

N^o 4399



A. D. 1900

Date of Application, 7th Mar., 1900—Accepted, 26th May, 1900

COMPLETE SPECIFICATION.

**Improvements in or connected with Breech-loading Recoil
Small Arms.**

I, GEORG LUGER, of 34, Weimarar Strasse, Charlottenburg, in the Empire of Germany, 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 thereof, reference being had to the drawings hereunto annexed and to the figures and letters marked thereon that is to say:—

This invention relates to improvements in breech-loading recoil firearms provided with moveable barrels and toggle actuated or knee-jointed breech blocks, its object being, whilst simplifying the construction of breech-loading recoil firearms of this class, to perfect their operation in such a manner as to enable them fully to meet all reasonable requirements.

The invention has reference not only to arrangements calculated to improve the mode of operation of the most important parts of the weapon, and more especially of the breech mechanism, and to simplify their structural features; but also to devices by the aid of which, while the weapon is being carried from place to place, the parts are prevented from coming accidentally into operation when they are required to remain out of action and which in firing, render it impossible for the breech to open prematurely under the pressure of the gases; so that the safety of the marksman is under all circumstances guaranteed, and yet the readiness for firing, of the weapon is in no way impaired.

As regards, first of all, the breech mechanism, there is provided a highly important new arrangement which enables the toggle or knee-joint at the barrel-end, which serves to effect a positive closing, to be extended or closed or cranked folded or opened, as the case may be by manipulating it directly at the central hinge or pivot point, whereas it is a well known fact that formerly special lever mechanism was required to transmit motion thereto for this purpose; or, as in the well known "Borchardt" pistol, the joint-lever at the rear was constructed as a double-armed lever, so that, as the barrel receded, it might impinge upon two suitably located curved surfaces, and thereby give the knee-joint the initial opening impulse.

This arrangement not only employed the force of the recoil to no advantage, in view of the relative disposition of the levers involved; but an additional drawback of such an arrangement was that the parts of the firearm concerned,—such as the sleeve in "Borchardt's" butt, for example,—formed comparatively bulky rearward projections which not only materially impaired the appearance of the weapon, but unnecessarily added to its weight.

Now according to the present invention the knee-joints or central joint, of the toggle levers laterally project beyond the barrel-tube and co-operate with correspondingly situated curved surfaces of the butt in such a manner that, in opening, or when the barrel recedes after firing the recoil is fully taken advantage of over the entire length of joint-levers the natural result being a maximum impact and, consequently, a more rapid and ready opening of the breech, while at the same time the strain to which the several parts are subjected is turned to better account.

[Price 8d.]



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The knee-joint or toggle is in existing arrangements secured in the "closed" position and enabled to withstand the pressure of the gases by a construction owing to which, when the links of such knee-joint are extended, its central hinge comes to be situated a little below the end-points of the joint.

This slight depression,—adopted on the "knee-press" principle,—is intended to protect the joint, while at rest, and during the rearward traverse of the barrel, from breaking open.

Now in order to make this arrangement entirely secure, the contrivance here adopted consists in providing the rearward joint of the toggle lever, with shoulders which are somewhat inclined in upward and rearward directions and which lie in close contact with conveniently situated abutments and, in conjunction with the pivot of the knee-joint, take up on behalf of the rearward lever the gas pressure transmitted rearward by the breech-block.

The result is that the gas pressure in all cases is first exerted upon the above mentioned bevelled shoulders, or upon the abutments supporting them, so that only part of its weight is brought to bear upon the pivot of the rear lever of the joint, and which pivot is fitted loosely in its socket; whereas in the existing constructions, this pivot had to sustain the full gas pressure and was accordingly liable to injury or destruction by bending or breaking.

Owing to the provision of the free space above alluded to, for the pivot of the rear lever to work in,—small as that space is—and further of the bevelled shoulders, the links of the toggle lever or knee-joint, when extended have, as will be more fully explained later on, a tendency to move in such a manner that, in firing, that is under the influence of the pressure of the gases, before the bullet has left the barrel and consequently before the barrel has receded, the premature folding or cranking of the jointed links, or in other words the premature opening of the breech, cannot take place.

With reference to the closing spring, which serves to close the breech, or in other words to restore the knee-joint or toggle after it has been opened or cranked to its "closed" or extended position, the improvement which this invention provides is that a flat spring is used for the purpose, which is extended to its full length or approximately so within the neck of the butt, the operative or free upper end of such spring being connected to a swinging arm suspended from the rearward link or lever of the knee-joint or toggle owing to the intermediate agency of which arm, the said spring, though having but a comparatively narrow space to work in, is enabled to control the movements of the knee-joint or toggle within given, and relatively wide limits.

In order to facilitate and simplify as far as practicable the operations of taking the firearm to pieces, and afterwards refitting the same, the device here adopted consists in connecting the portion of the weapon, which comprises the breech chamber and the barrel, with the butt or handle piece, which receives that portion by means of a sliding and revolvable bolt, fitted in the butt so as to be laterally removeable and constituting what it is proposed to describe as the "breech-holder," a projecting part or stop of which is adapted to rest, directly or indirectly against an extension or projection on the lower side of the barrel.

While the barrel is at rest, that is, in the forward position, the barrel tube, or its extension, is, under the influence of the closing spring which maintains the linked levers or toggle in the extended condition, and the barrel in its forward position, firmly pressed against the bolt, or rather the stop of the bolt, so that consequently the said closing spring itself serves to secure the connection of the barrel, or barrel-tube, and the breech chamber with the butt.

The invention further comprises a novel automatic arresting arrangement for keeping the breech open after the contents of the magazine have been exhausted. It consists of a special arresting lever located within the firearm, on one side of the magazine close to the opening through which the cartridges pass into the breech; such lever being adapted, when, in consequence of the magazine being

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empty, the cartridge-feeder is raised, after the last cartridge has been fired, to be moved into the operative position by a stop, stud, or the like, connected with the said cartridge-feeder in such a manner that one end of it rests against a shoulder of the breech block, thereby preventing its moving into the "closed" position.

- 5 Now even should the empty magazine be removed, the arresting lever, being engaged with the breech, still, owing to the action of the breech closing spring, compels the breech to remain open, so that, for the purpose of inserting a freshly filled magazine and loading the barrel, the necessity of first re-opening the breech is avoided.

- 10 The button or stud with which the cartridge feeder is provided to enable it to operate the arresting lever, will at the same time render signal service in depressing the feeder-spring while the magazine is being filled.

Certain improvements, to be more fully described hereafter, have also been made in the trigger and in the means for securing the same.

- 15 In the accompanying drawings in which a recoil firearm in the form of a pistol constructed in accordance with the present invention is represented, by way of example, and in which like parts are indicated by similar letters of reference.

Figure 1 is a left hand side elevation of the pistol with all the operative parts secured against accidental movement.

- 20 Figure 1^a is a corresponding diagram illustrating the position of the breech mechanism or knee-joint.

Figure 2 is a similar view to Figure 1 but showing the pistol, after firing, in the first stage of the rearward motion of the barrel, that is, before the breech knee-joint or toggle has been retracted or opened.

- 25 Figure 2^a is a corresponding diagram of parts.

Figure 3 is a similar view to Figure 2 but showing the pistol with the breech open and the knee-joint or toggle retracted and the barrel in its rearmost position.

Figure 3^a is a corresponding diagram of parts.

- 30 Figure 4 is a view taken from the right hand side representing the parts of the pistol in the same position as in Figure 3 but with the wooden butt-casing or shell removed.

Figure 5 is a side elevation partly in section corresponding to Figure 3, including an elevation of the retracted knee-joint or toggle.

- 35 Figure 6 is a vertical longitudinal section representing the pistol immediately before firing.

Figure 7 is a corresponding horizontal section taken on the axial line of the barrel.

Figure 8 is a vertical transverse section taken on the line $x-x$, Figure 6, and viewed from the front.

- 40 Figures 8^a to 8^d illustrate the arrangement and operation of the trigger mechanism in its several positions, Figures 8^b 8^c and 8^d being diagrams showing the particular position occupied at the time by the trigger lever and trigger rod, in each case.

- 45 Figure 9 is a similar view to Figure 6 but representing the pistol immediately after firing and showing the magazine in elevation.

Figure 10 is a horizontal section corresponding with Figure 9.

Figure 11 is a longitudinal section but with the breech mechanism in elevation showing the parts in the same positions as are represented in Figure 9.

- 50 Figures 12 and 13 are diagrams showing how, before and during the firing operation, the shoulders of the rear link of the toggle levers co-operate with their respective abutments and the rear pivot of the levers and also illustrate the disposition of the toggle or knee-joint and its constituent parts when subjected to the pressure of the gases but prior to the backward stroke of the barrel.

- 65 Figure 14 is a similar view to Figure 1 illustrating the manner in which the barrel and trigger are locked against movement by means of an arresting device, the corresponding half of the butt shell being removed for the sake of greater clearness.

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Figure 15 is a similar view representing the arresting device out of action, the barrel and trigger being consequently unsecured and free to move.

Figures 16 and 17 are sectional side views illustrating the arrangement and operation of the breech-intercepting device, whereby after the magazine has been emptied, that is, the last cartridge fired, the breech is held open. 5

Figures 18 comprise a side elevation and a top view or plan of the breech-intercepting lever.

Figure 19 is an elevation of the handle piece or butt separately.

Figure 20 is a separate view of the barrel, with the fork-shaped casing and the breech knee-joint or toggle. 10

Figure 21 is a separate elevation of the trigger tongue and spring.

Figures 22 are front and side elevations of the breech-holding bolt.

Figures 23, 24, and 25 are respectively a side elevation, viewed from left to right, a front elevation and an opposite side view of the trigger cover plate separately. 15

Figure 26 is a front elevation of the trigger lever separately.

Figure 27 is a vertical longitudinal section of the butt separately.

Figure 28 is a side elevation of the fork shaped barrel-casing, separately, the breech knee-joint or toggle and trigger rod being omitted.

Figure 29 is a side elevation of the knee-joint or toggle and breech block separately. 20

Figure 30 is a top view or plan thereof.

Figures 31 are a top view and side elevation of the trigger rod separately.

Figures 32 are a top view and side elevation of the cartridge-ejector separately.

Figures 33 are a top view and side elevation of the cartridge-extractor separately. 25

Figure 34 is a separate view of the firing pin together with its actuating spring.

Figures 35 are a front elevation and a side elevation of the end piece of the breech; and 30

Figures 36 and 37 are opposite side elevations of the magazine separately.

As is usual in recoil fire-arms of the category of arms to which the pistol represented in the drawings belongs said pistol comprises three parts, namely, the barrel A with the forked shaped tube socket or casing B integral with or rigidly attached to it; the breech block c, and the case C whereby the barrel and fork-shaped casing are guided, and which, in pistols or the like, is best formed as shown with its lower extension constituting the handle of the weapon. 35

The case C will therefore herein after be referred to throughout as the "handle-piece."

As stated in the introductory part of this specification this fire-arm is one of the class wherein the closing of the breech is effected by means of a knee-joint or toggle and it comprises a breech-block c movable in the fork-shaped barrel casing B, with which engages one of the levers, namely, the front one c¹, while the other or rear lever c² is hinged to the said fork-shaped casing by means of the pivot b. 40

Now in accordance with the present invention, the knee joint or toggle is cranked, folded or opened while the barrel performs its rearward movement. 45

To this end the lever-eye knuckle or boss with which the knee joint or toggle is provided, and which in the example shown forms part of the rear lever c², though if desired, it might be formed on the forward lever—is extended laterally in one or preferably in both directions, beyond the arms of the fork shaped barrel casing B thus forming studs projections or shoulders which in the drawing are marked c*. 50

In the path of these studs or projections c* in the present example, suitably curved guide surfaces C* are provided on both sides of the handle piece, which when the barrel recedes are impinged upon by the above mentioned studs or pro- 55

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jections c^* which by reason of their shape, are termed "knee-eyes" or "link eyes" so that, when a shot is fired, they are by the effect of the recoil, moved upward and thus become the means of cranking or "opening" the linked levers.

During the first stage of this operation the closing spring f is strained somewhat so as to modify the violence of the impact of the studs or shoulders c^* upon the curved guide surfaces C^* and thereby as far as practicable, protect the parts involved from wear or destruction.

This phase is illustrated in the drawings by Figures 1 and 2 and the corresponding diagrams 1^a and 2^a ; Figures 1 and 1^a showing the position of the breech closing mechanism when the linked toggle levers are extended, while Figures 2 and 2^a illustrate the moment at which the studs or shoulders c^* impinge upon the guide surfaces C^* .

The position of the parts while the jointed levers are cranked or folded or in other words while the breech closing mechanism is open is illustrated in Figures 3 and 3^a .

In the second phase of the process of recession of the barrel, during which the studs or shoulders c^* rise to their highest position by sliding along the guide surfaces C^* the closing spring is necessarily subjected to its highest strain, so that the next succeeding first stage of the advance or closing movement of the breech, during which the cartridge is made to pass from the magazine into the barrel is accomplished by the aid of the maximum power which the spring is capable of displaying as it is relieved from pressure.

As the linked arrangement is about to be cranked or opened, the fullest possible benefit is derived from the relative position of the levers, inasmuch as it will be seen that the power of the recoil becomes operative at the joint connection of such linked arrangement—in the present example, the front end of the rearward linked lever,—so that the full length of the linked levers comes into play as the resultant motive force attains the maximum.

The link connection is partly carried out in the manner already known. Thus when the linked parts are extended, it happens that, of the three points I, II and III of the toggle joint, the axis of the central one II—namely the "knee" proper—occupies a position a little below a line drawn through the axes I and III of the ends of the jointed parts, as clearly shown in Figures 1^a and 2^a .

It is however essential that this depression of the central part of the joint should be very slight indeed, if it be desired that while the cartridge is firmly fixed in its firing position, the opening of the breech should be feasible without difficulty.

Now to effect this result the arrangement is supplemented by the following improved device: the rearward linked lever c^2 is provided with inclined shoulders c^3 which when the linked levers are extended, come into close contact with correspondingly inclined offsets c^4 of the fork shaped barrel casing B, so that while the breech is closed, or the linked mechanism extended, these offsets or abutments c^4 are capable, in conjunction with the pivot b , of taking up the pressure of the gases evolved in firing, thereby affording said pivot partial relief from pressure.

This object is attained in a perfect manner by inserting the said pivot or pin b into its socket loosely, whereby the result is secured that, under all circumstances, the pressure of the gases will invariably exercise its effect first upon the shoulders c^3 and their abutments c^4 , and will in consequence of the obliquity of the contact surfaces, raise the rear end of the linked lever c^2 and at the same time cause the said pivot to rest in contact with its bearings, and so that the extended links will exhibit a tendency rather to become a little more depressed at the centre though this tendency is of course, limited by the amount of play given to the pin or pivot b but is at all events no more than sufficient to prevent a premature folding or cranking of the links in firing in a more effective manner than is feasible in existing constructions.

The tendency of the linked parts, just referred to, which is caused partly by

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the fact already mentioned that the axis of the knee proper in any event comes to be situated a little below the axes of the ends of the linked parts and partly by the loose condition of the pin or pivot *b*, is illustrated in Figures 12 and 13; the former figure showing the normal or inoperative position thereof in which the linked or breech-closing parts are not subjected to any strain; while the latter figure indicates that position which the parts will occupy, when the links are under the action of the pressure of the gases before the barrel has receded, that is up to the moment when the studs or projections *c*^{*} impinge upon the curved guide surfaces *C*^{*}.

The freedom or play allowed to the pivot *b* is here shown on a somewhat exaggerated scale, so that the operation of the parts at this juncture may be fully realised.

The pivot *b* as will be seen has here been raised, and so the shoulders *c*³ have for a short distance been moved upward, without however, having come out of contact with their supports *c*⁴.

The closing spring *f*, which controls the linked mechanism and restores it to the closed or extended position after the breech has been opened, is a plate spring lying in the neck of the butt *C* extended to its full length or nearly so parallel to the magazine and having preferably an **S** shape.

Its lower end is laterally inserted into a notched or recessed projection of its guiding wall, while its operative upper end is suitably connected with a swinging arm *f*¹ also preferably of an **S**-shape, which is pivotally connected with the rearward linked lever *c*².

The lower end of the arm *f*¹ carries laterally projecting studs over which the end of the spring is passed and with which it engages by means of a half-open hinge-eye, suitably constructed in the shape of a claw or hook.

This method of connection ensures perfect mobility and enables the parts to be readily detached when it is desired to take the weapon to pieces.

The object of the combination of the spring *f* with the arm *f*¹,—in view of the comparatively limited play afforded to the spring by its confined location,—is to enable the movements of the linked mechanism, within the given relatively wide limits, to be controlled.

The great advantage of this arrangement of the spring, is, in fact, that while it occupies very little space, it is yet capable of exerting very great power.

It is also by the action of the closing spring that the connection of the barrel, or the fork-shaped barrel casing with the handle-piece, is secured.

This connection is effected by means of a revolvable bolt *r*, removably fitted within such handle-piece, and herein termed the "breech-holder," which is provided with a stud, projection or stop *r*¹.

When the parts are connected, the position of the bolt *r*, shown in Figures 6 and 9, is such that its stud *r*¹ is situated in front of a shoulder *o* projecting from the lower side of the barrel tube, the said shoulder or projection *o* thus serves to limit the forward movement of the barrel, and the barrel, or the said projection or shoulder *o*, is normally held in contact with the stud *r*¹ by the spring *f*, the closing spring *f* being under slight tension even while the firearm is inoperative, so as to obviate any accidental movement of the parts.

In order that the breech may remain open when the magazine is empty, an arresting lever *n*, Figures 16, 17 and 18, is arranged in the side wall of the handle-piece, at what is termed the "break," next to the magazine orifice, such lever being controlled by a spring *l*, and provided with an arresting finger or tappet *n*¹ at its rear end.

Somewhere near the centre of its length, or rather nearer to its front end, the said lever has a flange or species of projecting shield *n*², lying in the path of a device connected with the cartridge feeder, thereby enabling such device, while the cartridge feeder is raised as a result of the magazine being empty, to turn the arresting lever around its pivot *n*⁰ and thereby bring it into its operative position.

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In the instance here given the device in question is a button or knob p^1 secured to the cartridge feeder p and adapted to move on the outer wall of the magazine and to co-operate with the shield or flange n^2 .

5 The underside of the breech block c at its forward end, has a slot or recess c^0 in which, after the last cartridge has been fired, the arresting lever, which has been brought into the operative position as stated, engages by means of its finger or projection n^1 .

10 While in this position, the said arresting finger or projection engages the rear shoulder of the recess c^0 so that notwithstanding the action of the closing spring the link-mechanism cannot move into its extended position.

When the empty magazine is removed the breech still continues open, as the more powerful closing spring f presses the breech block or its shoulder c^0 against the arresting finger n^1 and retains the same in position against the action of its spring l .

15 The arresting lever n may however spring back to its inoperative position the moment it has, in its turn, been released, by a slight retraction of the link mechanism, effected by hand at the knee point c^* , from contact with the shoulder c^0 of the breech block, whereby at the same time a clear way will be left for the breech to spring back into its forward position under the action of the closing spring.

It is this arrangement that secures the advantages referred to in the introductory part of this specification.

Lastly, in connection with the "lock" and trigger devices the following improvements have been made:—

25 The breech block c sliding in the side grooves of the arms of the fork-shaped barrel casing, and being engaged with by the front link e^1 of the knee-jointed mechanism receives in its interior the hollow firing pin e , the nib e^1 of which, laterally protruding through a groove or slot provided in the wall of the block, is so controlled by a nose e^{1*} terminating the lever e^1 that, as the breech block
30 retires, the firing pin is "cocked."

In the wall of the left hand arm of the fork-shaped barrel casing, the trigger-rod k shown more particularly at Figures 7, 8 and 31, is arranged to oscillate upon its pivot k^0 ; the shoulder k^1 of such trigger-rod intercepting the trigger nib e^1 as the breech block advances, and retaining the firing pin thereby in its
35 cocked position, until the trigger is pressed, that is, until the trigger rod has been so acted upon by the trigger tongue that the shoulder k^1 has retired and, by so doing, has released the trigger nib e^1 .

Now in accordance with this invention the arrangement has been so modified that, the first movement or operation of the trigger may take place with comparative ease, but so that it becomes more difficult just before the release of
40 the parts which serve to effect percussion, that is the freeing of the trigger nib e^1 , so that what may be described as a "pressure-point" is provided, whereby the marksman is enabled to manipulate the trigger in an absolutely reliable manner, or in other words precisely to determine the moment at which percussion should
45 take place.

To this end there is suspended in contact with the trigger tongue z ,—that is, over it, laterally,—a special pressure lever in the form of a double armed or bell-crank lever $a^1 a^2$, one arm of which, namely, the upper one, a^1 , extends upward and with its free end rests against the forward end of the trigger-rod k ,
50 which latter terminates in a spring-controlled pin or stud k^6 .

The other lower arm, a^2 which is nearly horizontal, engages in the recess z^2 of a piece z^1 projecting from the tongue z , which, as usual, is retained in its initial or inoperative position by a spring z^0 .

In the position of rest of the trigger mechanism, with the firing pin cocked,
55 but before firing, the extreme outer end of the lever arm a^2 lies in contact with the upper wall of the recess z^2 in question, their point of contact, at this stage, being marked a^3 in the drawing.

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Figures 6, 7 and 8 and also the diagram 8^b illustrate this position of the parts, and the last mentioned figure in particular, is an enlarged representation of the manner in which, at this juncture, the shoulder k^1 acts as an abutment or support for the nib e^1 , and also of the relative positions of a^1 to k^6 and of a^3 to z^2 .

Now the moment the pressure upon the trigger commences and its tongue z is forced backward, the wall of the recess will act upon the lever arm a^2 or its extreme outer point of pressure a^3 , and will thereby swing round the lever $a^1 a^2$ upon its pivot a^0 , when,—the effective lengths of the lever arms $a^1 a^2$ being approximately equal,—motion will be transmitted at the ratio of 1:1.

These conditions will prevail until, eventually, as the arm a^2 is drawn further downward, the wall of the recess meets an inner pressure point a^4 of the arm a^2 , at which moment the "pressure-point" position, above referred to, is reached.

This intermediate situation of the parts is delineated in the enlarged diagram Figure 8^c, by referring to which it will be seen that by this time the wall of the recess has taken up its position upon both pressure points a^3 and a^4 , and that the trigger rod k , overcoming the resistance of the spring k^4 acting upon the rear arm k^3 of the rod, has been pressed, with its point k^6 inward, for a sufficient distance to cause the shoulder k^1 to be withdrawn so that it only slightly overlaps the outer angle of the trigger nib e^1 .

As after this, the operation of the trigger is continued, the inner point of pressure a^4 will alone be effective, so that for the slight movement which remains to be performed, to complete the trigger operation,—and which it will scarcely take a moment to accomplish,—a far shorter length of lever a^2 will come into operation the ratio of transmission being now 1:2.

Thus the last brief trigger movement, immediately preceding percussion, requires a comparatively greater expenditure of power, than the initial, longer movement which may be accomplished with practically no appreciable effort.

The position of the parts of the trigger mechanism immediately after percussion, that is, after the "pressure-point" has been overcome, is illustrated by the enlarged diagram 8^d, by inspecting which it will be seen that the outer pressure-point a^3 is now relieved from contact with the wall of the recess z^2 in the projection z^1 , of the tongue z , contact with the inner pressure-point being alone maintained; by this time the shoulder k^1 of the trigger rod has just released the nib e^1 , of the firing pin e , so that the nib e^1 may now move past the rod k , and the firing pin e travel forward under the impulse of its spring e^4 .

The position of the parts after the firing pin e has thus sprung forward, that is, after firing, is illustrated in Figures 8^e, 9, 10 and 11, it being assumed however that, the bullet has just left the barrel-tube, and that consequently the barrel is only just starting on its return movement.

The arrangement adopted for securing the trigger against accidental movement, and, in conjunction therewith, the locking or arresting of the barrel and other moveable parts, is best exemplified by Figures 14 and 15.

Here, within the handle C, at the lower part and mounted upon the pin s^3 , there is provided an arm s , one end of which is formed with a bevelled head or plate s^1 , shaped to extend over, and engage with, the trigger rod, while a projection s^0 , from the arm s protrudes rearwardly from the handle C.

By reason of the bevelled head s^1 taking up a position in front of the shoulder k^2 of the trigger rod k , and thereby preventing the movement of the latter, such trigger rod becomes locked, so that neither by the operation of the trigger tongue z nor through any accident can the firing pin become released for firing.

At the same time that the trigger rod k is thus secured in position, the barrel and all its accessory parts are arrested, the head s^1 remaining in the path of the devices moveable concurrently with the barrel.

The head s^1 does not relinquish this locked position until after the butt C has been firmly grasped and consequently the projection s^0 pressed inward against the resistance of its spring; but the moment this has been done all the moveable parts recover their freedom of operation.

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Thus the trigger and all the moveable parts are at all times automatically secured against movement, so long as the weapon is carried in any position or manner otherwise than grasped by the hand, in readiness for firing and yet at the same time the weapon is at any moment, and without any special manipulation, ready for firing, all that is required for this purpose being firmly to grasp it with the hand.

But in order that it may even be held in the hand with safety,—no matter how carried,—the automatic locking devices have further been supplemented here by arrangements which enable the marksman himself, by a grip of his hand so to secure the said devices, that he cannot, except consciously, release them.

This purpose is effected by the double armed lever d pivotted, on the handle-piece or butt, by the pivot d^3 , the inner arm d^1 of which lever is provided with a laterally projecting stud d^2 which, according to its position for the time being comes into engagement with a lateral projection s^2 from the retaining arm s and so secures such arm that, no matter how firmly the projection s^0 is depressed, the arresting effect is maintained and all the parts continue secure, as shown at Figure 14, until by turning the outer lever downward, the extension d^2 rises, disengaging the projection s^2 and thereby restores the freedom of motion of the arm s , as shown at Figure 15.

To enable the locking lever d to be secured in either of the two positions assigned to it, its upper arm is made as or controllable by a spring and fitted with an inwardly projecting stud which engages in the notches 1 and 2 provided in the sides of the handle-piece or butt

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed I declare that what I claim is:—

1. In recoil-firearms having moveable barrels, the combination of the rearward moving barrel with linked levers, a stud or projection at the bending or "knee" point of the linked levers and a curved guide surface of the casing located in the path of the said projection, which in consequence of the recoil after firing is pressed against the said surface, substantially as described and shown with reference to Figures 1^a, 2^a and 3^a of the drawings.

2. In recoil-firearms having moveable barrels, the combination of both linked levers with a projection or shoulder of the one linked lever and a projection of the fork-shaped barrel casing bearing against the shoulder, the joint or boring receiving the rear pin of the linked levers allowing sufficient play of the said pin substantially as described and shown with respect to Figures 12 and 13 of the drawings.

3. In recoil-firearms having moveable barrels, the combination of the spring arranged in the stock, with an arm having projections on both sides, such projections being engaged by the free end of the spring and with the linked levers, from which the arm is suspended substantially as described and shown with respect to Figures 5 and 6 of the drawings.

4. In recoil-firearms having moveable barrels, the combination with the fork-shaped casing of the revolvable bolt removably fitted within the butt or handle piece, a stud of the said bolt, a projection located on the casing, against which projection the stud bears and a spring which tends to press the projection against the stud, substantially as described and shown with respect to Figures 5, 6 and 22 of the drawings.

5. In recoil-firearms having moveable barrels, the combination with an arresting or locking lever located close to the magazine orifice, of a spring, an arresting finger or tappet provided at the rear end of the lever, a shield shaped projection, a pivot on which the said arresting lever oscillates and a projection of the breech-block in which the said arresting finger or tappet engages when the magazine is empty substantially as described and shown with respect to Figures 16, 17 and 18 of the drawings.

Luger's Improvements in or connected with Breech-loading Recoil Small Arms.

6. In recoil-firearms having moveable barrels, the combination with the breach block of the firing pin, the nib, the trigger rod oscillating on the rotary axle, the shoulder which intercepts the trigger nib as the breech-block advances, a double-armed bell crank lever of the trigger tongue, the spring controlled pin; and a recess of the projection substantially as described and shown with respect 5 to Figures 6—8, 8^a—8^d and 9—11 of the drawings.

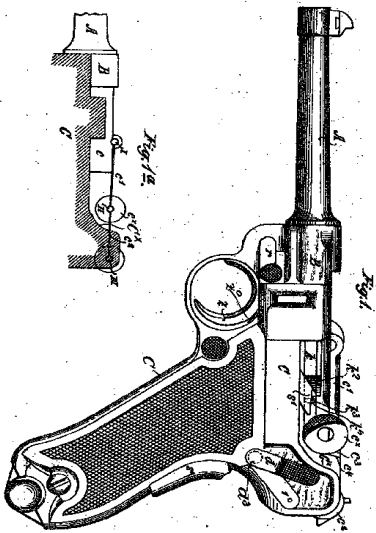
7. In recoil-firearms having moveable barrels, the combination with the handle of a catch or arm, a spring, a plate, a projection, a shoulder, a double lever having an inner arm and projection and rotating on a pivot, a retaining arm with extension, a projection, and arresting lever, which engages with its inwardly 10 projecting stud in notches of the sides of the handle-piece or butt; substantially as described and shown with respect to Figures 14 and 15 of the drawings.

Dated this 7th day of March 1900.

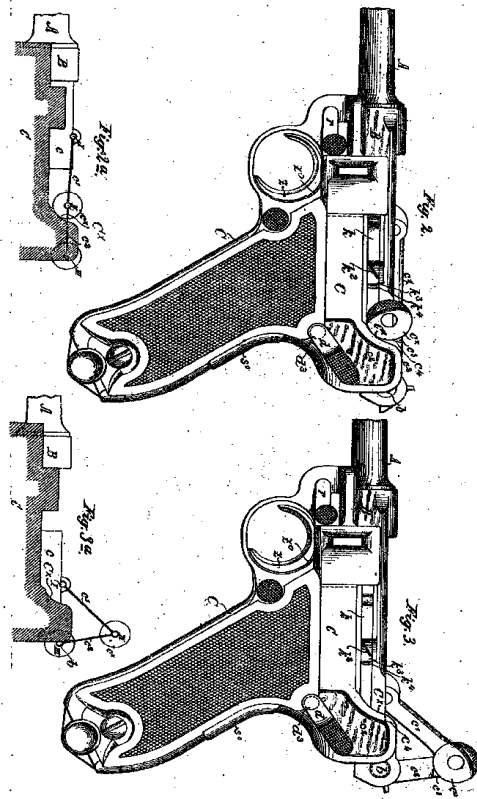
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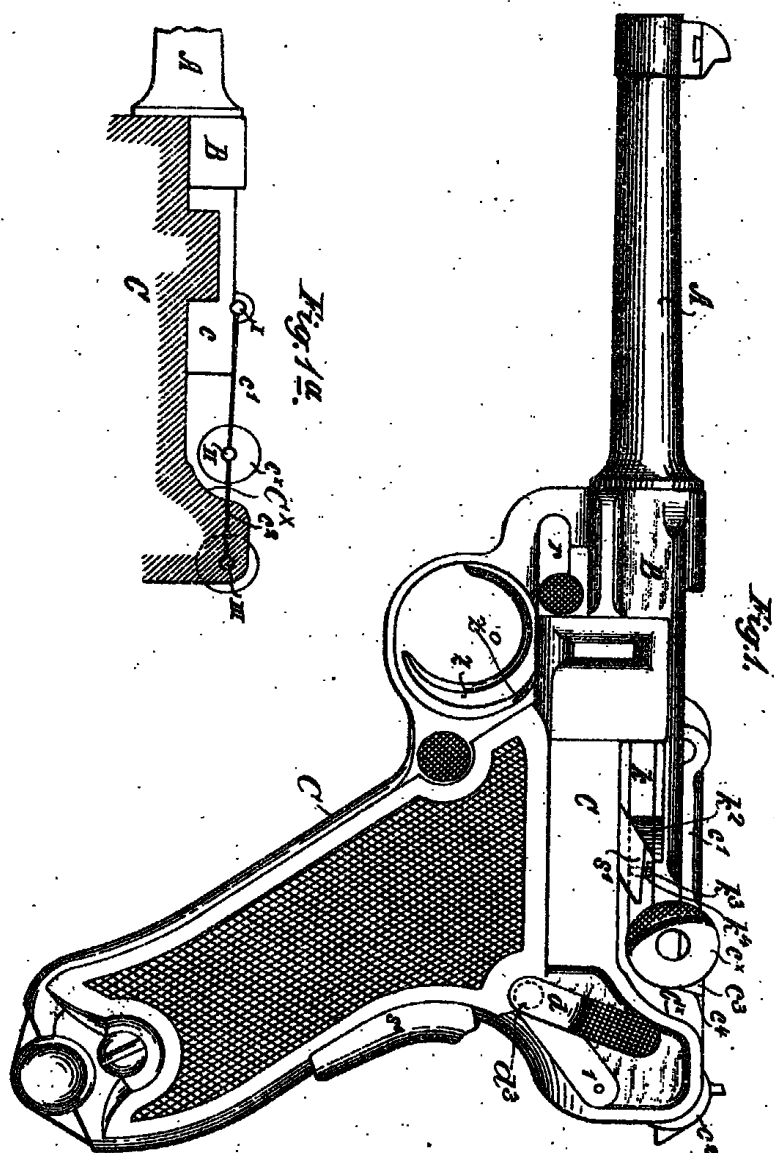


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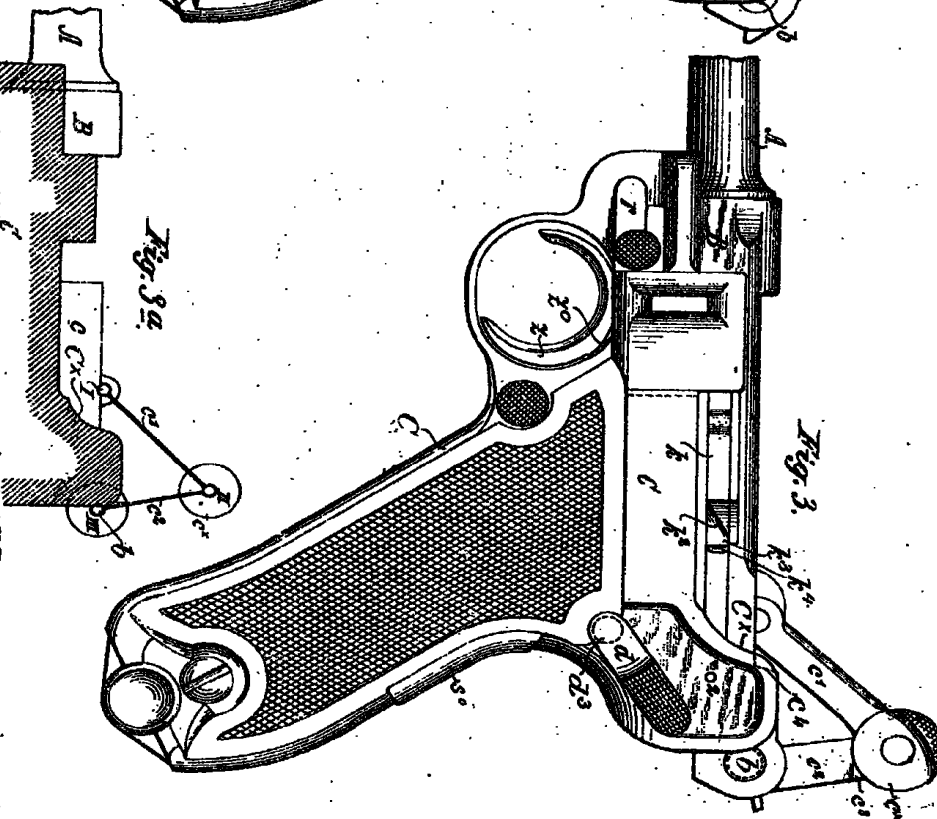
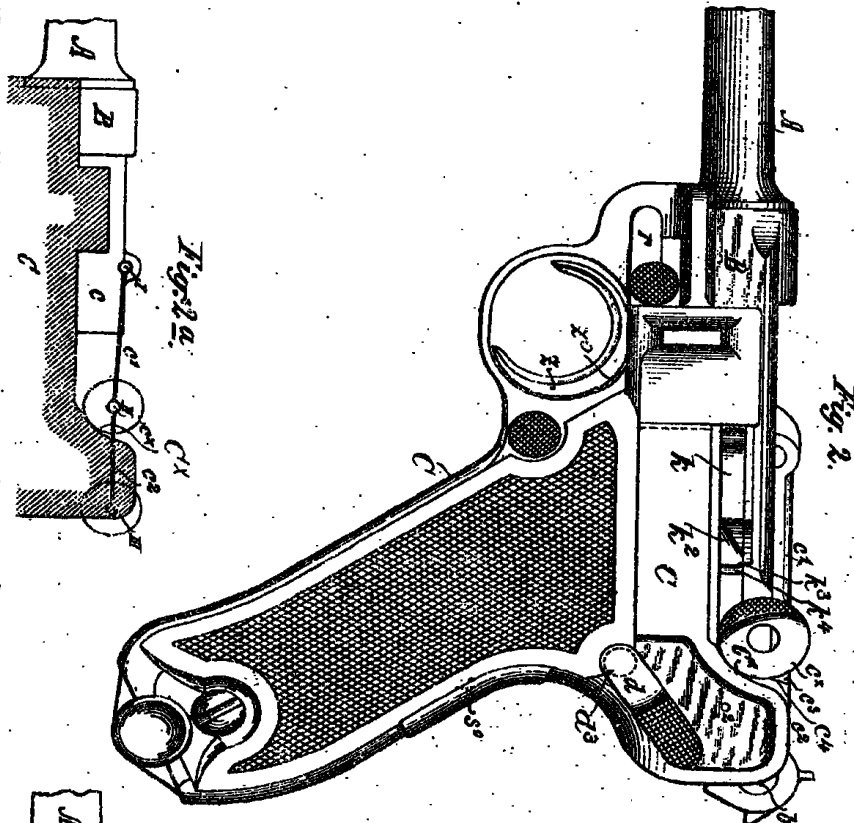


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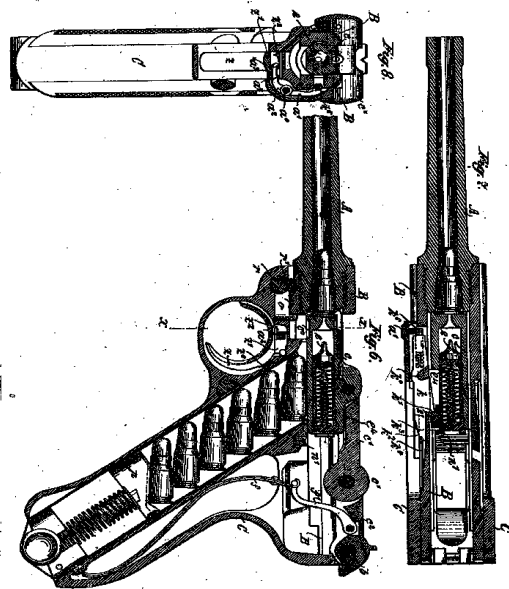
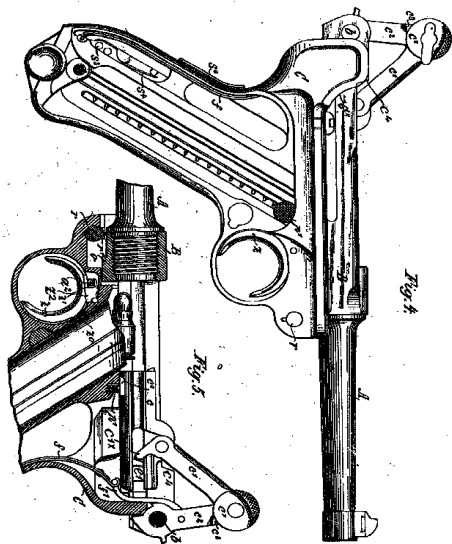
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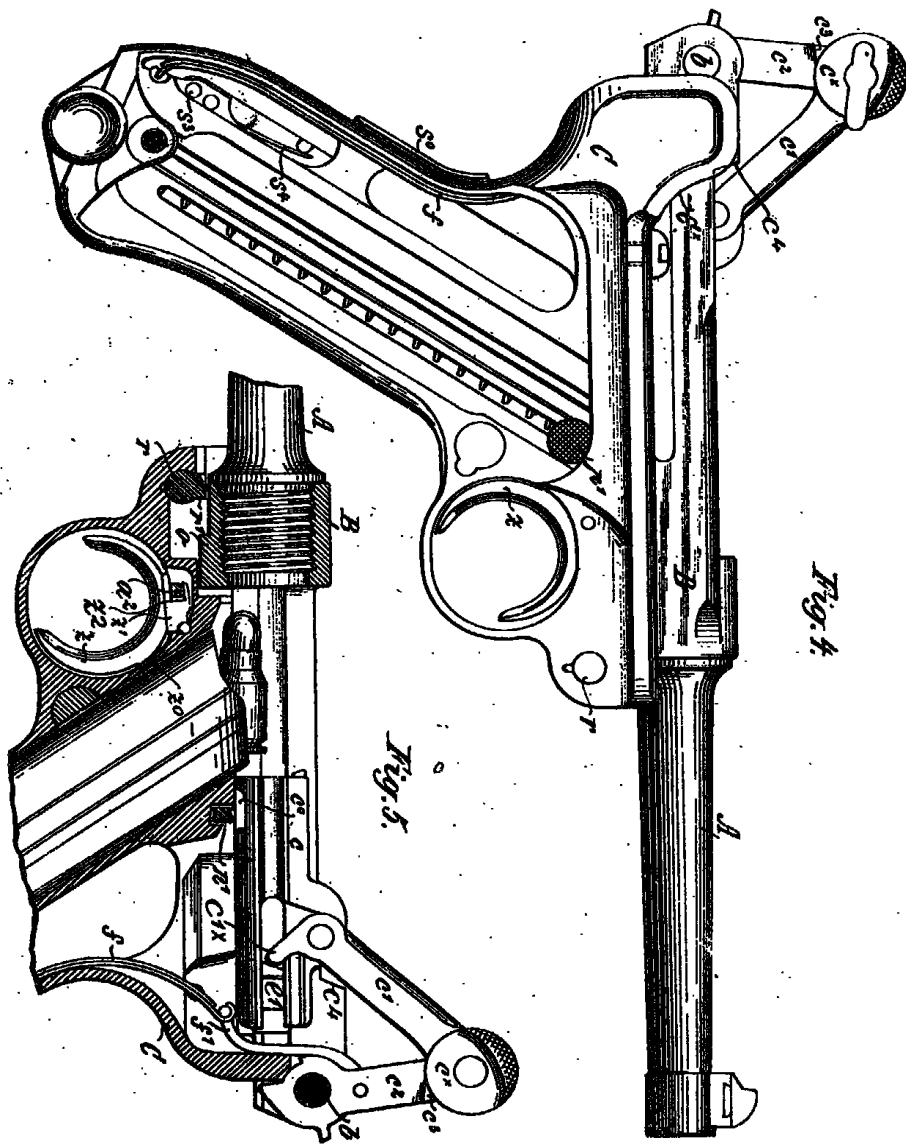


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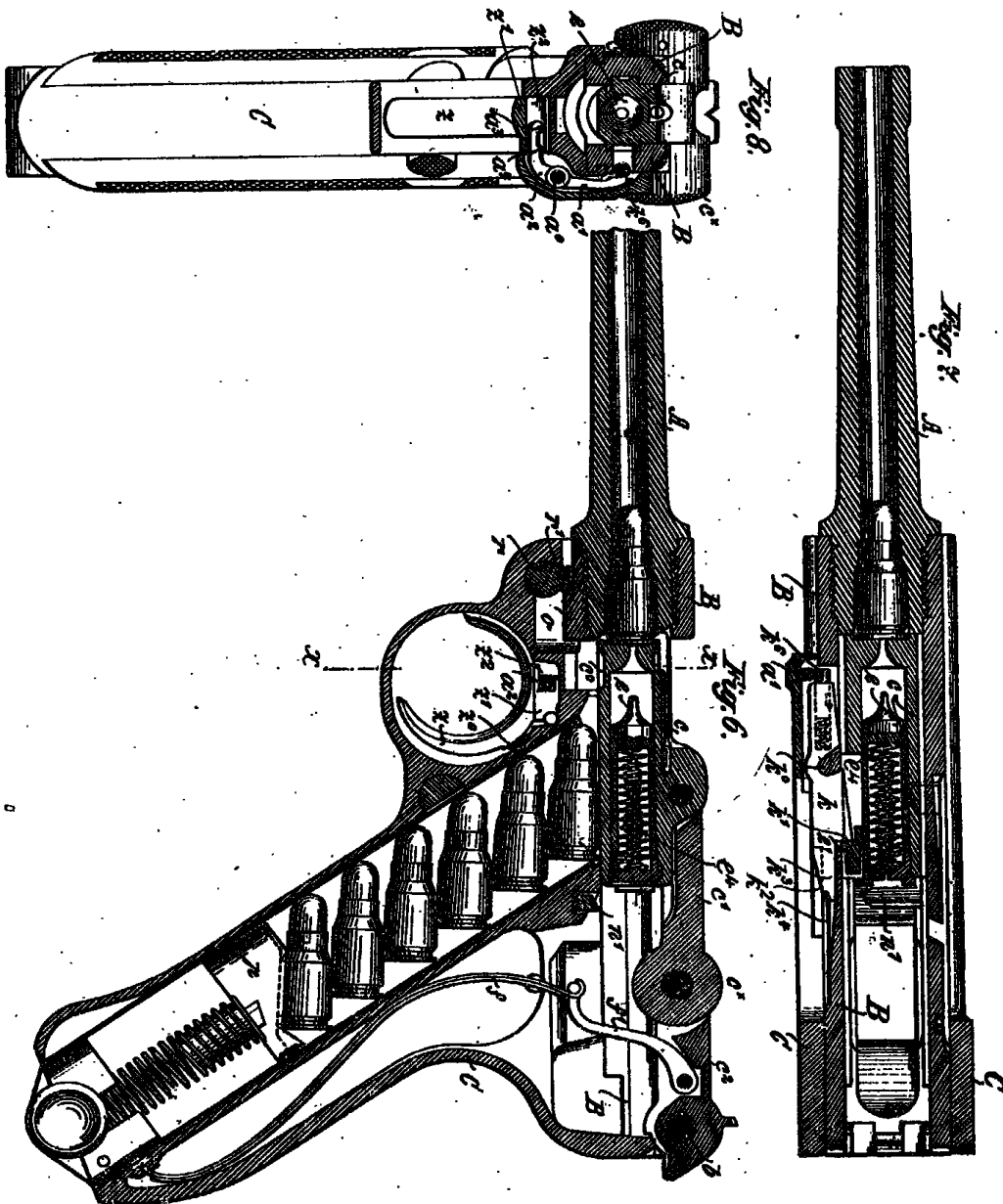


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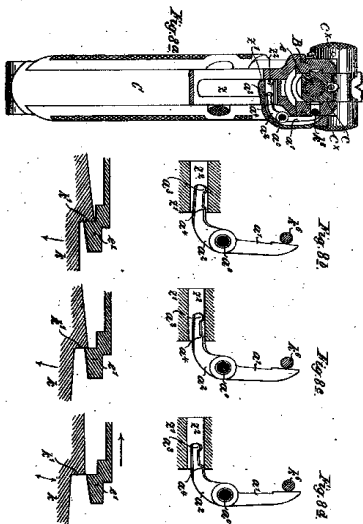


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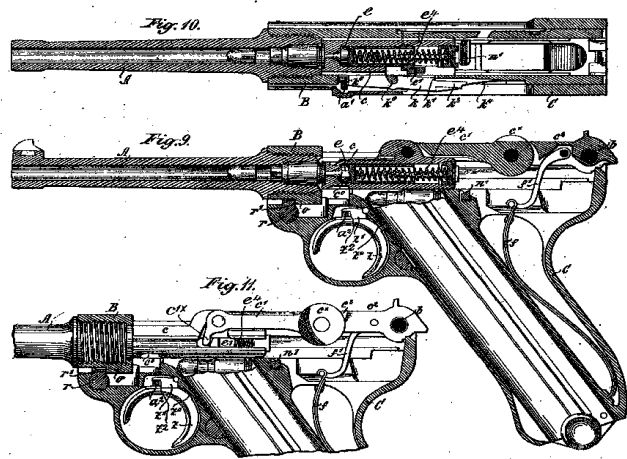


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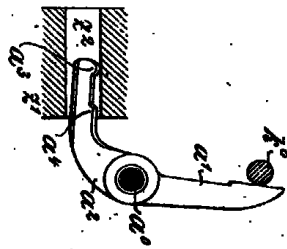
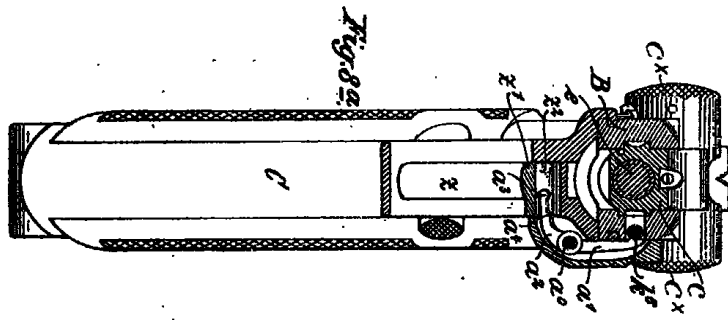


Fig. 82.

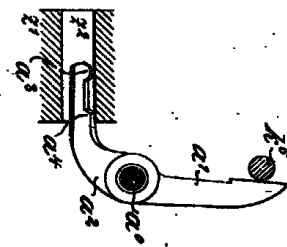


Fig. 82c.

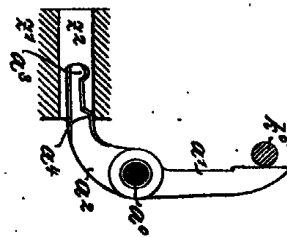
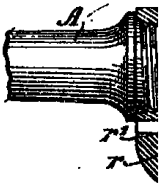
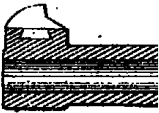
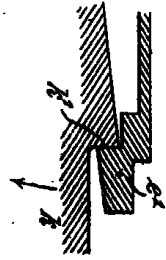
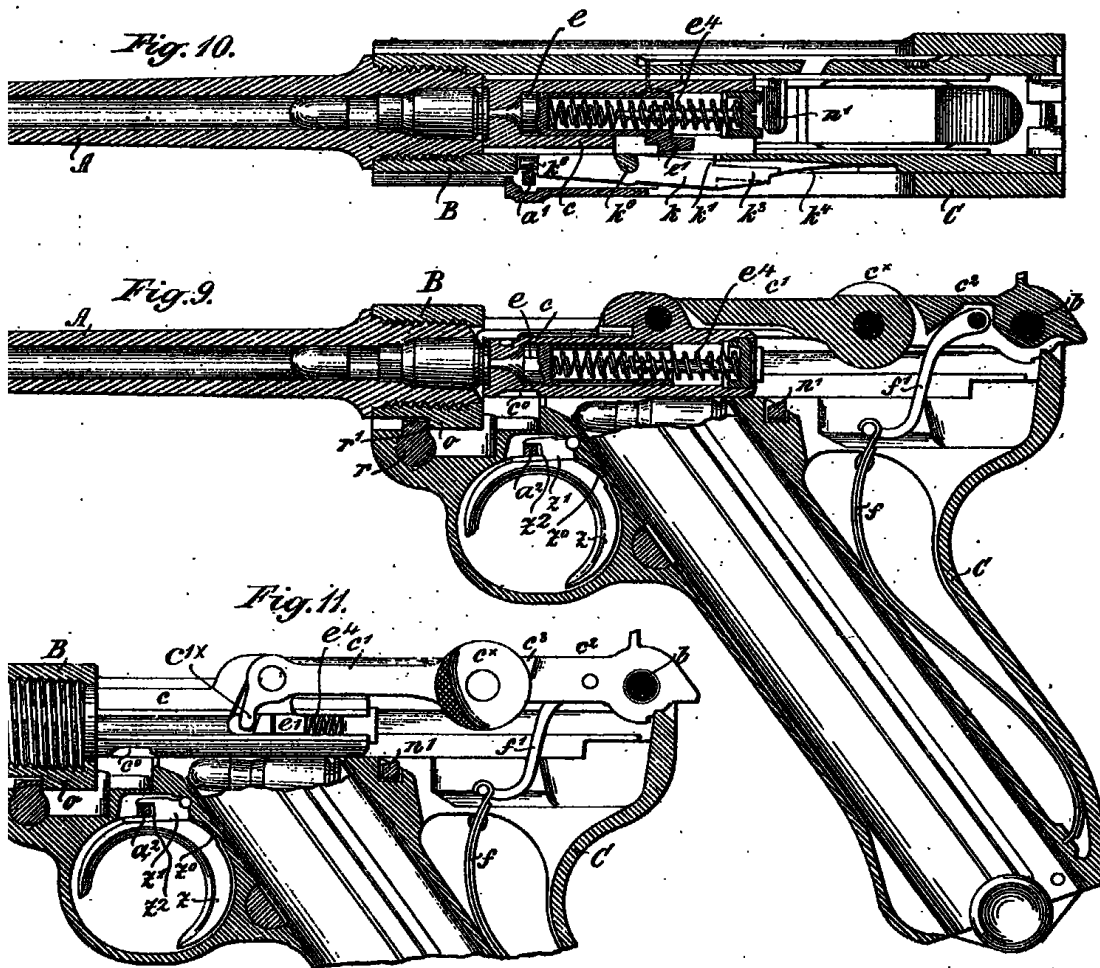


Fig. 82d.

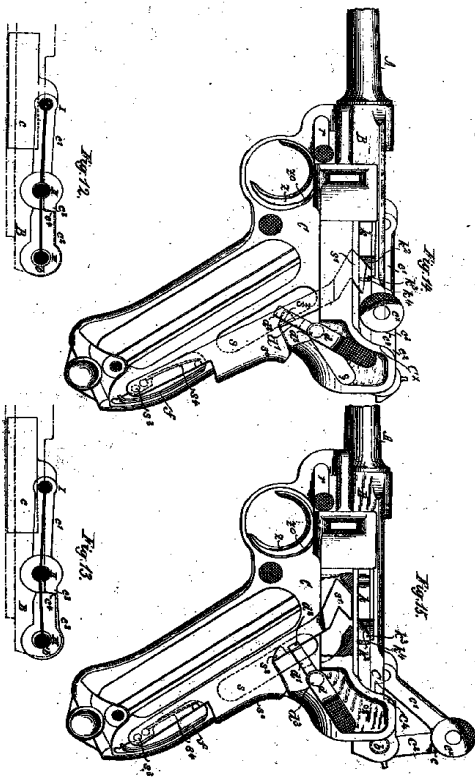




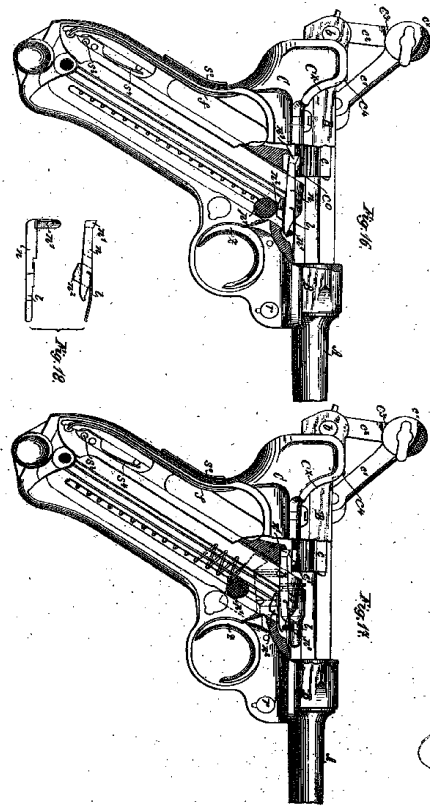
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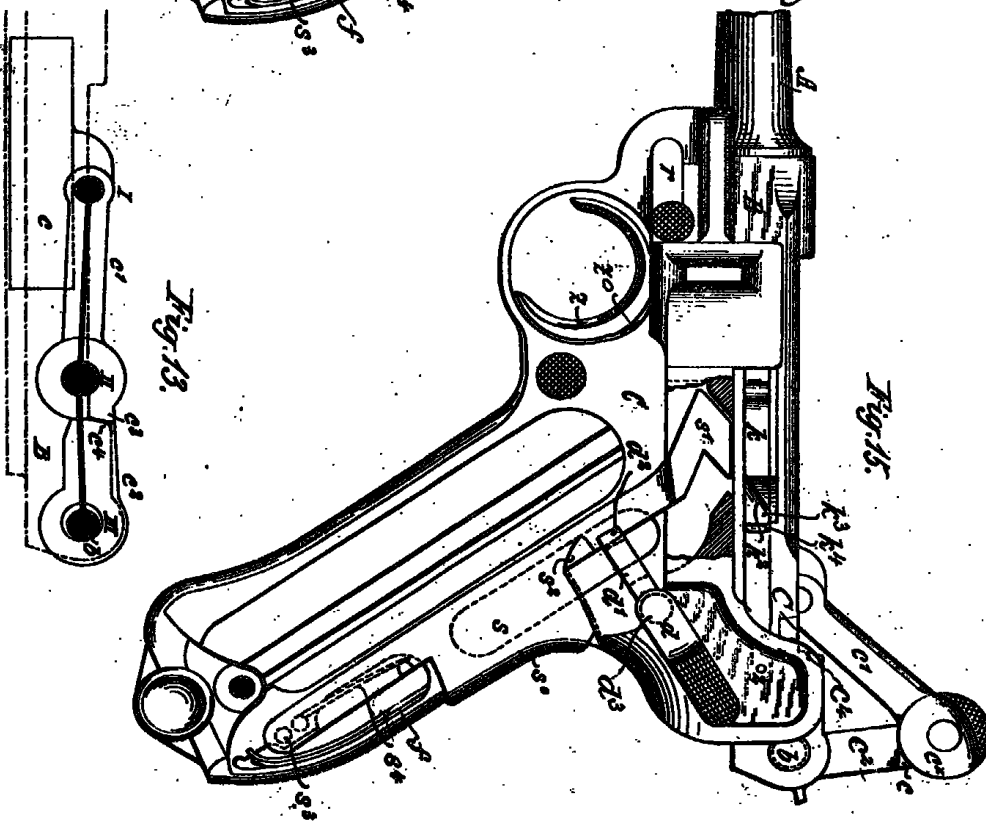
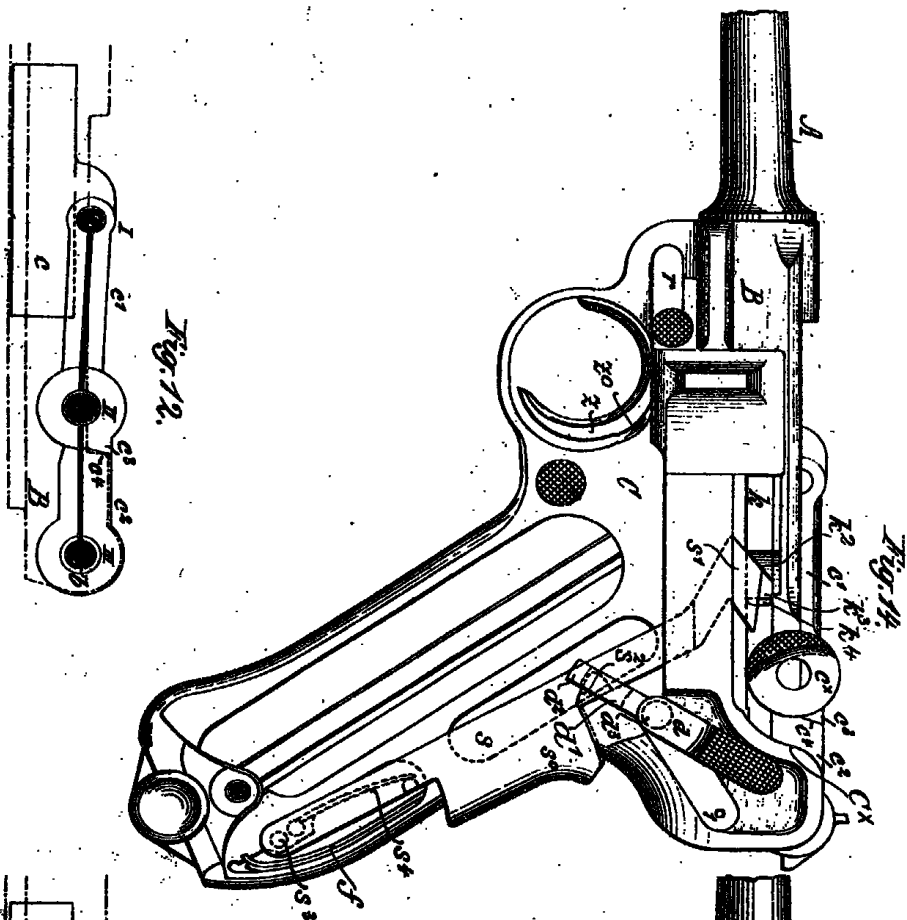


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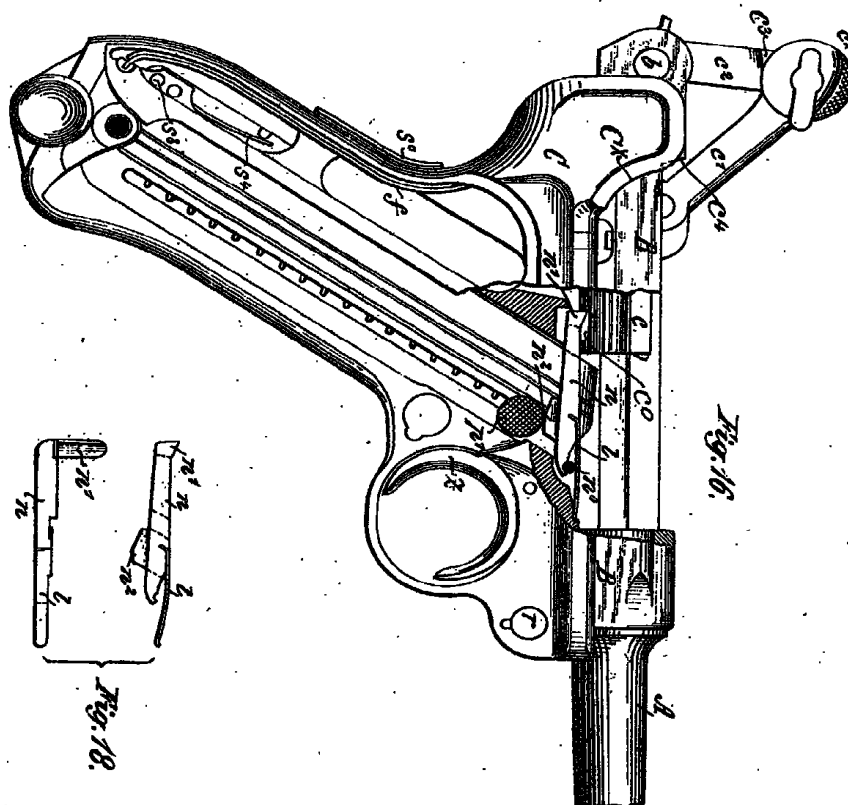


Fig. 16.

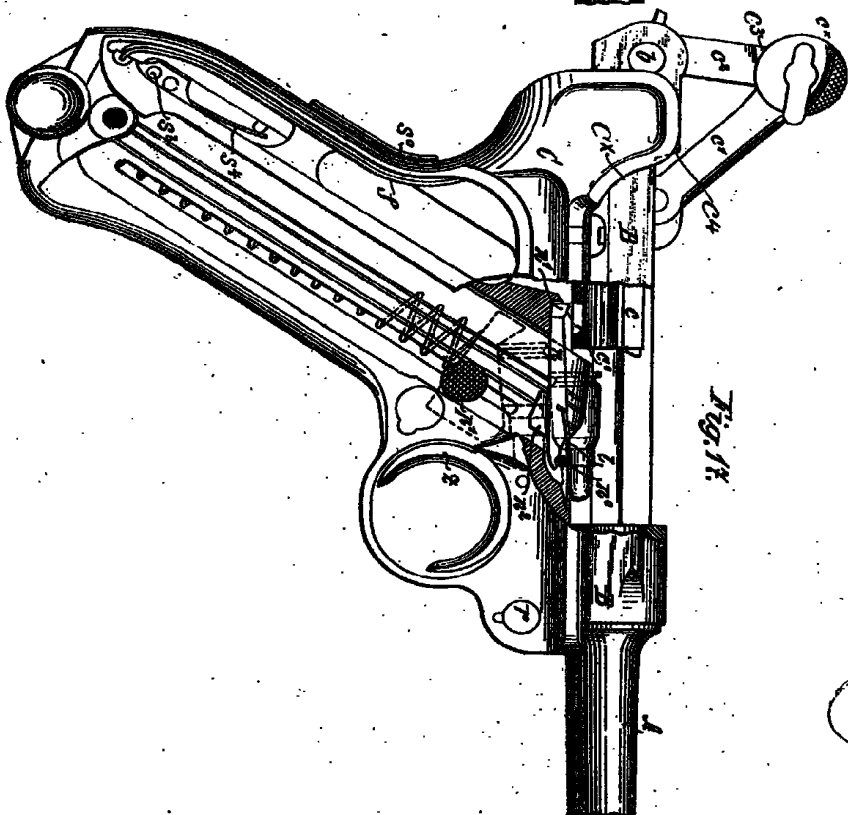


Fig. 17.

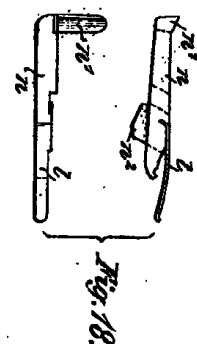
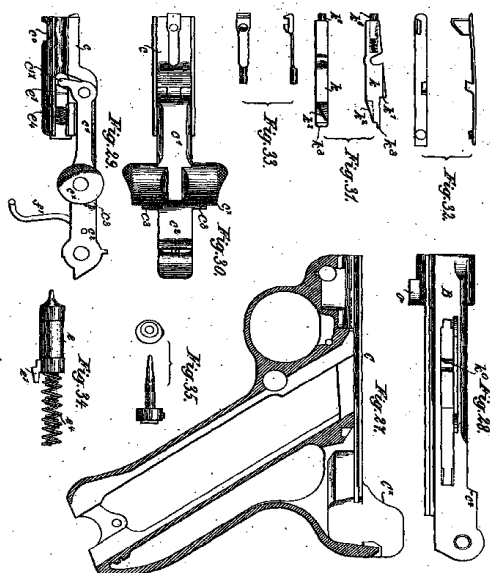
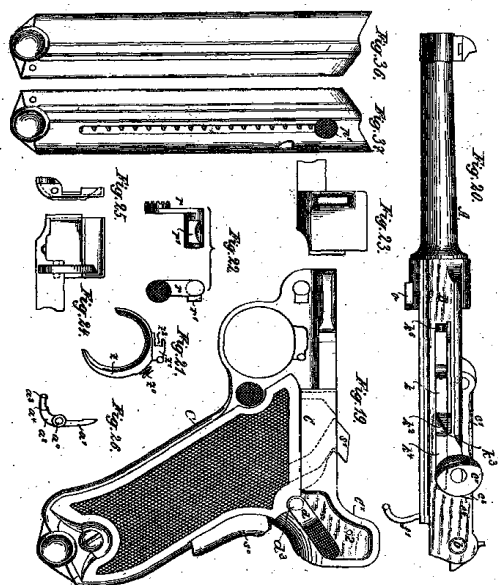


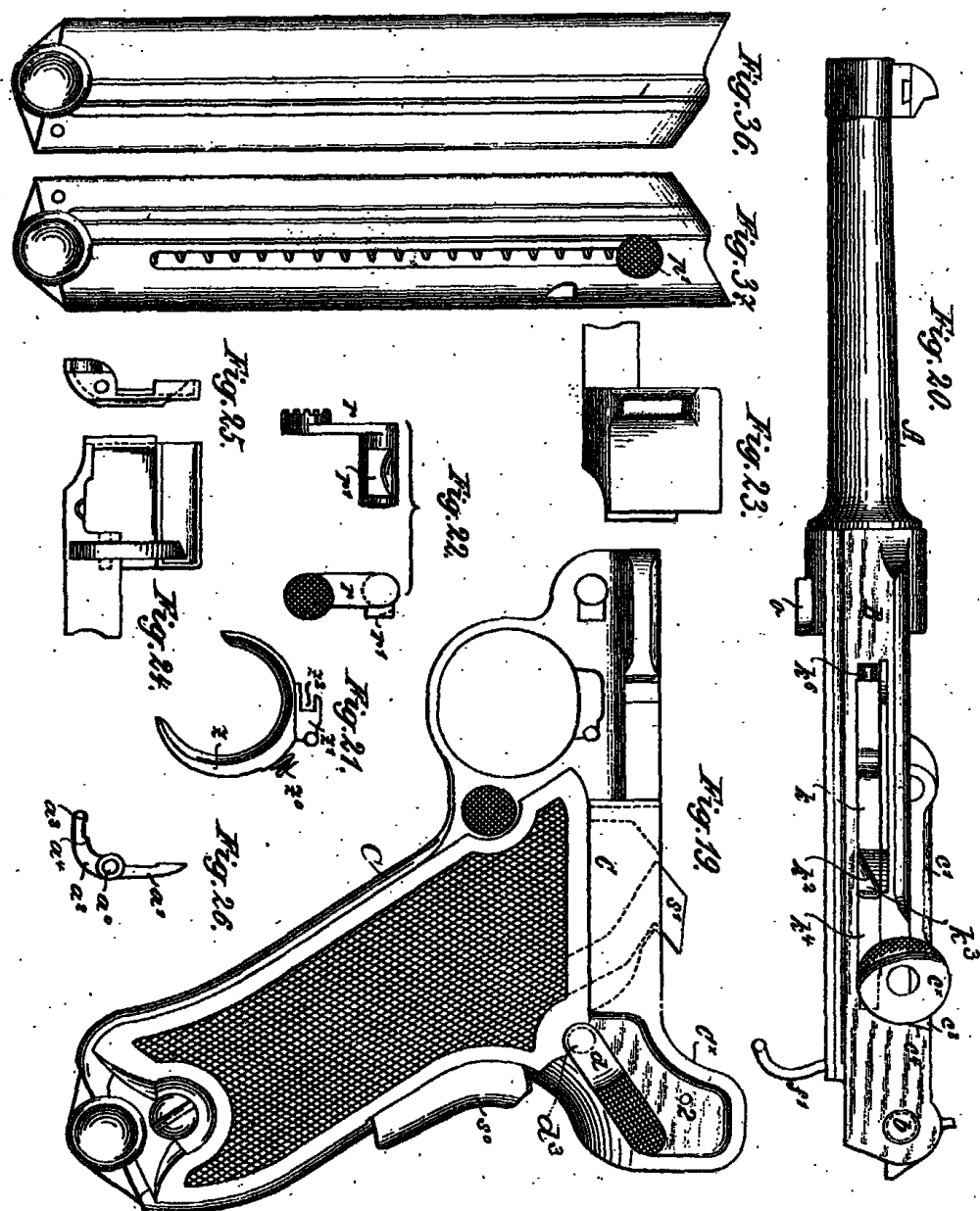
Fig. 18.

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