

N<sup>o</sup> 29,836



A.D. 1896

*Date of Application, 28th Dec., 1896*

*Complete Specification Left, 28th Sept, 1897—Accepted, 30th Oct., 1897*

**PROVISIONAL SPECIFICATION.**

**Improvements in Automatic and Similar Breech-loading Fire-arms.**

We, **HIRAM STEVENS MAXIM**, of 18 Queen's Gate Place, in the County of Middlesex, Mechanical Engineer, and **LOUIS SILVERMAN**, of Crayford Works, Crayford in the County of Kent, Engineer, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to automatic or partly automatic fire-arms of the kind in which a rectilinear reciprocating breech block is directly operated by the pressure of the powder gases, to open the breech a recoil spring or springs returning the said block to its closed position after each discharge of the fire-arm.

10 An important feature of our invention consists in so arranging the breech block and firing pin that the rearward movement of the block in opening the breech ceases before that of the firing pin, so that the continued movement of the latter due to its momentum effects the "cocking" of the weapon. Another important feature of our invention consists in arranging a catch or sear on the breech block or the firing pin so that when the latter assumes its cocked position, it will be  
15 there retained by the sear until released by the displacement of the sear when the trigger is pulled to discharge the weapon.

According to one construction of our improved fire-arm the breech block slides longitudinally in a suitable guideway formed in the body portion of the fire-arm and is made hollow to surround the front end or nose of a comparatively long  
20 firing pin. The outer end of this firing pin projects through the end of the aforesaid body where it is provided with a knob or is otherwise formed to permit of its being conveniently grasped by the hand of the user when it is desired to pull back the firing pin to cock the weapon by hand. Near the front end or nose of the firing pin is a shoulder against which one end of a spiral spring surrounding the  
25 said firing pin abuts; the other end of such spring bearing against the rear end of the body of the weapon. The aforesaid catch or sear is under the control of a firing sear arranged on the trigger in such a manner that when the latter is pulled, the catch is acted on to liberate the firing pin which accordingly flies forward under the influence of its surrounding spring and thereby fires the weapon. The  
30 firing sear on the trigger may be furthermore so constructed and arranged that when once the trigger is pulled, the firing sear will be incapable of again releasing the firing pin catch, until after the trigger has been allowed to resume its normal position. A succession of rapid discharges is thus avoided.

The body portion of the weapon is provided with a cover which moves with the  
35 breech-block so that each time the block retires, an opening in the upper part of the body is uncovered to allow the empty cartridge case to be ejected. The rear portion of the said cover may be held in place by a transverse pin passing through a longitudinal slot or recess in the firing pin. This pin will also serve as a stop to limit the extent of rearward independent movement of the firing pin as it  
40 performs its cocking movement. By removing this pin the said cover can be readily detached.

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For extracting and ejecting the empty cartridge case we may employ an ordinary claw extractor arranged in a recess in the upper part of the front end of the breech block and we may arrange diametrically opposite such extractor a pin working loosely in an inclined hole whose inner end lies contiguous to the flange of the cartridge when the latter is in the charge chamber and the breech closed. 5  
This pin is so arranged that its head will, when the breech block retires with an empty cartridge case, strike against a projection on the body of the weapon and thereby cause the inner end of said pin to project from the aforesaid hole and forcibly strike the cartridge case, thereby throwing it out upwardly, through the ejection opening in the body of the weapon. 10

The cartridges may be contained in a magazine provided with a spring lifter and the weapon may be formed with a suitably shaped receptacle to receive said magazine. A clip or other retaining device may be provided on the said receptacle for keeping the magazine in place and for permitting its ready removal when empty and replacement by a full one. The mouth of the magazine may be so formed that the uppermost cartridge projects slightly therefrom but cannot escape, until it has been pushed forward a certain distance by the breech block as the latter advances to close the breech. The charge chamber of the barrel is so formed that as the cartridge is pushed forward longitudinally by the advancing breech block it is directed into the barrel. 15 20

According to a modified construction of our improved fire-arm, the firing pin does not extend through the rear end of the body of the weapon as in the previously described construction but is wholly contained within the body. It is made somewhat shorter than the breech block so that when the said breech block completes its recoil there will be sufficient space left between the end of the body and the rear end of the firing pin to permit of the latter performing a further rearward movement in cocking. The movable cover referred to in the construction above described is dispensed with in this arrangement. 25

The breech block is provided with a depending portion or lock case wherein a cocking lever and sear are arranged, these parts moving with the breech block. 30

The said cocking lever may be formed with a tail to be acted upon by a fixed incline as the breech block recoils whereby the cocking of the firing pin may be effected. In this case the cocking would be effected partly by the momentum of the recoiling firing pin and partly by the aforesaid incline.

The trigger may be provided with a projection so arranged that the tail of the sear will be lifted thereby as the breech block returns to the firing position and so release the firing pin. The firing of the weapon will thus take place automatically so long as the trigger is pulled and so long as there is ammunition within the magazine. 35

An external crank arm may be provided for enabling the fire-arm to be worked by hand, the said crank arm being mounted on a shaft carrying a finger or arm which engages with a suitably shaped recess in the breech block. 40

Dated this 28th day of December 1896.

HASELTINE, LAKE & Co.,  
45 Southampton Buildings, W.C., Agents for the Applicants. 45

## COMPLETE SPECIFICATION.

**Improvements in Automatic and similar Breech-loading Fire-arms.**

We, HIRAM STEVENS MAXIM, of 18 Queen's Gate Place, in the County of Middlesex, Chevalier of the Legion of Honour, Civil and Mechanical Engineer, and LOUIS SILVERMAN, of Crayford Works, Crayford, in the County of Kent, 50

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Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to automatic or partly automatic fire-arms of the class  
5 or kind in which a rectilinear reciprocating breech-block is directly operated by the pressure of the powder gases to open the breech, a recoil spring or springs returning the said block to its closed position after each discharge of the fire-arm.

According to one construction of our improved fire-arm, the breech block and firing pin are so arranged that the backward movement of the block in opening the  
10 breech ceases before that of the firing pin, so that the continued movement of the latter due to its momentum effects the "cocking" of the weapon. For this purpose the breech block is made hollow and contains the forward part of a comparatively long firing pin, which at its outer extremity projects through the end of the body portion or casing of the fire-arm, where it is provided with a knob or is  
15 otherwise formed to permit of its being conveniently grasped by the hand of the user when it is desired to pull back the firing pin to cock the weapon by hand. Near the front or nose of the firing pin is a shoulder against which one end of a spiral spring surrounding the said firing pin abuts; the other end of such spring bearing against the rear end of the body of the weapon. The breech block carries  
20 a catch or sear which is under the control of a firing sear or pivotted piece arranged on the trigger in such a manner that when the latter is pulled, the catch is acted on to liberate the firing pin, which accordingly flies forward under the influence of its surrounding spring and thereby discharges the weapon.

For extracting and ejecting the empty cartridge case we employ an ordinary  
25 claw extractor, arranged in a recess in the upper part of the front end of the breech block, and we arrange diametrically opposite such extractor an ejector pin working loosely in an inclined hole whose inner end lies contiguous to the flange of the cartridge when the latter is in the charge chamber and the breech is closed. This pin is so arranged that its head will, when the breech block retires with an empty  
30 cartridge case, strike against a projection on the body of the weapon and thereby cause the inner end of said pin to project from the aforesaid hole and forcibly strike the cartridge case, thereby throwing it out upwardly, through the ejection-opening in the body of the weapon.

According to a modified construction of our improved fire-arm, the firing pin does  
35 not extend through the rear end of the body of the weapon as in the previously described construction, but is wholly contained within the body, and is made somewhat shorter than the breech block, so that when the said breech block completes its recoil there will be sufficient space left between the end of the body and the rear end of the firing pin to permit the latter by virtue of its momentum to perform a  
40 further rearward movement in cocking. The breech block is provided with a depending portion or lock case wherein a cocking lever and sear are arranged, these parts moving with the breech block. The said cocking lever is formed with a tail to be acted upon by a fixed incline as the breech block recoils, whereby the cocking of the firing pin is effected.

45 In order that our said invention may be clearly understood and readily carried into effect we will proceed to describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is a side elevation,

Figure 2 a plan, and

50 Figure 3 a rear end view of a pistol constructed in accordance with the first part of our invention.

Figure 4 is a longitudinal sectional elevation shewing the position of the parts immediately after pulling the trigger to discharge the pistol.

55 Figures 5 and 6 are similar views to Figure 4 the former shewing the position of the parts after the discharge has taken place and the breech block has fully

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recoiled, and the latter shewing the position of the parts when the breech block has closed the breech and the pistol is ready for another discharge.

Figure 7 is a transverse section taken on the line 1. 1 of Figure 4.

Figures 8 and 9 are detail sections taken on the line 2. 2 of Figure 7 and drawn to an enlarged scale, shewing the extracting and ejecting devices. Figure 8 5 representing the breech block in its closed position and Figure 9 in its open position.

Figure 10 is a side elevation, and

Figure 11 a longitudinal section, of a pistol constructed in accordance with the second part of our invention. 10

Figure 12 is a transverse section on the line 3. 3. of Figure 11.

Figures 13 and 14 are longitudinal sectional views of a modification of the means shewn in Figure 11 for cocking the firing pin, Figure 13 representing the firing pin in its forward or fixed position and Figure 14 the said pin in its cocked position.

Figure 15 is a detail view of the cocking lever employed in this last mentioned 15 arrangement.

In all these figures like letters of reference indicate similar parts.

A is the body portion or casing enclosing the breech mechanism; B is the barrel; C the breech block; D the firing pin; E the recoil spring; F the cartridge magazine and G the trigger. 20

Referring more particularly to the pistol illustrated by Figures 1 to 9, the body A thereof is tubular and formed with a hollow depending portion A<sup>1</sup> which serves as the handle of the pistol and for the reception of the cartridge magazine F. A spring clip A<sup>2</sup> or similar retaining device is provided on the said handle for permitting of the ready removal of the magazine when empty and its replacement 25 by a full one.

The breech block C is hollow for the greater portion of its length and is formed externally with a longitudinal groove *c* (Figures 7, 8 and 9) into which fits a projection or feather *a* on the body A, so that said block is capable of sliding longitudinally in the body without turning angularly. The firing pin D is cylindrical 30 at the part where it is surrounded by the said hollow breech-block and is of such a diameter that an annular space is left within the block for the spiral spring E. The remaining portion of the said firing pin is rectangular or flat and the aperture *a*<sup>1</sup> in the rear end of the body A through which the said pin projects is of similar shape, to permit of the pin's longitudinal movement without turning. 35 D<sup>1</sup> is the knob with which the outer extremity of the firing pin is furnished to enable said pin to be pulled backward when cocking the pistol by hand. The front extremity of the firing pin is formed with a conical shoulder *d* terminating in a firing needle *d*<sup>1</sup>, the solid portion *c*<sup>1</sup> of the breech block being similarly formed to permit of said needle reaching the detonator of the cartridge to explode the same 40 Immediately in rear of the said conical shoulder *d* is a collar *d*<sup>2</sup> on the firing pin between which and the rear end of the body A is located the spiral spring E.

At the front portion of the breech block is a cavity *c*<sup>2</sup> for the reception of the catch or sear C<sup>1</sup> by which the firing pin is held in its cocked position. This catch or sear is pivotally connected to the breech block by a pin *c*<sup>3</sup>, and a spring *c*<sup>4</sup> 45 normally tends to keep the end *c*<sup>5</sup> thereof pressed upwardly. As soon as the firing pin is fully retracted, the said end of the catch will come in front of the collar *d*<sup>2</sup> on the firing pin and thereby keep the latter cocked until said catch is released by the pulling of the trigger. For effecting this release, the trigger is furnished with the firing sear or pivoted piece *g* which, under the influence of a spring *g*<sup>1</sup>, 50 normally occupies the vertical position represented in Figure 4 with its nose immediately below the aforesaid catch ready to trip the latter when the trigger is pulled and thus permit the firing pin to fly forward to explode the cartridge. This pivoted piece *g* is provided with a tail *g*<sup>2</sup> which bears against the trigger by the action of the said spring *g*<sup>1</sup> and is thereby restrained from turning beyond 55 the vertical position in a left hand direction, but is unrestrained from turning in the opposite direction. By this construction, if after pulling the trigger to fire a shot,

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it should still be held in its pulled back position, another discharge will not take place, because as the block advances to close the breech the said pivotted piece  $g$  will be pushed forward about its pivot pin  $g^3$  by the catch  $C^1$  and as the nose does not pass beneath the said catch the firing pin will not be released. Immediately  
 5 however the trigger is allowed to return to its normal position by the action of its spring  $g^4$  the said pivotted piece  $g$  will resume its vertical position under the influence of its spring  $g^1$ , and will come beneath the said catch as represented in Figure 4. The weapon can then be discharged again by pulling the trigger but a rapid succession of discharges, without manipulating the trigger, is prevented.

10 H is a cover with which the body of the pistol is provided; this cover moves with the breech block so that each time the latter retires, an opening  $A^3$  in the upper part of the body is uncovered to allow an empty cartridge case to be ejected as hereinafter explained. The front end of the said cover is furnished with a bent lug or hook  $h$  which is adapted to fit into a correspondingly shaped recess in the  
 15 breech block as shewn in Figures 4 to 7 and the rear end of said cover is forked at  $h^1$  to fit over the flat or rectangular portion of the firing pin. A transverse pin or screw  $h^2$  passes beneath the said firing pin and through a recess  $d^3$  formed in the under side thereof. This transverse pin or screw not only serves to keep the cover in place but also serves as a stop to limit the extent of the independent rearward  
 20 movement of the firing pin which the latter performs in being cocked. By removing this pin or screw the rear end of said cover can be turned upward until the bent lug or hook  $h$  arrives in a position to permit of its escape from the recess in the breech block and the consequent entire removal of the cover from the pistol.

I is the extractor (see Figures 8 and 9) consisting of a spring claw having its  
 25 end  $i$  screw threaded to engage with a screw threaded hole or recess  $e^6$  in the front end of the breech block. Situated diametrically opposite to such extractor is the ejector J which works in the inclined hole  $e^7$  in the front end of the breech block. This pin is formed with a head  $j$  which, when a cartridge is in the charge chamber  
 30 of the pistol and the breech closed is caused to protrude into the aforesaid longitudinal slot  $e$  in the breech block. Thus after the discharge of a cartridge and during the rearward movement of the breech block, the head of such pin will forcibly strike against the projection or feather  $a$  (Figure 9) whereby said pin will be driven inwardly and will strike a sharp blow on the flange of the cartridge  
 35 case, with the result that the latter will be thrown out of the pistol in an upward direction through the aforesaid ejection opening  $A^3$ .

The mouth  $f$  of the magazine is formed in the well known manner to prevent the cartridges contained in the magazine from escaping by the direct upward  
 40 pressure of the spring lifter  $f^1$  but permits of their being one by one pushed forward by the breech block into the charge chamber as said block advances to close the breech.

The working of this pistol is as follows:—Assuming the parts to be in the position represented in Figure 6 that is to say the weapon being ready for a fresh discharge the act of pulling the trigger will cause the nose of the sear  $g$  to press the spring  
 45 controlled end of the catch  $C^1$  upwardly, and the end  $e^5$  downwardly out of the path of the collar  $d^2$  on the firing pin. The firing pin will then immediately fly forward under the influence of the spring E as represented in Figure 4, thus exploding the cartridge in the charge chamber of the barrel. The recoil due to such explosion will then drive both the breech block and the firing pin rearwardly at the same velocity against the resistance of the spring E, until the said breech block  
 50 strikes the rear end of the body A. The breech block will thus be arrested in its backward movement, but the firing pin will continue its movement by its momentum until stopped by the pin or screw  $h^2$ . Simultaneously with the completion of this independent movement of the firing pin, the end  $e^5$  of the catch  $C^1$  will be elevated by the action of the spring  $e^4$  and will engage with the collar  $d^2$  of the  
 55 firing pin, thus retaining the latter in its fully withdrawn or cocked position. The parts will then be in the position represented in Figure 5, the extraction and ejection of the empty cartridge case having been effected by the extractor I and

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ejector pin J as hereinbefore described. The spring E will then re-act and carry the breech block and firing pin forward to close the breech, the said block in this movement pushing the uppermost cartridge in the magazine into the charge chamber. The parts are thus brought into the position represented in Figure 6. The pistol can then be discharged again upon pulling the trigger provided that, as already explained above, the trigger has been previously released from its pulled back position. 5

Referring now to Figures 10, 11 and 12 these figures illustrate a modified construction of our pistol, wherein the cocking of the firing pin instead of being effected wholly by its momentum as in the previous construction is effected by a cocking lever acting in conjunction with an incline as the breech block recoils. The breech block C is, as in the former case, made hollow to receive the firing pin D, but instead of the said firing pin being prolonged through the rear end of the body A it is made short and also hollow to receive one end of the recoil spring E. The other end of said spring fits around and is supported by a horizontal pin A<sup>4</sup> projecting inwardly from the rear end of the body A. The handle or stock A<sup>1</sup> is formed solid instead of hollow, the magazine F being located in a chamber A<sup>5</sup> provided for the purpose in front of the trigger. The said breech block is provided with depending portions or wings C<sup>2</sup> C<sup>3</sup> between which is located the cocking lever C<sup>3</sup>. This cocking lever is mounted on a pivot pin C<sup>4</sup> and is provided with an arm C<sup>5</sup> engaging with the firing pin. The said cocking device is also provided with a tail C<sup>6</sup> which occupies a position contiguous to the fixed incline A<sup>6</sup>. When recoil of the breech block takes place the spring E is compressed and the said tail is acted upon by the fixed incline, the cocking lever is thereby turned about its pivot and cocks the firing pin. The nose of the sear g then engages with a notch C<sup>7</sup> on the cocking lever and retains the latter and the firing pin in their cocked position. After the breech block has regained its firing position by the re-action of the aforesaid spring E, the firing pin can be released by pulling the trigger which trips the said sear by the projection G<sup>1</sup> on the leaf of the trigger acting on the prolongation g<sup>x</sup> of the sear. A<sup>7</sup> is a buffer of wood or leather for the wings C<sup>2</sup> of the breech block to strike against in their rearward movement. An external crank arm C<sup>8</sup> is arranged on a short axle C<sup>9</sup> carried by one of the side plates of the pistol and the inner end of said axle is provided with a finger or arm C<sup>10</sup> whose free end engages with a notch C<sup>11</sup> formed for its reception in the breech block. By these means the weapon can be cocked by hand when desired. 10 15 20 25 30 35

The above described modification can be varied as illustrated by Figures 13, 14 and 15, that is to say the cocking of the firing pin D is effected by a cocking lever C<sup>3</sup> of somewhat different construction from that employed in Figure 11. In this case the said cocking lever is provided with trunnions C<sup>12</sup> which are supported in semi-circular recesses in the wall of the breech block, and the tail C<sup>6</sup> is made extremely short in comparison with the arm C<sup>5</sup>. This arm is preferably forked to bridge over the firing pin and enters a transverse recess C<sup>13</sup> in the breech block. The incline A<sup>6</sup> which acts upon the tail C<sup>6</sup> is modified in shape, that is to say it is formed as a curve instead of as an inclined plane. The operation of the said cocking lever is, however, analogous to that of the cocking lever shown in Figure 11, that is to say when the recoil of the breech block occurs, it carries with it the said cocking lever and consequently brings the short tail C<sup>6</sup> against the curve A<sup>6</sup>. The said tail is thus forced towards the right with the result that the arm C<sup>5</sup> is pressed in the opposite direction and cocks the firing pin as represented in Figure 14, the firing pin being retained in this position by a sear similar to that shown at Figures 4 to 6. 40 45 50

By reason of the greatly increased leverage obtained by this construction of cocking lever a comparatively light recoil spring can be employed.

Although we have illustrated our invention as applied to a pistol we wish it to be understood that we may equally well apply the same to fire-arms of other kinds. 55

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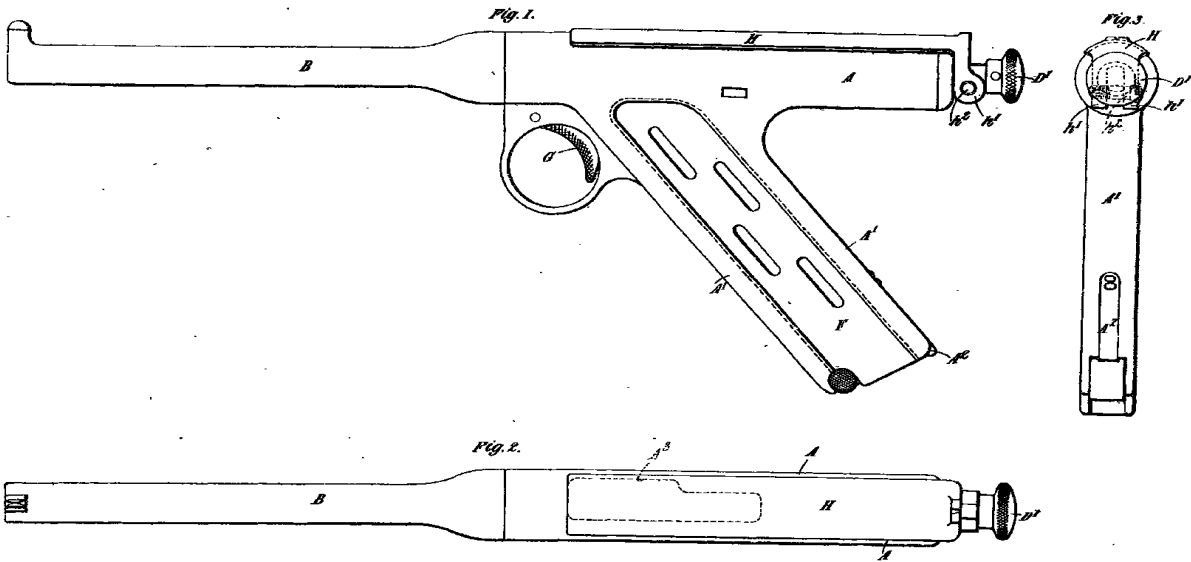
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Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim in an automatic or similar fire-arm is:—

1. The firing pin carried by the breech-block, and arranged substantially as described to be cocked by its own momentum after the termination of the recoil of the said block.
2. The spring catch or sear carried by the breech-block and acting in conjunction with the pivotted piece on the trigger, substantially as described and for the purposes specified.
- 10 3. The combination, with the breech block and the firing pin, of a detachable cover, substantially as described.
4. The combination with the breech block and the extractor, of an inclined ejector pin acting in conjunction with a fixed projection substantially as described with reference to Figures 8 and 9 of the accompanying drawings.
- 15 5. The modified construction of the firing pin and the means for cocking the same during recoil by a cocking lever and incline, substantially as described.
6. The combination with the breech block of a finger or arm mounted on an axle extending through the casing of the fire arm and provided with a crank handle, substantially as described and for the purpose specified.
- 20 7. The construction and arrangement of the cocking lever substantially as described with reference to Figures 13 to 15 of the accompanying drawings and for the purpose specified.
8. An automatic pistol or other fire-arm embodying any or all of our improvements substantially as described with reference to Figures 1 to 9 or Figures 10 to 25 12 of the accompanying drawings.

Dated this 28th day of September 1897.

HASELTINE, LAKE & Co.,  
45 Southampton Buildings, London, W.C., Agents for the Applicants.

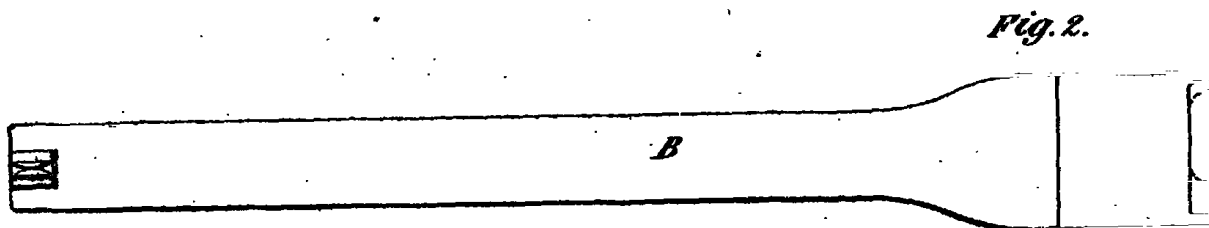
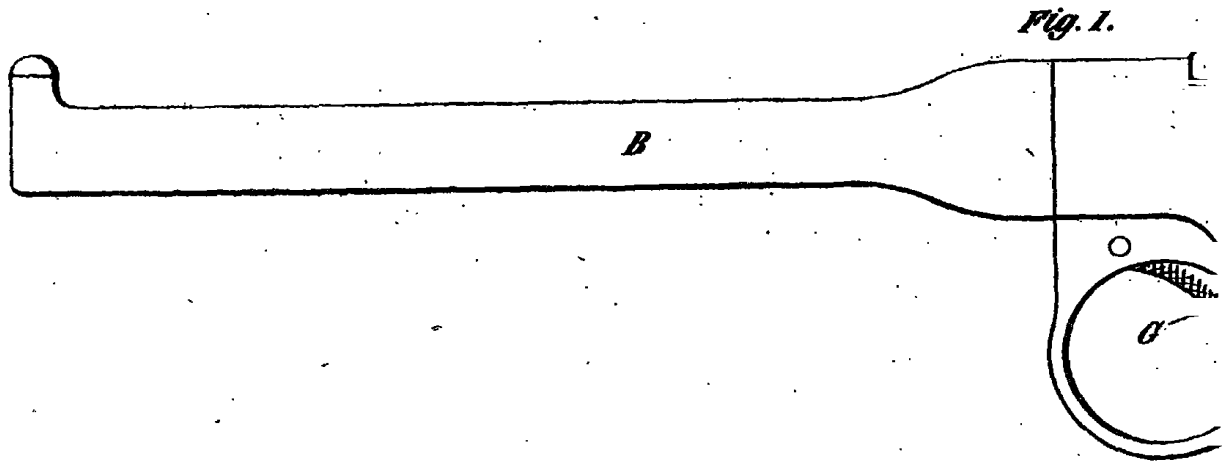


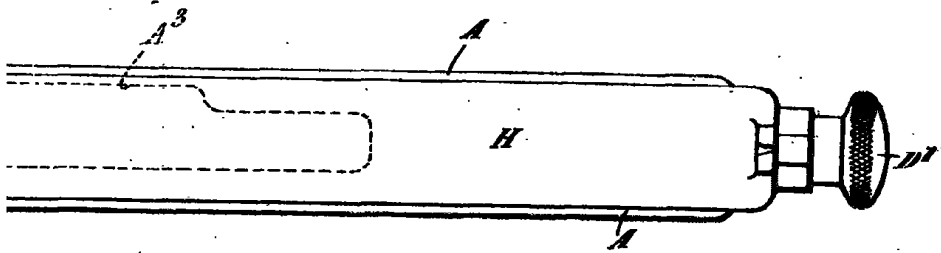
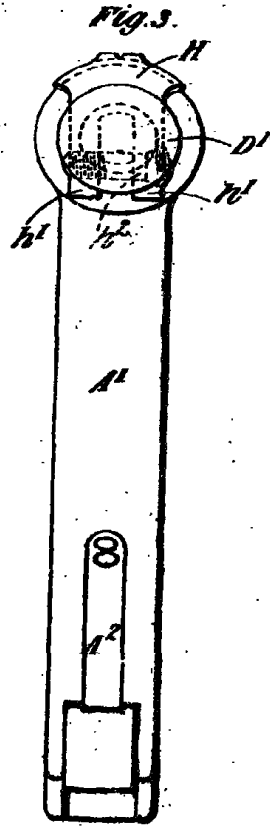
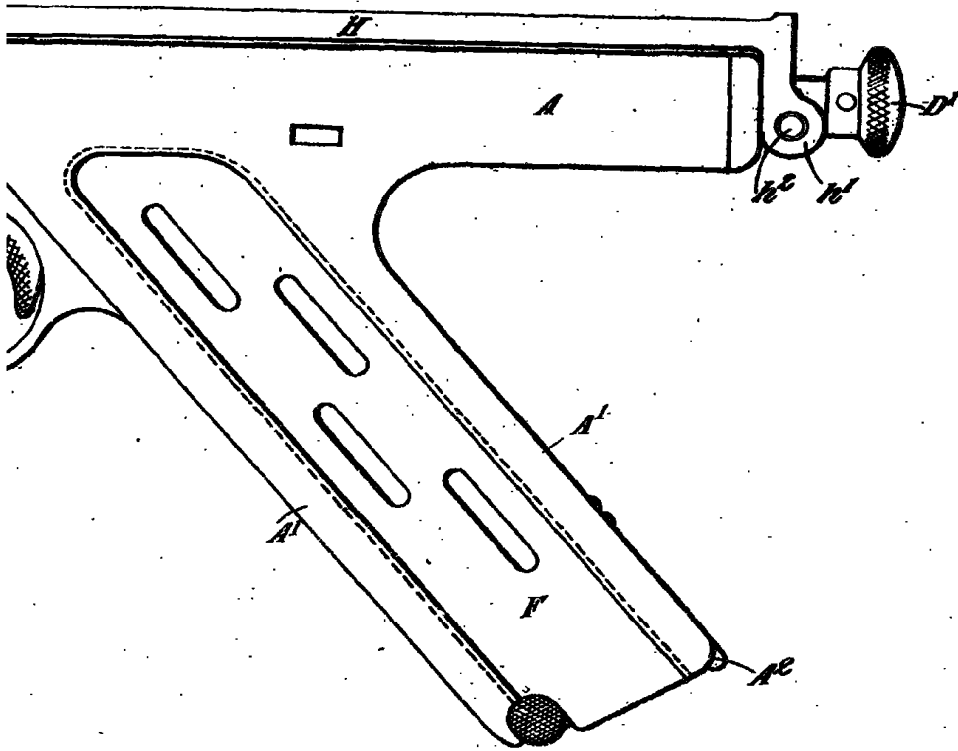
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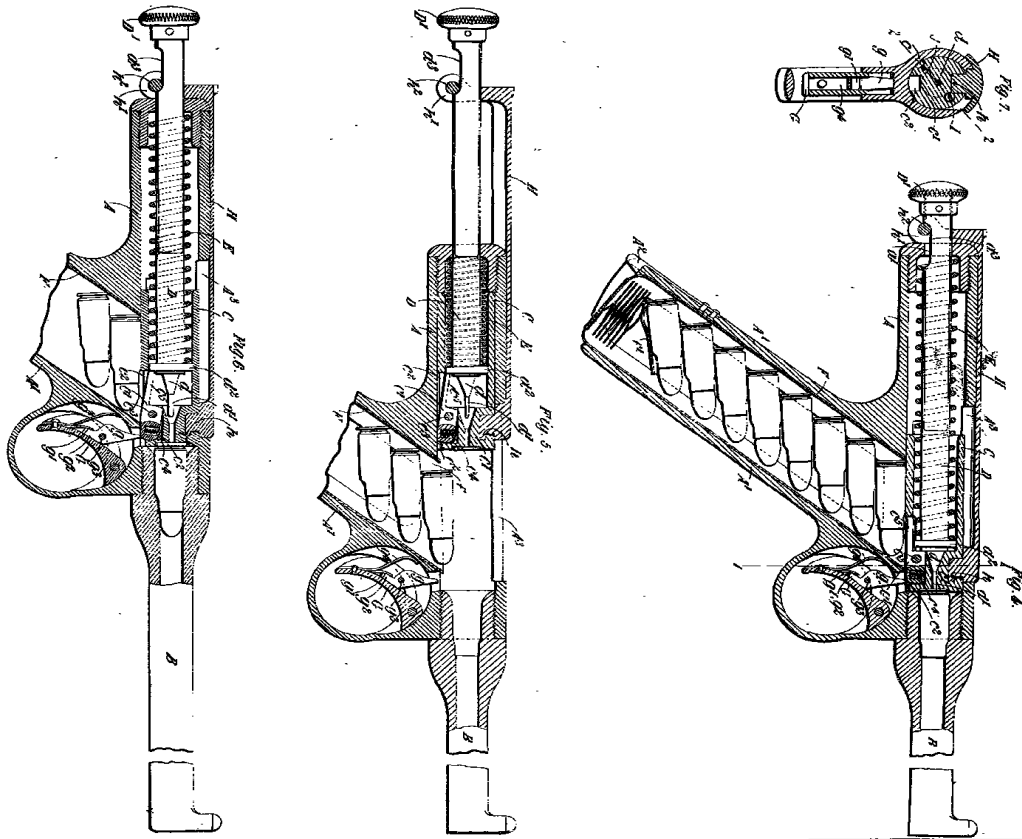


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15 SHEETS.  
SHEET 2.

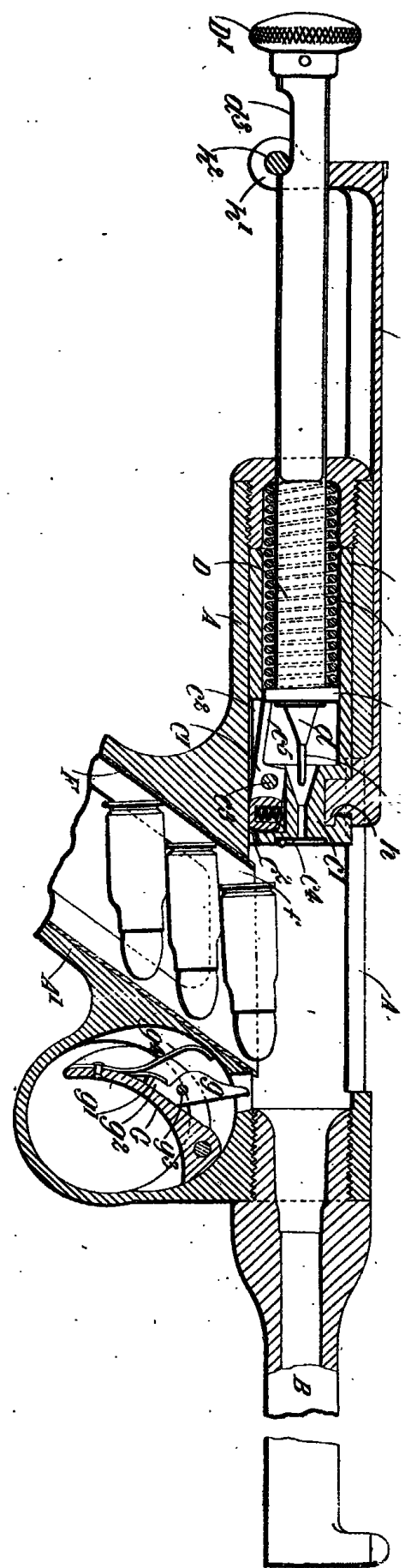
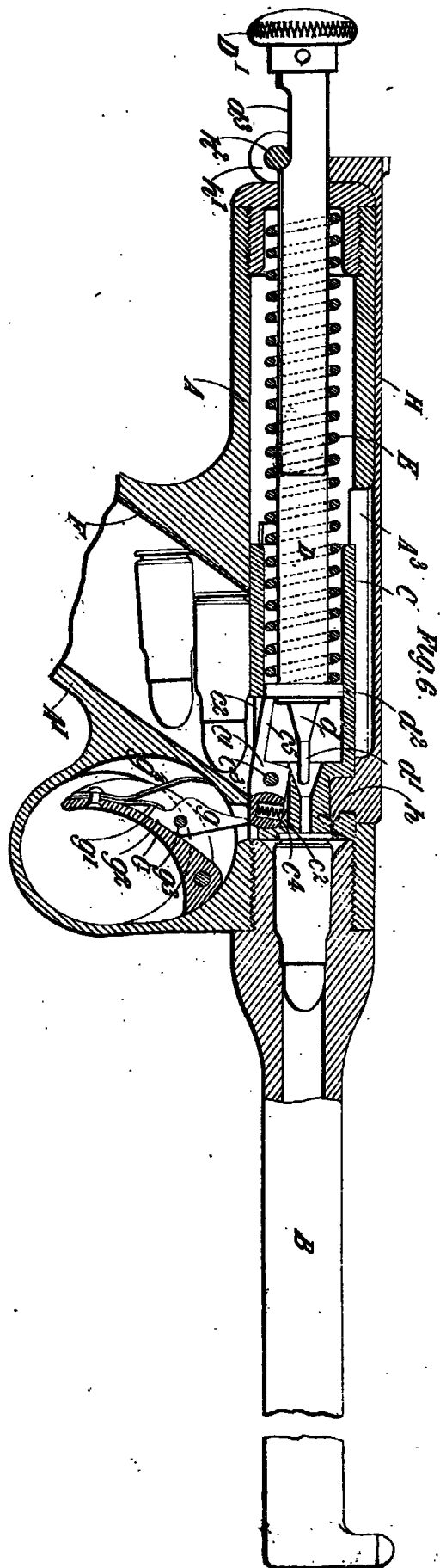


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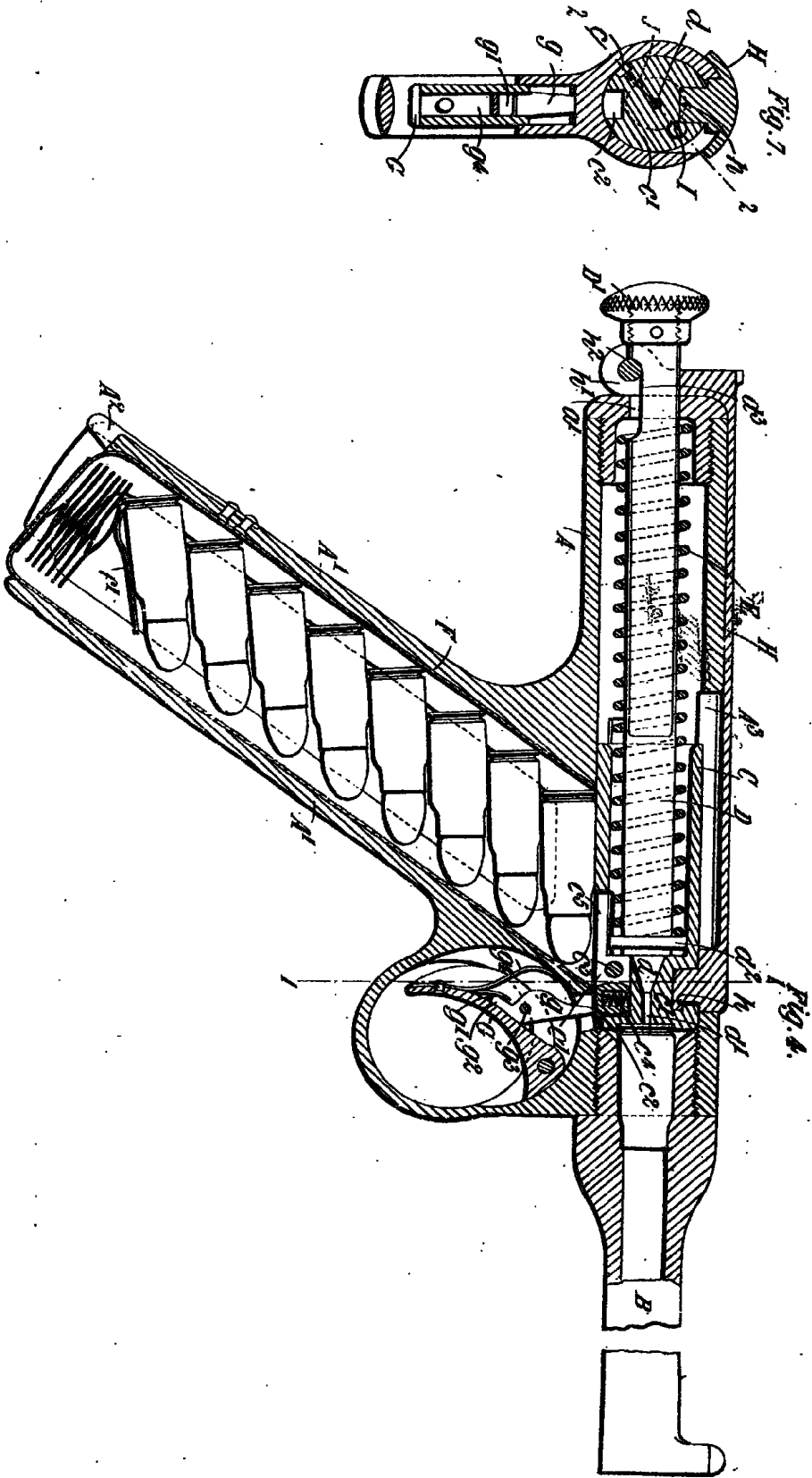
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Fig. 5.

Fig. 8.

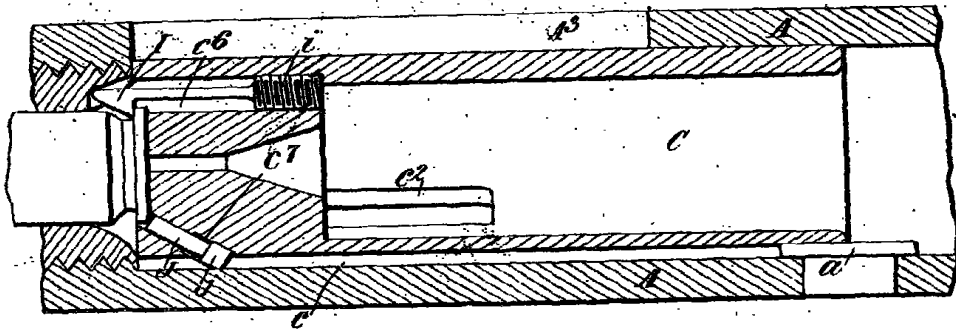
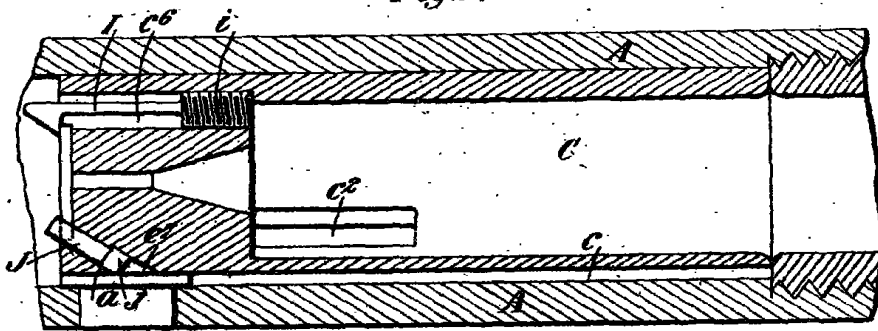
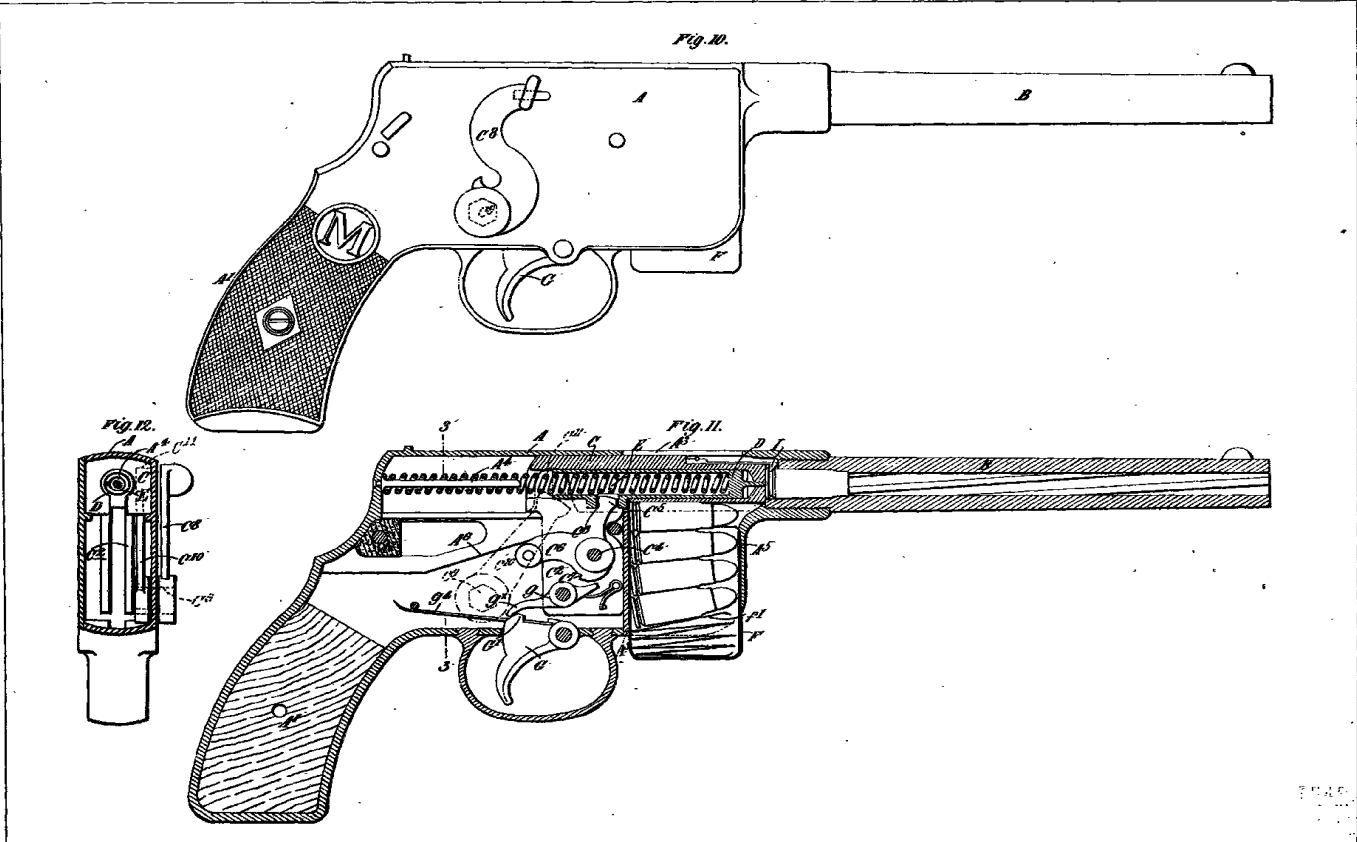


Fig. 9.



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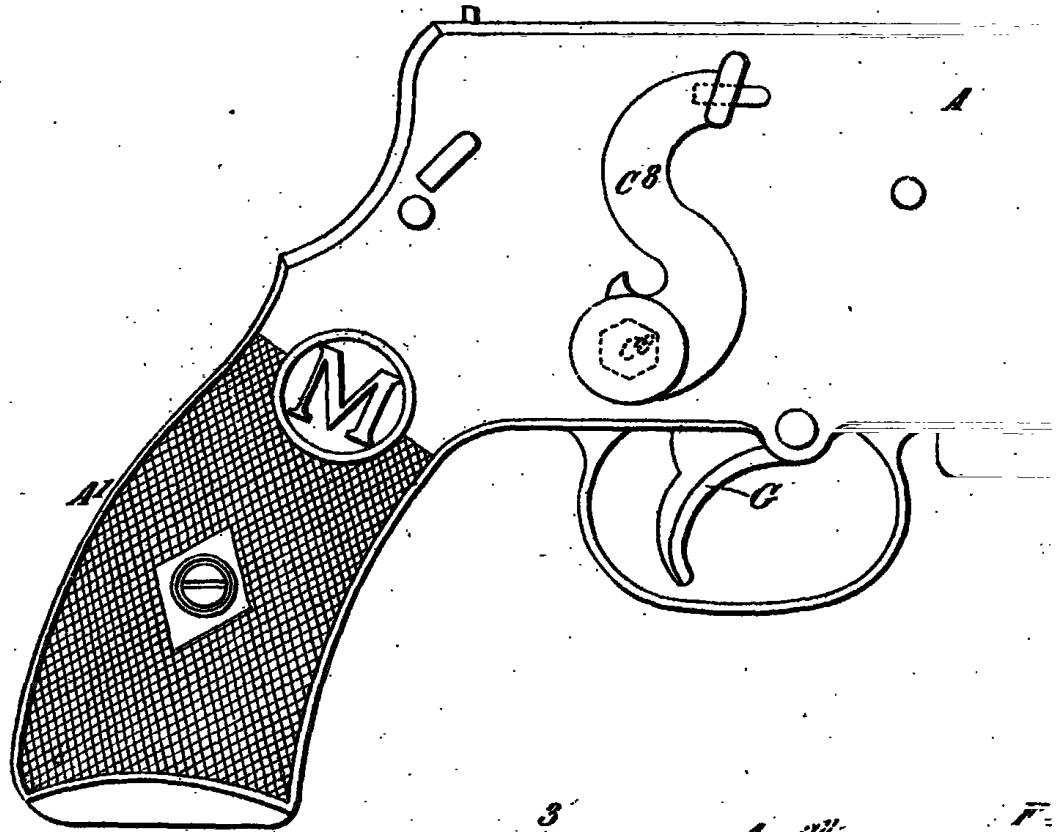


Fig. 12.

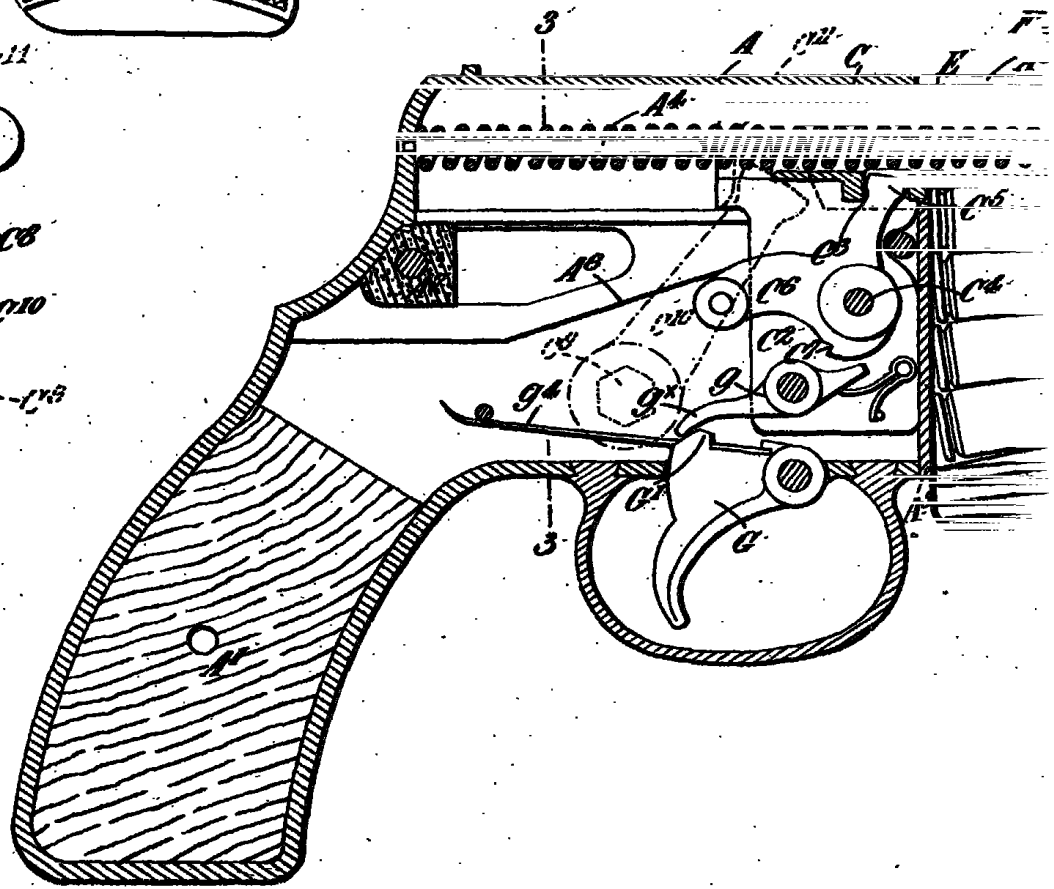
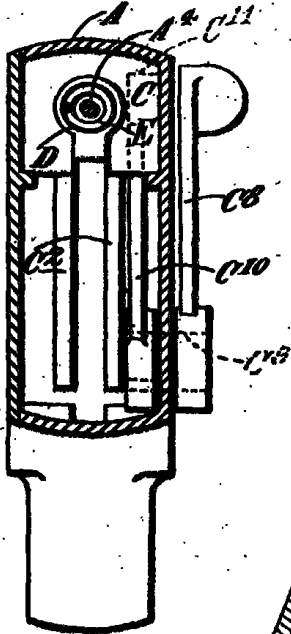




Fig. 10.

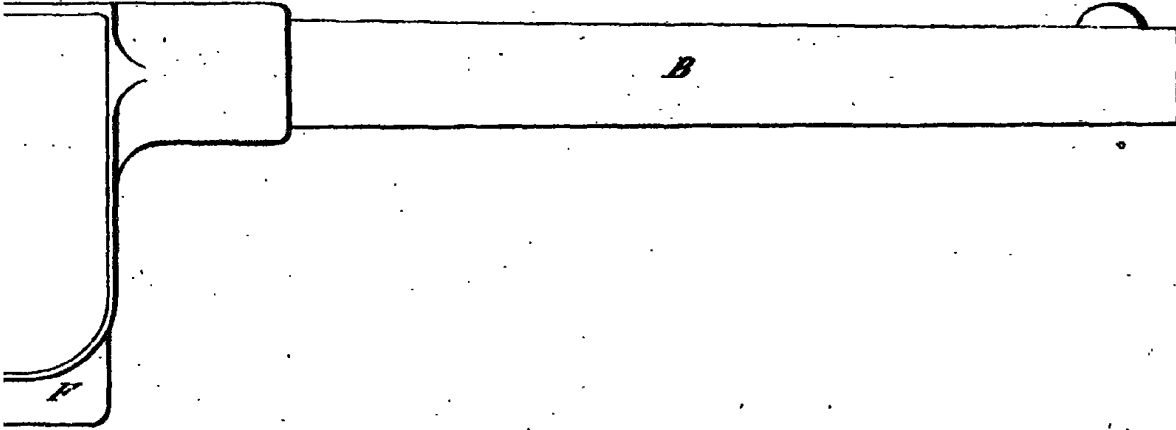
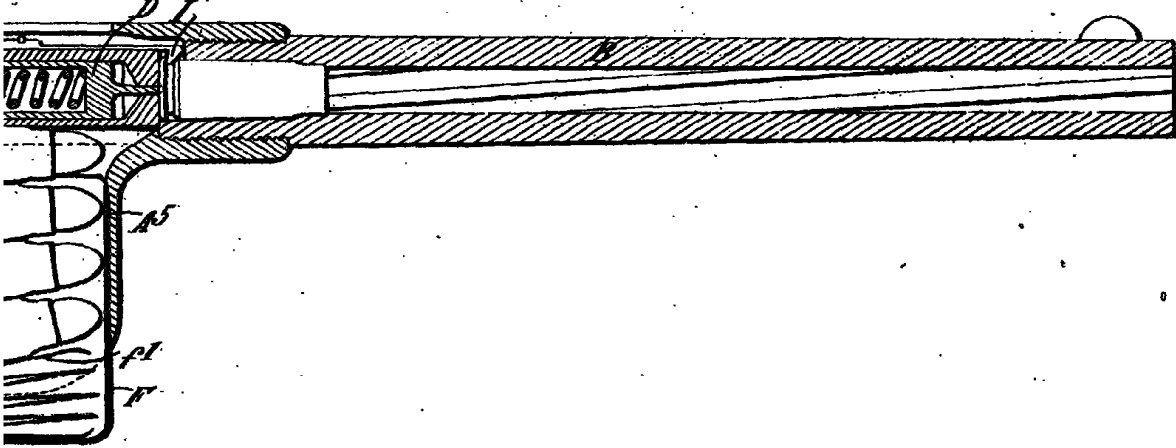
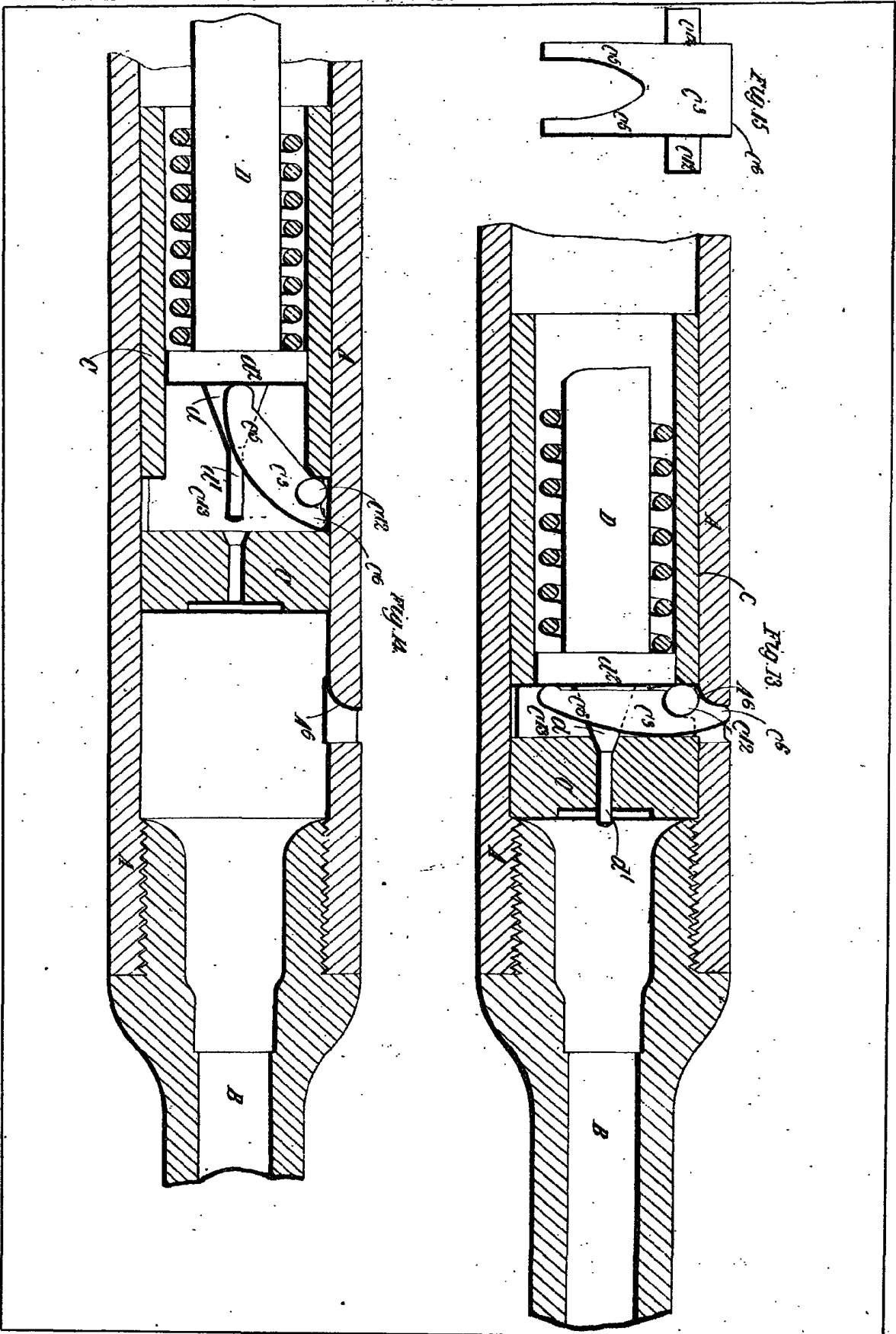


Fig. 11.



*[This Drawing is a reproduction of the Original on a reduced scale.]*

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