

1,355,418.

J. D. PEDERSEN.  
MECHANICAL MOVEMENT.  
APPLICATION FILED MAY 29, 1917.

Patented Oct. 12, 1920.

3 SHEETS—SHEET 1.

FIG. 1.

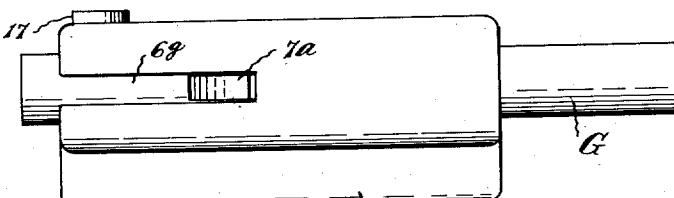
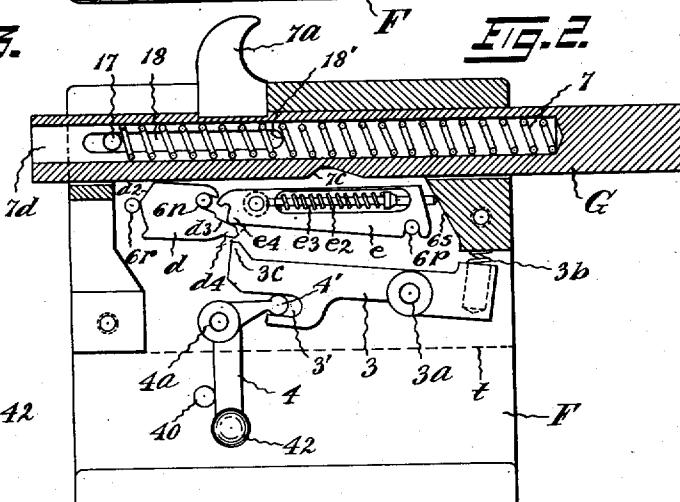
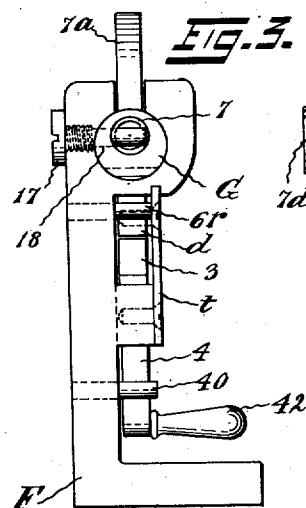


FIG. 3.



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3 SHEETS—SHEET 2.

FIG. 8.

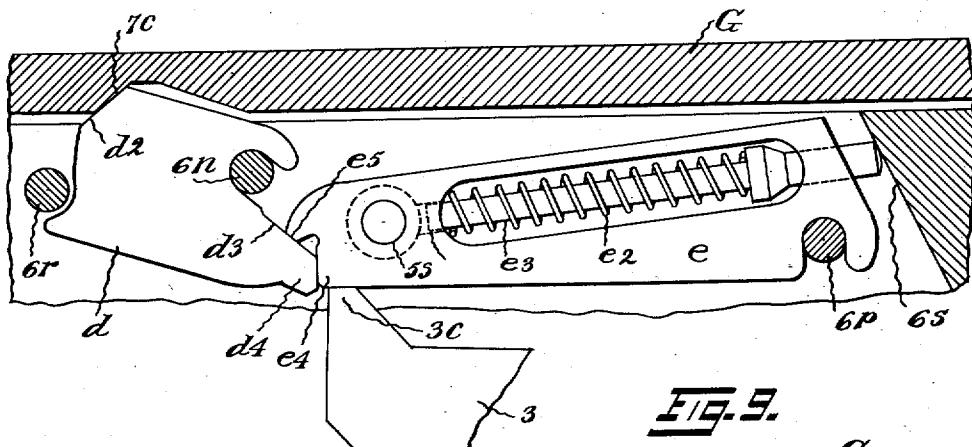


FIG. 9.

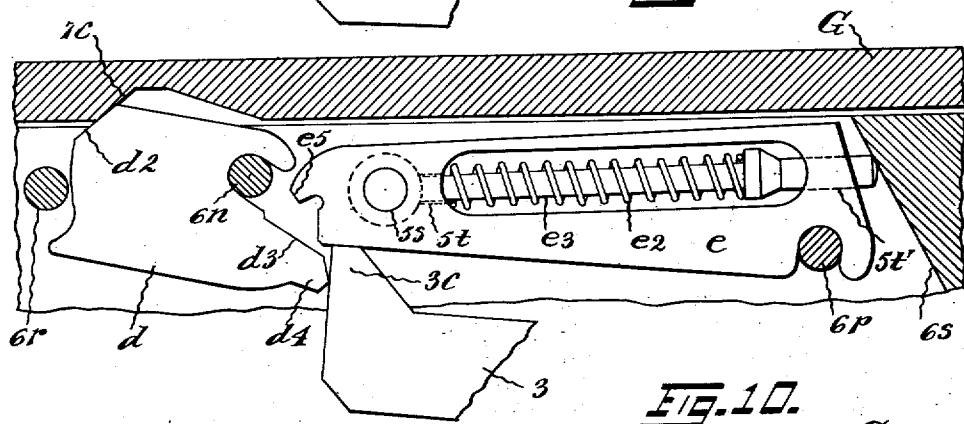
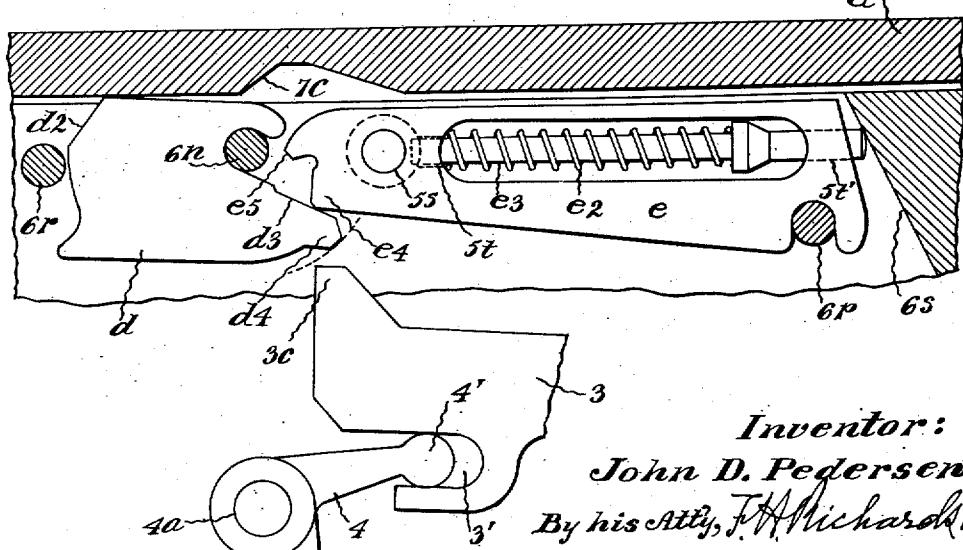


FIG. 10.



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3 SHEETS—SHEET 3.

FIG. 11.

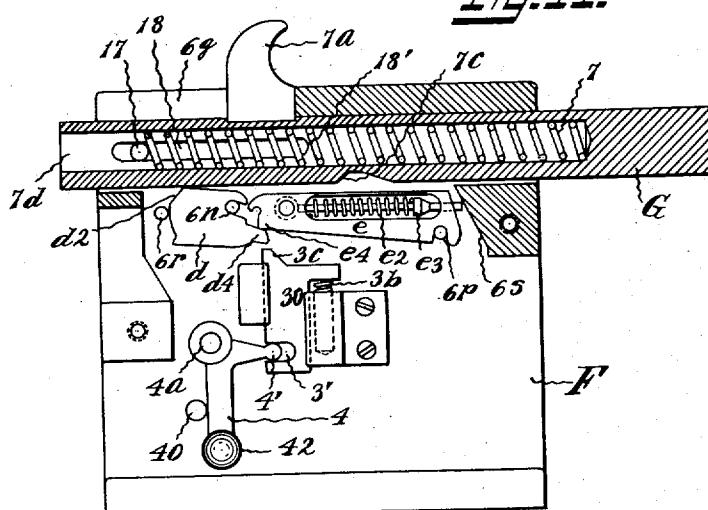


FIG. 12.

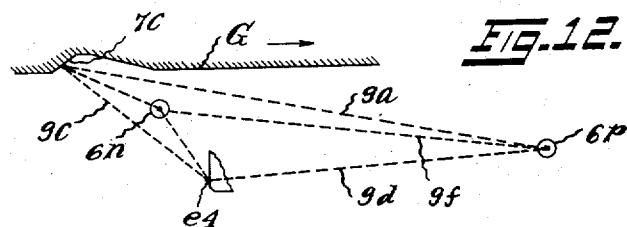


FIG. 13.

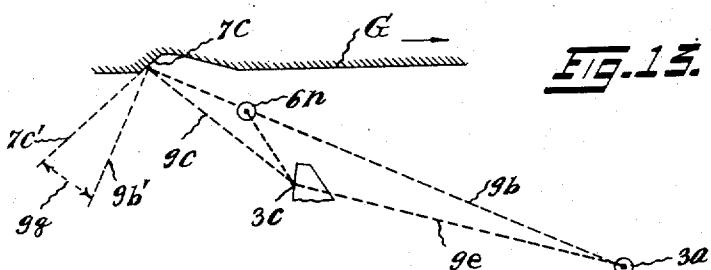
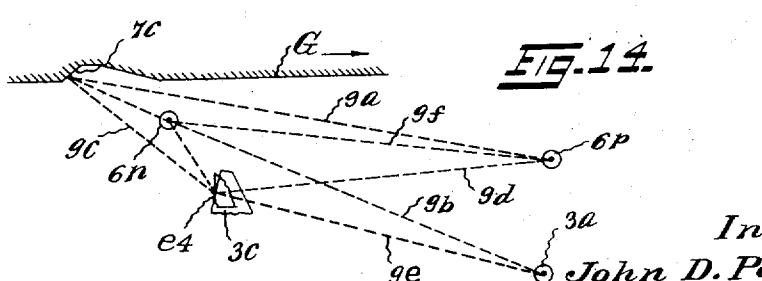


FIG. 14.



Inventor:  
John D. Pedersen,  
By his Atty, F. W. Richards.

# UNITED STATES PATENT OFFICE.

JOHN D. PEDERSEN, OF JACKSON, WYOMING.

## MECHANICAL MOVEMENT.

1,355,418.

Specification of Letters Patent. Patented Oct. 12, 1920.

Application filed May 29, 1917. Serial No. 171,663.

To all whom it may concern:

Be it known that I, JOHN D. PEDERSEN, a citizen of the United States, residing in Jackson, in the county of Lincoln and State of Wyoming, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

This invention relates to that class of mechanical movements which comprise devices whereby to control the operation of reciprocatable members.

One of the principal objects in my present invention is to provide an improved mechanism in the nature of a mechanical movement, which shall be applicable for controlling a reciprocatable member,—such as a slide or analogous device,—as regards the locking and releasing thereof. A further object is to furnish a mechanical device of the class indicated which shall be applicable,—by suitable adaptation of the form and proportions thereof,—to certain kinds of breech-loading guns, and when so applied shall be adapted for engaging and releasing the reciprocating breech-bolt in such a firearm. This particular adaptation or application in my present improvements is illustrated in a copending application, Serial No. 165,171, filed April 28th, 1917, for certain improvements in firearms.

In the accompanying drawings forming a part of this specification, Figure 1 is a plan view of a preferred form of the mechanical movement, and illustrates one embodiment of the invention in a mechanism organized in accordance with my present improvements.

Fig. 2 is a front elevation of the mechanism in the form thereof illustrated in Fig. 1; in this view a cover-plate,—as *t*, Fig. 3,—is omitted, and some parts are shown in section.

Fig. 3 is an end elevation of the mechanism as seen from the left-hand in Fig. 2.

Fig. 4 is a view similar to Fig. 2, for showing the operating parts in a different position, and for thereby more clearly illustrating the mode of operation of the details and of the mechanism considered as a whole.

Fig. 5 is a side view of the locking-member *e*, and is drawn on a scale twice that of said member as shown in Figs. 2 and 4; Fig. 6 is a section on line *X*<sup>6</sup>, of Fig. 5; and, Fig.

7 is an end view of the member *e* as seen from the right-hand in Fig. 5.

Figs. 8, 9 and 10 are three views drawn on an enlarged scale for illustrating the mode of action, and the step-by-step operation, of the slide-engaging and releasing devices when these are of the particular form and arrangement shown in Figs. 2, 3 and 4.

Fig. 11 is a front view, similar to Fig. 2, for illustrating a modification which is hereinafter more fully explained.

Figs. 12, 13 and 14 are a series of similar diagrams explanatory of certain features of the mechanism when this is arranged as in Figs. 2, 4, and 8 to 10.

Similar reference characters designate like parts in all the views.

Referring to Figs. 1 to 10 of the drawings, the several operative details are shown assembled on a frame, *F*, which may have, in practice, various modifications in form and proportion. In the upper part thereof, said frame, or base-member, *F*, is shown as being provided with a slide-way, which in this instance is circular in cross-section, but which, obviously, may be of other forms, (not shown). The slide *G* is designated as the main member, and is fitted to have in said frame a reciprocatory movement to and from a forward position,—as in Fig. 2,—and a rearward or retracted position, Fig. 4. The slide *G*,—in this instance shown of a bolt-like form,—may be provided with an arm or handle, *7*<sup>a</sup>, extending upwardly through the guide-slot *6*<sup>a</sup>, to serve as a handle whereby the slide may be retracted by hand to said rearward position thereof.

As one suitable means for forwardly-actuating said slide-member, *G*, I have shown this member provided with a bore or chamber *7*<sup>b</sup> in which is located a slide-actuating spring, *7*, which reacts against an abutment that may consist of a pin, as 17, fixed in the frame *F* and having one end thereof extending through a slot, 18, formed in the slide *G*; thus the inner end of the pin 17 extends into said spring-chamber 100 and forms the desired abutment, as clearly indicated in Fig. 3. Said slot 18 may be of such a length and location that the forward end or face thereof, as at 18', may serve as a stop-face for limiting the retraction of the slide,—see Fig. 4.

The slide locking and releasing mechanism is preferably arranged adjacent to the slide, as G, and in the form thereof herein shown consists of the principal members *d* and *e*, and the co-operating, or co-acting, member 3; for convenience of reference, these members are herein designated by the same names, respectively, as in my aforesaid prior application, viz.—the “sear *d*,” the “sear-lock *e*,” and the “main sear-lever, 3.” These several members are shown located against a vertical wall surface (Figs. 2, 3, 4) of the frame F, and may be held in place and protected by a cover plate, 10 as *t*, which is shown in end view in Fig. 3, but is omitted from the other views. The sear member, or slide-lock, *d* is shown of a lever-form construction and operably supported for oscillation about a pivot pin, 6<sup>a</sup>, 15 and the sear-lock *e*, about the similar pivot 6<sup>b</sup>. In practice, said pivot-pins may be inserted in holes formed in the members *d* and *e*, but I prefer the bearing arrangement as shown because of the greater ease of 20 assembling afforded thereby. A stop-pin, as 6<sup>c</sup>, may be located for co-operating with the pivot 6<sup>a</sup> to hold the sear *d* in working position.

The sear *d* may be operated on its pivot 30 6<sup>a</sup> into the bolt-engaging position thereof, (Figs. 4, 8), by some directly-acting spring, (not shown), to be suitably arranged therefor. In the present instance, however, the means appurtenant to said locker *e*, whereby 35 by said sear-actuation is effected, consists of the sear-lock-actuating spring, *e*<sup>2</sup>, acting through the sear-lock member *e*. The spring *e*<sup>2</sup> is or may be carried on a guide rod, *e*<sup>3</sup>, slidably mounted in the lock member *e*, and bearing against the frame face 40 6<sup>a</sup>, which thus serves as an abutment.

For convenience of manufacture and assembling, the member *e* is preferably formed with a recess, 5<sup>a</sup>, for said spring *e*<sup>2</sup>, and with bearings, 5<sup>b</sup>, 5<sup>c</sup>, for the rod *e*<sup>3</sup>; the bearing 5<sup>c</sup> extends into a relief-space, 5<sup>d</sup>,—see Figs. 5, 6, 7,—and should be larger than rod or stem *e*<sup>3</sup>, for permitting this stem to be slipped into place from an oblique position, in a well-known manner.

The sear-lock *e* is a combined sear-actuator and sear-locker, and is preferably supported on the pivot or pin 6<sup>b</sup>, so that the spring *e*<sup>2</sup> will continuously tend to force 55 down the sear-engaging end *e*<sup>4</sup>, which thus bears on the face *d*<sup>3</sup> of the retracted sear, (Fig. 10), for thereby turning the sear to the position thereof in Fig. 8; this slide-engaging stroke of the sear *d* is limited by 60 the stop 6<sup>d</sup>. When said slide-locking operation takes place, the lock-end *e*<sup>4</sup> comes forward of the face *d*<sup>4</sup> of the operating arm of the sear *d*, thereby blocking (or “locking”) the sear in said slide-engaging position there- 65 of (Fig. 8) until the lock *e* shall be raised

(retracted) to the position thereof shown in Fig. 9; when thus released, however, the lock *e* (unless otherwise controlled) will be quickly raised to its position in Fig. 10, by a rotation of primary sear *d*, since the faces 7<sup>e</sup> and *d*<sup>2</sup> are,—in the preferable form herein shown,—so inclined or shaped as to constitute a sear-actuating device, and thus to operate as a sear retracting means, whereby by the sear *d* will be actuated (toward its 75 slide-releasing position in Fig. 10) by the forwardly acting pressure of the bolt or slide G. Said face 7<sup>e</sup> is herein shown inclined in an upwardly and forwardly direction. For limiting the downward movement of the lock *e*, this may be provided with some suitable stopping means, such, for instance, as the stop-face *e*<sup>5</sup> arranged to strike the face *d*<sup>3</sup> when the parts are in the 80 positions shown in Figs. 4 and 8. 85

For further controlling the operation of the sear *d*,—and notwithstanding the above described direct mode of coaction thereof with the lock-member *e*,—I have provided a further improvement, as follows: The 90 sear-lever 3, (which is the secondary sear device), is shown pivoted at 3<sup>a</sup> to the frame F, and may be strongly actuated by some suitable spring, as 3<sup>b</sup>. The point 3<sup>c</sup> of the lever 3 will thus normally be kept raised 95 up to its position in Fig. 9, and will then engage forwardly of the operating arm *d*<sup>4</sup> of the sear *d*, and will do this at a time when this sear has been turned only a slight distance, as from its position in Figs. 4, 8, to 100 its position in Fig. 9. Said position, Fig. 9, is thus the ready-to-release position of the slide-locking mechanism; in this position of the mechanism, said secondary sear device holds the primary sear member *d*, 105 against disengagement from the main member G.

When the several members are in the position illustrated in Fig. 9, the operator by drawing the lever member 3 downwardly to the position thereof in Figs. 2 and 10, thereby permits the forwardly-acting force of the slide G (acting through said actuation-face, 7<sup>e</sup>) to further turn or depress the sear *d*,—Fig. 10; this releases the slide G, which 110 will then be carried forward by its spring 7 to the positions thereof indicated in Figs. 10 and 2. Thus the point end 3<sup>c</sup> of said lever 3, may be said to constitute a secondary sear device with relation to the member *d* considered as an intermediate slide-lock. By the action here explained, the forwardly 115 actuated and reciprocatable main member, G, is allowed to release itself by its face 7<sup>e</sup> actuating and retracting the primary sear *d*. 120

As a convenient means whereby to retract the sear-end, 3<sup>c</sup>, of the lever 3 in the manner above indicated, I have shown herein a simple form of trigger device, 4, which may consist of a lever turning upon a pivot, as 125 130

4<sup>a</sup>, and provided with an arm, 4', engaging in a slot, 3', of said main sear-lever 3. A stop, as 40, may be located for properly limiting the retractive stroke of said members 3 and 4. Also, the trigger or lever 4 may be provided with a finger piece, or, with a handle, as 42, whereby to operate this lever device. The lever 4 is indicated as being in the same position in Figs. 2 and 10; as shown by the solid lines in Fig. 4, said levers 4 and 3 correspond with the position of member 3 in Fig. 8; as shown by dotted lines in Fig. 4, said trigger-lever 4 corresponds with the position of sear-lever 3 in Fig. 9.

In Figs. 2 and 4, the member 3 is shown pivotally supported, and of a form and arrangement similar to the pivoted lever-form sears used in well-known kinds of firearm mechanisms. For the purposes of my present improvements, however, said member 3 may be modified in construction and may be arranged in the form of a slide, while retaining in the mechanism the same functions and operative relations as already described. One such modification and arrangement is illustrated in Fig. 11, which is a view similar to Fig. 2, and in which 30 is a slide-form of the member 3. By comparison, it will be evident that the point-end 3<sup>c</sup>, Fig. 11, is the same in all material respects as the point-end 3<sup>c</sup> in Figs. 8, 9, 10, so far as involving the direct coaction with the coacting portions d<sup>a</sup> and e<sup>a</sup> of the sear 35 and sear-lock members d and e, respectively. Thus the mechanism, whether arranged as in Figs. 2 and 4, or as in Fig. 11, may be said to comprise a compound sear-device which includes a primary-sear, (as d, for 40 directly engaging the reciprocatable member, as G), and a secondary sear, (as 3<sup>c</sup>, for engaging and releasing the primary sear), and in which the secondary sear-member is a combined sear-lock-retractor and primary-45 sear-locker. Also, it should be noted that the releasing of the retracted slide, G, is effected by a two-stage sear-retractive action, the means for which,—in the present instance,—comprises the sear-lock e and a 50 member such as the lever, 3, or an equivalent therefor.

The herein-described pivotally supported arrangement of the member 3 has the advantage of sustaining the pressure of the 55 arm d<sup>a</sup> without creating so much friction as with the described slide-form thereof, and hence the direction and locations of the force-lines which occur within the mechanism are deemed to be much more favorable. 60 These features of the kinematics of the mechanism are further illustrated in the diagrams, Figs. 12, 13 and 14, which are drawn and arranged in a well-known manner. Of these diagrams, Fig. 12 illustrates 65 certain of the lines of force, with relation

to the pivots 6<sup>a</sup> and 6<sup>p</sup> and the several co-acting bearing faces, as occurring when the members are in position as in Fig. 8; Fig. 13 similarly illustrates the same features as indicated in Fig. 9; Fig. 14, shows the diagrams of Figs. 12 and 13 combined into one diagram. In Fig. 13, the line 9<sup>b</sup> normal to the line 9<sup>b</sup>, and line 7<sup>c</sup> parallel to face 7<sup>c</sup>, form an angle indicated by arc 9<sup>e</sup>, for indicating the actuation effect of said face 7<sup>c</sup>; 75 said angle, 9<sup>e</sup>, of course, must be greater in practice, than the angle-of-repose which may appertain to the faces 7<sup>c</sup> and d<sup>a</sup> (see Fig. 9) in any given instance.

In Figs. 12 and 14, the line 9<sup>a</sup> indicates the direct or normal line of action,—or line of force,—between the inclined face 7<sup>c</sup> and pivot 6<sup>p</sup>. In Figs. 13 and 14, the line 9<sup>b</sup> indicates the similar line of force between said face 7<sup>c</sup> and the pivot 3<sup>a</sup>. However, in 85 Figs. 12, 14, the actual path of the force from face 7<sup>c</sup> to pivot 6<sup>p</sup> is by way of the point e<sup>a</sup>, and on the lines 9<sup>c</sup> and 9<sup>d</sup>, thus showing the low triangle of force-lines, (of which line 9<sup>c</sup> is the base and point 6<sup>a</sup> the apex) from 7<sup>c</sup> to e<sup>a</sup>; also showing these features with relation to the line of centers 9<sup>f</sup>, the triangle 6<sup>a</sup>, e<sup>a</sup>, 6<sup>p</sup>, and the non-parallel positions relative to each other of the faces at 7<sup>c</sup> and e<sup>a</sup>. In Fig. 14, a fragmentary part, e<sup>a</sup>, of the sear-lock, is shown superposed on a corresponding part 3<sup>c</sup>, of the secondary sear 3, thus showing how the position of face e<sup>a</sup> relative to pivot 6<sup>p</sup> is similar to the position of face 3<sup>c</sup> relative to pivot 3<sup>a</sup>; in each case, however, the relation of line 9<sup>c</sup> to face 7<sup>c</sup> and pivot 6<sup>a</sup>, remains unchanged. From the proportions of the triangles, it is evident that the principal part of the force exerted by face 7<sup>c</sup> will be 100 transmitted to pivot 6<sup>a</sup>, and only a small part to face e<sup>a</sup> (Fig. 12) or to face 3<sup>c</sup>, (Fig. 13).

Having thus described my invention, I claim:—

1. The combination with a forwardly actuated main member having a sear-engaging and sear-actuating face; a lever-form sear member having a sear-face in position for engaging forwardly of said face of the main member when this member is in a retracted position, and also having a sear-arm; a sear-member actuator-and-locker in position and operable for actuating the sear-member into said engagement with the main member, 115 and for thereupon also locking the sear-member in its said engaging position; and, a secondary sear-device in position and operable, (on one stroke thereof) for retracting said actuator-and-locker and thereupon 120 engaging with said sear-arm, and for (on a reverse stroke thereof) disengaging from said sear-arm and thereby permit the main-member to actuate the sear-member out of its engagement therewith. 125

2. The combination with a forwardly actuated main member having an upwardly and forwardly inclined sear-engaging and sear-actuating face; an operably supported 5 sear-member having a sear-face in position for engaging forwardly of said face of the main member when this member is in a retracted position, and also having a sear-arm; a sear-member actuator-and-locker in 10 position and operable for actuating the sear-member into said engagement with the main member, and for thereupon also locking the sear-member in its said engaging position; and, a secondary sear-device in position and 15 operable (on one stroke thereof) for retracting said actuator-and-locker and thereupon engaging said sear-arm, and for (on a reverse stroke thereof) disengaging said sear-arm and thereby permit said sear-actuating face to retract the sear-member from 20 its engagement with the main member.

3. In a mechanical movement comprising a reciprocatable main member, and means for forwardly actuating said main member, 25 the combination with the main member, of a sear-member having an operating arm and operably supported in position for engaging the main member when this member is in a retracted position; a combined sear 30 actuator and sear locker in position and operable for first actuating said operating arm to a position for thereby engaging the sear-member with the main member, and for next locking the operating arm in said position; and, a secondary sear-device in position and operable on one stroke thereof for retracting said combined actuator and locker and thereupon by engaging said operating arm holding the sear-member against 35 40 disengagement from the main member.

4. In a mechanical movement comprising a reciprocatable main member, and means for forwardly actuating said main member, the combination with the main member, of 45 a sear-member having an operating arm and operably supported in position for engaging the main member when this member is in a retracted position; a combined sear actuator and sear locker in position and operable for first actuating said operating arm to a position for thereby engaging the sear-member with the main member, and for next locking the operating arm in said position; means appurtenant to the said combined actuator and locker for actuating this member toward the arm-locking position thereof; and, a secondary sear-device in position and operable for retracting said combined actuator and locker and thereupon by 50 55 60 engaging said operating arm holding the sear-member against disengagement from the main member.

5. In a mechanical movement of the character described, in combination, a slide having a sear-engaging face and provided with 65

slide actuating means; a primary sear for engaging said slide face when the slide is in a retracted position; a sear-lock for engaging the primary sear and locking it into engagement with the slide when this is in a retracted position; and, a combined secondary sear and sear-lock retractor in position and arranged for first retracting the sear-lock and then holding the slide retracted by acting through the primary sear as an intermediate member.

6. In a mechanical movement of the character described, in combination, a slide having a sear-engaging face and provided with slide actuating means; a primary sear pivotally supported in position for engaging said slide-face when the slide is in a retracted position; a sear-actuating sear lock arranged for engaging the primary sear and for locking it into engagement with the slide when this is in a retracted position; means for actuating the sear lock in a sear-actuating direction; and, a combined secondary sear and sear-lock retractor in position and arranged for first actuating the sear-lock in a sear-releasing direction and then holding the slide retracted by acting through the primary sear as an intermediate member.

7. The combination with a reciprocatable main member which is retractable to a sear-engaging position; a primary sear having a sear-face in position for engaging with the main member when this member is in a retracted position, and also having a sear-arm; a combined sear-actuator and locker in position and operable for actuating the sear into engagement with the main member, and then locking the sear in said engaging position; and, a secondary sear in position and operable on a stroke thereof in one direction for retracting said actuator-and-locker and for thereupon by engaging said sear-arm continuing the locking of the sear in engagement with the main member.

8. The combination with a reciprocatable main member which is retractable to a sear-engaging position; a primary sear operably supported adjacent to said main member and having a sear-face in position for engaging with the main member when this member is in a retracted position, and also having a sear-arm; a sear-lock in position and operable for locking the sear in said engaging position; and, a reciprocatable device in position and operable for retracting said sear-lock and thereupon by engaging said sear-arm holding the sear in engagement with the main member.

9. The combination with a reciprocatable main member which is retractable to a sear-engaging position; a primary sear pivotally supported adjacent to said main member and having a sear-face in position for engaging with the main member when this

member is in a retracted position, and also having a sear-arm; a sear lock pivotally supported in position for locking the sear in said engaging position thereof; and, a 5 secondary sear pivotally supported in position for retracting said sear-lock and thereupon by engaging said sear-arm prolonging

the engagement of the sear with the main member.

JOHN D. PEDERSEN.

Witnesses:

E. C. GILBERT,  
L. E. WETMORE.