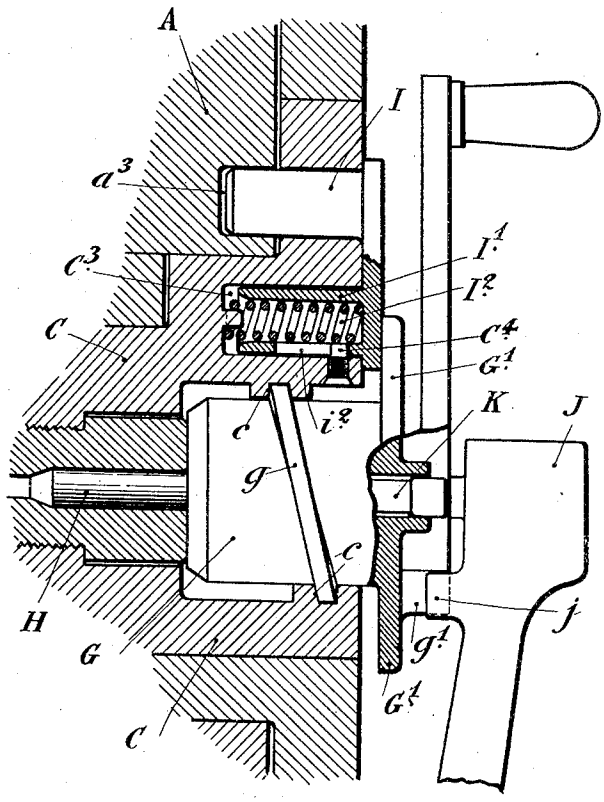
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1,336,093.

Patented Apr. 6, 1920.

10 SHEETS—SHEET 7.

Fig. 10.



Inventor.
Eugene Schneider,
by,
Mann, Cameron, Lewis & Massie
Attorneys.

E. SCHNEIDER.

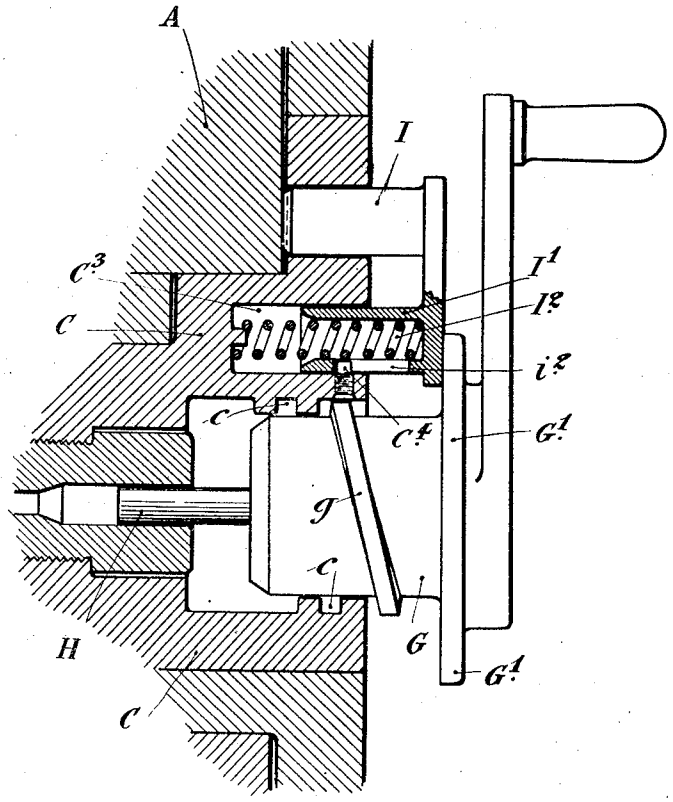
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1,336,093. Patented Apr. 6, 1920.

10 SHEETS—SHEET 8.

Fig. 11.



Inventor.
Eugène Schneider,
by, Mann, Cameron, Lewis & Mann
Attorneys.

E. SCHNEIDER.

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10 SHEETS—SHEET 9.

Fig. 12.

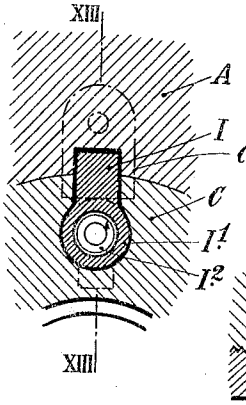
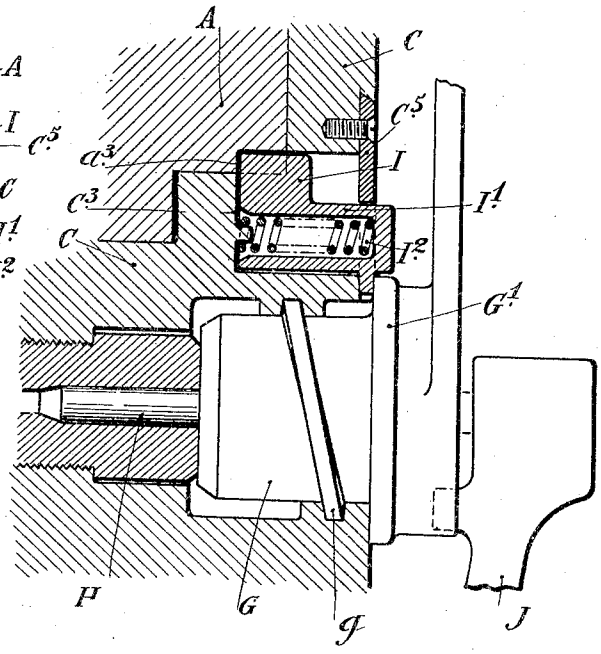


Fig. 13.



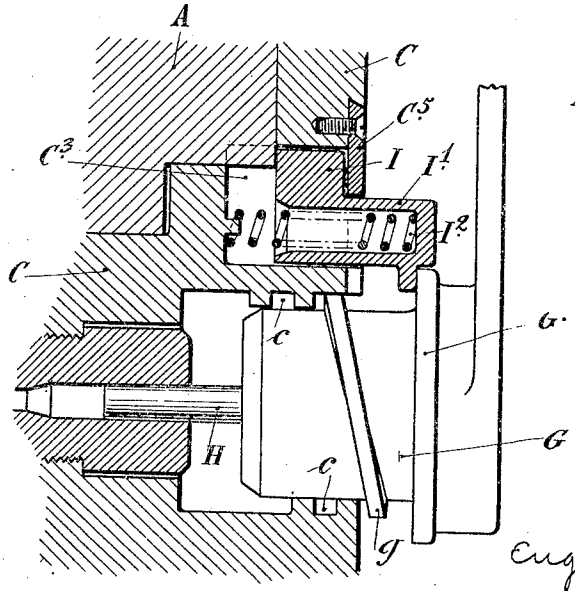


Fig. 14.

Inventor.
Eugene Schneider,
by Munn, Cameron, Lewis & Massie
Attorneys.

E. SCHNEIDER.

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10 SHEETS—SHEET 10.

Fig. 15.

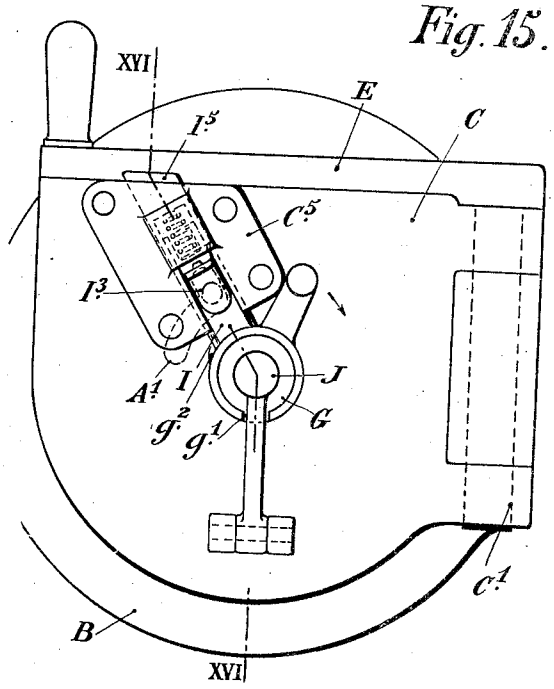


Fig. 16.

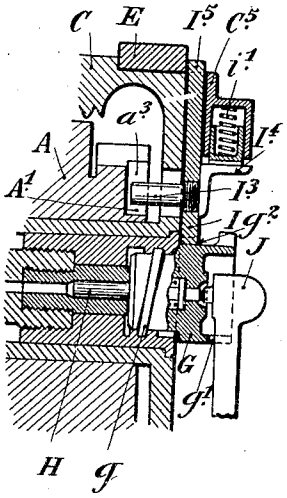


Fig. 17.

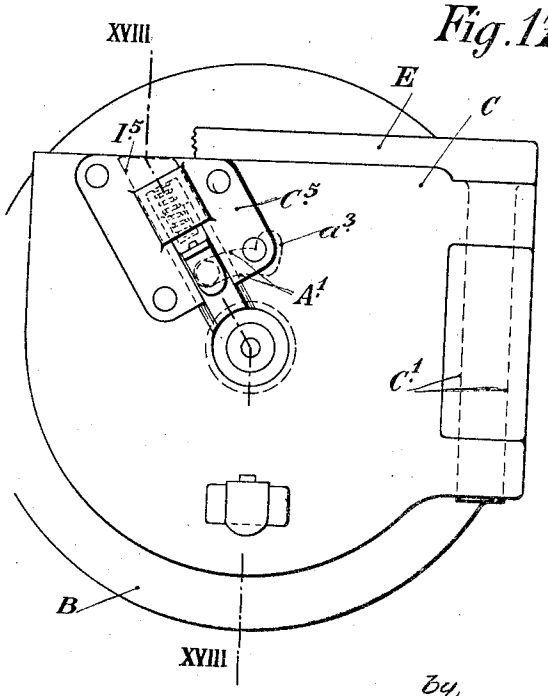
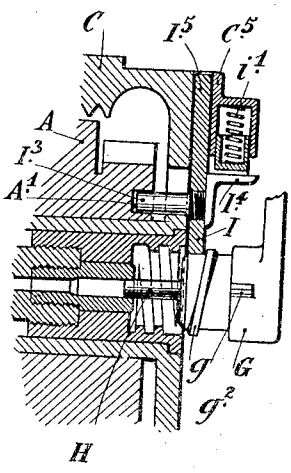


Fig. 18.



Inventor.
Eugène Schneider,
by, Mann, Cameron, Lewis & Massie
Attorneys.

UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF PARIS, FRANCE, ASSIGNOR TO SCHNEIDER & CIE., OF PARIS, FRANCE, A LIMITED JOINT-STOCK COMPANY OF FRANCE.

SAFETY MECHANISM FOR USE WITH GUN BREECH-BLOCKS COMPRISING REMOVABLE FIRING-TUBE HOLDERS.

1,336,093. Specification of Letters Patent. Patented Apr. 6, 1920.

Application filed August 21, 1918. Serial No. 250,869.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, a citizen of the French Republic, and a resident of 42 Rue d'Anjou, Paris, France, have invented a new and useful Improvement in Safety Mechanism for Use with Gun Breech-Blocks Comprising Removable Firing-Tube Holders, which invention is fully set forth in the following specification.

This invention relates to breech mechanism for guns, and it has for its object to provide an improved safety apparatus which will prevent any operation of the firing mechanism, in guns provided with screw-threaded breech-blocks having a removable firing-tube holder, so long as the breech is open or only partially closed.

The improved safety apparatus, which is necessary for preventing premature firing due to the inertia of the firing pin when closing the breech, consists first in a device for preventing the insertion of the firing tube holder so long as the breech is only partially closed, and second in a device for preventing the firing hammer from coming into operation so long as the firing-tube holder is only partially inserted in the recess provided for it in the breech-block. The improved safety apparatus thus renders it necessary first that the breech shall be completely closed before the firing-tube holder can be engaged in its recess, and second that the firing-tube holder shall be completely inserted in its recess in the breech-block before the firing hammer can engage the firing pin.

The safety device for preventing the firing-tube holder from being inserted in position so long as the breech is only partially closed is shown as consisting of a bolt movably located in the breech-block holder and having one end which is caused to project by the breech-block in such a manner as to prevent the insertion of the firing-tube holder so long as the inner end of the said bolt has not been brought opposite a recess, formed in the breech-block, by the complete movement of the breech block screw into the breech nut.

The safety device for preventing the operation of the firing hammer so long as the firing-tube holder is only partially inserted in its recess is shown as consisting of a notch formed in the front face of the firing-tube holder to which there corresponds a projection on the hammer whereby the notch in the one part will register with the projection on the other part only after the complete insertion of the firing tube holder into its recess, which registration is necessary before the head of the hammer can come in contact with the firing pin.

The invention is capable of receiving a variety of mechanical expressions, several of which are shown on the accompanying drawings, but it is to be expressly understood that the drawings are for purpose of illustration only, and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

In the drawings:

Figures 1 and 2 show in plan, partly in horizontal section, a known type of breech and breech-block with interrupted threads to which the improved safety apparatus is to be applied, Fig. 1 showing the breech closed, and Fig. 2 showing the breech-block unscrewed from the breech but before it is withdrawn from the breech by turning back the breech-block holder;

Figs. 3 to 6 inclusive illustrate one embodiment of this invention;

Fig. 3 is a vertical section through the axis of the gun barrel, showing the position of the breech-block, firing-tube holder and safety apparatus when the breech is completely closed and the firing-tube holder is completely inserted in its recess;

Fig. 4 is a rear end elevation of the breech partly in section on the line IV—IV of Fig. 3;

Figs. 5 and 6 are views corresponding respectively to Figs. 3 and 4, showing the breech-block in partial engagement with the threads of the breech screw;

Figs. 7 and 8 are end views showing two different positions of a modified form of the safety bolt and of the recess provided in the breech screw;

Figs. 9 to 11 illustrate a second embodiment of the invention;

Fig. 9 is an end elevation;

Fig. 10 is a vertical section on the line X—X of Fig. 9; and

Fig. 11 is a section similar to that of

Fig. 10, the parts being shown in the operative position of the safety apparatus (that is to say, while the breech is only partially closed);

Figs. 12, 13 and 14 show a modification of the preceding embodiment;

Fig. 12 is a fragmentary vertical section;

Fig. 13 is a section on the line XIII—XIII of Fig. 12; and

Fig. 14 is a section similar to that of Fig. 13, wherein the bolt is shown in the position in which it prevents the insertion of the firing-tube holder;

Figs. 15 to 18 illustrate an embodiment of this invention wherein the retraction of the safety bolt to allow of the forward movement of the firing-tube holder is effected by a hand operation which is possible only after the breech has been completely closed;

Fig. 15 is an elevation showing the parts in the position they occupy when the breech is completely closed and when the firing-tube holder is inserted in its recess;

Fig. 16 is a corresponding section on the line XVI—XVI of Fig. 15;

Fig. 17 is an elevation showing the parts in the position in which the breech is only partially closed; and

Fig. 18 is a corresponding section on the line XVIII—XVIII of Fig. 17.

Referring first to Figs. 1 and 3, the breech mechanism illustrated comprises a breech-block A having screw-threaded sectors a separated by plain sectors a^1. To the screw-threaded and plain sectors a, a^1, there correspond respectively screw-threaded sectors b and plain sectors b^1 of the screw-thread of the breech-nut B. The breech-block A is permanently connected to a breech-block holder C that is hinged to the nut B by a pin c^1. The breech-block is adapted to turn in its holder to enable it to be screwed into and out of the breech-nut.

The breech-block is operated by means of a lever E journaled on the pin c^1. Movement of the lever E, owing to the interposed stud e, imparts longitudinal motion to rack F which is guided in the holder C. This rack engages by means of its teeth f, a toothed sector a^2 formed on the breech-block. By this means, movements imparted to the breech-block by the lever E effect the screwing or unscrewing of the breech-block screw into and out of the breech-nut. When unscrewed, the whole system consisting of the lever E, the holder C, the rack F and the breech-block A, may be rotated around the axle pin c^1 for the purpose of withdrawing the breech-block from the breech.

Referring now to Figs. 3 to 8, G is the removable firing-tube holder which may be of any suitable construction. In the various embodiments shown, it is assumed that the firing-tube holder G, together with its contained firing tube H, is formed, for the purpose of inserting and withdrawing the same into and out of the breech-block, with a screw-thread g working in an internal screw-thread c formed in the holder C.

The improved safety apparatus of the present invention comprises first a bolt I movable in a recess C^1 formed in the holder C. Rotation of this bolt may be prevented in any suitable way as by the coöperation of a groove i in the said bolt with a stud C^2 fixed on the breech-block holder.

When the breech-block has been screwed home in the breech-nut, there is presented opposite the head of the bolt a notch a^3 into which the head of the bolt I may move either automatically, as by the action of a spring, or, as is assumed in the examples shown in Figs. 3 to 8, by being raised by the screw-thread g on the firing-tube holder G. When on the one hand the breech is completely closed, and on the other hand the firing tube holder G is screwed home into the breech-block holder, the parts will occupy the position shown in Figs. 3 and 4. The front face of the firing-tube holder G will then present, in the path of the firing hammer J, a notch g^1 into which a projection j on said hammer can enter.

In order to open the breech, it is first necessary to withdraw the firing tube holder G. This previous withdrawal, which is obligatory by reason of the obstacle opposed by the bolt I to any unscrewing of the breech-block from the breech-nut, constitutes also to a certain extent a safety device against hanging fire. As a matter of fact, since the breech remains necessarily closed during the time required for the withdrawal of the firing-tube holder, hanging fire may in most cases occur without danger to the gun crew. Moreover, when the firing-tube holder has been withdrawn, a hanging fire gives rise through the uncovered aperture of the vent passage to a jet of smoke which will warn the gun crew that they must deter the opening of the breech.

When the firing-tube holder G—H has been withdrawn, the retraction of the bolt I, and consequently the unscrewing of the breech-block, becomes possible. In the embodiment shown in Figs. 3 to 6, where the unscrewing movement takes place as above stated, the breech-block screw A by the action of one of the faces of the recess a^3 upon the corresponding bevel of the head of the bolt I, compels the latter to descend, and thus causes the tail of the bolt to project into the interior of the recess for the firing-tube holder in the breech-block holder C (Figs. 5 and 6). So long as the notch a^3 has not been brought opposite the head of the bolt, the unnotched portion of the breech-block will maintain the said bolt in the position which it occupies in Figs. 5

and 6, and the tail of the bolt will constitute an obstacle to the engagement of the firing-tube holder G in the breech-block holder C. In order to enable a firing-tube holder charged with a fresh firing tube to be inserted in position, it will therefore be absolutely necessary that the breech-block shall be first screwed home into the breech-nut. On the other hand, the complete insertion of the firing-tube holder G into its recess in the breech-block holder is absolutely necessary in order to allow the firing hammer J to strike the firing pin K, since, so long as the firing-tube holder G presents opposite the projection j of the hammer any portion of its front face other than the notch g^1 the hammer will be prevented from coming into its operative or striking position.

It will be readily understood that, in the example shown in Figs. 3 to 6, the raising of the bolt I to cause its head to enter the notch a^3 after the previous complete closing of the breech, might, as above stated, be effected wholly or partially by means of a spring. It might also be produced by the action of any suitable part other than the screw-thread g formed on or carried by the firing-tube holder G. It might further be produced with the aid of a push member formed on the breech-block and adapted to come into operation as soon as the notch a^3 has come opposite the head of the bolt.

In the modification shown in Figs. 7 and 8, the notch a^3 in the breech-block A is of cylindrical shape and the head of the bolt I has a corresponding cylindrical shape. The retraction of the bolt, after withdrawal of the firing-tube holder G—H, is here shown as produced by the action of the weight of said bolt, aided if necessary by a spring i^1.

In the preferred practical construction shown in Figs. 9, 10 and 11, the bolt I is arranged horizontally, the notch a^3 being of course correspondingly arranged. The bolt is fixed to a guide sleeve I^1 movable in a recess C^3, shown as formed in the breech-block holder C, and under the action of a spring I^2 that tends to force the said bolt outward. The outward movement of the bolt is limited by a projection C^4 carried by the breech-block holder which engages in a slot i^2 in the sleeve.

So long as the breech is only partially closed, the bolt I, not being opposite the notch a^3, will occupy the position shown in Fig. 11. Therefore, the firing-tube holder G, provided with a collar G^1, cannot be screwed into its recess because the said collar strikes against the arm that connects the bolt I to its guide sleeve I^1. As soon, however, as, owing to the complete closure of the breech, the bolt I is in front of the notch a^3, it is possible to screw-in the firing-tube holder. During this movement, the pressure exerted by the collar G^1 causes the bolt to enter its recess and the bolt comes then into the position shown in Fig. 10.

In the modification shown in Figs. 12, 13 and 14, the notch a^3 is formed in the front face of the breech-block A. The bolt proper I consists of a projection on the guide sleeve I^1. The outward movement of the whole system I—I^1 is limited by a plate C^5 screwed to the breech-block holder C and serving as a stop for the bolt I. A hole is provided in the said plate for the passage of the sleeve I^1.

As in the preceding examples, a previous withdrawal of the firing-tube holder is necessary in order to allow of opening the breech.

In the example shown in Figs. 15 to 18, the bolt I is movable in a guide in a box C^5 fixed to the breech-block holder C. It comprises a finger or nose I^3 which is arranged horizontally and is movable in a recess in the breech-block holder and also in a slideway A^1 formed in the front face of the breech-block A. This slideway is shown as a groove having the shape of an arc of a circle struck from the longitudinal axis of the breech-block A and is provided at one end with a notch a^3 that serves as a recess for the reception of the safety bolt.

i^1 is a spring having a constant tendency to force the bolt I down into its safety position. This spring may, as shown in the drawings, bear at one end against the bottom of a housing member mounted upon the box C^5 and at its other end upon a projection I^4 of the bolt I, shown as carrying a housing member for the spring which telescopes within the first-mentioned housing member.

The bolt I is so arranged that, in the position it occupies when the breech is closed and the firing-tube holder is inserted in its recess, the said bolt, by bearing upon the outer surface of the firing-tube holder, will project its upper end I^5 out of its guide in the breech-block holder. In this manner, as shown in Figs. 15 and 16, it constitutes a retaining stop at the rear of the lever E and prevents the operation of the latter so long as the firing-tube holder is not sufficiently disengaged to render it impossible to fire the gun. In other words, when the parts are in the position shown in Figs. 15 and 16, it is absolutely necessary that the firing-tube holder G shall be first disengaged before it is possible to operate the lever E to open the breech.

When the firing-tube holder has been moved into the position shown in Figs. 17 and 18, wherein it is impossible to fire the gun, the bolt I is caused to move down by the spring i^1, and its finger I^3 moves down out of the notch a^3 into a position wherein it allows of unscrewing of the breech-block

A, while operation of the lever E, for the purpose of effecting such unscrewing, is rendered possible by the retraction of the head I^5 of the said bolt. During the unscrewing movement of the breech-block, the finger I^3 of the bolt occupies the position shown in Figs. 17 and 18.

In order to insert the firing-tube holder, it is absolutely necessary that the breech-block shall have been screwed home in its nut in order that the finger I^3 of the bolt shall come opposite the notch a^3. At this moment the bolt can be lifted by hand by raising the projection I^4. The finger I^3 will then be retracted into the notch a^3, and it is possible to insert the firing-tube holder. When this insertion has been effected, the parts will assume the position shown in Figs. 15 and 16, with the bolt I retained by its coaction with the enlarged outer portion of the firing-tube holder so as to lock the lever E in closed position.

To unscrew the firing-tube holder, the previous raising of the bolt I, against which a projection g^2 formed on the body of the said firing-tube holder is adapted to strike, is necessary. The necessity for withdrawing the bolt I is also likely to prevent any premature withdrawal of the firing-tube holder during the firing.

While the embodiments illustrated on the drawings have been described with considerable particularity, it is to be understood that the invention is not to be restricted thereto, as the same is capable of receiving a variety of mechanical expressions some of which will readily suggest themselves to those skilled in the art, while certain parts thereof are capable of use without other parts thereof.

Reference is to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:—

1. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means controlled by the relative movement of the breech-block and its holder to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means also operating on the insertion of the firing-tube holder into its recess to prevent relative movement of the breech-block and its holder until the withdrawal of the firing-tube from its recess.

2. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt to be projected into the path of the firing-tube holder by the relative movement of the breech-block and its holder until the breech-block reaches its closed position.

3. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt to be projected by the relative movement of the breech-block and its holder into the path of the firing-tube holder until the breech-block reaches its closed position, and means for withdrawing said bolt when said breech-block is moved into its closed position.

4. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt adapted to project into the path of the firing-tube holder, a recess in the breech-block adapted to register with said bolt when the breech-block is in its closed position, and means for moving said bolt into said last-named recess.

5. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt adapted to project into the path of the firing-tube holder, a recess in the breech-block adapted to register with said bolt when the breech-block is in its closed position, and an element on the firing-tube holder adapted to engage said bolt in said last-named recess.

6. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt adapted to project into the path of the firing-tube holder, a recess in the breech-block adapted to register with said bolt when the breech-block is in its closed position, and a thread on the firing-tube holder adapted to move said bolt into said last-named recess.

7. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt adapted to project into the recess for the firing-tube holder, a recess in the breech-block

adapted to register with said bolt when the breech-block is in its closed position, and means for moving said bolt into said last-named recess, said second-named recess and said bolt being so constructed that rotation of the breech-block automatically projects said bolt into the path of the firing-tube holder.

8. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position, said means comprising a bolt adapted to project into the path of the firing-tube holder, a recess in the breech-block adapted to register with said bolt when the breech-block is in its closed position, and means adapted to move said bolt into the path of the firing-tube holder upon withdrawal of the latter.

9. In combination with a breech-block, its holder, a firing-tube holder adapted to be positioned in a recess in the breech-block holder, and a firing hammer, means to prevent insertion of said firing-tube holder into said recess until the breech-block is moved into its closed position, said means also operating on the insertion of the firing-tube holder into its recess to prevent relative movement of the breech-block and its holder until the withdrawal of the firing-tube from its recess, and means to prevent the operation of said firing hammer prior to the complete insertion of said firing-tube holder into its recess.

10. In combination with a breech-block, its holder, a firing-tube holder adapted to be positioned in a recess in the breech-block holder and a pivoted firing hammer, means to prevent insertion of said firing-tube holder into said recess until the breech-block is moved into its closed position, and means to prevent the operation of said firing hammer prior to the complete insertion of the firing-tube holder into its recess, said last-named means comprising a notch in the firing-tube holder to register with the hammer to permit striking movement of the latter only on complete insertion of the firing-tube holder into the recess of the breech-block holder.

11. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means controlled by the relative movement of the breech-block and its holder to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position and said means actuated by the inserted firing-tube holder to prevent the removal of the breech-block prior to the withdrawal of the firing-tube holder from its recess.

12. In combination with a breech-block, its holder, a firing-tube holder adapted to be positioned in a recess in the breech-block holder and a firing hammer, means controlled by the relative movement of the breech-block and its holder to prevent insertion of the firing-tube holder into its recess until the breech-block is moved into its closed position and said means actuated by the inserted firing-tube holder to prevent the removal of the breech-block prior to the withdrawal of the firing-tube holder from its recess, and means on the firing-tube holder to prevent firing action of the hammer until complete insertion of the firing-tube holder into its recess.

13. In combination with a breech-block, its holder and a firing-tube holder adapted to be positioned in a recess in the breech-block holder, means to prevent removal of the breech-block prior to withdrawal of the firing-tube holder from its recess.

In testimony whereof I have signed this specification.

EUGÈNE SCHNEIDER.

Witnesses:
ANDRÉ MOSTICKER,
JOHN F. SIMONS.