No. 860,471. PATENTED JULY 16, 1907.

M. HERMSDORF.

LEVER ACTUATED WEDGE BREECH MECHANISM FOR GUNS.

APPLICATION FILED APR. 30, 1906.

4 SHEETS—SHEET 1.

Fig. 1.

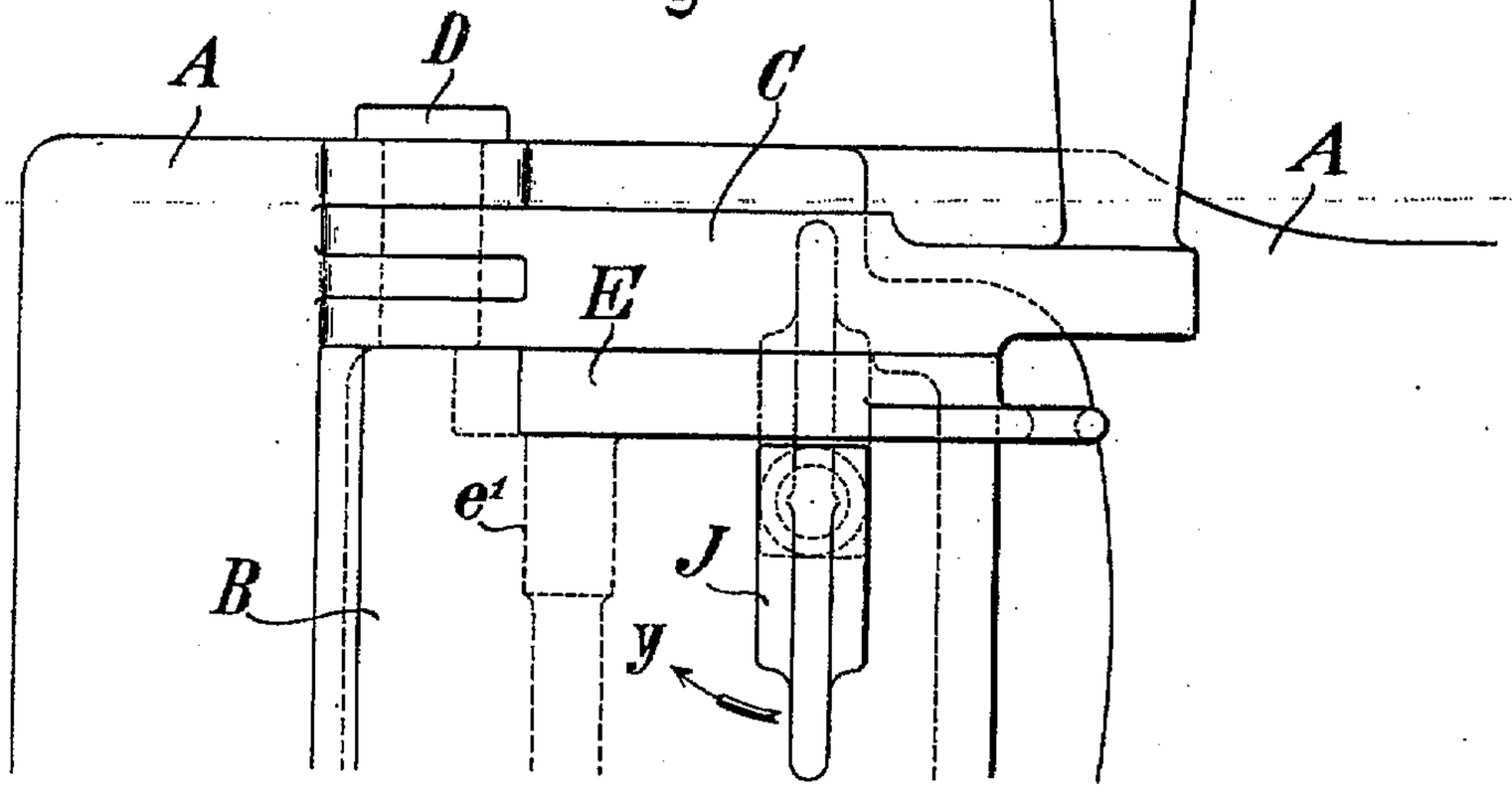


Fig. 2.

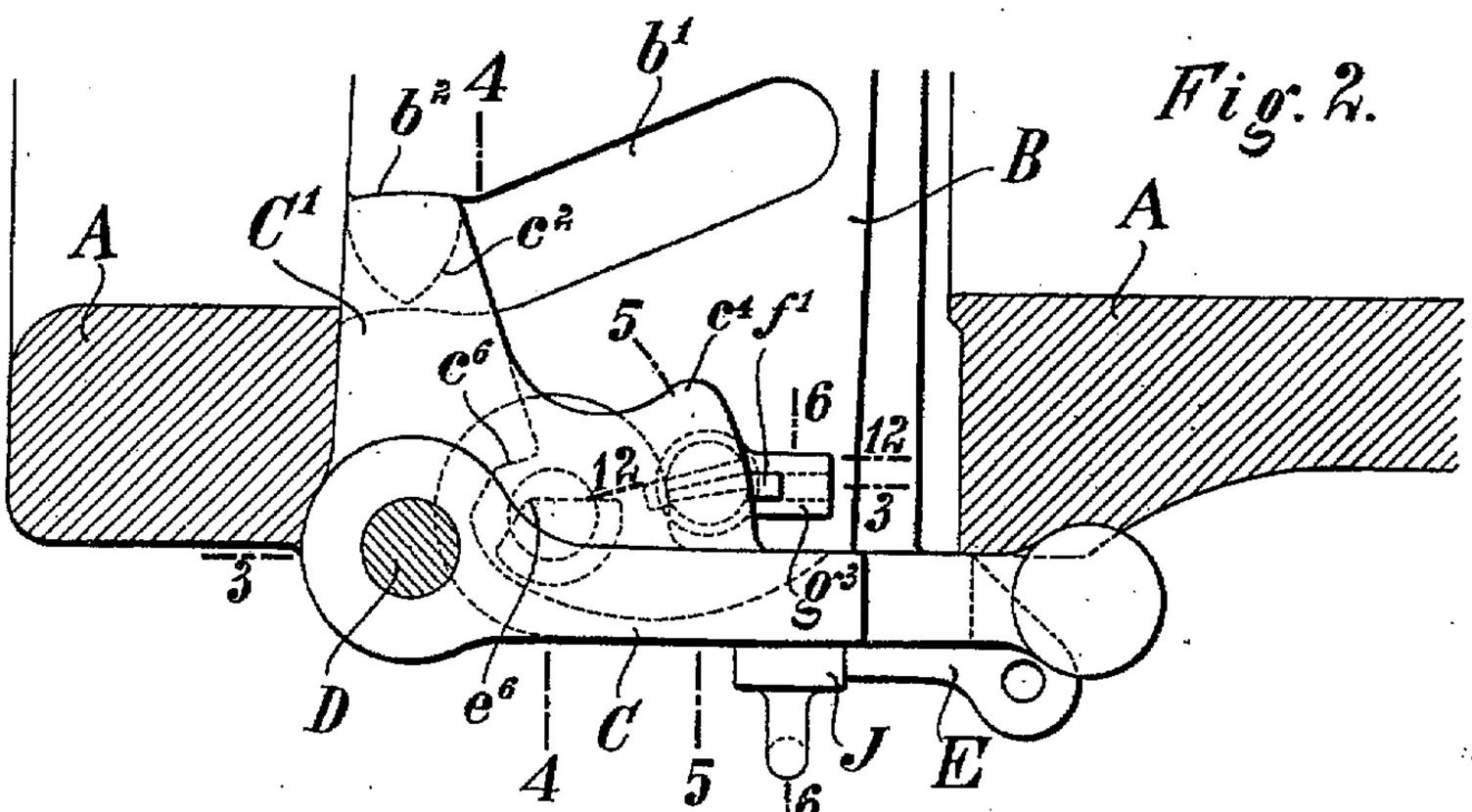
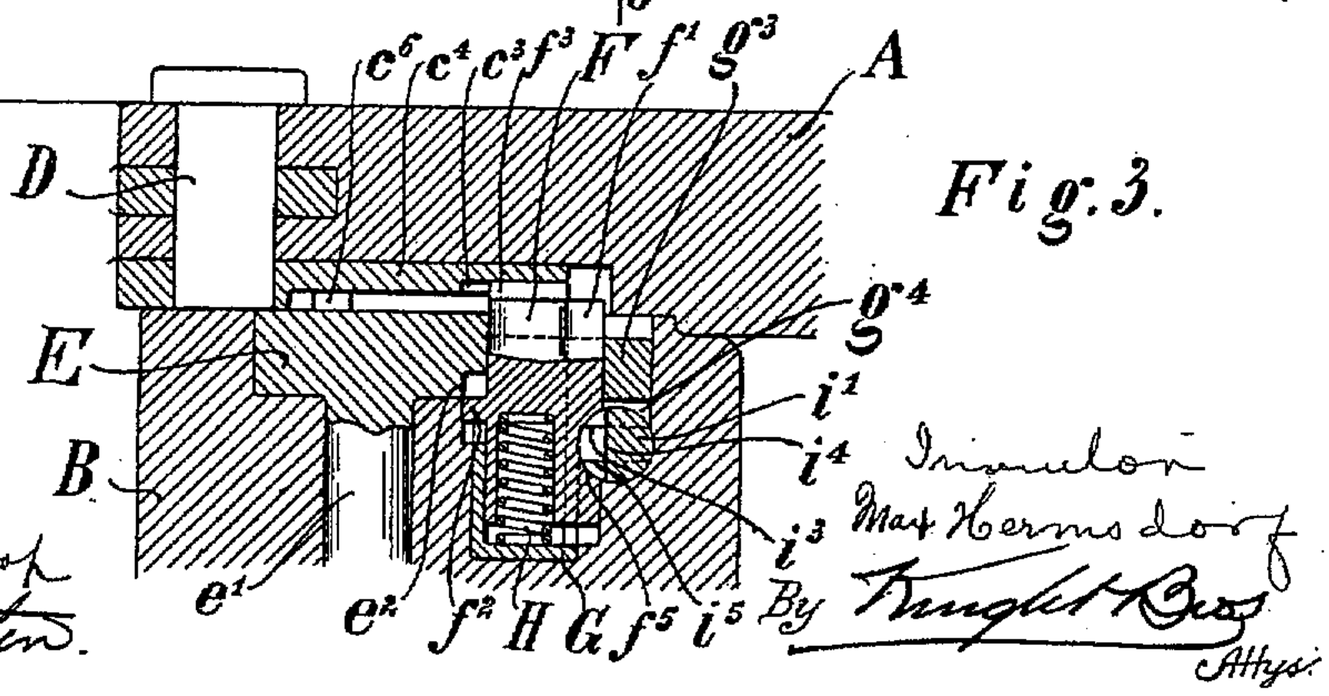


Fig. 3.



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4 SHEETS—SHEET 2.

Fig. 4.

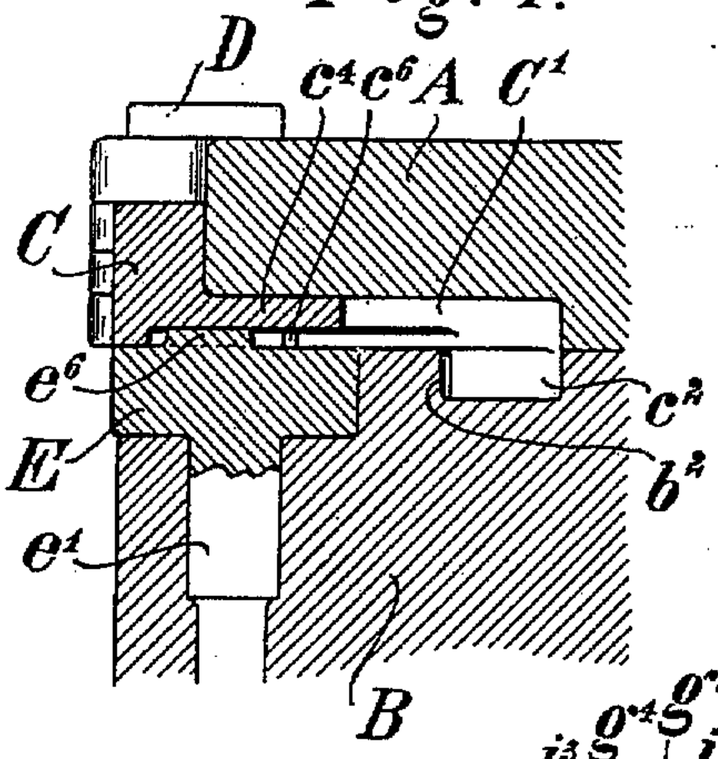


Fig. 5.

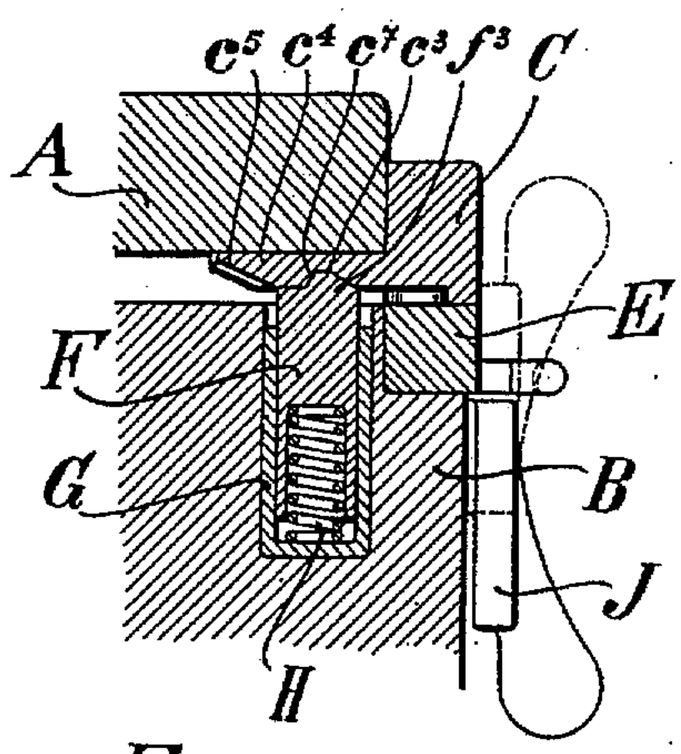


Fig. 6.

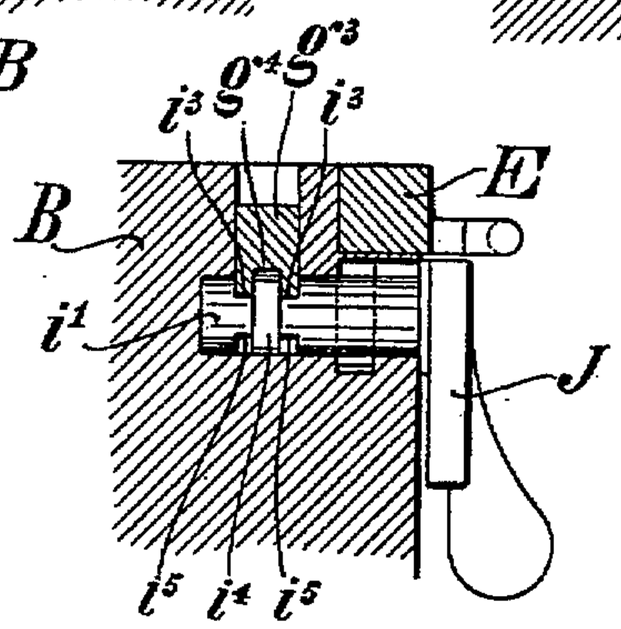
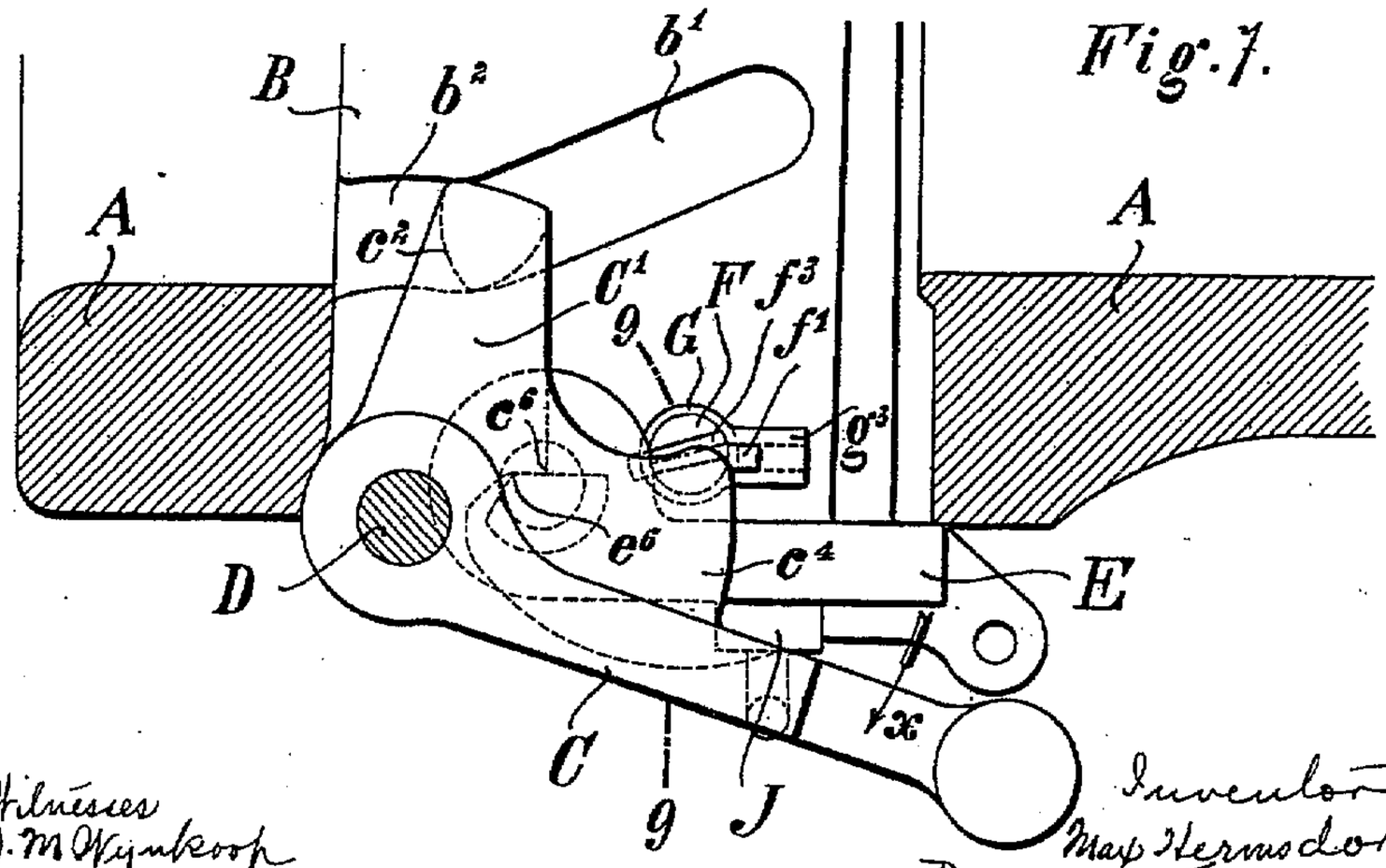


Fig. 7.



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4 SHEETS—SHEET 3.

Fig. 8.

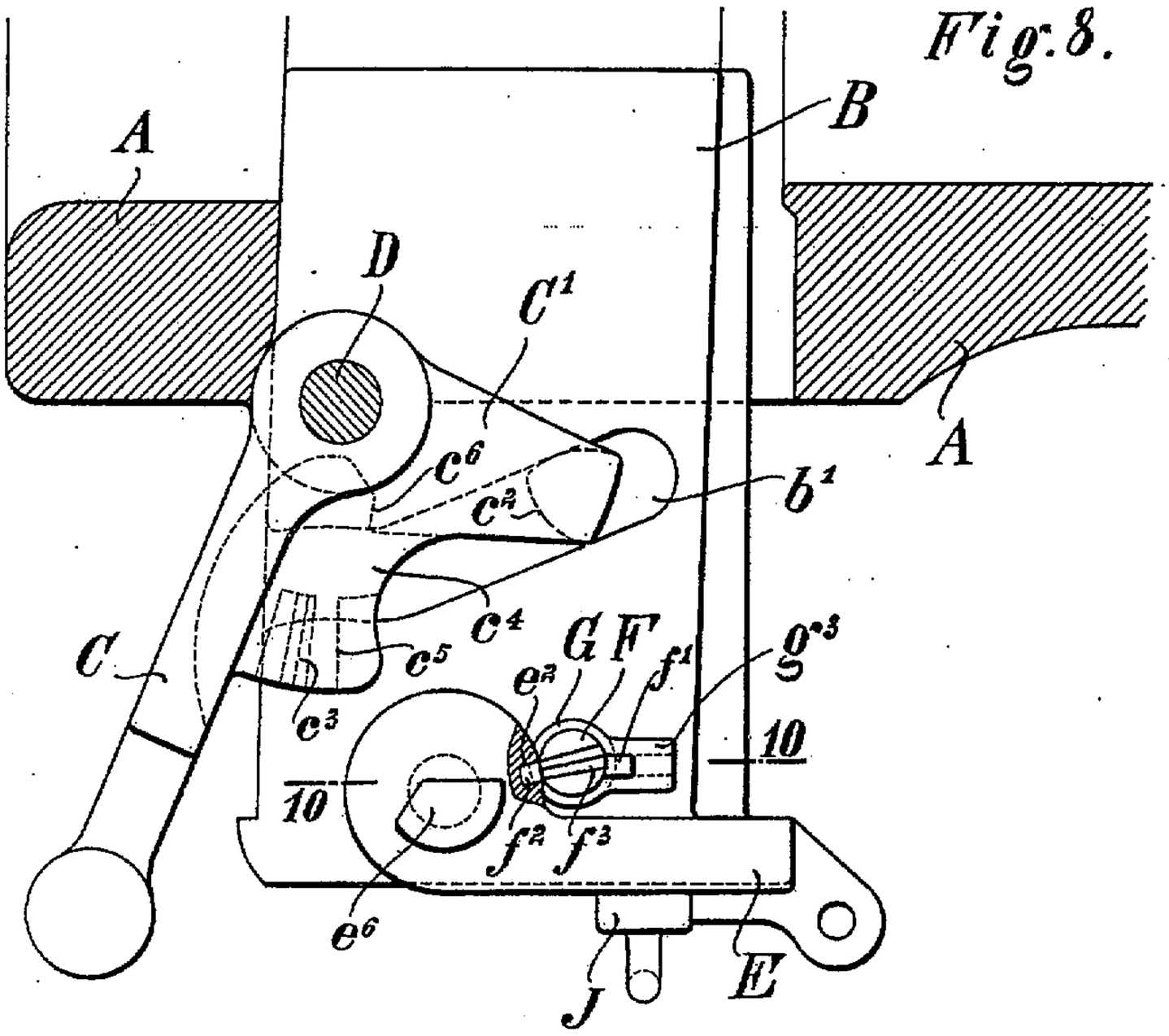


Fig. 9.

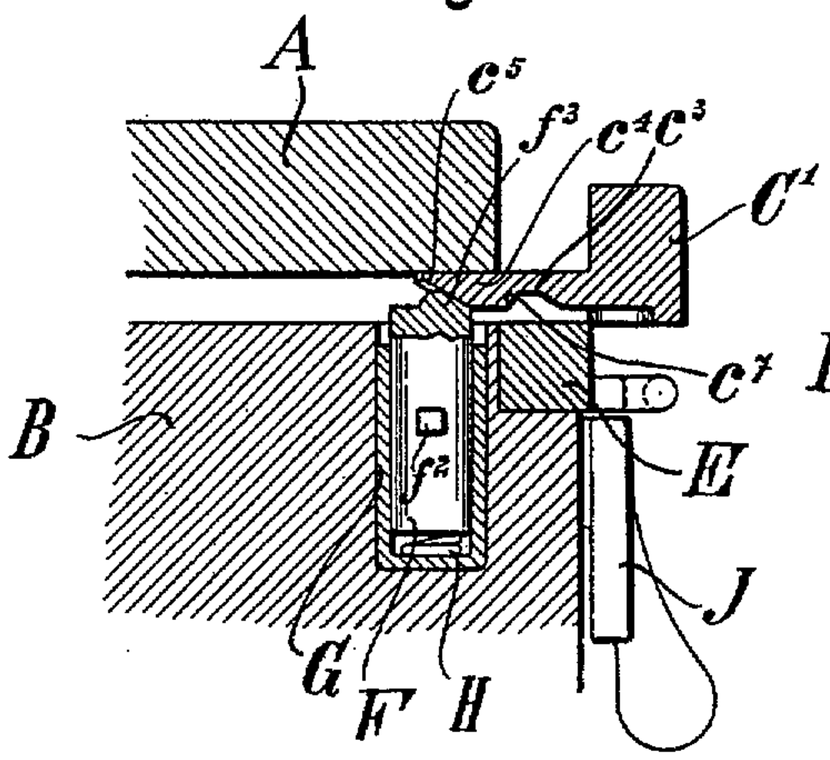
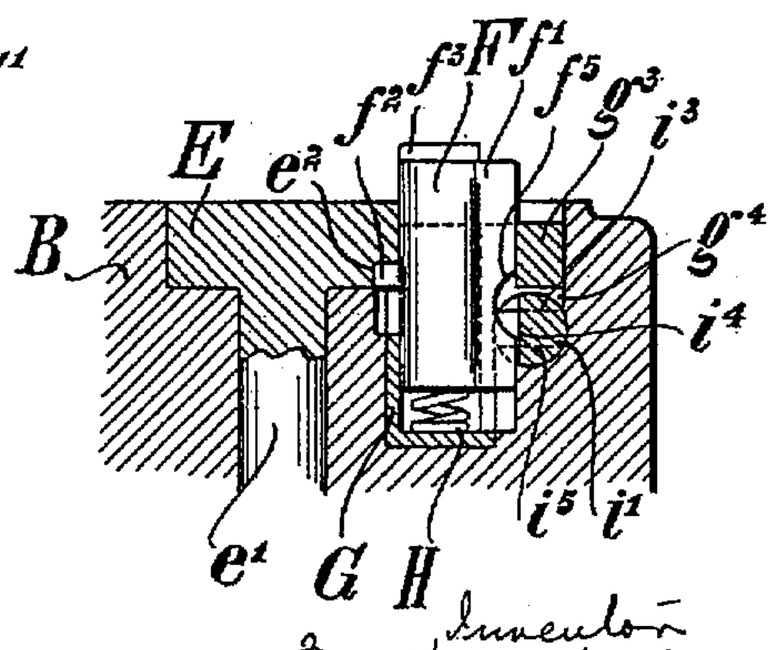


Fig. 10.



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LEVER ACTUATED WEDGE BREECH MECHANISM FOR GUNS.

APPLICATION FILED APR. 30, 1906.

4 SHEETS—SHEET 4.

Fig. 11.

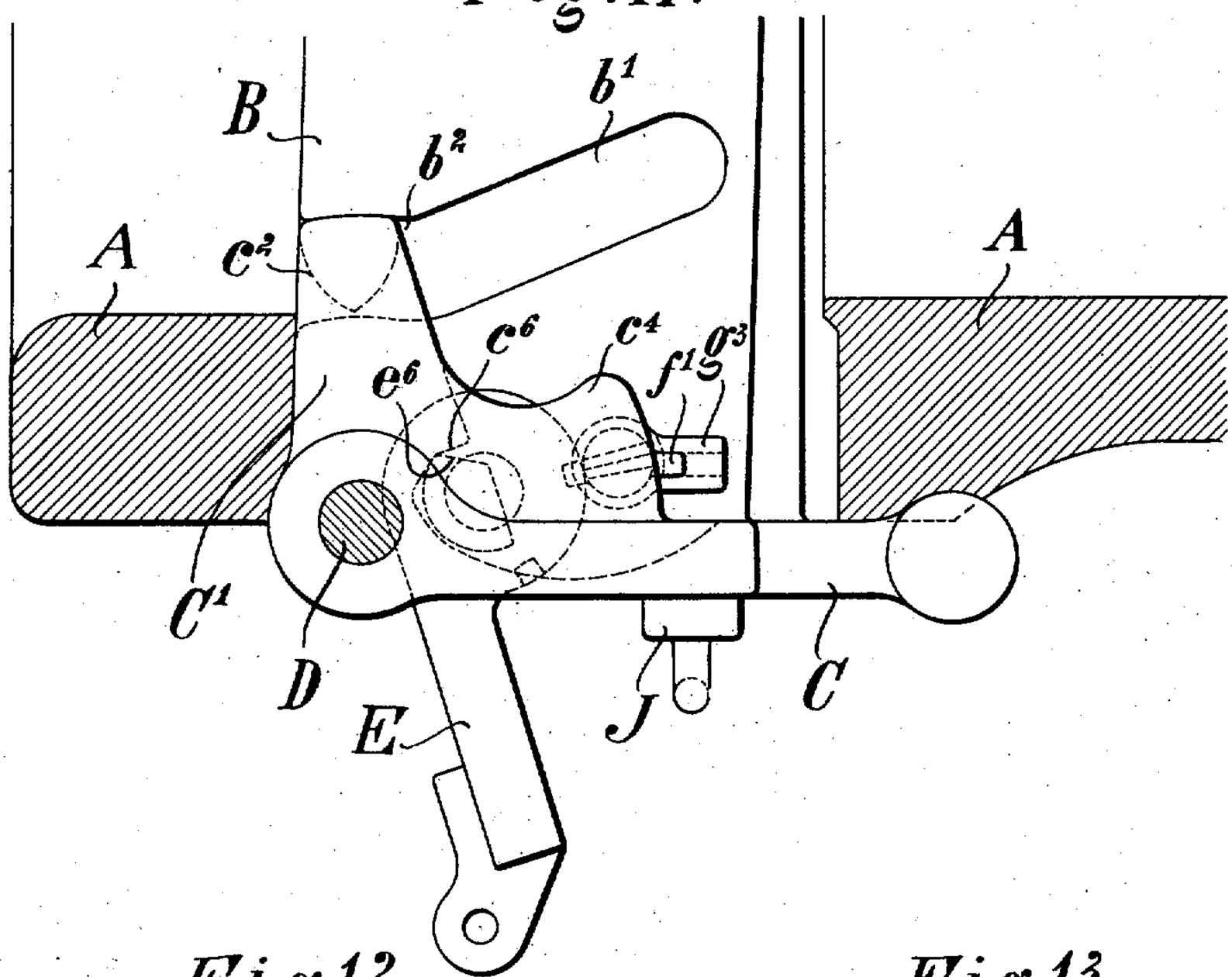


Fig. 12.

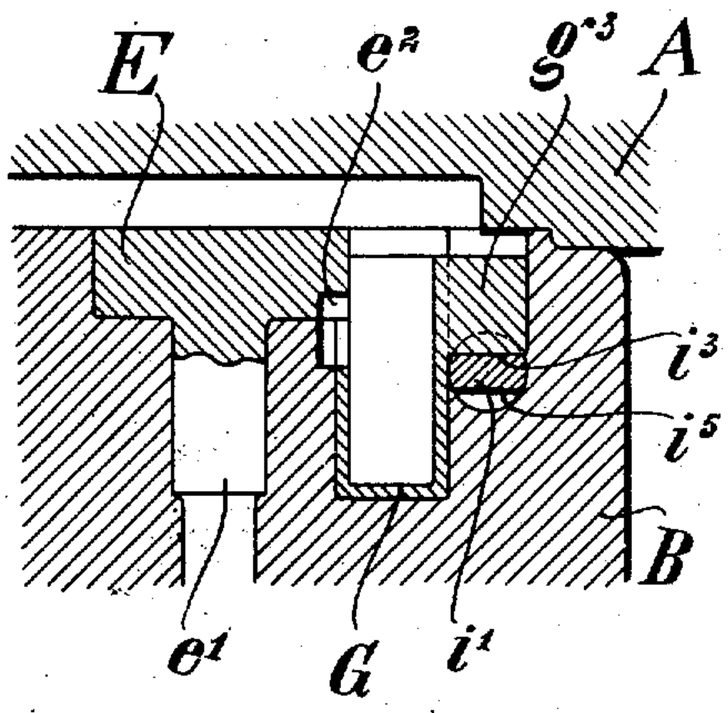
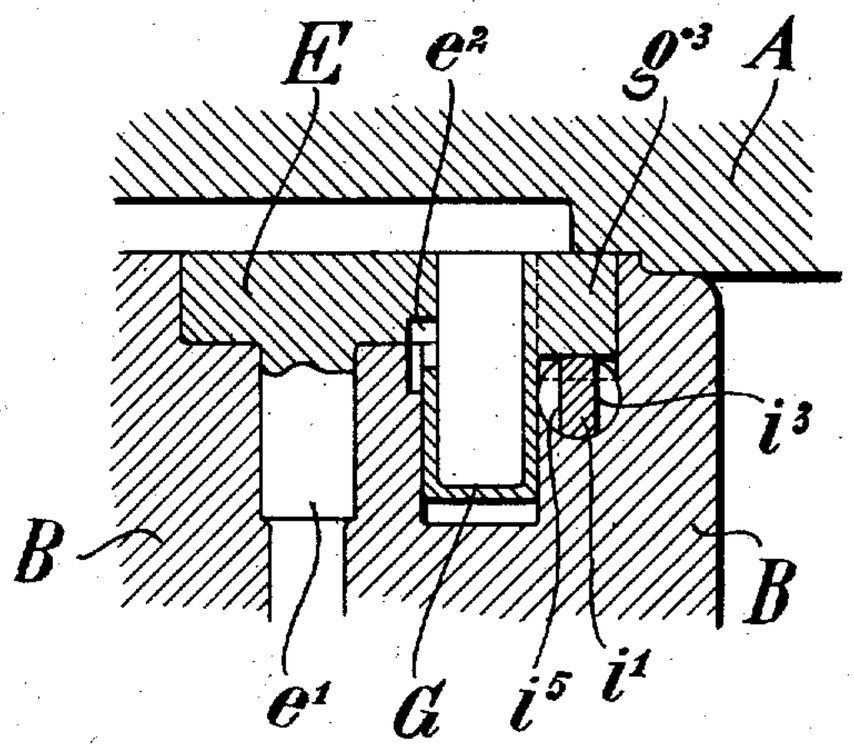


Fig. 13



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UNITED STATES PATENT OFFICE.

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LEVER-ACTUATED WEDGE BREECH MECHANISM FOR GUNS.

No. 860,471. Specification of Letters Patent. Patented July 16, 1907.

Application filed April 30, 1906. Serial No. 314,496.

To all whom it may concern:

Be it known that I, MAX HERMSDORF, a subject of the Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Lever-Actuated Wedge Breech Mechanisms for Guns, of which the following is a specification.

The present invention relates to lever actuated wedge breech-mechanisms for guns and an object of the invention is to provide such mechanisms with an automatic safety device against premature firing.

Other and further objects will appear in the following description and will be particularly pointed out in the appended claims.

In the accompanying drawing, the invention is, by way of example, shown as applied to a wedge breech-mechanism in which the device securing against premature firing is brought into reciprocatory action with different other securing devices.

Figure 1 shows a part of a side view of the closed breech-mechanism; Fig. 2 is a corresponding top view with the upper wall of the breech opening broken away; Fig. 3 is a section on line 3—3, Fig. 2, looking from below; Fig. 4 is a section on line 4—4, Fig. 2, looking from the right; Fig. 5 is a section on line 5—5, Fig. 2, looking from the left; Fig. 6 is a section on line 6—6, Fig. 2, looking from the left; Fig. 7 is a view corresponding to that shown in Fig. 2, the breech-mechanism being closed but unlocked; Fig. 8 is a view corresponding to that shown in Fig. 2, the breech-mechanism being open; Fig. 9 is a section on line 9—9, Fig. 7, looking from the left; Fig. 10 is a section on line 10—10, Fig. 8; Fig. 11 is a view corresponding to that shown in Fig. 2 with changed position of one of the parts; Fig. 12 is a section on line 12—12, Fig. 2; some parts being omitted, and Fig. 13 is a section corresponding to that shown in Fig. 12 with changed position of the parts.

By means of an operating and locking lever C, C′, the fulcrum pin D of which is journaled in the breech A of the gun-barrel, the breech-wedge B can be forced transversely of the bore into the tapering breech opening and locked therein. To attain this purpose, the arm C′ of the operating lever engages a cam groove b', b^2, in the breech-wedge through the medium of a heart-shaped stud c^2, the part b^2 being concentric to the fulcrum-pin D when the breech-mechanism is closed and the breech-wedge being locked in the breech-opening when the stud c^2 of the operating lever is at the free end of the part b^2 of the cam groove (Fig. 2). The breech-closure is provided with a firing mechanism, the drawing only showing the trigger E and its shaft e' journaled in the breech-wedge.

In order to prevent the operating and locking lever C, C′ from moving from its locked position under the effect of the shocks which take place during the recoil and during the subsequent forward movement, and in order to secure the trigger against premature pulling, I provide the following means: The arms C C′ of the operating lever are connected by means of a lip or web c^4 which on its under side is provided with an inclined face c^5, and a notch c^3 having inclined side walls (Figs. 5, 8 and 9). On the under side of the nave of the trigger E is provided a notch e^2 (Figs. 3, 8, 10 and 12) and in the breech-wedge is arranged a sliding bolt F (see in particular Fig. 3). A movable sleeve G, the purpose of which will be explained later on, is non-rotatably arranged in the breech-wedge and in this sleeve the bolt F is mounted in such a manner that it can move at a right angle to the direction of movement of the breech-wedge, a spring H interposed between the bolt F and the bottom of the sleeve G, tending to force the bolt outwardly. The bolt F is provided with a lateral longitudinal rib f' which projects through the wall of the sleeve G and prevents turning of the bolt relatively to the sleeve. On the side opposite the rib f', the bolt is provided with a projection f^2, which projects under the nave of the trigger E (Fig. 3), while on the upper face of the bolt is formed a roof-formed projection f^3.

In the closed and locked position of the breech-mechanism (Figs. 1 to 6) the action of the spring H holds the projection f^3 of the bolt F in engagement with the notch c^3 in the operating lever thereby securing the lever in its locked position. The spring H is of sufficient strength to maintain the engagement notwithstanding the shocks which arise during the recoil and return movement of the gun-barrel.

When the parts assume the position just mentioned and the trigger E is in its position of rest, the projection f^2 of the bolt F is directly under the notch e^2 of the trigger but does not engage therewith (see Fig. 3) and the trigger E is, therefore, free to move.

If the operating lever is turned in order to open the breech-mechanism the bolt F is first forced into the breech-wedge by the inclined wall c^7 of the notch c^3 and against the action of the spring H. When the operating lever is turned further the projection f^3 of the bolt F slides along the inclined surface c^5 and the bolt is released and again forced outwardly automatically by the spring H and when the operating lever is turned beyond the position shown in Figs. 7 and 9, the bolt commences to pass, with its projection f^2, into the notch e^2 of the trigger E, and from this moment the trigger is locked. By further turning the operating lever to open the breech-mechanism, the bolt is still more raised until the projection f^2 reaches the upper wall of the notch e^2, whereupon the inclined face c^5 leaves the bolt F. When the breech-mechanism is closed, the proceeding is the same but in inverted order. The inclined face c^5 first forces the bolt F into the breech-wedge, and at the moment the breech-

wedge is completely forced into the breech opening and the lug c^2 of the operating lever enters the groove b^2, the projection f^2 of the bolt F leaves the notch e^2 (Figs. 7 and 9) and finally the projection f^3 of the bolt reënters the notch c^3 without the projection f^2 of the bolt entering into engagement with the notch e^2 of the trigger.

During the turning of the operating lever from the position shown in Fig. 7, to that shown in Fig. 2, the trigger, therefore, is not locked. Now, in order to make it impossible to fire the gun during this part of the movement of the operating lever, I provide the following means: On the under side of the arm C′ of the operating lever I provide a stop c^6 and on the upper side of the nave of the trigger is a stop e^6 (Figs. 2, 4 and 7). The shape and relative arrangement of the two stops are selected in such a manner that the stop c^6 lies against the stop e^6 in the manner shown in Fig. 7, when the operating lever is in the position shown in Fig. 7, and the trigger is in the position of rest. When the parts are in this position and the trigger E is turned in the direction of the arrow x (Fig. 7) to fire the gun, the operating lever will be turned into its locked position (Fig. 11) through coöperation of the two stops e^6 c^6, this position being reached directly after the trigger has passed the entire distance necessary for releasing the firing device. If, at the moment of pulling the trigger, the operating lever is in a position that is intermediate of the two positions shown in Figs. 7 and 2, the stops e^6 c^6 do not meet until the trigger has been moved a certain amount. In every instance, however, the operating lever is brought into the locked position by the pulling movement of the trigger.

There is one more advantage due to the just described coöperation of the trigger and the operating lever. When the breech-mechanism is opened and while the lug c^2 of the operating lever passes through the groove b^2, the action of the stop c^6 on the stop e^6 causes the trigger to be carried back to its position of rest, if the automatic return of the trigger does not take place for one reason or the other, such as failure of the spring, or the like.

In order to secure the breech-mechanism against opening under the effect of the shocks which take place during the travel, and also against unauthorized opening and firing, a rotary lock-bolt J is provided which is turnable about a fulcrum-pin i' horizontally journaled in the breech-wedge, the bolt being secured against removal from the breech-block by means of a bayonet-closure or the like (Figs. 1, 5 and 6). When the lock-bolt J is withdrawn, it assumes the position shown in full lines in the drawing. By turning the bolt 180° in the direction of the arrow y (Fig. 1) it is brought into its locking position in which it lies in front of the trigger E and the arm C of the operating lever and prevents a turning of these parts (see the dotted line position indicated in Figs. 1 and 5). It is, however, necessary to prevent the lock-bolt J from being brought into the locking position when the breech-mechanism is open, as otherwise the operating lever C will hit the lock-bolt upon closing the breech-mechanism, and the bolt and the operating lever C would in such case be likely to sustain damage. To prevent this I provide the following means: The fulcrum-pin i' of the rotary lock-bolt J is arranged so close to the sliding bolt F that a segmental cut f^5 (Figs. 3 and 10) in the rib f' of the bolt F is necessary for turning the lock-bolt when the breech-mechanism is closed. Moreover, a flattened surface on the fulcrum-pin i' is necessary for the movements of the bolt F when the lock-bolt is withdrawn. It is, therefore, not possible to shift the bolt J when the breech-mechanism is open, because in that instance the bolt F is in a position in which the part of the rib f' that is below the cut f^5 lies against the flattened surface i^4 of the fulcrum-pin i' (Fig. 10). If the segmental cut f^5 in the rib f' of the bolt F is of such a shape that it is entirely filled by the pin i' of the lock-bolt J in the locking position, the bolt F will, in this position of the lock-bolt J, be locked, and as the bolt F engages with the notch c^3 of the operating lever C C′, a second means is thereby provided for holding or locking the operating lever against turning.

In order to make it possible to hold the lock-bolt J in its extreme positions by means of the spring H, the pin i' is provided on each side of the flattened surface i^4 with two flattened surfaces i^3 and i^5 which extend at right angles to the flattened surface i^4 and are located in an equal distance from the axis of the pin i', (Figs. 6, 3 and 10). Moreover, the sleeve G is provided with a lateral projection g^3 which projects beyond the pin i' a corresponding cut being provided in the breech-block for the projection g^3 (Figs. 2 and 6). The projection g^3 which embraces the rib f' (Figs. 2 and 7) is, on its under side, provided with a cut g^4 so as to be capable of overlapping the part of the pin i', which is between the flattened surfaces i^3 or i^5, and lies on the flattened surfaces i^3 or i^5 (Fig. 6). The spring H, which continuously presses the sleeve downwardly, therefore tends to maintain the projection g^3 in engagement with the flattened surfaces (Figs. 3 and 10) so as to secure the lock-bolt J against accidental turning in its extreme positions.

When the lock-bolt J is withdrawn, the projection g^3 lies on the flattened surfaces i^3. When the lock-bolt is shifted from the withdrawn to the locking position, the sleeve G is, through the medium of its projection g^3, first raised by the cylindrical part of the pin into the position shown in Fig. 13, in order to subsequently descend under the action of the spring H until the projection g^3 rests on the flattened surfaces i^5.

From the foregoing specification, it will be seen that the operating lever C, which is also the locking means of the breech-wedge B, controls the trigger locking means that is, it releases the spring pressed bolt F and permits said bolt to prevent the operation of the trigger when the breech-wedge is moved from firing position, and moves the bolt to unlocking position when the breech-wedge reaches firing position. It is further apparent that the rotary bolt J and sliding bolt F form means for simultaneously effecting the locking of the operating lever and the trigger.

Having thus described the invention, what is claimed as new is:

1. The combination with the breech, and a transversely movable breech-wedge, of an operating lever for the breech-wedge, a trigger provided with a notch and a spring pressed sliding bolt released by the operating lever to enter the notch of the trigger and hold the trigger against movement.

2. The combination with the breech, and the trans-

versely movable breech-wedge, of an operating lever provided with a notch, a trigger provided with a notch, and a spring pressed sliding bolt resting in the notch of the operating lever, when the breech is closed, and resting in the notch of the trigger, when the breech is open.

3. The combination with the breech-wedge, and an operating lever for the same, of a trigger, a locking means for the trigger controlled by the lever, and connection between the lever and the trigger causing the operating lever to move, during the moving of the trigger, to a position in which it locks the wedge and engages the trigger locking means.

4. The combination with the breech-wedge, of an operating lever provided with a notch, a trigger, a spring pressed sliding bolt for holding the trigger against movement and resting in the notch of the operating lever when the said lever is in one of its extreme positions, and connection between the trigger and the operating lever causing the lever to move to a position so that the sliding bolt enters the notch to insure the sliding bolt against moving during the movement of the trigger.

5. The combination with the breech-wedge, of an operating lever provided with a notch, a sliding bolt adapted to enter the notch, a trigger and a lock effecting the locking of the trigger and the locking of the sliding bolt.

6. The combination with the breech-wedge, the operating lever, and a trigger, of a sliding bolt engaging the lever, and movable to lock the trigger, and means for preventing the movement of the sliding bolt while it engages the lever to prevent the movement of the lever.

7. The combination with the operating lever, and a trigger, of a trigger locking means moved from locking position by the lever, and means for causing the trigger locking means to lock the operating lever.

8. The combination with the operating lever, and the trigger, of a sliding bolt to lock the trigger, controlled by the operating lever, and provided with a notch, and a rotary bolt provided with a notch to permit the sliding of the bolt and adapted to be moved into the notch of the sliding bolt to prevent the sliding of said latter bolt.

9. The combination with the operating lever, and the trigger, of a sliding bolt to lock the trigger, controlled by the operating lever, and provided with a notch, and a rotary bolt provided with a notch to permit the sliding of the bolt and adapted to be moved into the notch of the sliding bolt to prevent the sliding of said latter bolt; said rotary bolt having a portion located in the path of the trigger when the sliding bolt is locked against movement.

10. The combination with the operating lever and the trigger, of a sliding bolt to lock the trigger, controlled by the operating lever, a movable sleeve in which the sliding bolt works, a spring interposed between the bolt and the sleeve, a rotary bolt for locking the sliding bolt against movement, and connection between the rotary bolt and the sleeve whereby the spring is utilized for yieldingly holding the rotary bolt in various positions.

11. In a breech-mechanism for guns, the combination of a wedge moving transversely to the axis of the bore of the gun-barrel, an operating lever for moving and locking the wedge, a trigger having a notch and a locking bolt slidably mounted in the wedge and adapted to engage the notch in the trigger under the action of a spring when the operating lever is out of its path.

12. In a breech-mechanism for guns, the combination of a wedge moving transversely to the axis of the bore of the gun-barrel, an operating lever for moving and locking the wedge, a trigger having a notch, a locking bolt slidably mounted in the wedge and adapted to engage the notch in the trigger under the action of a spring when the operating lever is out of its path, the operating lever having a notch with which the locking bolt engages when the operating lever is in a position for locking the wedge, the notch in the operating lever being of a depth to prevent engagement between the locking bolt and the notch in the trigger when the locking bolt engages the notch in the operating lever.

13. In a breech-mechanism for guns, the combination of a wedge moving transversely to the axis of the bore of the gun-barrel, an operating lever for moving and locking the wedge, a trigger having a notch, a locking bolt slidably mounted in the wedge and adapted to engage the notch in the trigger under the action of a spring when the operating lever is out of its path, a notch in the operating lever with which the locking bolt engages when the operating lever is in a position for locking the wedge, and a pair of stops mounted respectively upon the operating lever and the trigger and causing, when trigger is pulled the operating lever to move in the position in which the operating lever locks the wedge.

14. In a breech-mechanism for guns, the combination of a wedge moving transversely to the axis of the bore of the gun-barrel, an operating lever for moving and locking the wedge, a trigger having a notch, a locking bolt slidably mounted in the wedge and adapted to engage the notch in the trigger under the action of a spring when the operating lever is out of its path, a notch in the operating lever with which the locking bolt engages when the operating lever is in a position for locking the wedge, and a pivotally mounted lock adapted to be thrown in and out of a position in which it prevents accidental opening of the breech and accidental firing, said lock being controlled by the spring acting upon the locking bolt and held in its operative and inoperative position.

15. In a breech-mechanism for guns, the combination of a wedge moving transversely to the axis of the bore of the gun-barrel, an operating lever for moving and locking the wedge, a trigger having a notch, a locking bolt slidably mounted in the wedge and adapted to engage the notch in the trigger under the action of a spring when the operating lever is out of its path, a notch in the operating lever with which the locking bolt engages when the operating lever is in a position for locking the wedge, a pivotally mounted lock adapted to be thrown in and out of a position in which it prevents accidental opening of the breech and accidental firing, the locking bolt having a recess receiving the pivot of the pivotally mounted lock when the breech-mechanism is closed, and said pivot having a flattened portion allowing the locking bolt to slide along when the pivotally mounted lock is thrown out of operation.

The foregoing specification signed at Düsseldorf, this seventh day of April, 1906.

MAX HERMSDORF.

In presence of—
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PETER LIEBER.