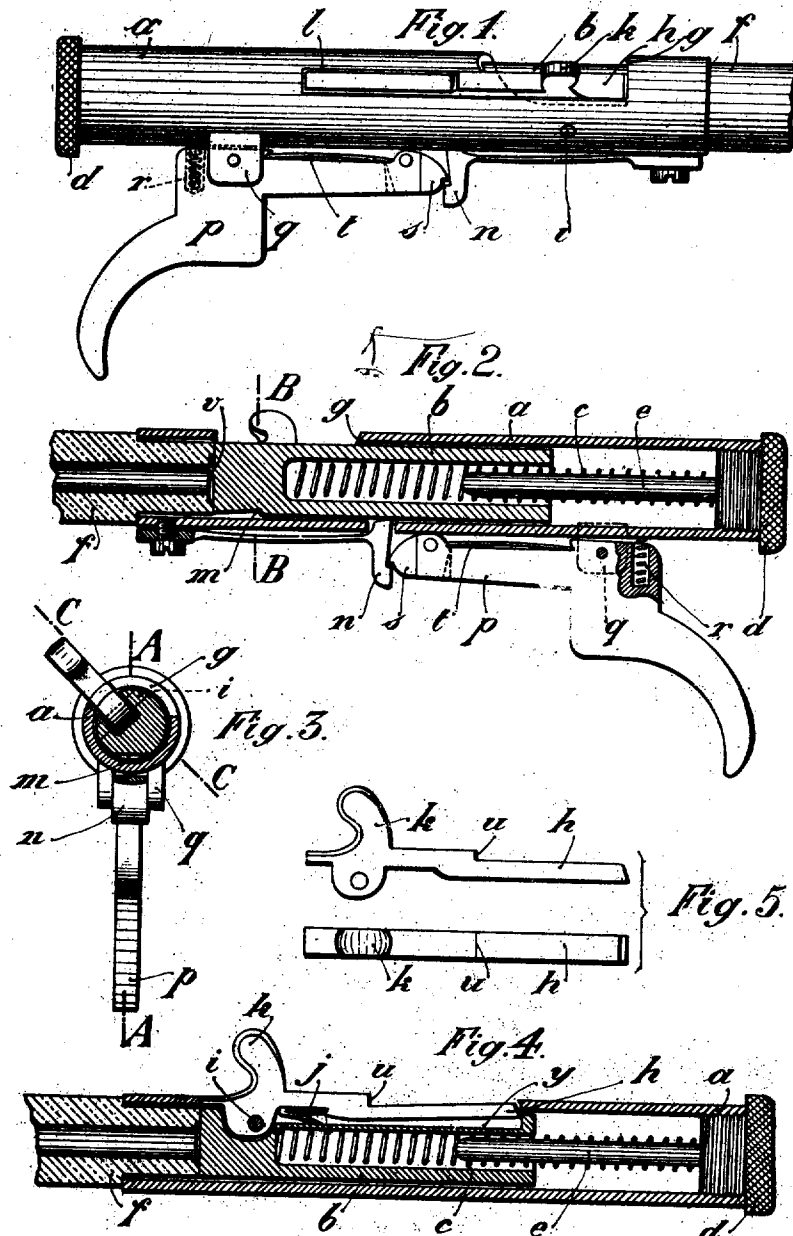


N. PIEPER.
SEMI-AUTOMATIC SMALL ARM.
APPLICATION FILED APR. 22, 1910.

974,425.

Patented Nov. 1, 1910.

3 SHEETS-SHEET 1.



Witnesses:
Cyril S. Brown.
Munroe C. Bender.

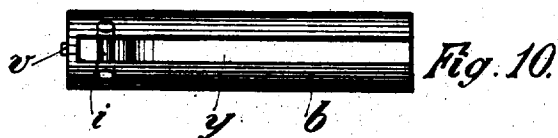
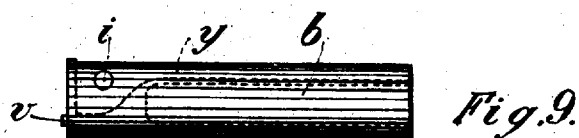
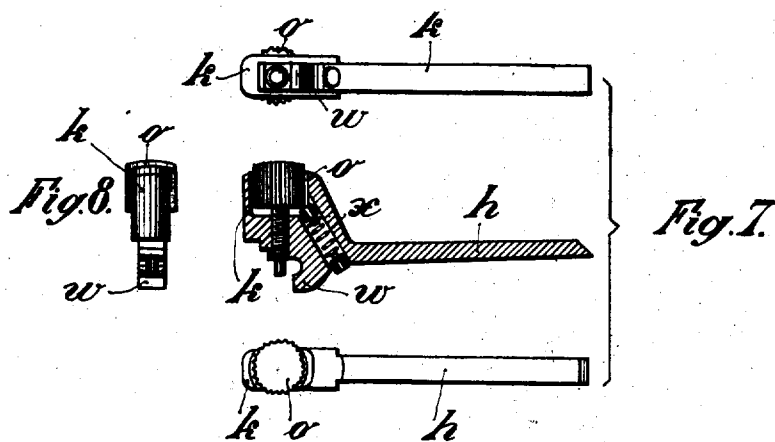
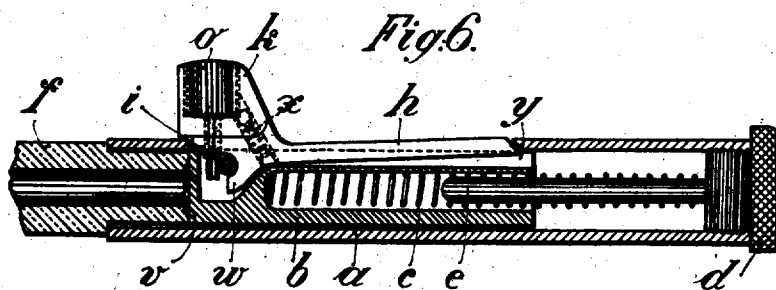
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3 SHEETS-SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 11.

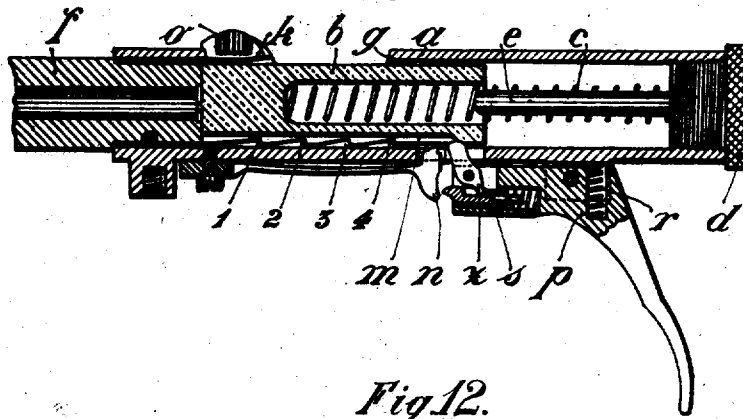


Fig. 12.

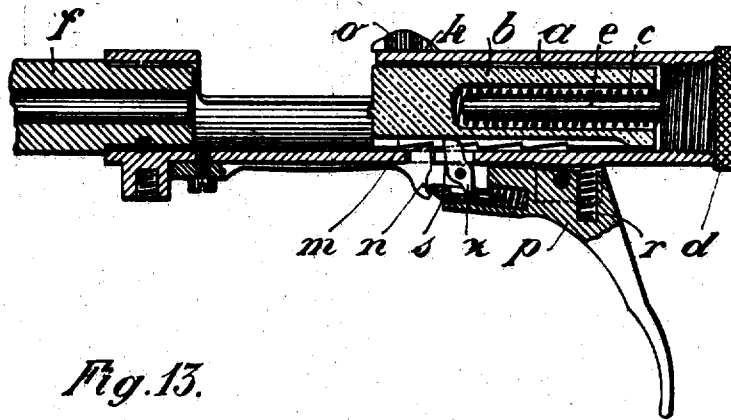


Fig. 13.

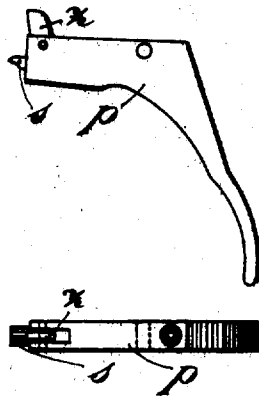


Fig. 14.



Fig. 15.

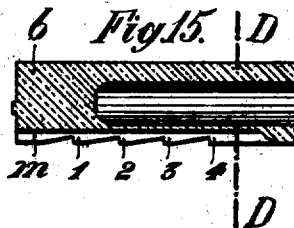


Fig. 16.



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UNITED STATES PATENT OFFICE.

NICOLAS PIEPER, OF LIEGE, BELGIUM.

SEMI-AUTOMATIC SMALL-ARM.

974,425.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed April 22, 1910. Serial No. 557,090.

To all whom it may concern:

Be it known that I, NICOLAS PIEPER, subject of the King of Belgium, residing at Liege, Belgium, have invented certain new and useful Improvements in Semi-Automatic Small-Arms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it

appertains to make and use the same.

This invention has reference to semi-automatic small arms wherein the cartridges are introduced by hand, shot by shot, and in which the breech box remains open after each discharge owing to the breech-bolt or striker being automatically engaged and retained by the sear of the firing mechanism; the rearward or cocking movement of the said striker being effected automatically by the recoil. The arm is also constructed so that, at the moment of the discharge of a cartridge, the breech bolt is latched or retained in the breech-closing position by a simple spring device which is automatically released after the actual discharge, and so also that the resistance which is opposed by the said latch device to the opening of the breech by the rearward movement of the said bolt may be regulated according to the power of the cartridges employed.

The accompanying drawings show improved fire arms which are constructed according to the present invention and are distinguished by their extreme simplicity.

Figure 1 shows an elevation of the right-hand side of the action of one form of the hand-loaded recoil-cocked rifle. Fig. 2 is a longitudinal section upon the dotted line A—A Fig. 3; the breech being closed by the bolt. Fig. 3 is a transverse section on B—B Fig. 2. Fig. 4 is a section longitudinally on C—C Fig. 3. Fig. 5 shows, in plan and elevation, the part of the mechanism which serves to effect the locking of the bolt within the breech at the moment of discharge. Fig. 6 is a view similar to Fig. 4 of a modified construction of the arm. Fig. 7 shows a plan, section and elevation of the modified form of the device represented in Fig. 5, and Fig. 8 is an end view thereof. Fig. 9 is a separate view of the bolt, in elevation and Fig. 10 is a plan of the same. Fig. 11 is a section similar to Fig. 2 of a further modified construction. Fig. 12 is a section showing the breech open, or with the parts in the position for loading. Fig. 13 shows the

trigger in elevation and plan. Fig. 14 is a plan of the underside of the bolt. Fig. 15 is a longitudinal section of the said bolt, while Fig. 16 is a cross section thereof on D—D.

Describing first the construction shown in Figs. 1 to 5: the arm comprises a breech-box *a* which is preferably cylindrical, inclosing a cylindrical striker bolt *b* of corresponding form. This striker-bolt is bored to provide a chamber for the striker spring *c* whose rear end has its bearing against screw plug *d* that constitutes the end of the box *a*. This plug carries a rod *e* which serves as a guide for the striker spring *c*. The barrel is fixed into the forward end of the breech box which is formed with an aperture *g* wherethrough the cartridges can be inserted by hand into the said box when the striker-bolt is held in its rearward position. A lever *h* (Fig. 5) provided with a projection or head *k* is mounted in a groove in the striker bolt in such a manner that it can rock or pivot about an axis *i*, disposed in the said groove near the forward end of the striker bolt. This lever constitutes the bolt-latching device and a spring *j* is arranged to act thereon so as to tend constantly to force the rearward end thereof outwardly when the bolt is in its extreme forward or breech-closing position and whereby the inclined extremity thereof is opposed to the inclined end of a groove *y*, formed in the exterior walls of the breech-box. The groove corresponds in width to the part of the lever which engages therewith, so that in addition to serving as a bolt-latch, the arrangement acts as a guide for the said bolt and prevents it rotating within the breech-box. When the breech of the arm is closed by the striker-bolt being in its forward position, the rearward beveled extremity of the lever *h* is maintained by the latch spring, in opposition to the corresponding incline on the breech-box, and thus the said bolt is spring-maintained in the breech-closing position, but when the said striker-bolt is influenced by the recoil from a discharge, the two inclines come into contact and the lever is tilted in opposition to the spring *j* so that it lies flush within its groove or seating. The striker-bolt and latch can then slide collectively into the rearward cylindrical part of the breech-box. The resistance which is opposed by the latch to the rearward motion of the bolt is dependent upon the angles of the opposed

bevels on the latch lever and breech-box and by varying the said angles, any desired resistance can be obtained, according to the power of the cartridges to be used in the particular arm. The cocking of the striker-bolt by hand may be effected by grasping the head *h* of the latching lever and actuating the same so that the said lever is rocked about its pivot-pin and its rearward end is disengaged from the walls of the breech-box, when the only resistance that has to be overcome in moving the bolt rearward is that which is offered by the striker-spring *c*. The underside of the striker-bolt is formed, near the forward end, with a notch or bent *m* with which the spring sear *n* is adapted to engage on the said bolt being pushed back to the limit of its rearward movement, and when the sear and bent are so engaged, the arm is cocked and a cartridge can be readily charged by hand into the breech of the barrel *f* by way of the loading aperture *g* in the breech box. The trigger *p* is pivoted between a pair of lugs *q* on the underside of the breech box, and a spring *r* is arranged to act upon the said trigger so that the forward arm thereof is constantly pressed in the upward direction. This arm carries, at its front end, a small rocking piece *s* that constitutes a pawl through the medium of which the trigger acts upon the sear *n*. A spring *t* acts on the pawl and maintains the same in its normal position in which its nose engages with the shoulder at the back of the sear *n* so as to provide for the disengagement of the latter on the trigger being pulled. The sear comprises a spring whose forward extremity is fixed to the breech-box, and the part *n*, on which the trigger pawl acts, extends through a corresponding opening in the underside of the said box.

The arm is not provided with an extractor or an ejector, since the cartridge shells are always thrown out of the barrel chamber by the recoil, and the aperture *g* renders the said chamber fully accessible so that a shell can always be easily withdrawn by hand if it is not properly ejected by the recoil.

When, the striker-bolt is traversed rearwardly by the recoil, the shock thereby produced is received partly by the plug *d* in the end of the breech box, and partly by a shoulder *u* on the lever *h*, striking against the end of the groove *l* in the said box. Thus, after a cartridge has been inserted by hand into the barrel chamber, and the trigger has been pulled, the sear *n* is disengaged from the bent *m* of the striker bolt and the latter is projected forwardly by the striker spring *c*. The point *v* at the front of the striker-bolt then strikes the cap of the cartridge which is thereby discharged and by the resulting recoil, the resistance of the

spring-actuated latch-lever is overcome, the bolt is driven back into the cocked position (in which it is retained after each shot by the spring-engaged sear) and the empty shell is ejected, as has already been described. The bolt is retained in its forward position and the breech thereby kept closed during firing by the lever *h* which serves as a breech latch, and to provide for the firing, in one and the same arm, of cartridges of different strengths and to give an appropriate locking of the breech in each case, it suffices to furnish the lever *h* with a regulating screw or equivalent device which acts upon the spring that tends to move said arm outward and provides for its tension being increased or decreased, and this alteration in the spring tension produces a corresponding alteration in the resistance which is opposed by the bolt-latching lever *h* to the opening movement since as the tension of the spring is increased or decreased, so its beveled end can disengage more or less freely from the inclined end of the groove in the breech box. Figs. 6 to 10 represent one such arrangement for altering the spring resistance of the latch. In this arrangement, as in the construction shown in Figs. 1 to 5, the striker is formed with a groove *y* whose forward end is furnished with a transverse pivot pin *i*, which is engaged by the hooked part *w* of the bolt-latching lever *h*. A screw *o*, whose head is partially contained in the button *k* of the said lever, is arranged in front of the pin *i* and serves to keep the lever in engagement with the said pin (see Fig. 6). As is shown in Fig. 7, the head of the screw is made to project beyond the sides of the lever-button so that it can be readily rotated in either direction by the thumb and finger. The latch-spring *x* which actuates the lever *h* is located in the button end *k* of the latter and one of its extremities bears against the bottom of the groove *y* in the striker-bolt while the other extremity has its abutment against the head of the screw. With this arrangement, by raising or lowering the screw more or less, the tension of the spring *x* can be diminished or increased to a corresponding extent, which results in a corresponding diminution or increase of the resistance which is opposed by said spring to the disengagement of the end of the lever from the opposed part of the breech-box on the bolt and lever being influenced by the rearwardly-acting recoil forces. To dismount the parts of the arm, it is sufficient to remove the screw plug which closes the rear of the breech-box, and to withdraw the regulating screw *o* to a sufficient extent to admit of the disengagement of the hooked part of the latch lever from its pivot *i* and the consequent detachment of the said lever. The striker-bolt can then be withdrawn through the open rear end of the

breech-box. The parts can be re-assembled with great facility by the inversion of the above-described operations. The working and manipulation of the arm shown in Figs. 5 6 to 10 is, in other respects, the same as in the construction represented in Figs. 1 to 5.

When small cartridges of low power are used in arms such as above described, it will be understood that the recoil produced by 10 their discharge is not always sufficient to throw the striker-bolt rearwardly through the requisite distance for enabling the spring sear to engage with the bent in the underside of the said bolt, and thus the bolt is returned to the closed position and instead of 15 the empty shell being ejected, it is pushed back into the barrel chamber. It then becomes necessary to withdraw and cock the striker-bolt by hand and to have recourse to 20 a tool or instrument for removing the shell from the chamber. To avoid this inconvenience and to obviate the risk of the empty shell being returned to the breech-chamber by the inadvertent closing of the striker-bolt, the construction shown in Figs. 11 to 16 25 may be used, in which the said striker-bolt is formed with a plurality of notches or bents 1, 2, 3, 4, arranged one behind the other in the longitudinal axis and either one or other 30 of which may be engaged by the sear *n*, according to the extent of the recoil movement made by the striker-bolt after a discharge. From this arrangement it results that the breech always remains open (to a greater or 35 less extent) after each discharge, which renders it always an easy matter for the spent shells to be removed since the bolt is always caught and retained at a sufficient distance from the face of the breech-chamber to enable the shell to fall into the breech 40 box, opposite to the aperture *g*.

In the arm shown in Figs. 11 to 16, an arrangement is provided whereby after the striker-bolt has been released, the sear *n* is momentarily disconnected from the trigger 45 *p*, so that the latter will not affect the action of the sear in engaging with the said bolt during its recoil. This arrangement is operated by the striker-bolt during its forward or firing movement, and it consists of 50 a small spring-actuated slide or peg *s*, which is mounted in the front of the trigger and serves to connect the latter with the sear. This slide is also engaged by the lower arm 55 of a small lever *z*, which is pivoted above it in the front part of the trigger; and whose upper arm engages in a groove cut longitudinally in the underside of the striker-bolt and having an inclined rearward end. 60 With this arrangement, the spring of the small slide *s* normally keeps the latter engaged with the sear and makes the connection between the said sear and the trigger, but when the trigger has been pulled and 65 the released striker-bolt is about completing

its forward or firing movement, the incline at the rear end of the groove in the said bolt strikes against the arm of the lever *z* which is thereby rocked and made to retract the slide *s* in opposition to its spring (see Fig. 75 11). This effects the disconnection of the sear from the trigger, but on the other hand, when the recoiling movement of the striker-bolt commences, the restraint upon the lever *z* is removed and the slide *s* can be reengaged by its spring with the sear immediately the finger pressure on the trigger is 75 relieved, while the sear is free to engage automatically with one or other of the series of bents 1, 2, 3, 4 of the bolt (as shown in 80 Fig. 12) either prior to or after the release of the trigger.

It is obvious that the actions herein described can be varied or modified as to their details of construction without departing 85 from the invention, and that the arrangements are applicable to other types of semi-automatic arms.

Having fully described my invention, what I desire to claim and secure by Letters Patent is:— 90

1. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting to force said bolt toward the barrel, means for retaining the bolt in its rearward position, a yielding stop device connected with 95 the bolt and adapted to cooperate with an abutment on the body and retard the initial recoil movement of the bolt, and means for varying the resistance to recoil offered 100 by said device.

2. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting to force the bolt toward the barrel, means for retaining the bolt in its rearward position, and adjustable means adapted to retard 105 the initial recoil movement of the bolt.

3. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting to force the bolt toward the barrel, means for retaining the bolt in its rearward position, a spring actuated device adapted to 110 check the initial recoil movement of the bolt, and means for varying the resistance to the recoil offered by said device. 115

4. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting to force the bolt toward the barrel, means for retaining the bolt in its rearward position, and a lever fulcrumed on the bolt and 120 adapted to engage the body to check the initial recoil movement of the bolt, said lever having a lateral projection by means of which it may be moved to inoperative position. 125

5. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting to force said bolt toward the barrel, means for retaining the bolt in a rearward position, and a yielding stop device extending later- 130

ally from the bolt and adapted to cooperate with the body to retard the initial recoil movement of the bolt and to prevent rotation thereof.

5 6. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting to force the bolt toward the barrel, means for retaining the bolt in a rearward position, a spring pressed lever cooperating
10 with the bolt and body to initially check recoil movement of the bolt, and means for varying the resistance to recoil offered by said lever.

7. In a fire arm, the combination of a
15 body, a barrel, a striker bolt, a spring acting to face the bolt toward the barrel, means for retaining the bolt in a rearward position, a lever interposed between the bolt and body, a spring acting to cause said lever to
20 initially check recoil of the bolt, and means on the lever for varying the tension of the last said spring.

8. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting
25 to force the bolt toward the barrel, means for retaining the bolt in a rearward position, a yielding stop device interposed between the bolt and body to initially check the recoil movement of the bolt, and an adjusting
30 screw carried by said device and adapted to vary the resistance offered to recoil by said device.

9. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting
35 to force the bolt toward the barrel, means for retaining the bolt in a rearward position, a lever interposed between the bolt and body, a spring acting to cause said lever to initially check recoil of the bolt, and an ad-
40 justing screw adapted to assist in securing the lever in place and to vary the tension of the spring acting on the lever.

10. In a fire arm, the combination of a body, a barrel, a striker bolt, a spring acting
45 to force the bolt toward the barrel, means for retaining the bolt in a rearward position, a lever detachably fulcrumed on the bolt, a spring acting to hold one end of the lever

in alinement with an abutment on the body, and means for varying the tension of said 50 spring.

11. In a fire arm, the combination of a body, a barrel, a spring impelled striking bolt, a sear adapted to restrain movement of the bolt by the spring, a trigger having a 55 spring pressed pin adapted to engage the sear, and a lever fulcrumed on the trigger and adapted to be actuated by the bolt to move said pin to inoperative position.

12. In a fire arm, the combination of a 60 body, a barrel, a spring impelled striking bolt, a sear adapted to restrain movement of the bolt by the spring, by engagement therewith at either of a plurality of points, a trigger adapted to adjust the sear to disen- 65 gage it from the bolt, and means actuated by the bolt for breaking the connection between the sear and trigger, whereby the sear may reengage the bolt before the trigger returns to its normal position. 70

13. In a fire arm, the combination of a body, a barrel, a spring impelled striking bolt, a sear adapted to restrain movement of the bolt by the spring, a trigger, a member 75 adjustably mounted on the trigger and adapted to normally engage the sear, and a lever fulcrumed on the trigger and adapted to be actuated by the bolt to move said adjustable member out of engagement with the 80 sear.

14. In a fire arm, the combination of a body, a barrel, a spring impelled striking bolt, a sear adapted to restrain movement of the bolt by the spring, a trigger, a spring 85 pressed pin movable to and from a position in front of the trigger and adapted in its forward position to engage the sear, and means adapted to be actuated by the bolt to move said pin rearwardly to break the connection between the trigger and the sear. 90

In testimony whereof I affix my signature in presence of two witnesses.

NICOLAS PIEPER.

Witnesses:

GEORGE E. COYLE,
E. KIRSCH.