

No. 748,086.

PATENTED DEC. 29, 1903.

J. F. MEIGS, S. A. S. HAMMAR & L. N. D. MIXSELL.
ELECTRIC FIRING GEAR FOR BREECH LOADING GUNS.

APPLICATION FILED AUG. 27, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

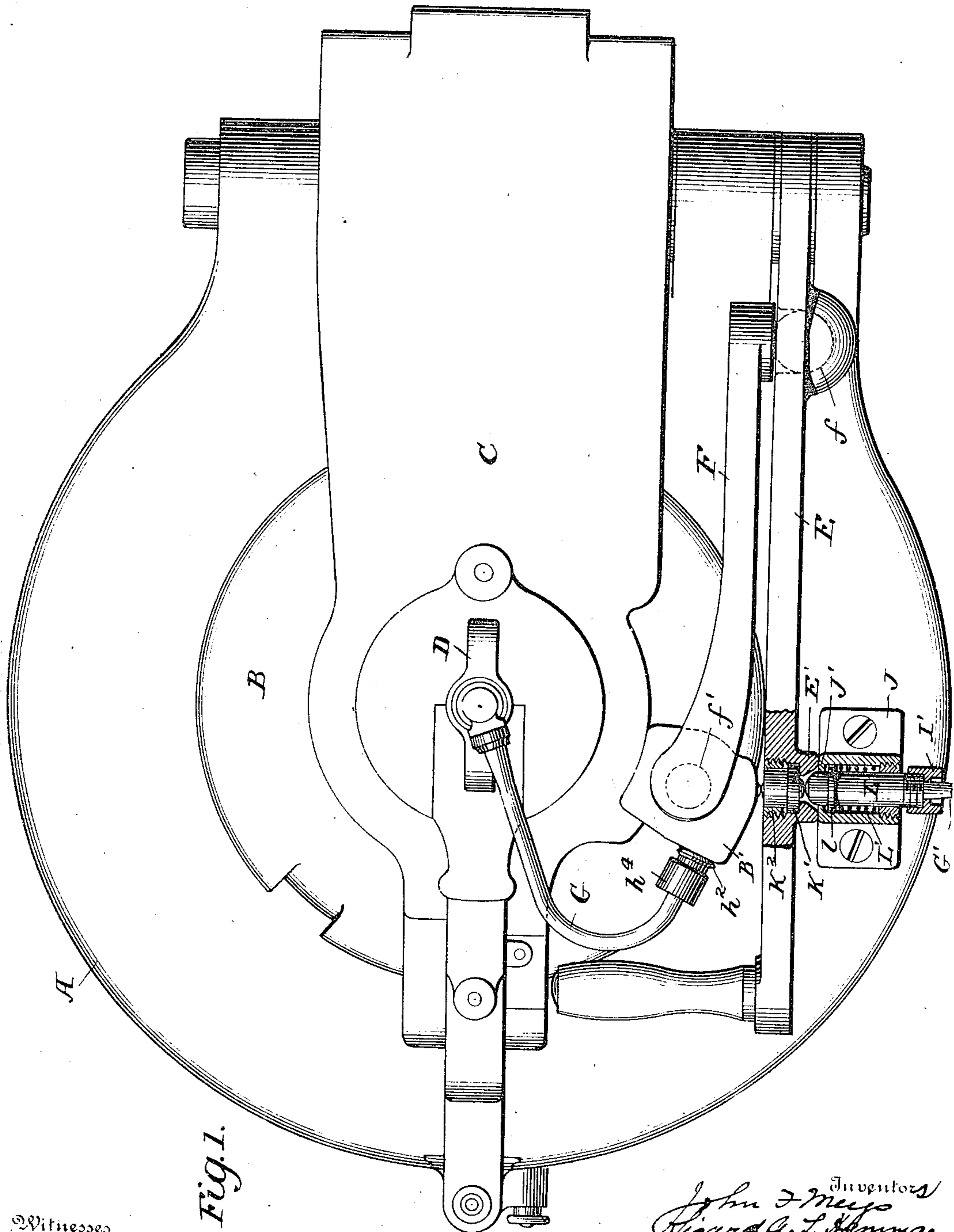


Fig. 1.

Witnesses

J. F. Meigs

S. A. S. Hammar

334

Inventors
John F. Meigs
Richard G. S. Hammar
Lafayette N. D. Mixsell
Lawrence Newman
Attorneys

No. 748,086.

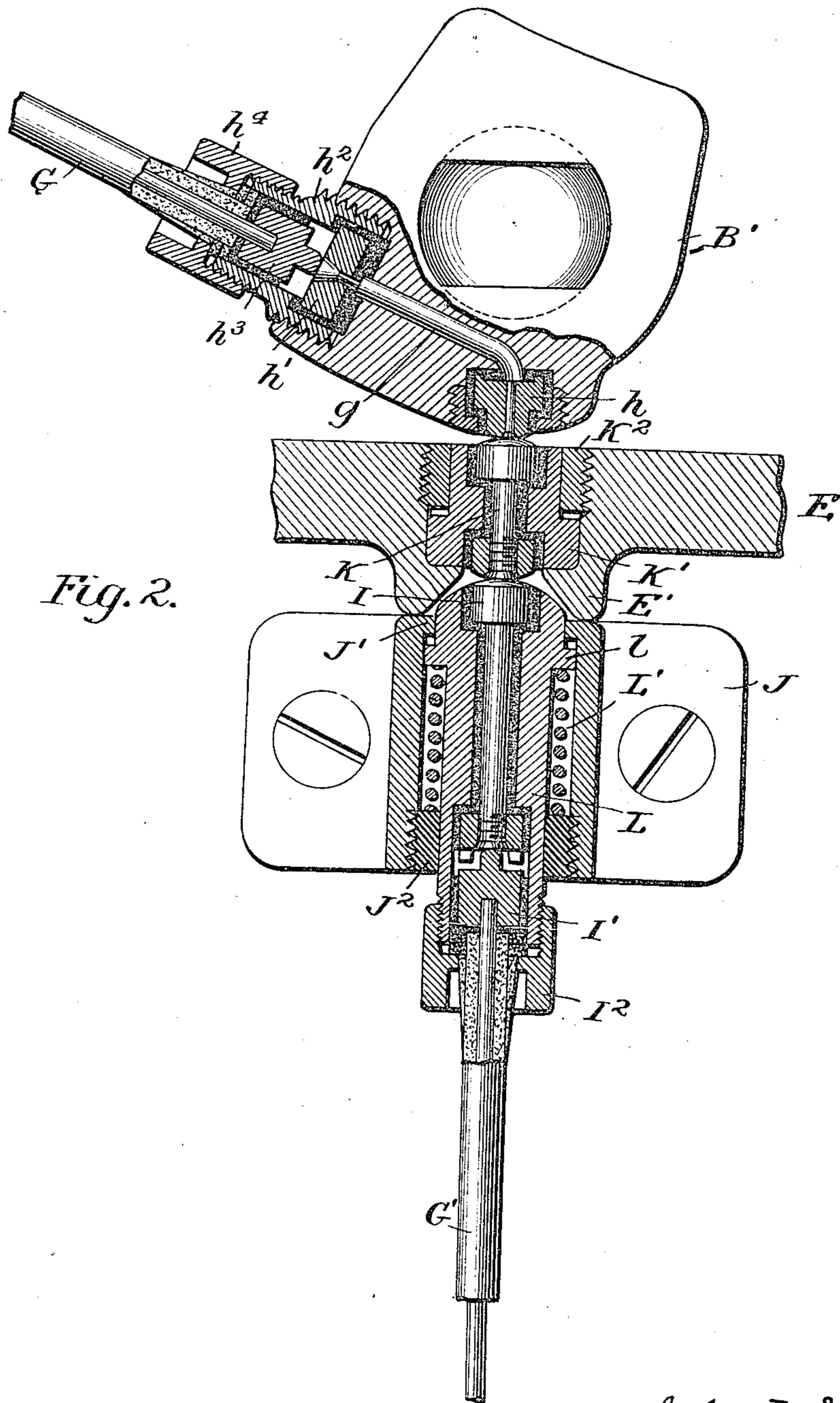
PATENTED DEC. 29, 1903.

J. F. MEIGS, S. A. S. HAMMAR & L. N. D. MIXSELL.
ELECTRIC FIRING GEAR FOR BREECH LOADING GUNS.

APPLICATION FILED AUG. 27, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses

J. G. Huickel
Sam. Gillman, Jr.

Inventors

John F. Meigs
Sigard A. S. Hammar
Leighton N. D. Mixsell

By

Forster Freeman

Attorneys

UNITED STATES PATENT OFFICE.

JOHN F. MEIGS, SIGARD A. S. HAMMAR, AND LEIGHTON N. D. MIXSELL, OF BETHLEHEM, PENNSYLVANIA, ASSIGNORS TO BETHLEHEM STEEL COMPANY, OF SOUTH BETHLEHEM, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ELECTRIC FIRING-GEAR FOR BREECH-LOADING GUNS.

SPECIFICATION forming part of Letters Patent No. 748,086, dated December 29, 1903.

Application filed August 27, 1902. Serial No. 121,251. (No model.)

To all whom it may concern:

Be it known that we, JOHN F. MEIGS, a citizen of the United States, SIGARD A. S. HAMMAR, a subject of the King of Sweden and Norway, and LEIGHTON N. D. MIXSELL, a citizen of the United States, all residing at Bethlehem, Northampton county, State of Pennsylvania, have invented certain new and useful Improvements in Electric Firing-Gear for Breech-Loading Guns, of which the following is a specification.

Our invention relates to electric firing-gear for guns; and it has for its object to provide a simple and effective arrangement of parts whereby there is provided a safety connection for the firing-gear, which will prevent the premature discharge of the gun or a discharge before all the operative parts of the breech mechanism and its connections are practically in their normal or loaded position.

To these ends our invention consists in the various forms of construction and arrangement of parts having the general mode of operation substantially as hereinafter more particularly set forth.

In the accompanying drawings, Figure 1 is a rear elevation of a gun, showing our invention applied thereto, some parts being in section. Fig. 2 is an enlarged sectional view of the preferred embodiment of the safety connection.

While our invention may be applied to many and various forms of guns and breech mechanisms therefor and the advantages of our invention attained to a greater or less extent, we have shown our invention as applied to a form of breech mechanism and operating means therefor whereby the advantages of our invention are readily perceived and will be understood by those skilled in the art.

Generally speaking, our invention consists, among other things, in providing a safety connection for an electric firing-gear so arranged that the firing-circuit cannot be completed until the parts are in the desired position, and in order to obtain the best advantages we so arrange the parts that the circuit is con-

trolled by some one of the parts of the breech-block or its operating mechanism, which completes its movement at or about the time the breech mechanism is secured and locked in position, and preferably the circuit is controlled by a part of the operating mechanism which has a relatively large movement compared to the movement of the breech block or plug, and more especially has this relatively large movement just before the breech-plug is seated in the breech, so that the ratio of movement between the said part of the operating mechanism and the plug is relatively very large at this time.

Furthermore, in carrying out our invention we provide an electric connection or circuit with a break which is adapted to be closed by some part of the operating mechanism of the breech-block which is not closed until the breech-block is practically in position and is then closed by a part of the operating mechanism having a relatively large movement compared to the movement of the breech-block, and in the preferred form of our construction we provide for a double break or double contact for closing the break in the firing-circuit and, further, so construct and arrange the parts that not only is the break closed, as above set forth, but the parts are locked in position in the act of closing the break.

With this general description we will now proceed to describe the specific embodiment of the invention illustrated in the drawings, wherein there is shown a gun A with a breech-block B, mounted in a suitable carrier C, secured to the gun A in any well-known manner. In the drawings we have not illustrated the specific means of securing the breech-block in position or holding it in the carrier, as these are immaterial to our present invention and may vary from those indicated. This breech-block may be provided with any suitable firing mechanism—such, for instance, as is adapted to be operated by percussion—and in the drawings we have indicated a firing-pin D of a well-known construction and which may be used as a per-

cussion firing-pin provided with our improved safety connection and can be used for electrically discharging the gun, especially when safety ammunition is used. We do not
 5 deem it necessary herein to illustrate the details of construction of this firing-pin, as there are many forms known which embody substantially the broad idea illustrated in the drawings of having a firing-pin or con-
 10 nection which is brought into firing position for use with electric-firing mechanism when the breech is closed.

In the present instance the breech-block-operating mechanism comprises, essentially,
 15 a lever E, pivoted on the breech of the gun and connected to the breech-block B through the medium of the link F, and this link is shown as pivotally connected to the lever E at one end and to the rear face of the breech-
 20 block B by means of ball-and-socket connections f f' , the breech-block being provided with a knob or projection B' , to which the link F is directly connected. The parts are shown in Fig. 1 in their normal or closed po-
 25 sition, and it will be understood that swinging the operating-lever E on its pivot first produces the desired partial rotation of the breech-block B to unlock the same, and owing to the arrangement of the parts the lev-
 30 erage in starting the rotation of the breech-block and in imparting the final closing movement thereto is much greater than at other parts of the operation, and in this way the desirable increase of power at those por-
 35 tions of the operations where the greatest resistance is to be overcome is attained, which will readily be understood that when the breech-block is rotated a further movement of the operating-lever operates the carrier C
 40 and moves the breech-block away from the breech ready to charge the gun, and a reverse movement of the operating-lever first swings the carrier to bring the breech-block into the breech of the gun, and the further
 45 and final movement locks the breech in position. In carrying out our invention with this form of breech mechanism we connect an electric conductor G with the firing-pin D and with the projection B' on the breech-
 50 block. We further connect an electric conductor G' with a terminal or contact device which is mounted on the breech below the operating-lever. It is understood that this conductor G' is suitably connected with a
 55 source of power and is provided with any suitable firing device and that the source of power is also connected to the body of the gun, so that when the circuit is completed the current can pass to discharge the gun,
 60 and we have not shown these circuits, as their construction and arrangement are well understood by those skilled in the art.

In Fig. 2 we have illustrated the details of the connections between the conductors G and
 65 G' and have shown a construction where there is what may be termed a "double break" in the electric circuit—that is, a break which is

to be closed in two places—and have shown a single contact device, which in this instance is carried by the operating-lever to simulta-
 70 neously close the two breaks and complete the circuit. One of these breaks is represented by the contact h , which is mounted in the lower portion of the projection B' , but insulated therefrom, and in the present instance
 75 is connected by an insulated conductor g with a contact-plate h' , mounted in a removable socket h^2 , secured to the projection B' , and the conductor G terminates in a contact h^3 ,
 80 which is insulated from the socket h^2 and is held in position by the adjusting-nut h^4 . It is manifest that any other desirable connection may be used; but that shown is preferred, as it can readily be removed or replaced and
 85 adjusted as occasion requires.

Mounted on the breech is a plate J, which forms a socket to receive the locking device L, which is arranged to move in the socket under pressure from the spring L' and is provided with a projection l , which is adapted to
 90 engage with the internal projection J' on the socket, and there is provided a nut or bushing J^2 , which forms an abutment for the spring and a guide for the locking device L. This locking device L is hollow and carries a con-
 95 tact or terminal piece I, which is insulated from the locking device, and there is also shown a contact-piece I' , which is connected to the conductor G' and mounted in the recess in the locking device and is held in position
 100 by the screw-cap I^2 , the parts being insulated, as shown. It will readily be seen from this construction that the locking device L forms a movable terminal or contact piece mounted in the socket and held under spring-pressure,
 105 and this contact forms what may be termed the "second break" in the electric circuit.

Mounted in the operating-lever E and insulated therefrom is what we have termed a
 110 "double" contact-piece K, which preferably is mounted in a bushing or socket K' , held in a recess in the operating-lever by a screw-
 115 ring K^2 , and this double contact is shown as provided with rounded ends. The operating-lever E is provided with a projection E' , which surrounds the contact-piece, as shown, and which forms in connection with the locking
 120 device L a substantial lock or securing means for the operating-handle E. The contour of this projection is preferably such that before the parts can be brought into the position shown in Fig. 2 the outer edge of the projec-
 125 tion E' impinges upon the curved surface of the locking device L and forces it inward in the socket, compressing the spring L' , and then when the operating-handle has completed its movement the spring automatically
 130 forces out the locking device, causing its contact I to engage one end of the double contact K and complete the circuit; and it will be seen that with this construction the circuit cannot be completed until the op-
 135 erating-lever is in its normal position. The double contact K is shown in the form of a bolt

and nut, and this constitutes a desirable construction; but any other similar construction can be used.

Such being the construction of the device, it will be seen that as soon as the operating-lever E commences its movement it breaks the circuit, and, as before stated, the operating-lever is in such a position that at this moment it has a relatively large movement compared to the movement of the breech-block at the moment of unlocking. So, too, it is further seen that the circuit cannot be closed until the operating-lever E has reached its normal position, and, as before intimated, at this time the movement of the operating-lever with relation to the breech-block is relatively very large, and this insures the complete closing of the breech-block before the circuit is closed, and, further, it will be observed that when the circuit is closed the operating-lever is itself locked in position by the locking device L.

What we claim is—

1. In a breech mechanism, the combination with an operating-lever carrying a contact, of a movable terminal adapted to engage the lever and lock the same and engage the contact thereof to complete the circuit, substantially as described.

2. In a breech mechanism, the combination with an operating-lever carrying a contact and having a recess, of a movable terminal, the movable terminal engaging said recess to lock the lever and engaging the contact to close the circuit, substantially as described.

3. In a breech mechanism, the combination with an operating-lever carrying a double

contact, of a terminal mounted on the breech-block, and a movable terminal mounted on the breech adapted to engage the operating-lever and the contact carried thereby to lock the lever and close the circuit, substantially as described.

4. In a breech mechanism, the combination with an operating-lever carrying a double contact and provided with a projection forming a recess, of a terminal mounted on the block, and a spring-actuated terminal mounted on the breech, the latter terminal serving the double purpose of closing the circuit through the contact and locking the lever by engaging the recess, substantially as described.

5. In a breech mechanism, the combination with a breech-block and firing mechanisms, of a projection on the breech-block, an electric connection between the firing mechanism and projection, a movable terminal on the breech, and an operating-lever carrying a double contact and having a projection thereon whereby the circuit is completed between the terminals by the double contact and the operating-lever locked in position by the movable terminal, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of the subscribing witnesses.

JOHN F. MEIGS.

SIGARD A. S. HAMMAR.

LEIGHTON N. D. MIXSELL.

Witnesses:

C. R. MILLER,

J. E. MATHEWS,

EDWIN A. MILLER.