No. 661,550. Patented Nov. 13, 1900.

C. POHLIT.

BREECH CLOSING MECHANISM FOR RECOIL GUNS.

(Application filed Aug. 18, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

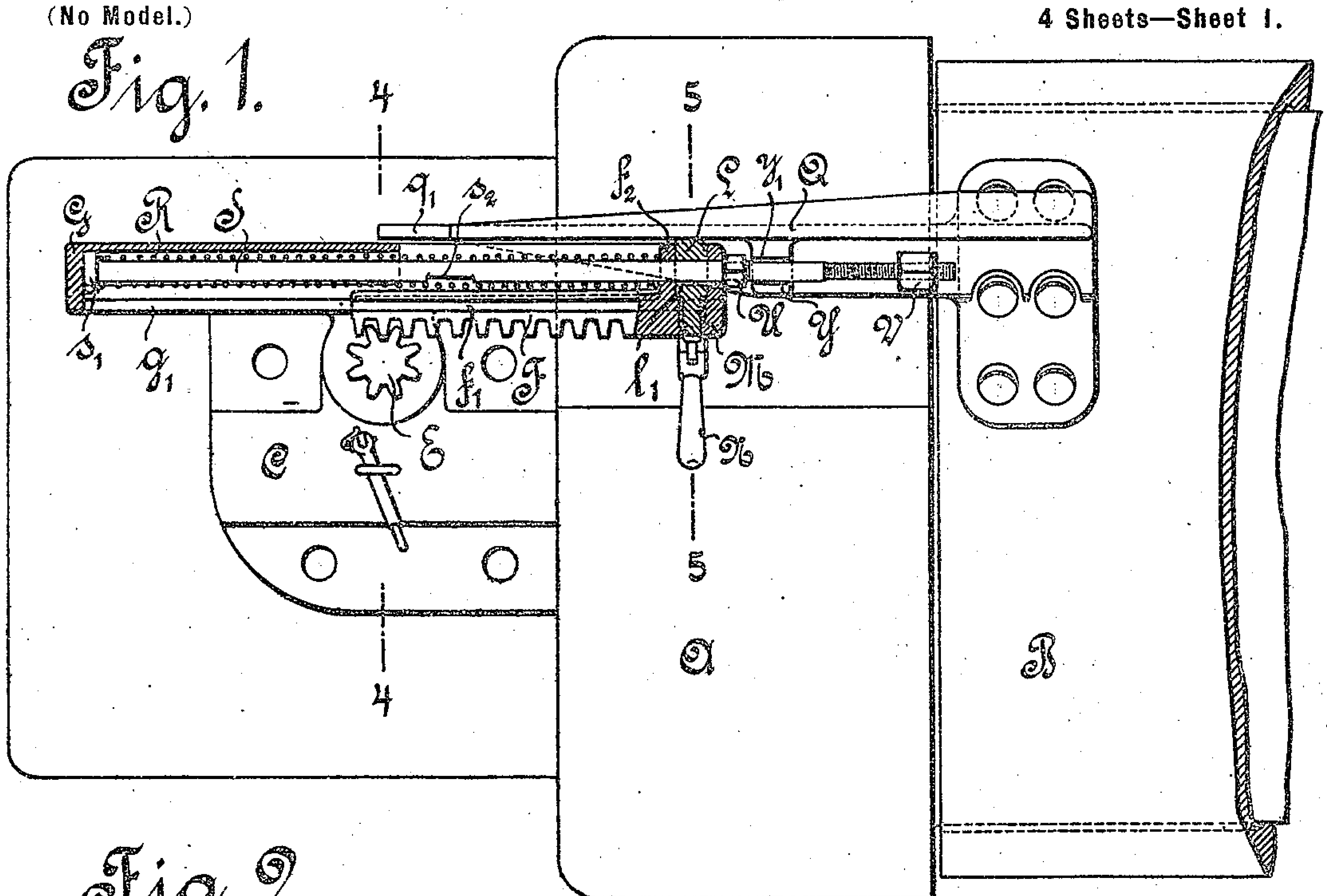
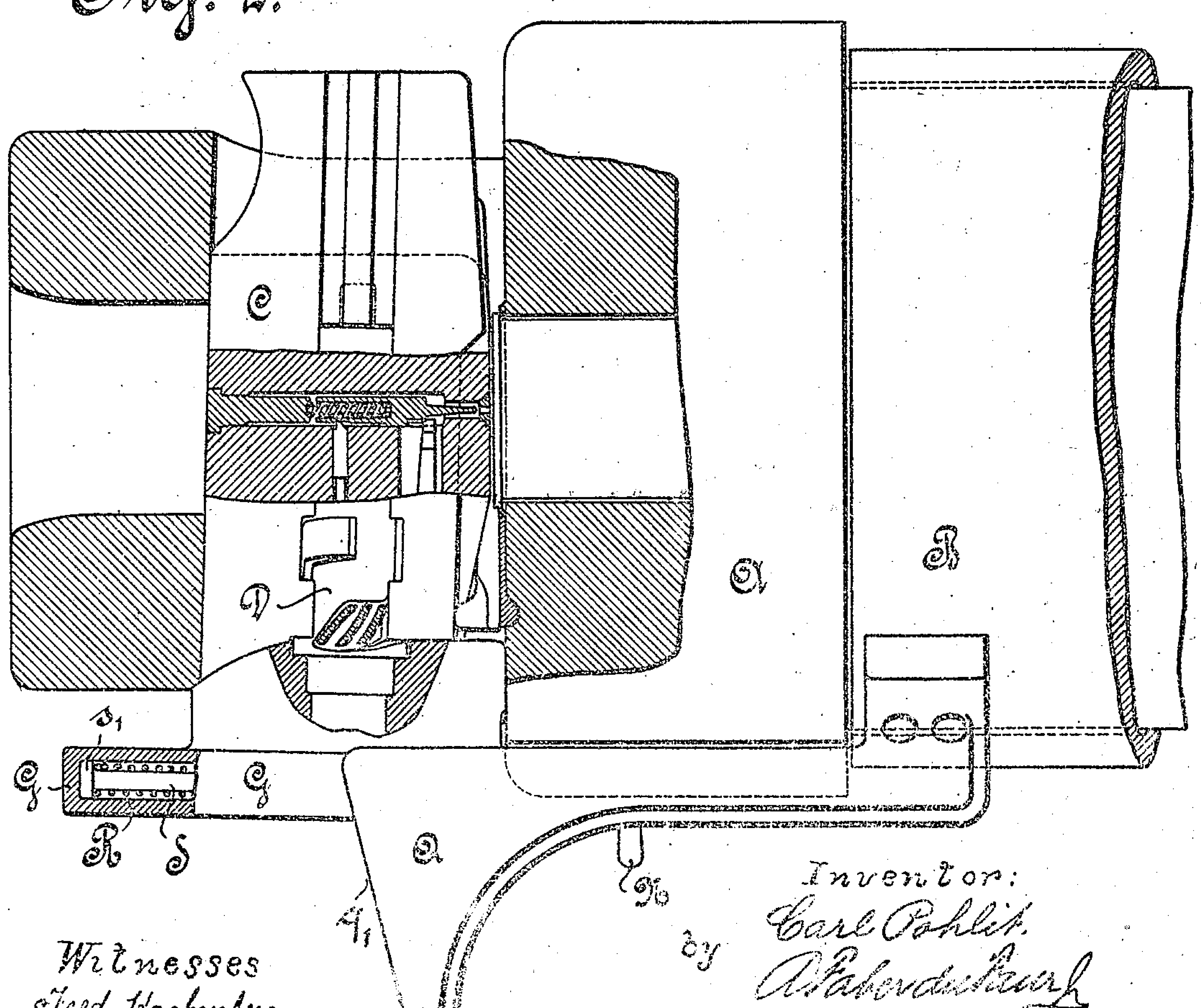


Fig. 2.



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(No Model.) 4 Sheets—Sheet 2.

Fig. 3.

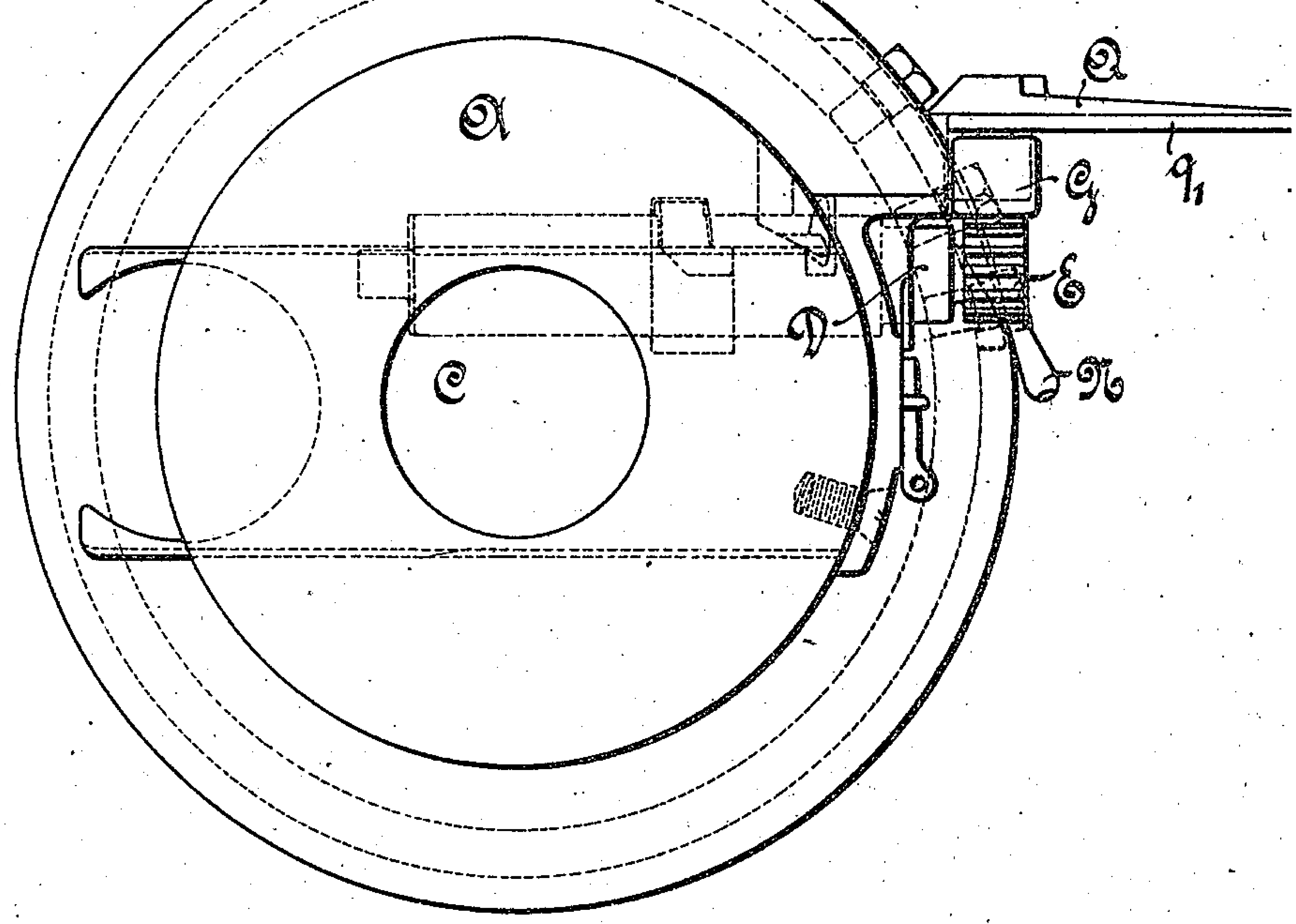


Fig. 4.

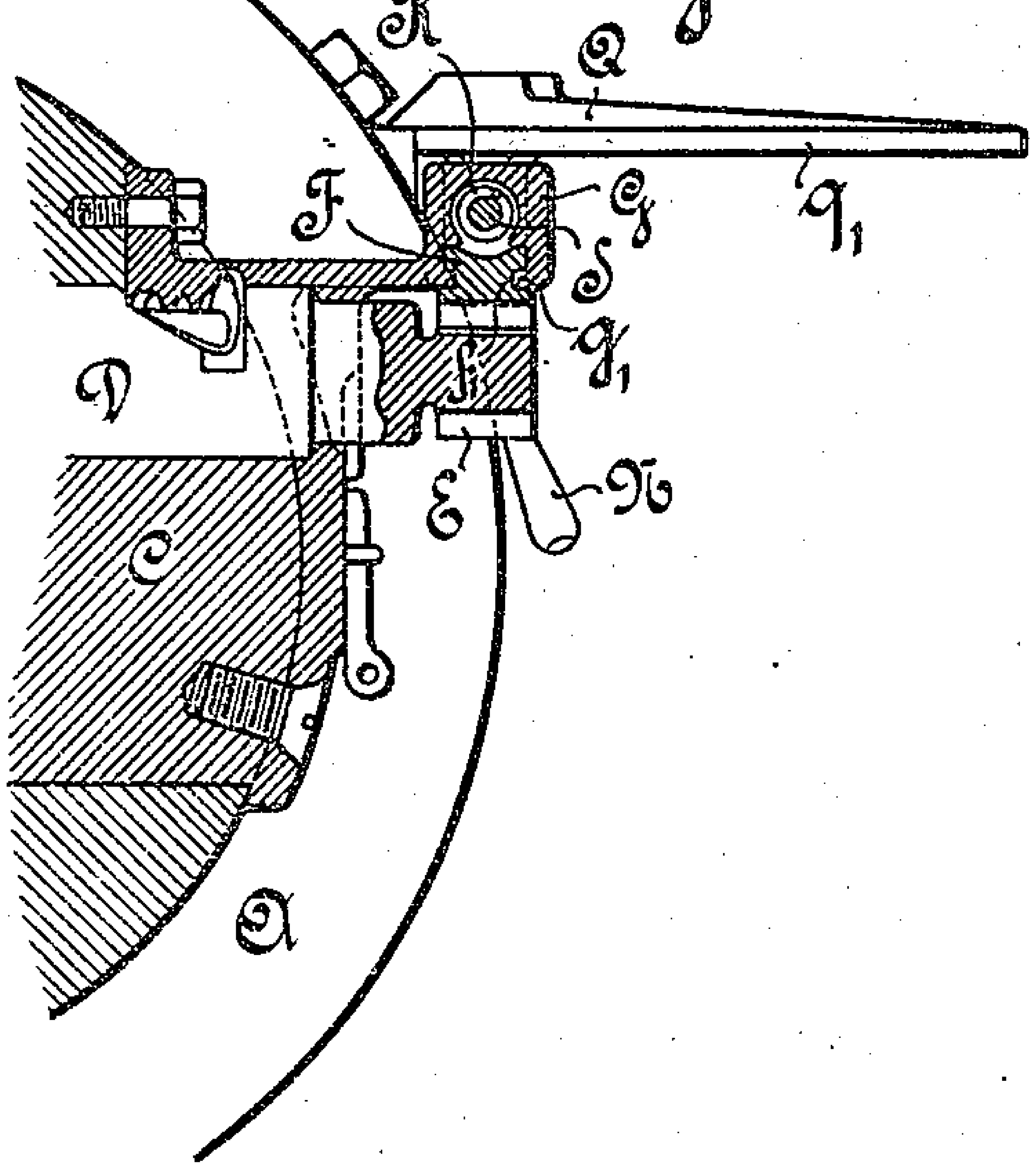
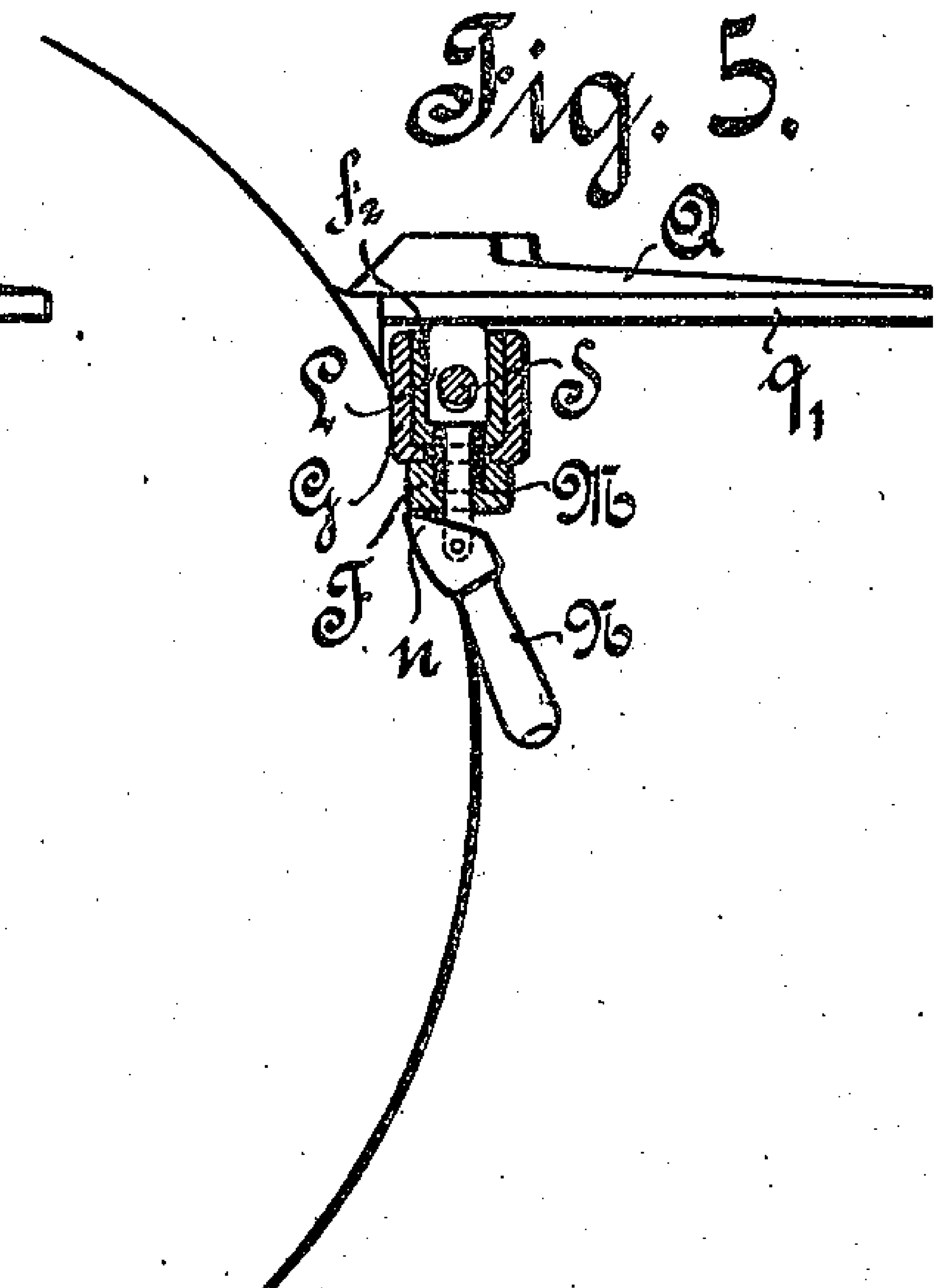


Fig. 5.



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No. 661,550. Patented Nov. 13, 190

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BREECH CLOSING MECHANISM FOR RECOIL GUNS.

(Application filed Aug. 18, 1900.)

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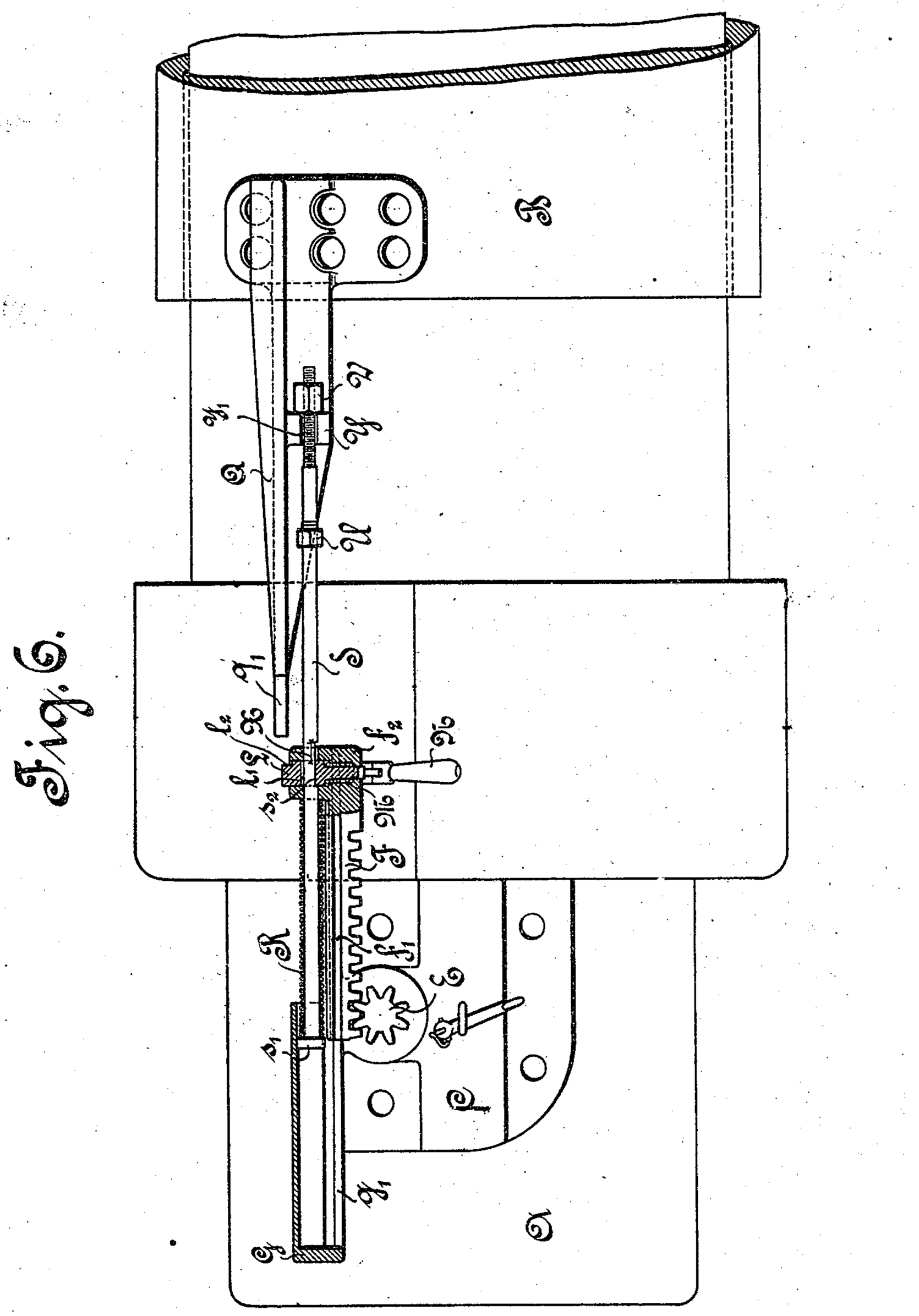

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No. 661,550. Patented Nov. 13, 1900.

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BREECH CLOSING MECHANISM FOR RECOIL GUNS.

(Application filed Aug. 18, 1900.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 7.

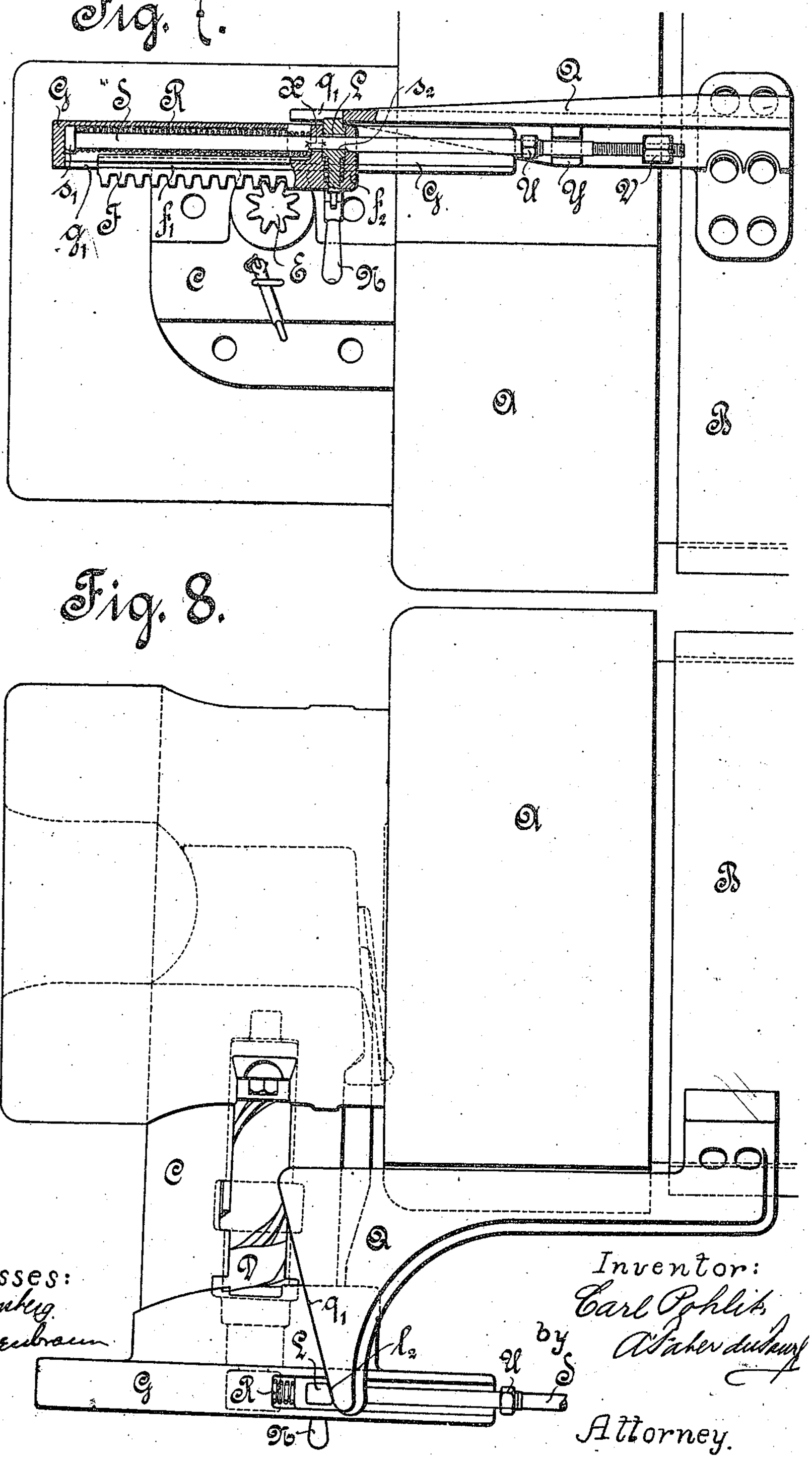

Fig. 8.

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UNITED STATES PATENT OFFICE.

CARL POHLIT, OF ESSEN, GERMANY, ASSIGNOR TO FRIED. KRUPP, OF SAME PLACE.

BREECH-CLOSING MECHANISM FOR RECOIL-GUNS.

SPECIFICATION forming part of Letters Patent No. 661,550, dated November 13, 1900.

Application filed August 18, 1900. Serial No. 27,278. (No model.)

To all whom it may concern:

Be it known that I, CARL POHLIT, a citizen of the German Empire, residing at Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Breech-Closing Mechanism for Recoil-Guns, of which the following is a specification.

This invention has reference to breech-closing mechanism for recoil-guns having horizontal wedge-blocks, and particularly for such of large caliber, and has for its object to utilize the recoil and running-out movement of the barrel relatively to the carriage for the purpose of automatically opening the breech.

The object of this invention is accomplished by securing to the screw-spindle, by which an inward and outward movement of the breech-block is effected, a gear-wheel adapted to engage with and be turned by a rack moving with the gun-barrel, but at reduced speed, and thus effecting the opening of the breech.

The nature of the invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, of a gun provided with the improved breech-operating mechanism, the parts being shown in the positions they are in just before firing. Fig. 2 is a top view of Fig. 1, partly in section. Fig. 3 is a rear view. Fig. 4 is a vertical section on the line 4 4, Fig. 1. Fig. 5 is a vertical section on the line 5 5, Fig. 1. Fig. 6 is a side elevation similar to Fig. 1, but showing the parts in the positions assumed when the gun-barrel has ended its recoil in the cradle. Fig. 7 is a view similar to Fig. 1, but showing the parts in the positions assumed after the running-out movement of the gun is finished. Fig. 8 is a top view of Fig. 7.

Similar letters of reference designate corresponding parts throughout the several views of the drawings.

In the present instance the invention is applied to a gun having its barrel mounted in a cradle, and a construction is shown in which the closing of the breech is also effected automatically by a spring, in which latter energy for this purpose is stored by the recoil of the gun-barrel.

The barrel A is mounted in the usual manner in a cradle B, so that after the shot is fired it can recoil or move backwardly in a straight line in the cradle and then run out or move forwardly. In the breech-block C is mounted, so as to be capable of being turned, a screw-spindle D, which engages with a thread in the barrel A and effects the opening and closing of the breech when turned. It is assumed that the screw-spindle and the thread are constructed similarly to the construction described in United States Letters Patent No. 617,907, granted to me January 17, 1899, and the same need not, therefore, be more fully described here. To the end of the screw-spindle D, projecting beyond the breech-block C, is secured a gear-wheel E, which is constantly in engagement with the teeth of a rack F. The rack F can move in a straight line in a housing G, secured to the crown of the wedge-block C, and is guided by rails g' in the housing, which engage with suitable ways f' formed on the sides of the rack. The stroke of the rack is in such proportion to the diameter of the gear that when the rack is moved to its full stroke backward and forward the breech is fully opened and closed. Of course the movement of the rack in opposite directions is limited by the movement of the wedge-block through the medium of the screw-spindle, since after complete opening and closing of the breech it is impossible to further turn the screw-spindle in either direction. In the front and strengthened part f^2 of the rack F is vertically mounted a spring-pressed bolt L, the spring M of which tends to press the same constantly upward into a position in which it would project above the top surface of the part f^2 of the rack. At the lower end of the bolt L is pivoted a hand-lever N, having a thumb-like projection n, which bears against the lower surface of the rack, so that by turning the lever N toward the gun-barrel the bolt L can be drawn downwardly. To the cradle B is rigidly secured a horizontal plate Q, which may be termed the "impact-plate." This plate has for its purpose, by coöperating with the bolt L, to ultimately effect the opening of the breech when the gun is run out. To bring about this result, the edge q' of the impact-plate, which edge may be called the "impact edge," is arranged in

the path of the side l^2 of the bolt L when the latter is in its upper position, Fig. 6, while the lower face of the impact-plate lies somewhat higher than the upper edge of the part f^2 of the rack, the housing G, and also the top of the bolt L when the latter is in its lower vertical position, so that part f^2 and housing G can pass under the impact-plate at any time, but the bolt L only when in its lower vertical position, Fig. 1. The impact-plate Q extends from the cradle so far backward that after the end of the recoil of the barrel (see Fig. 6) the bolt L is not covered by the same; but said bolt is in a position somewhat back of the plate and is therefore in its upper vertical position. In consequence of this it can readily be seen that the upper side l^2 of the bolt L will strike against the impact edge q' when the gun-barrel is run out and will hold up the rack F, so that the gear E, which participates in the further movement of the gun-barrel, rolls on the rack and effects the opening of the breech. To provide for the outward movement of the wedge-block which here takes place, together with the rack F and the gear E, the impact-plate—that is, its impact edge—extends from the gun-barrel so far outwardly that after the complete opening of the block the bolt L is still against the impact edge. Since, in the example illustrated, the length of the running-out movement of the barrel and the stroke of the rack are not the same, the latter being much smaller than the former, the impact edge q' of the plate Q is made oblique and slanted forward from the gun-barrel, and the side l^2 of the bolt is correspondingly slanted, Fig. 8. In consequence of this the bolt L can as it moves along the edge q' on the opening of the breech simultaneously move toward the front through a distance equal to the difference between the running-out movement of the barrel and the stroke of the rack. In order to accomplish also an automatic closing of the breech after it has been automatically opened, the following provision is made: In the housing G is placed a long helical spring R, which surrounds a cylindrical rod S and bears with one end against a head s' on said rod and with its other end against the reinforced part f^2 of the rack F. The rod S can be moved in the direction of its length in the housing G and extends forwardly through an opening in the part f^2 of the rack and also through a vertical slot l' in the bolt L. The portion of the rod projecting through the rack also passes through a vertical slot y' in a stop Y, formed on the lower face of the impact-plate Q, and remains in said slot as long as the breech is closed. The slot y' opens laterally or outwardly, so that the rod S can pass out of the slot when the breech-block is moved outwardly. The rod S has at its forward external part two stops U and V, formed by nuts, and at the part inside of the housing it has a socket s^2. The stop U is so set that when the gun is in its normal position, Fig. 1, the front crowned face of the part f^2 of the rack F abuts directly against the same, so that the rear teeth of the rack F, engaging with the gear-wheel E, are relieved from the pressure of the spring R. The stop V has for its purpose to bend the spring R when the gun-barrel recoils, which it does by engaging the stop Y, and so holding back the rod S. The stop V is so set that when the spring R is completely bent at the end of the recoil of the barrel the socket s^2 of the rod S is exactly within the bolt L. In this position the lower wall of the slot l' in the bolt L can pass into the socket s^2, thus coupling the rod S and the rack F and maintaining the tension of the spring when the rod is freed from the stop Y of the impact-plate Q by the outward movement of the breech. By pulling down the bolt L the coupling between the rod S and the rack F is disconnected. Since the recoil of the barrel is variable within small limits, the length of the socket s^2 is made somewhat greater than the breadth of the bolt—that is to say, by a length X, Figs. 6 and 7, which is equal to the distance between the maximum and minimum recoils. In consequence thereof the rod S can shift in one direction or another with respect to the rack F, even if the bolt L engages the socket.

Before the gun is fired the several parts are in the positions shown in Figs. 1 and 2. The gun-barrel is in its outermost position relative to the cradle and the breech is closed and locked. The spring R is at its initial tension and the rack F moved toward the front, so that the part f^2 thereof is below the impact-plate Q and the latter holds the bolt L down. The head s' of the rod S rests against the rear end of the housing G. On firing, the barrel A recoils in the cradle B and the first part of the movement is participated in by the breech-block, the housing G, attached thereto, and all the parts contained in said housing, (rack F, spring R, and rod S,) so that no change is made in the relative positions of the recoiling parts. On continued motion of the barrel the stop V of the rod S engages the rigid stop Y and is held back and the head s' of said rod forms from this instant on a rigid bearing for the spring R, which is now compressed by the part f^2 of the recoiling-rack, Fig. 6. Toward the end of the recoil, and as soon as the lower wall of the slot l' arrives opposite to the socket s^2 of the rod S, the bolt L projects above the impact-plate Q and rises under the pressure of the spring M into the socket s^2 of the rod S. Since the length of the socket s^2 is somewhat greater than the width of the bolt L, the latter, and consequently the rack F, can move backward a little farther on the rod S through the distance X. At the end of the recoil the several parts take the positions shown in Fig. 6, it being assumed that the gun-barrel has passed through the maximum recoil.

When the running out of the barrel starts, the rack F also moves a little distance to-

ward the front without any relative movement or displacement between it and the breech. The spring R is somewhat distended, while the rod S remains at rest, for such a time until the bolt L engages the front edge of the socket s^2. From this moment on the rod S is also carried forward. The relative positions of the rack F and the rod S are not changed for the present, since the same are coupled by the bolt L, and the spring R remains compressed when the rod S is released from the stop Y in consequence of the outward movement of the breech-block. During the further progression of the running-out movement of the gun-barrel the side l^2 of the bolt L strikes against the impact edge q' of the impact-plate Q, so that the rack F is prevented from moving farther forward together with the barrel, the breech-block, and the gear E. In consequence of this the gear E begins to roll on the rack F and turns the screw-spindle D to the left, and said spindle effects the opening of the breech in the well-known manner. During this movement the breech-block moves laterally out of the wedge-chamber, and the housing G and the parts installed therein participate in the said movement, so that the rod S passes out of the slot y' and disengages itself from the stop Y, and the side l^2 of the bolt L moves along the oblique edge q'. In so doing the bolt L is moved so far toward the front as corresponds to the oblique position of the edge q'. Since the forward movement of the rack F corresponds with that of the bolt L, the said rack does not stand absolutely still, but is delayed in its forward movement with respect to the breech and the barrel At the end of the running-out movement the several parts assume the positions shown in Figs. 7 and 8. The bolt L rests against the outer end of the impact edge q', the gear E engages the forward teeth of the rack F, and the breech is fully opened. During the running-out movement the housing G is shoved over the rod S, so that its rear end abuts against the collar s'.

After the gun has been reloaded the lever N is turned to draw the bolt L downwardly against the action of its spring M, thereby uncoupling the rod S from the rack F, and the top surface of the bolt L is now below the lower face of the impact-plate Q. In consequence of this the spring R is distended and presses the rack F toward the front, since the head s' cannot be moved against the housing G. This, however, causes the gear E to be turned to the right, which causes the breech to be closed through the agency of the screw-spindle D. After the breech is closed the gun is in its firing position, as shown in Fig. 1.

The invention is of course also applicable to breech-closing mechanism where another form of screw-spindle different from that shown in the said Letters Patent previously referred to is used. Furthermore, it is not absolutely essential that the screw-spindle should be located in the breech-block. It might be mounted in the breech and coöperate with an internal thread in the breech-block. In this case the rack F would also be mounted in the breech and the impact-plate would extend vertically to the axis of the barrel, only so far outwardly as to form a stop for the rack, which now moves only in a straight line.

What I claim as new is—

1. In a breech-loading mechanism having a breech-block moved in and out by a screw-spindle, the combination of a rack participating at a reduced rate of speed in the running-out movement of the gun-barrel, and a gear-wheel secured to the screw-spindle and adapted to roll on the rack during the running-out movement of the barrel for automatically turning the screw-spindle to open the breech, substantially as described.

2. In a breech-loading mechanism having a breech-block moved in and out by a screw-spindle, the combination of a rack participating in the running-out movement of the gun-barrel and in the inward and outward movement of the breech-block, means for reducing the longitudinal movement of the rack relative to the running-out movement of the gun, and a gear-wheel secured to the screw-spindle and moving inwardly and outwardly with the same and engaging with the rack during the running-out movement of the gun for automatically turning the spindle to open the breech, substantially as described.

3. In a breech-loading mechanism having a breech-block moved in and out by a screw-spindle, the combination of a housing attached to the breech-block, a rack guided to move in said housing, a spring-pressed bolt mounted in the rack and movable at an angle to the same, an impact-plate attached to a stationary part of the gun and having a laterally-extending edge adapted to engage with the bolt during a portion of the running-out movement of the gun-barrel, while its body engages with and holds down the bolt during the recoil of the gun-barrel, and a gear-wheel attached to the screw-spindle and engaging with said rack, substantially as described.

4. In a breech-loading mechanism having a breech-block moved in and out by a screw-spindle, the combination of a housing attached to the breech-block, a rack guided to move in said housing, a spring-pressed bolt mounted in the rack and movable at an angle to the same, an impact-plate attached to a stationary part of the gun and having a lateral impact edge extending obliquely to the axis of the gun-barrel and adapted to engage with the bolt during a portion of the running-out movement of the gun-barrel for reducing the speed of the rack, while its body engages with and holds down the bolt during the recoil movement of the gun-barrel, and a gear-wheel attached to the screw-spindle and engaging with said rack, substantially as described.

5. In a breech-loading mechanism having a

breech-block moved in and out by a screw-spindle, the combination of a housing attached to the breech-block, a rack guided to move in said housing, a spring-pressed bolt mounted in the rack to move at right angles to the same, an impact-plate attached to the cradle of the gun and having an impact edge extending obliquely to the axis of the gun-barrel and adapted to engage with the bolt during the running-out movement of the gun-barrel, while its body engages with and holds down the bolt during the recoil movement of the gun-barrel, means for withdrawing the bolt, a rod mounted in the housing, a spring surrounding said rod and confined between the rack and a head on said rod, an open stop on the impact-plate, stops on the rod located on opposite sides of the former stop, means for connecting the rod and bolt and for disconnecting the same, and a gear-wheel on the screw-spindle; whereby the rod is held from moving by one of the stops and the spring thereby compressed during the recoil movement of the gun and the rod is coupled to the rack at the end of the recoil movement for retaining the spring under tension when the rod is released from the open stop in the outward movement of the breech-block, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CARL POHLE.

Witnesses:
WILLIAM ESSENWEIN,
PETER LIEBER.