No. 620,259.

Patented Feb. 28, 1899.

J. W. STOCKETT.

BREECH MECHANISM FOR GUNS.

(Application filed Nov. 26, 1898.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

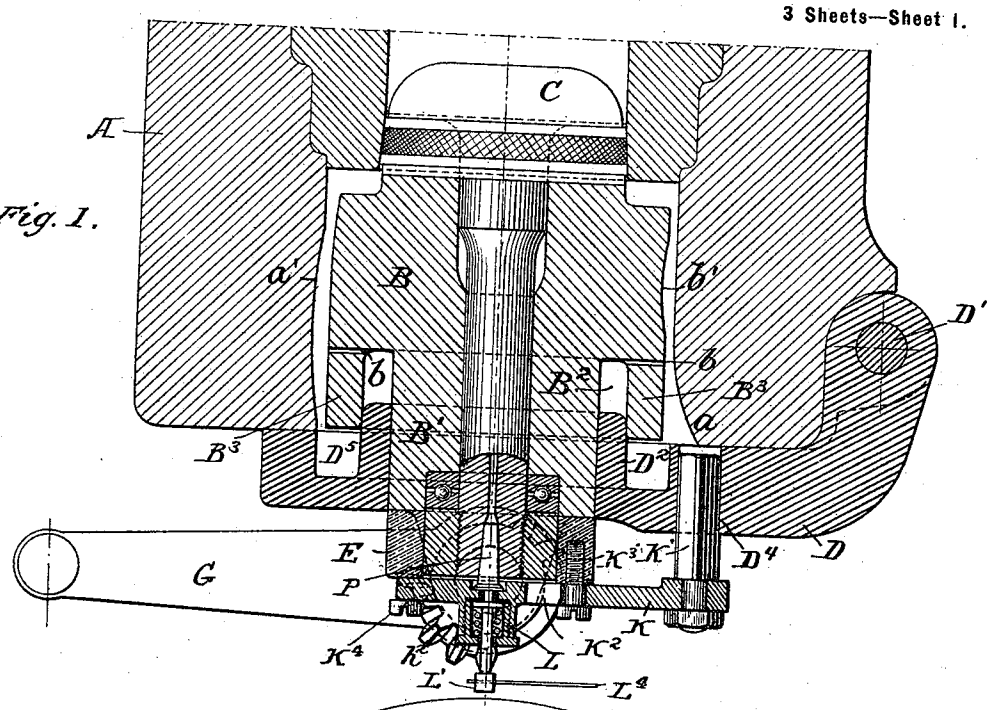
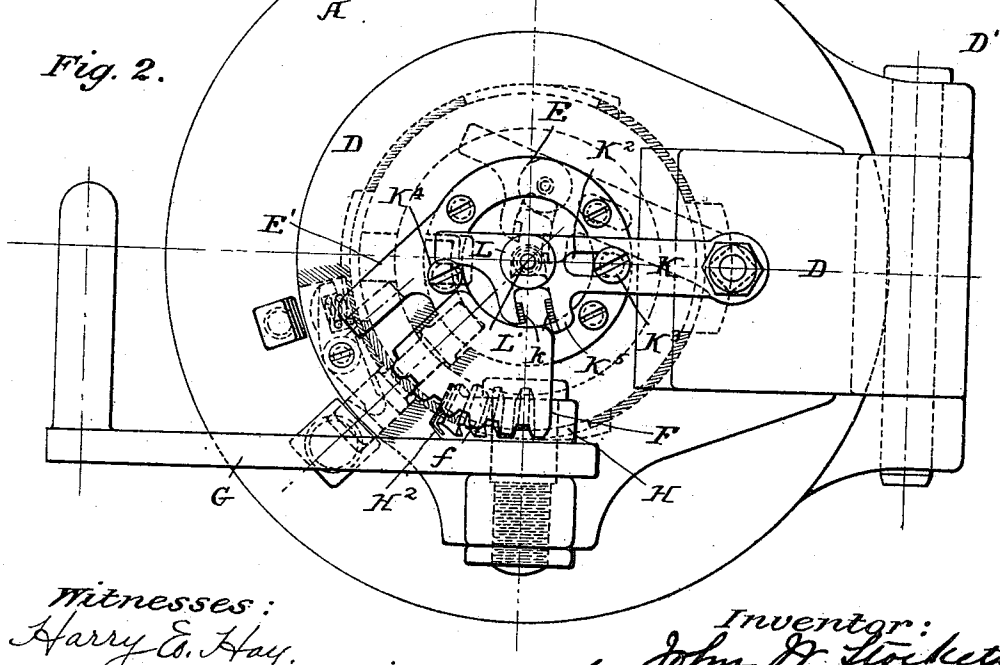


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

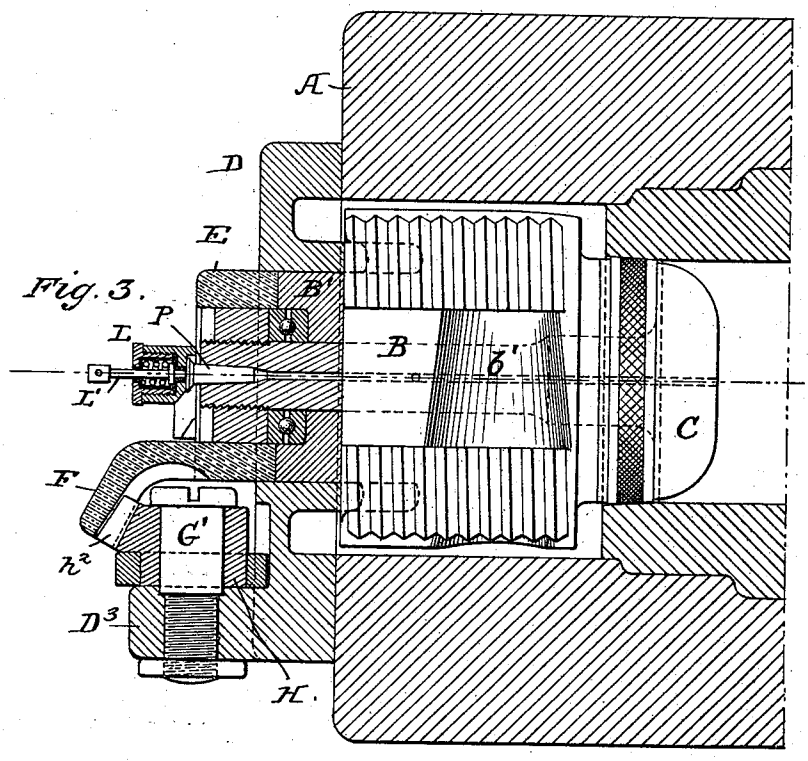


Fig. 4.

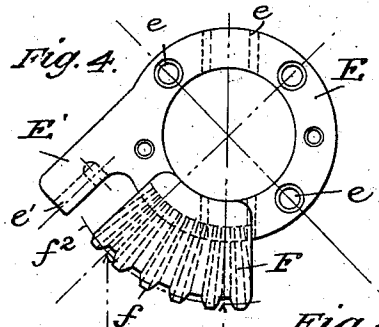


Fig. 5.

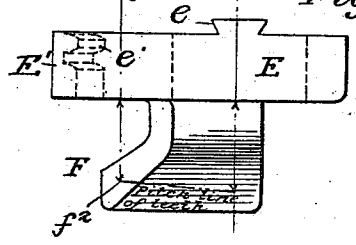


Fig. 6.

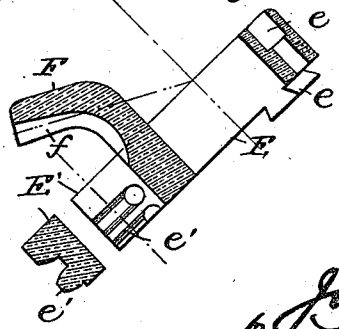


Fig. 7.

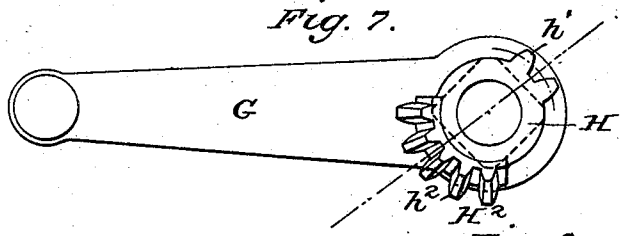
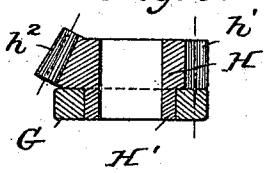


Fig. 8.



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No. 620,259.

Patented Feb. 28, 1899.

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BREECH MECHANISM FOR GUNS.

(Application filed Nov. 26, 1898.)

(No Model.)

3 Sheets—Sheet 3.

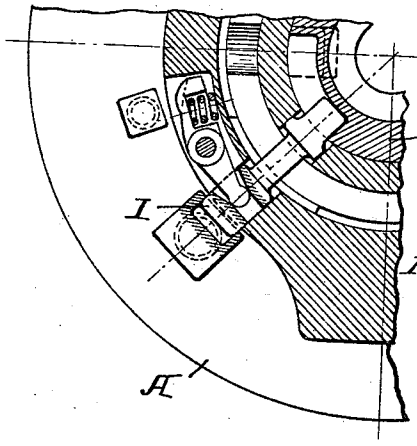


Fig. 9.

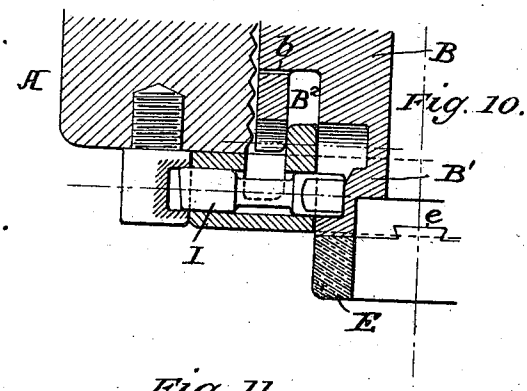


Fig. 10.

Fig. 11.

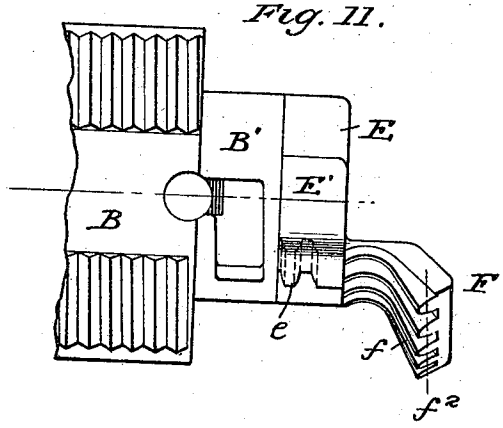


Fig. 12.

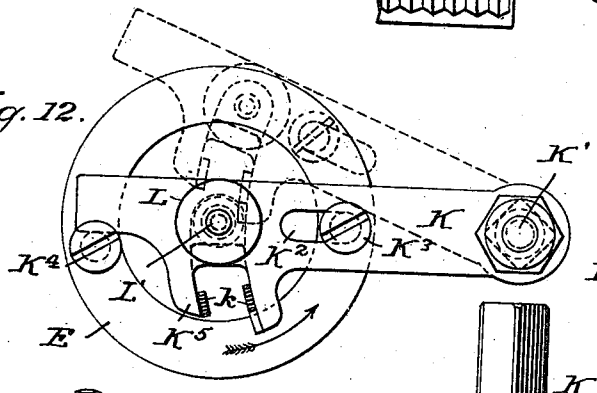
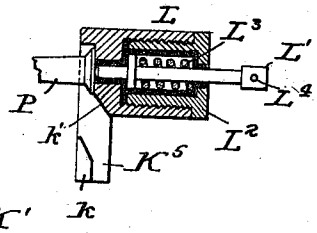


Fig. 13.



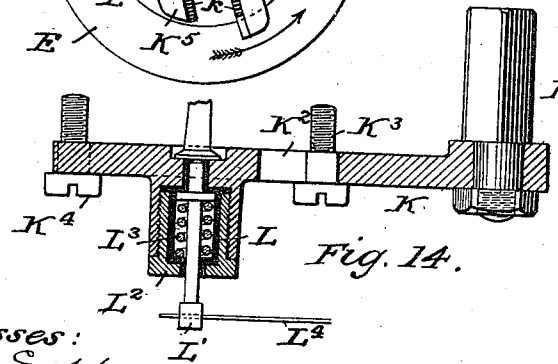


Fig. 14.

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UNITED STATES PATENT OFFICE.

JOHN W. STOCKETT, OF WASHINGTON, DISTRICT OF COLUMBIA.

BREECH MECHANISM FOR GUNS.

SPECIFICATION forming part of Letters Patent No. 620,259, dated February 28, 1899.

Application filed November 26, 1898. Serial No. 697,528. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. STOCKETT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Breech Mechanism for Guns, of which the following is a specification.

My invention relates to breech mechanisms for rapid-fire guns, and more particularly to that general class of breech mechanisms known as the "interrupted-screw" type and in which but a single motion is required to unscrew, withdraw, and swing the breech-block free of the gun and to restore it to its normal position.

The general object of my invention is to improve and simplify the construction of such guns; and to these ends my invention consists in various features of construction and arrangement of parts having the general mode of operation substantially as hereinafter more particularly set forth.

Referring to the accompanying drawings, wherein I have illustrated a preferred embodiment of my invention, Figure 1 is a horizontal section of the breech of a gun, showing the mechanism applied thereto. Fig. 2 is a rear elevation of the same. Fig. 3 is a vertical section. Figs. 4, 5, and 6 are respectively rear elevation, plan, and sectional views of a circular plate attached to the breech-block. Figs. 7 and 8 are respectively plan and sectional views of the operating lever and pinion. Figs. 9 and 10 are sectional views of portions of the mechanism, showing the locking-pin. Fig. 11 is a side view of a portion of the breech-block and attachments. Figs. 12, 13, and 14 are rear and sectional views of the automatic safety-extractor and firing attachment.

One of the principal objects of my invention is to provide a mechanism of the class described which is adapted to be used without the employment of fixed ammunition and which therefore provides for the use of a plastic pad as a gas-check.

Another important feature of my invention consists in arranging the mechanism of this class of guns so that a minimum amount of withdrawal or translation of the breech-block in a right line is necessary in order that the block may be swung clear of the breech of the gun.

Another feature of invention resides in the construction and arrangement of parts to accomplish the above in such a manner that the walls of the breech of the gun about the screw-box are not weakened by cutting through the same or otherwise.

Other features of invention will appear from the following description taken in connection with the accompanying drawings.

In the drawings, A represents the breech portion of a rapid-fire gun of any usual construction, and B the breech-block provided with the usual interrupted screw-threads fitting similar screw-threads in the screw-box of the breech in the usual manner. Mounted on the breech-block is a gas-check C, shown in the form of a plastic pad fitting the rear portion of the bore of the gun.

Mounted on the breech of the gun is the block-carrier D, shown as pivotally mounted on the side of the breech at D′ and adapted to swing backward and laterally, and while this is the preferred position of the carrier it of course can be differently arranged with relation to the breech without departing from the invention.

The breech-block B is shown as provided with a reduced rearward extension B′, fitting and passing through the opening in the block-carrier and moving therein to permit the "motion of translation," so called—that is, the longitudinal movement of the breech-block in the carrier. The rear face of the breech-block is grooved at B^2 to receive a forwardly-projecting annular flange D^2 of the block-carrier, which closely fits into said groove in order to assist in supporting the block when open, and the carrier is grooved at D^5 to receive the flange B^3 and form a large-surfaced stop, limiting the movement of translation of the block and avoiding danger of upsetting the usual lock-bolt. In order to permit this movement without producing an air-cushion in the groove B^2, at the inner end thereof are drilled several small holes *b*.

Outside of the central extension of the breech-block and projecting beyond the block-carrier ring is a detachable attachment, shown in the form of a circular plate E, (illustrated

in detail in Figs. 4 to 6,) and this plate may be attached to the breech-block in any suitable way, as by dovetailed portions or bolts *e*. This attachment is provided with turning and translating devices coöperating with the operating lever and pinion and is made separable from the block, so that in case of accident or otherwise this attachment may be readily removed and another substituted, and in the present instance the plate E is shown as having an extension E′, provided with teeth *e′*. As in this construction there is relatively a small movement of translation of the breech-block, only sufficient to withdraw the plastic pad from the bore of the gun, it is only necessary to have practically two teeth *e′* on the extension E′, as best shown in Fig. 6.

In order to produce the rotation of the breech-block necessary to disengage the interrupted screw-threads from the breech, I have shown as formed with or mounted on the circular plate E an extension in the form of a rotating gear-sector F, provided with gear-teeth *f*, adapted to be engaged by a sector on the operating-pinion, as hereinafter described, and this is so arranged that the gear-teeth of the gear-sector are practically housed at all times and are protected from injury, and at the same time the teeth of the operating-pinion are also protected.

Mounted on the block-carrier D and on a rearward extension D^3 thereof is the operating-lever G, formed with or carrying an operating-pinion H and conveniently held in position by a screw-pin G′. In the present instance, as shown in Figs. 7 and 8, the operating-pinion is made separate from the operating-lever and is secured thereto by a squared extension H′, fitting a similar recess in the end of the lever, the pinion thus forming a bearing for the lever and the screw-pin forming a bearing for the operating-pinion. The operating-pinion H is provided on one side with two spur-teeth *h′*, adapted to engage the teeth *e′* on the extension E′ of the circular plate E to produce the movement of translation. The operating-pinion is also provided with a sector H^2, having a number of teeth h^2, adapted to engage the teeth *f*, and this sector is preferably less than a quadrant, the teeth being so arranged, as indicated in Fig. 7, that they will engage the teeth of the rotating gear-sector F and turn the breech-block sufficiently to disengage the interrupted screws to allow the breech-block to be moved outward and so as not to interfere with such movement. Thus, as shown, the tooth h^2, for instance, is practically in the central vertical plane of the breech mechanism and normally engages a corresponding tooth *f* of the rotating gear-sector F when the breech-block is in its normal closed position.

I find it an advantage to make the operating-pinion separate from the lever and to secure them together in the manner shown, as it is impracticable to cut the teeth on the operating-pinion if made an integral part of the lever, and the construction furnishes a strong union between the parts and a ready means for attaching them to the breech of the gun.

An important feature of my invention is found in the construction and arrangement of the teeth on the operating-pinion and the rotating rack-plate. It is well known that in breech mechanisms of this class as the breech-block is unscrewed to disengage the mutilated screws it moves outward from the gun to a greater or less extent, and the amount of this outward motion of the breech-block is determined by the pitch of the threads on the block and the amount of circular motion required to disengage the mutilated threads on the block from those of the breech, and, as above described, while the teeth or one of them at least of the sector normally engages the teeth of the rotating rack-plate when the breech-block is in its normal closed position this outward movement of the block due to its rotation, as above set forth, tends to produce lost motion or varying strains on the teeth of the sector and plate. In order to overcome this, the teeth on the rotating gear-sector F are cut on an incline equal to the pitch of the thread on the breech-block and have an inward inclination with reference to a line parallel with the face of the breech of the gun, as indicated by the pitch-line f^2. The teeth on the sector H^2 of the pinion and those on the rotating gear-sector F are set so that when the breech-block is closed their pitch-lines are coincident or intermesh, and the pitch-line of the teeth on the rotating gear-sector being cut on an inclination toward the block, as indicated by the line f^2, as the block moves backward it will necessarily present a constant and uniform working surface between the teeth on the rotating gear-sector and those on the sector of the pinion, and there will consequently be no lost motion or varying strains between the teeth, so that the block will be uniformly rotated and under the most advantageous conditions.

Arranged on the end of the breech of the gun and coöperating with the breech-block is an automatic locking-bolt I of usual construction, the details of which need not be herein set forth, as they form no part of my present invention, and it is simply shown as one well-known means of locking the breech-block in the usual manner and serves to limit the rotation of the block and hold it in position in the block-carrier while it is being swung out of the breech of the gun.

Another feature of my invention comprises the automatic safety-extractor and firing attachment, (shown more in detail in Figs. 12 and 13,) and this comprises a lever K, mounted on a movable fulcrum K′, connected to the block-carrier and shown in the present instance in the shape of a bearing-pin for the lever K, sliding in an opening D^4 in the carrier, so that it can move in and out in ac-

cordance with the movements of the breech-block and still be properly supported with relation to the block-carrier. This lever K is provided with an elongated slot K^2, through which passes a stud, shown in the form of a screw K^3, engaging the circular plate E. Also connected to the circular plate in the present instance is a screw K^4, the head of which is adapted to engage the end of the lever K, forming what may be termed a "blow-back latch"—that is, serving to maintain the lever K in the position shown in Fig. 12 when the gun is fired. It will be seen that not only does the lever have a longitudinal movement on its fulcrum K', but that it is rotated thereon by the screw K^3 as the circular plate E is rotated, its two extreme positions being shown in Fig. 12 in full and dotted lines. This lever is further provided with extensions K^5, having on their adjacent faces inclined lugs k, arranged as shown and adapted to engage the head of the primer P as the lever K is moved upward and to force the primer out of position ready to receive a fresh primer. The inner edge of the lever adjacent the primer is also inclined, as at k', so that as the lever K is returned to its normal full-line position it engages the fresh primer put in place and insures its being forced home to its normal position ready for firing. Also carried by the lever K is the firing attachment L, which may be of any usual or preferred construction, either electrical or mechanical. As shown, it comprises a pin L', mounted in an adjustable case L^2, but insulated therefrom and pressed forward by a spring L^3 and having an electric conductor L^4 connected therewith, being adapted for electric firing. If, however, a mechanical fuse or primer is used, this can be replaced by the ordinary mechanical device.

Having now briefly described the general construction and arrangement of the parts, the operation will be largely understood therefrom by those skilled in the art and may be briefly described as follows: The parts being in the positions shown in Figs. 1, 2, and 3, the lever G is swung rearward and laterally, and the sector H^2 of the operating-pinion being in engagement with the rotating gear-sector F the breech-block is rotated sufficiently to disengage the interrupted screws and is thereby unlocked when the teeth h' of the operating-pinion engage the teeth e' of the extension E' of the circular plate E and produce a longitudinal movement of translation of the block sufficient to withdraw the plastic pad from the bore of the gun. In doing this the extension B' of the breech-block moves through the opening in the breech-block carrier and the inwardly-extending ring or flange D^2 passes into the groove B^2 of the breech-block. As the movement of translation is accomplished the locking-bolt I operates to secure the block in the carrier, and on a further movement of the operating-lever G the breech-block is swung outward and laterally away from the breech. In order that this may be done without friction, the block and the screw-box of the breech are cut away slightly at points a a' b', as best indicated in Fig. 1. Meanwhile as the breech-block was rotated the screw K^3 has operated the lever K, causing the lugs k to engage the head of the primer P and extract the same. When the new charge is in place, a reverse movement of the lever G first swings the breech-block within the screw-box. Then the teeth h', coöperating with the teeth e', produce the necessary movement of translation to force the plastic pad into the bore of the gun, and a further movement of the lever, through the medium of the sector engaging the rotating gear-sector, turns the block to lock the same and produce the final longitudinal movement. In doing this the lever K is restored to its normal position, its inclined face k' forcing the fresh primer P into position and bringing the firing-pin into proper relation therewith to operate the gun, and the end of the lever K engages the blow-back latch K^4. It will be seen that these operations are very simple yet positive and effective and that the longitudinal movement of translation of the breech-block is relatively small and yet sufficient to allow the use of the plastic pad or gas-check. It will further be seen that it is impossible to fire the gun until the parts are firmly in their normal positions and completely locked, as the firing-pin is not brought into operative position until the breech-block is screwed home.

It will further be observed that all the parts are simple of construction and not liable to get out of order and that the gearing is properly housed and protected from injury; but if perchance it should be injured it is only necessary to remove the circular plate E and repair the same or substitute another, and the whole apparatus has been found exceedingly effective and satisfactory in its operation. Furthermore, the rotating and translating devices are outside of or beyond the elements of the gun.

It is evident that the extensions E' and F of the circular plate may be joined together at their adjacent sides, so as to more fully house the gear. It may be observed that in a breech mechanism having forty-five degrees angular motion to disengage the interrupted threads the last tooth on the sector may be omitted, so that the sector is less than a quadrant.

What I claim is—

1. The combination with a breech-block carrier having an opening, of a breech-block having an extension sliding in said opening, a circular plate attached to said extension, said plate having two sets of teeth, and means coöperating with said teeth for rotating and translating the breech-block, substantially as described.

2. The combination with a breech-block

carrier having an opening, of a breech-block having an extension sliding in said opening, a circular plate attached to said extension, said plate having two sets of teeth formed and housed thereon, and means coöperating with said teeth for rotating and translating the breech-block, substantially as described.

3. The combination with a breech-block carrier having an opening, of a breech-block having an extension sliding in said opening, a circular plate attached to said extension, said plate having an extension provided with a tooth, and a gear-sector provided with teeth on its inner face, all the teeth being housed, and means coöperating with the teeth for rotating and translating the breech-block, substantially as described.

4. The combination with a breech-block carrier having an opening, of a breech-block having an extension sliding in said opening, a circular plate attached to said extension, said plate having two sets of teeth formed and housed thereon, an operating-pinion provided with spur-teeth, and a gear-sector coöperating with the teeth on the circular plate to translate and rotate the breech-block, substantially as described.

5. The combination with a breech-block carrier having an opening, of a breech-block having an extension sliding in said opening, a circular plate attached to said extension, said plate having two sets of teeth formed and housed thereon, an operating-pinion attached to the block-carrier and provided with spur-teeth, and a gear-sector coöperating with the teeth on the circular plate to translate and rotate the breech-block, all the teeth being housed by the plate, substantially as described.

6. The combination with a breech-block carrier having an opening, of a breech-block having an extension sliding in said opening, a circular plate attached to said extension, said plate having two sets of teeth formed and housed thereon, and an operating-pinion provided with two sets of teeth coöperating with the teeth on the circular plate to translate and rotate the breech-block, the rotating and translating devices being outside of and beyond the elements of the gun, substantially as described.

7. The combination with a block-carrier, of a breech-block provided with interrupted screw-threads and having a rotating rack-plate provided with gear-teeth, the pitch-line of the gear-teeth inclining inwardly equal to the pitch of the screw-threads on the breech-block, substantially as described.

8. The combination with a block-carrier and breech-block rotating and sliding therein, of an automatic extractor comprising a lever connected to and operated by the breech-block, and a movable fulcrum connected to the carrier for said lever, substantially as described.

9. The combination with a carrier and breech-block rotating and sliding therein, of an extractor comprising a slotted lever, a movable fulcrum therefor, and a stud connected to the breech-block and engaging the slot in the lever for operating the same, substantially as described.

10. The combination with a carrier and breech-block rotating and sliding therein, of an extractor comprising a slotted lever, a movable fulcrum for the lever, a stud connected to the breech-block and engaging the slot in the lever, and a firing attachment mounted on the lever, substantially as described.

11. The combination with a breech-block, of an automatic extractor comprising a lever having extensions provided with oppositely-inclined lugs for engaging the primer to extract the same or force it into position, substantially as described.

12. The combination with a block-carrier and a breech-block sliding therein, of an automatic extractor movably attached to the block-carrier and moved in and out with and operated by the breech-block, substantially as described.

13. The combination with a block-carrier and a breech-block sliding therein, of an automatic loader and extractor having a longitudinally-movable fulcrum on the block-carrier and connected to be operated by the breech-block, substantially as described.

14. The combination with a block-carrier and a breech-block sliding therein, of an automatic extractor provided with a firing-pin and moved in and out with and operated by the breech-block, substantially as described.

15. The combination with a block-carrier and a breech-block sliding therein, of an automatic extractor provided with a firing-pin, and means for positively locking the extractor on opposite sides of the firing-pin, substantially as described.

16. The combination with a block-carrier and a breech-block sliding therein, of an automatic extractor movably fulcrumed on the block-carrier and provided with a firing-pin, and connections between the breech-block and extractor whereby the latter is operated by the breech-block and locked when in position for firing, substantially as described.

17. The combination with a block-carrier, of a breech-block, an automatic loader and extractor comprising a lever movably fulcrumed on the block-carrier and having a slot, a stud on the breech-block engaging the slot to operate the lever, and a lock on the breech-block adapted to engage the free end of the lever when in position for firing, substantially as described.

18. The combination with a block-carrier, of a breech-block, an automatic loader and extractor comprising a lever movably fulcrumed on the block-carrier and having a slot, a firing-pin mounted on the lever, a stud on the breech-block engaging the slot to operate the

lever, and a lock on the breech-block adapted to engage the free end of the lever when in position for firing, substantially as described.

19. In a breech mechanism, the combination with a lever having a squared opening therein, of an operating-pinion carrying rotating and translating gear-teeth and having a squared extension fitting the opening in the lever, substantially as described.

20. In a breech mechanism, the combination with a lever having a squared opening therein, of an operating-pinion carrying rotating and translating gear-teeth and having a squared extension fitting the opening in the lever, and a pivot passing through the operating-pinion and holding the pinion and lever in place on the block-carrier, substantially as described.

21. The combination with a block-carrier, of a breech-block having a central rearward extension formed integrally thereon passing through the block-carrier, and devices whereby the breech-block may be rotated and translated attached to the outer end of said extension, substantially as described.

22. The combination with a block-carrier having an opening and an inwardly-projecting flange, of a breech-block having a central rearward extension formed integrally thereon passing through the opening and having a groove receiving the flange of the block-carrier, a plate attached to the outer end of said extension, said plate being provided with devices whereby the breech-block may be rotated and translated, and means coöperating with said devices, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JNO. W. STOCKETT.

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W. CLARENCE DUVALL.