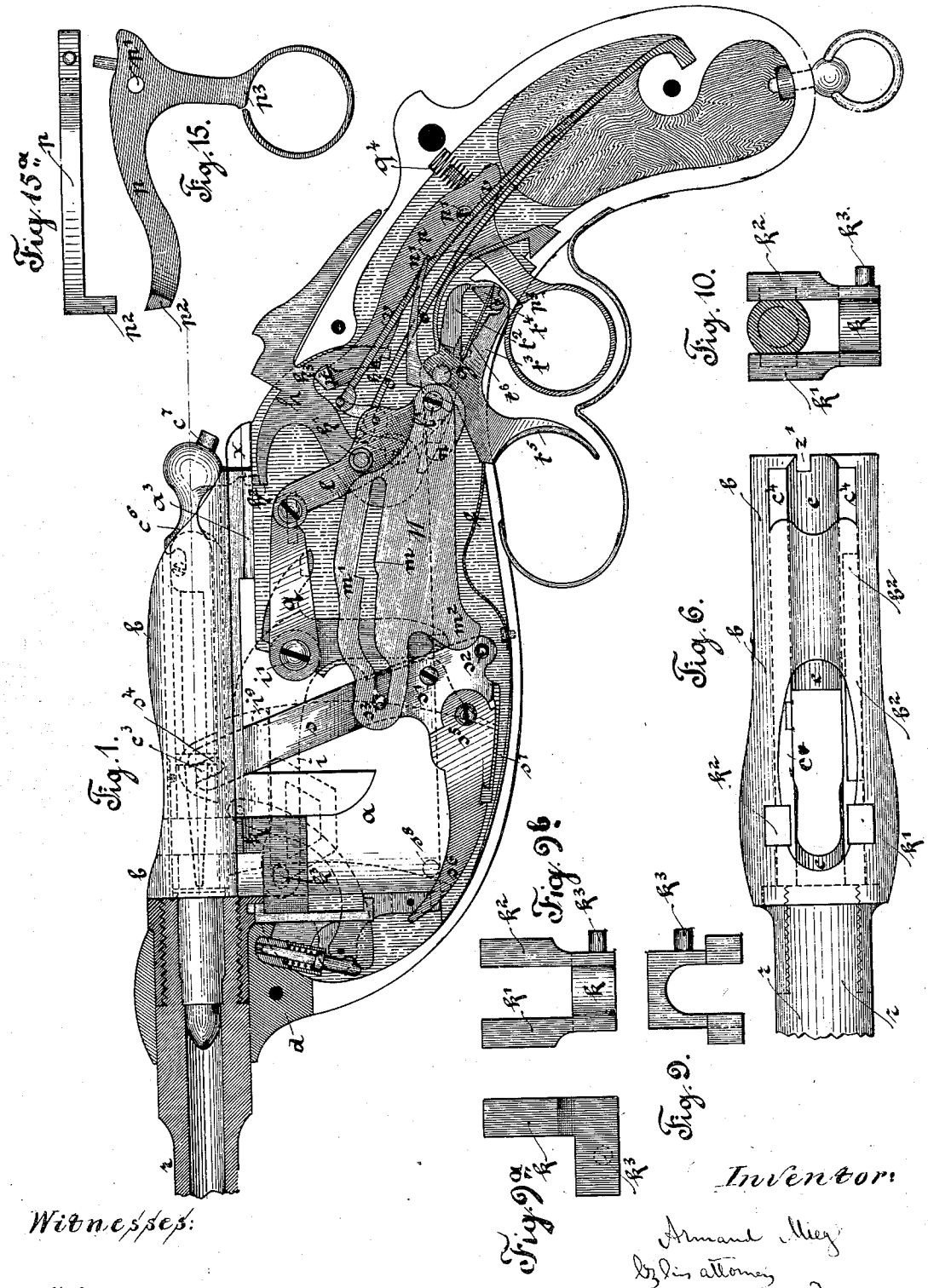
(No Model.) 4 Sheets—Sheet 1.

A. MIEG.

RECOIL OPERATED FIREARM.

No. 533,911. Patented Feb. 12, 1895.



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Charles R. Seaule.

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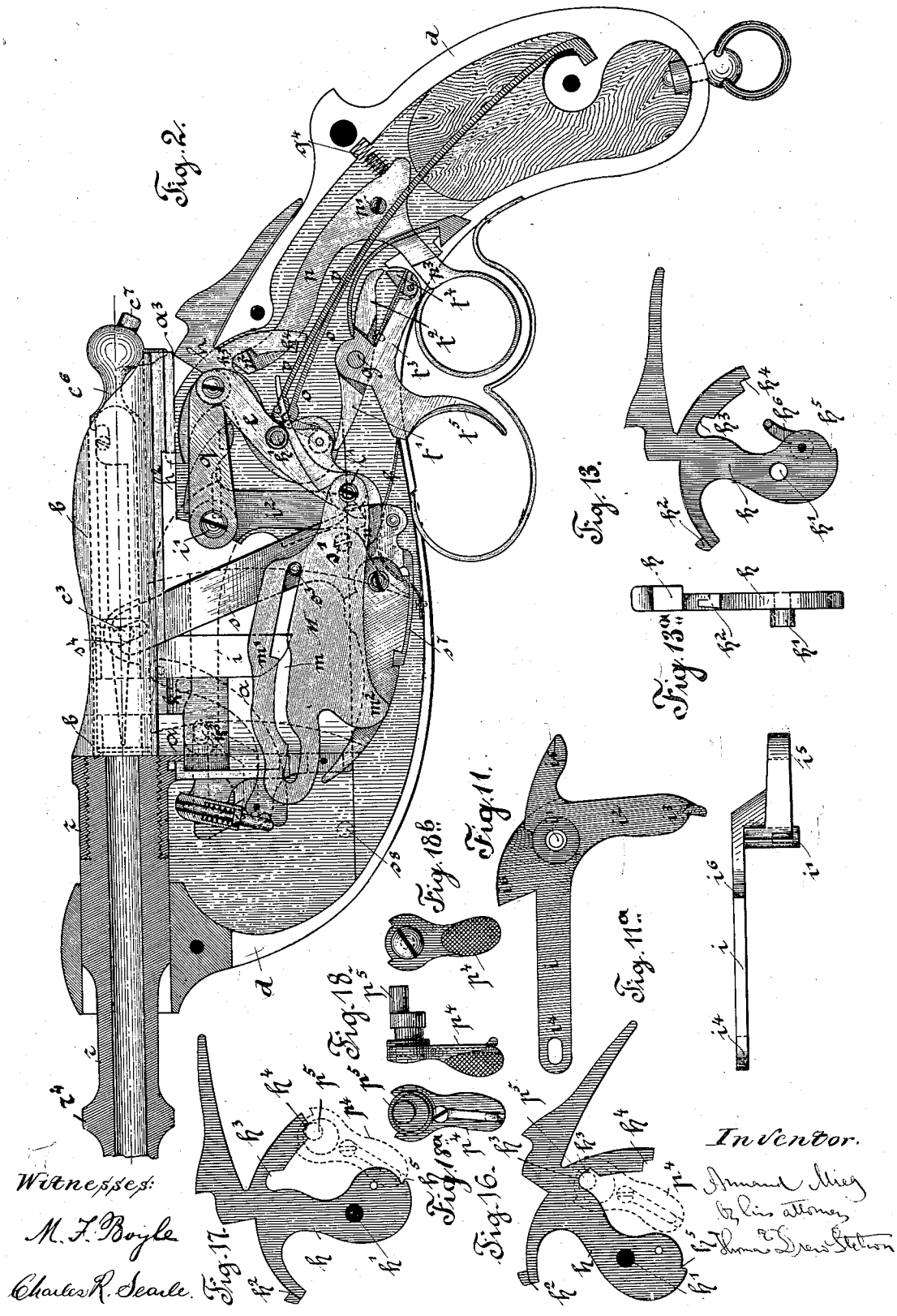
(No Model.) 4 Sheets—Sheet 2.

A. MIEG.

RECOIL OPERATED FIREARM.

No. 533,911. Patented Feb. 12, 1895.



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(No Model.) 4 Sheets—Sheet 3

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RECOIL OPERATED FIREARM.

No. 533,911. Patented Feb. 12, 1895.

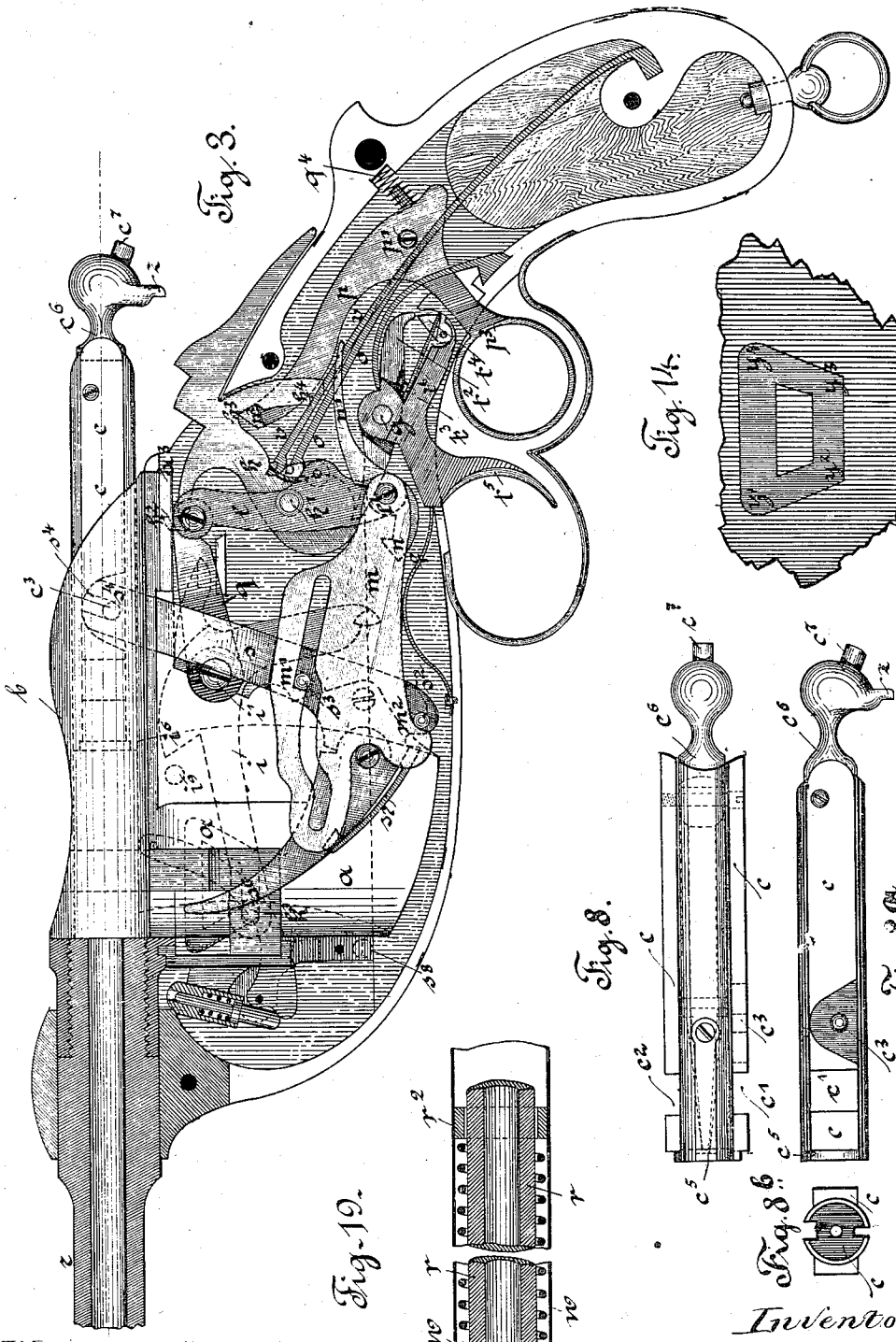

Fig. 3.

Fig. 14.

Fig. 8.

Fig. 8a.

Fig. 8b.

Fig. 19.

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(No Model.) 4 Sheets—Sheet 4.

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RECOIL OPERATED FIREARM.

No. 533,911. Patented Feb. 12, 1895.

Fig. 3.

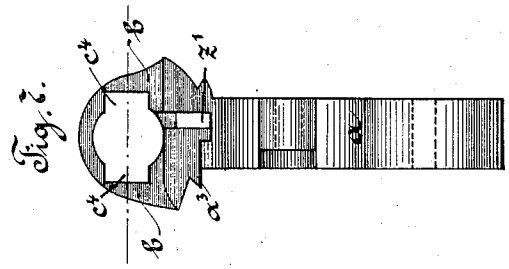

Fig. 4.

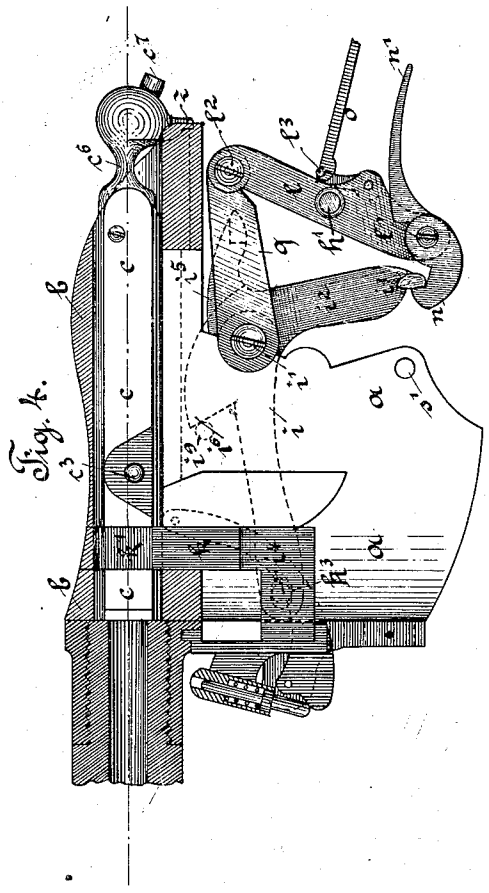

Fig. 5.

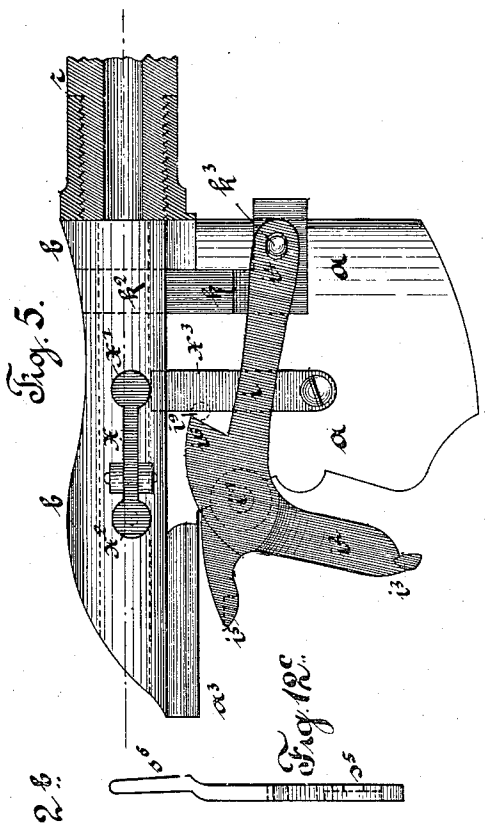

Fig. 12a.

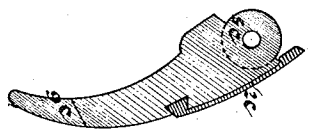

Fig. 12b.

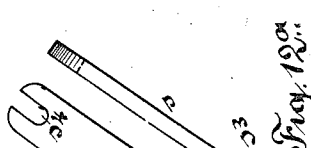

Fig. 12c.

Fig. 12d.

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UNITED STATES PATENT OFFICE.

ARMAND MIEG, OF HEIDELBERG, GERMANY.

RECOIL-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 533,911, dated February 12, 1895.

Application filed July 10, 1894. Serial No. 517,117. (No model.)

To all whom it may concern:

Be it known that I, ARMAND MIEG, a subject of the Emperor of Germany, residing at Heidelberg, Baden, Germany, have invented a certain new and useful Improvement in Fire-arms, of which the following is a specification.

The improved arm makes available the recoil which is produced by the action of the powder in firing. To open the breech, extract and eject the empty cartridge-shell, cock the gun, insert a cartridge from an adjacent magazine, move it into position, and again close and secure the breech, the operator has only to pull the trigger. The invention relieves him from a great portion of the shock ordinarily induced by the recoil and allows a calm holding and an accurate aiming of the weapon.

The invention consists of improvements in the mechanism to promote the convenience and the safety of the user, which improvements will be fully described below and specifically defined in the claims.

The invention may be applied to all sorts of fire-arms and of any caliber; not only arms for military service, but also pistols, hunting-pieces and target rifles.

The accompanying drawings form a part of this specification. They represent the invention applied to a pistol, and show the novel parts with so much of the ordinary parts as is necessary to show their relation thereto.

Figure 1 is a vertical longitudinal section partly in elevation, showing the parts in the condition ready for firing. Fig. 2 is a corresponding section showing the parts after firing has occurred and the barrel and its attachments have moved backward by the recoil. Fig. 3 is a corresponding section showing the condition after the breech-block has been moved rearward and the barrel and its attachments have been carried forward again nearly to the former position. Fig. 4 is a corresponding view showing the rear end of the barrel and its attachments with the breech closed but not locked. Fig. 5 is a section partly in elevation showing some of the parts as seen from the opposite side, in the same condition as in Fig. 4. Fig. 6 is a plan view of the receiver. Fig. 7 is an end view corresponding to Fig. 4, with certain portions removed. Fig. 8 is a plan view of the breech-block detached. Fig. 8^a is a side elevation of the same. Fgi. 8^b is an end view seen from the front. Fig. 9 is a plan view of the rocking belt detached. Fig. 9^a is a side view of the same, and Fig. 9^b is a plan view of the same. Fig. 10 is a cross section of the breech-bolt immediately back of the locking-bolt with the latter in elevation, as seen from the rear. Fig. 11 is a side view of a portion, detached. Fig. 11^a is a plan view of the same. Fig. 12 is a side elevation showing certain parts detached. Fig. 12^a is an edge view of one of the parts. Fig. 12^b is a side view of one of the parts detached from the other. Fig. 12^c is an edge view of the same. Fig. 13 is a side elevation of the hammer detached. Fig. 13^a is an edge view of the same. Fig. 14 is an interior elevation of a portion, Sheet 3. Fig. 15 is a side elevation of a portion, Sheet 1. Fig. 15^a is a top view of the same, Sheet 1. Fig. 16 is a side elevation of the hammer with one of the other parts shown in dotted lines, Sheet 2. Fig. 17 is a corresponding view of the hammer in the position which it assumes in the act of firing. Figs. 18, 18^a, 18^b and 19 show modifications. Fig. 18 is a front view of a locking dog which serves to retain the hammer reliably in its locked and in its unlocked position. Fig. 18^a is a view of the same from the right. Fig. 18^b is a view of the same from the left. Fig. 19 shows a further modification. It is a central longitudinal section of a portion of the barrel and adjacent parts when the invention is applied to a long barrel, as of a musket or rifle.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

The arm is constructed with two principal parts, the stock or body carrying the cock and trigger mechanism, which part is to be held by the operator, and the barrel and attached receiver and magazine, rigidly connected together, and carrying the other portions of the mechanism. This barrel and connected case or receiver and magazine, which I shall refer to collectively as the carriage, is capable of moving longitudinally within the stock. The mechanism is accessible by removing certain covering portions.

The barrel r of the pistol is provided at about its mid-length with an annular enlargement or collar r^4 which is favorably condi-

tioned to allow the hand to aid in opening or closing the breech when such shall be necessary. By the recoil due to the firing, the barrel with its attached receiver *b* and magazine box *a*, moves rearward in the stock *d*. The mechanism insures that this movement shall bend a stout spring *o*, the resilient action of which spring again drives forward the barrel, and its attachments. The barrel is screwed into the front part of the receiver *b*, and the magazine box *a* is formed in one piece with the latter. The upper portion of the receiver *b* is formed with an aperture serving for the insertion of the cartridges, which are stored in a series one upon another in the magazine *a* below. In the interior of the receiver *b* are longitudinal grooves c^4 one on each side, as shown in Figs. 6 and 7.

The breech-bolt *c* is adapted to slide longitudinally in the receiver *b*. Vertical grooves are provided in the receiver *b* and in the guides c^4, at each side of the breech-bolt *c*, which receive a forked operating lever *s*, which turns on a pivot *s'* set in the carriage and serves as a means for communicating the required motion to the breech-bolt.

The front of the breech-bolt carries ordinary extractors c^5 for removing the empty cartridge-shell and ejecting it through the open top of the receiver *b*. See Fig 8.

The striking or firing pin c^6 is adapted to move to a small extent longitudinally within the bolt *c*, impelled by a blow of the hammer received on a projecting spur.

The striking pin c^6 is provided with a rigid lateral arm or tooth *z*. In the last part of the forward movement of the breech-bolt, this tooth *z* strikes against a stud h^2, carried on the hammer *h*, and thereby arrests the forward movement of the firing pin, in the act of closing the breech.

In the forward portion of the carriage is the locking-piece *k*, carrying the two parallel arms or double-locking bolt *k'*, k^2, guided by the vertical grooves before referred to. The requisite vertical movement is given to this piece *k* at the proper time, through the medium of a closing lever *i* turning on a pivot *i'*, set in the carriage and moving backward and forward therewith. The longest arm of this lever, lies ordinarily parallel to the breech-bolt *c*, and engages by a slot i^4 near its forward end with the pin k^3, on the locking plate *k*. The arm i^2 extending downward, is provided with a stud i^3 at its lower end, with which in a certain position of the parts the unlocking hook *n* can engage. See Fig. 4. A backward extending arm i^5 is curved as shown. In case the locking-bolt *k* shall not be completely moved up into position, this arm i^5 will stand in such position that the forward projection h^2 of the hammer will engage over it and induce the completion of the movement of the locking lever before the firing is effected. In case the movement of the locking bolt has not progressed so far, or has not commenced, the arm of the hammer will so engage the recessed arm i^5 as to completely arrest the hammer and prevent the discharge.

The pin *i'* set in the carriage *a* serves as a center for the lever *i* and also as a means of attachment for a link *q*, which connects to the upper end of a lever *l*, pivoted on the center *h'* set in the stock, and which performs important functions. This lever connects by a link l^3 with the spring *o*, before referred to, the considerable force of which tends to turn this lever in the direction to restore the carriage and the attached barrel again to their forward position after each recoil. The lever *l* carries by a pivot on its lower arm *l'*, a lever *n*, *n'*, the front end of which has a hook-form, and serves as the locking hook before referred to, by taking hold of the stud i^3 on the lower arm of the lever *i*. The opposite end *n'* of this lever strikes the pivot pin *g* at the proper time and disengages the hook the latter having been relieved from the force of the spring *f*, which is mounted in the interior of the stock, and serves to hold the hook in engagement during the period required. The pin *l'* on the lower arm of the lever *l* also carries pivoted on it a piece M which I will term a catch, having considerable longitudinal and vertical dimensions. It is provided with a long nearly horizontal slot *m* having an offset *m'* near its mid-length, which receives a pin s^3 set in the side of the operating lever *s*. The bottom of this catch is equipped with a rounded projection m^2, which, at the proper time, strikes against a pin s^2 carried in the lower end of the lever *s*, and lifts the catch M sufficiently to disengage the offset *m'* from its hold on the pin s^3.

The lever *s* turning on the pivot *s'* mounted in the carriage, is provided at its upper end with an open fork s^4, by which it embraces the pin c^3 of the bolt *c*, and is able to impart the required longitudinal motion. It is inserted into the recess in the slot in the bolt *c* from below,—the fork allowing for the circular motion. It is moved backward at the proper time to open the breech by the engagement of the offset *m'* with the pin s^3. This movement occurs immediately after the barrel *r* with the accompanying carriage *a*, *b*, has moved forward. This rearward movement of the bolt *c* is effected rapidly, and the extractor c^5 moves the empty shell which remains in the barrel after the preceding discharge, and ejects it through the opening in the top of the case *b*. See Fig. 6. The certainty that this will result is increased by a shock which is received through the lever *s* immediately after the discharge. This shock is in the nature of a concussion due to the liberation of the hinged lever s^6, which is secured to the lever *s* by the pivot s^5. There is a shoulder above such pivot which holds this lever s^6 so that it cannot approach nearer than a certain angle to the lever *s*, but it may yield downward indefinitely. A spring s^7 urges this lever s^6 smartly upward. When the barrel *r* and its attachments move forward in closing the

breech the lever s^6 is received under a pin s^8 fixed in the stock d. When after the discharge, the barrel r and its attachments move rapidly rearward by the recoil, the curved upper surface of the lever s^6 acting on the pin s^8 depresses the lever s^6 in opposition to the force of the spring s^7. Near the termination of the rearward movement the lever s^6 escapes from its contact with the pin s^8, and is moved smartly upward by the force of the spring s^7. The nature of the union transmits a smart shock to the lever s, and thus to the bolt c, which effects a loosening of the cartridge shell, so that when at a later period the bolt c is moved rearward, the removal of the shell by the ordinary extractor is facilitated.

The pin s^8 is set in one side only of the stock d, and projects inward sufficiently to engage strongly with the arm s^6 and effect its movement, but there is liberty for the arm s^6 to yield laterally and pass it in its downward movement, so that when the parts are brought into position ready for firing the lever s^6 has always passed below the pin s^8 and is ready to again be deflected and liberated to give the necessary shock and effect the loosening of each shell.

The cock or hammer h is centered on the pivot h' before referred to, and is actuated by a link connecting a pivot on its rear side with a sufficiently strong spring v, so as to give the required blow on the striking pin whenever it is liberated by the action of the trigger. It is provided with a segment or arm extending forward and carrying on its front end a projection h^2, and also with an arm extending backward provided with two recesses h^3, h^4. The lower portion of the cock is rounded and provided with an offset or sear notch h^5. Into this notch engages the front end t' of a barring lever or sear t', t^2, which turns on the same pin g' which carries the trigger t^5. The rear arm t^2 terminates in a bow or descending bend, which bend stands directly over the detent t^4, which is carried on the rear arm t^3 of the trigger, and is held in position by a spring t^6. When the parts are properly adjusted for firing, the detent t^4, acting on the rear end of the sear disengages its front end t' from the sear notch h^5 and liberates the hammer, which then, under the strong action of the spring v turns smartly on its pivot h' and striking against the firing pin c^6, explodes the cartridge. The detent t^4, after effecting its work, may rise upward ineffectively to any distance, but it is again promptly brought down by the action of a suitable spring t^7 on relaxing the pressure of the finger on the trigger.

As a precaution against the working of the weapon with the parts improperly placed, as a premature or incomplete opening or closing of the breech action, the pin k^3 in the side of the locking bolt is guided in a trapezoidal groove y, see Fig. 14,—formed in the face of the stock adjacent to the carriage. I will designate the several portions of this groove by super-numerals, y', y^2, y^3, y^4. The engagement is such that the downward movement of the bolt k cannot take place until the carriage and consequently the pin k^3 has moved to the extreme rearward position induced by the recoil. With the commencement of the forward motion of the carriage in restoring the barrel and its associated parts to their firing position, the pin k^3 is moved downward by the tilting of the lever i. After the pin k^3 has moved downward to its fullest extent, the carriage moves forward for something like a half of its entire motion, carrying the pin k^3 forward at its lowest level. Near the termination of the forward motion the lever i is rocked in the opposite direction, raising the pin k^3 again to its original position. It will be observed that the pin k^3 describes a trapezoidal figure, of which the front and rear sides are inclined in opposite directions and the top and bottom are parallel, but the top is longest. The trapezoidal groove y corresponds exactly to that motion and it is so placed as to coincide with the traverse of the pin k^3, and said pin is elongated so as to always stand in such groove. The groove is of no effect so long as all the parts move properly, but in case of any derangement of the action due to a want of completeness of any movement or a loosening or breaking of any part, the groove y will arrest the action until the parts can be restored to their proper working condition.

To prevent a premature striking of the cock, there is arranged as shown in Fig. 15, a safety lever p, with connecting rod p^3, which latter is in the form of a ring, and is arranged to be operated at will. The spring q^4 acting on the rear end of this lever urges it into such position that a lateral projection p^2 on its forward arm p, will engage in one or the other of the recesses h^3, or h^4, in the rearward arm of the hammer h. Engaging in the forward arm h^3, it holds the hammer in the cocked position, and forbids the piece being discharged. Engaging in the rearmost notch h^4, it holds the hammer in the discharged position and prevents its being cocked. It follows that without a previous operation of this lever by operating on the lever p^3, the weapon can neither be charged nor discharged.

My weapon employs still another safety device, which prevents the striking pin from a premature forward movement which might be caused by an accidental shock or blow. When the hammer is cocked the stud h^2 of the front segment rises so high as to stand before a lateral arm or tooth z of the firing pin or striking pin c^6. By the striking of this arm z against this projection h^2 on the hammer, the firing pin is arrested. When by any force the firing pin is urged forward, while the hammer still remains cocked, the piece cannot be fired because of the engagement of the arm z with this projection or stop h^2. Instead of this constantly acting safety device there may be employed a safety contrivance regulated by hand. This is shown in Fig. 18.

In this modification there is provided on one side of the lock a safety wing p^4, which by an eccentric shaft p^5, penetrates into the interior of the lock. This shaft is so situated that the notches h^3, h^4, of the rear segment of the cock can be engaged by this safety wing. See Fig. 16. This modification of the locking device is shown in dotted lines holding the hammer in the cocked position.

Fig. 17 shows in dotted lines, the hammer with the safety device holding it in the discharged position.

The combined working of the mechanism is as follows: In Fig. 1 is shown the position of the working parts in respect to one another when the weapon is charged and ready for firing. The breech-bolt or closing bolt c is forced tightly against the cartridge chamber in the rear of the barrel. The locking bolt k is in its highest position and bars the breech action. The hammer h is in the correct position and is retained by the engagement of the safety stop p^2 in the notch h^3. The projection or stud h^2 of the hammer is before the tooth z of the firing or striking pin, and the detent t^4 of the trigger is beneath the bow t^2 at the rear end of the sear t', t^2, while the front end is engaged with the notch or offset on the hammer body and retains it with the spring v ready to effect the discharge. The lower arm l' of the lever l is so far back that the pin s^3 is received in the forward end of the slot m. The closing lever i maintains a horizontal position parallel to the line of the barrel. In the recoil of the weapon the barrel and the parts rigidly united thereto, composed of the magazine a, and the receiver b, which collectively I term the carriage, are by the recoil caused to make a backward movement. Fig. 2 shows the condition of the parts after this backward or rearward movement is completed. The receiver b has struck against the top of the hammer and pushed the same back, and allowed its offset h^5 to be engaged by the front arm t' of the sear. The lock is now cocked. The link q has turned the lever l into the position inclined the opposite to that which it originally held, and the spring o o is exerting its force to return this lever and its attachments to their original position. The hook on the front arm of the lever n, n', is before the stud or lateral projection i^3 on the lower arm i^2 of the lever i and the piece M has moved into its extreme forward position so that the pin s^3 on the lever s is received in the extreme rear end of the slot m. The cartridge loosener s^6 has been detached from the pin s^8, having been depressed rearward by such pin in the active movement of the parts rearward during the recoil, and has risen under the influence of its spring s^7, and been violently arrested by the shoulder near its pivot s^5, communicating thereby a smart shock to the lever s, and consequently to the bolt c with the effect to loosen the cartridge shell. As soon as the action of the recoil ceases, the releasing action of the bent spring o, acting through the link l^3 on the lever l, commences to turn this lever back to its original position, and to drive the magazine with all the united parts, (the carriage,) back into the position shown in Fig. 1. The unlocking hook n, is held by the spring f before the nose i^3, and by its curved end n' presses on the shaft g. As the turning of the lever l, and the consequent movement forward of the carriage progresses, the hook n' retains the lever arm i^2, and causes the lever i to turn around its pivot i', whereby the lever arm i and the locking bolt k are moved down, and the breech action is unlocked. A little later the further turning of the lever l, and the consequent rearward movement of the unlocking lever n, n' by the contact of the rear end n' with the pivot stud g, see Fig. 3, disengages the hook n from the stud i^3, and liberates the lever i. This lever and the connected locking bolt k, remain ineffective during all the middle portion of the forward movement of the carriage; but the continued rearward movement of the pin l', and consequently of the catch M, engages the offset m' in the latter with the pin s^3 in the lever s, and causes the lever s to turn actively rearward carrying with it, the previously liberated breech block c and the firing pin c^6 mounted therein. This movement by the ordinary operation of the extractor c^5, facilitated by the previous loosening, brings with it the empty shell of the cartridge previously fired, and it is ejected from the cartridge case. Next the series of cartridges in the front portion of the magazine, shown by dotted lines in Figs. 1, 2 and 3, are moved upward by any ordinary or suitable means, not shown, so that the uppermost of the unused cartridges is brought into line with the barrel. The forward movement of the carriage continuing, the parts again assume the position shown in Fig. 1. In this movement the catch M is lifted by the engagement of its nose m^2 with the pin s^2. This movement liberates the pin s^3 from the offset m' and leaves the lever s and the breech bolt c at liberty to be moved forward. These parts are thus moved by the continued pressure of the nose m^2 against the pin s^2, whereby the continued movement rearward of the catch M turns the lever s on its pivot s', carrying the upper end and the bolt connected thereto forward. When this movement has sufficiently progressed, the pin s^3 reaches the curved portion of the slot m and allows the catch M to rise further, so that the nose m^2 can pass over the pin s^2, and the further forward movement of the carriage, and the further rearward movement of the catch M can be completed. Near the termination of the forward motion of the carriage, the upper arm or shoulder i^6 of the closing lever i will strike a pin i^9 fixed in the stock, and compel the turning of the lever i into its original position, moving the locking bolt k upward to engage reliably in the recesses in the breech bolt c. Near the close of the forward move-

ment of the breech, the cartridge loosener s^6 moves downward past the short pin s^3. The passage may be facilitated by beveling the contact parts. The weapon is now again ready for firing.

All the parts are so adjusted that the several operating movements take place in the proper succession, and at the proper period.

In order to take out the cartridges unused, the breech action may be opened by moving back the barrel, and the attached carriage by the force of the hand. The barrel is equipped with a collar r' to facilitate this movement. The several motions of the parts may be the same as before described, as when the barrel is thus moved by the recoil after the discharge. By such opening the cartridge which at the preceding closing was forced into the barrel, is drawn out and ejected. The weapon may be used for single firing by moving the barrel back by its collar to open the breech. After inserting one cartridge the barrel is left free and the breech action is closed by the means previously described. For thus working the lock is retained in the open position by means of a special barring mechanism, which may as shown in Fig. 5, consist of a slide x with two end buttons x', x^2, and a spring x^3. The button x^2 by its pin penetrates through the receiver b and engages in a hollow made in the guiding rod of the breech closing bolt. It bears against the narrow side of this hollow and prevents an advancing of the breech closing bolt until this pin has been drawn out of the hollow. Then the closing bolt may be driven forward, and the weapon be ready for firing.

In order to indicate to the operator that the cartridges are spent, and that the magazine is empty, a plate on which the cartridges in the magazine are placed, may at the opening of the breech action, after the last shot is fired, enter into the receiver b and hold the carriage against being forced forward until a new charge of cartridges has been supplied.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Although I have shown this mechanism as applied to a pistol, it may be used with shoulder arms,—guns, the different parts being stronger and larger. Instead of the flat spring o, I can use a spring in a spiral or various other forms. Such spring may act on the link q. Another arrangement would be to place a spiral spring on the fore part of the barrel r, urging the barrel and its attachments forward. Fig. 19 shows such an arrangement,—the forward end of the spring abutting against a cylindrical ring r^8, which is screwed upon the barrel.

I claim as my invention—

1. In an automatically operating fire-arm, having the barrel r, and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with both longitudinal and vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the locking bolt k having arms k', k^2, engaging in such groove, and the lever i, pivoted in the carriage, and means for operating the lever i and engaging with such locking bolt, adapted to raise and lower the latter, all arranged for joint operation substantially as herein specified.

2. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with both longitudinal and vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing-pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the locking bolt k, having arms k', k^2, engaging in such groove, and the lever i, pivoted in the carriage and means for operating the lever i and engaging with such locking bolt, adapted to raise and lower the latter, and the double spring o, v, mounted in the stock and connected as shown, one spring to a suitable hammer and suitable confining and releasing means to effect the striking and the other part or spring to the carriage to effect the forward movement thereof, all arranged for joint operation substantially as herein specified.

3. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with the vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2, corresponding to said vertical grooves in the carriage, and the firing-pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the locking bolt, k, having arms k', k^2, engaging in such groove, and the closing lever i, engaged with such locking bolt, and provided with a descending arm i^2, having a stud i^3, and with means for engaging such stud and depressing such locking bolt during a portion of the forward movement of the carriage, all arranged for joint operation substantially as herein specified.

4. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech-bolt c, arranged to move lon-

gitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the locking bolt k having arms k', k^2, engaging in such groove, and the closing lever i engaged with such locking bolt, and provided with a descending arm i^2, and means consisting of the unlocking lever n, n' and means for operating it for engaging with such arm to effect the descent of said locking bolt, and the upwardly extending arm i^6 arranged to engage with the pin or stop i^9 set in the stock, adapted to insure the completion of the upward movement of the locking bolt, all arranged for joint operation substantially as herein specified.

5. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d under the impulse of the recoil, the lever l pivoted in the stock and connected by one end to said carriage by the link q, and by the other end to a catch M, so that the catch will move always in the opposite direction to that of the carriage, in combination with each other and with a double spring o, v, mounted in the stock, and with the link l^3 connecting one part of such spring o to the said lever l, all arranged for joint operation substantially as herein specified.

6. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the lever s engaged with the pin c^3, on the breech bolt adapted to communicate the required backward and forward movement of the breech bolt within the carriage, and the catch M with provisions for moving it into the opposite direction to that of the carriage, and having a slot m with an offset m' therein, and with the pin s^3 set in the lever s and received in such slot, giving the required rearward motion to the lever s, by means of the offset m', and releasing it by the lifting of the catch, and allow it to be moved forward, all substantially as herein specified.

7. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing-pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the lever s, engaged with the pin c^3, on the breech bolt adapted to communicate the required backward and forward motion of the breech-bolt within the carriage, and the catch M, with provisions for moving it into the opposite direction to that of the carriage, and having a slot m with an offset m' therein, and with the pin s^3, set in the lever s, and received in such slot, giving the required motion to the lever s by means of the offset m' and releasing it by the lifting of the catch, and the nose m^2 on the catch, and the pin s^2 on the lower arm of the lever s adapted to effect the lifting of the catch at the required period, and then to effect the forward movement of the breech bolt by the continued rearward movement of the catch M and forward movement of the casing, all substantially as herein specified.

8. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing pin c^6 movable longitudinally in such breech-bolt, the combination with the lever s, of a lever s^6 hinged to yield downward but not upward, and the spring s^7 carried also therein, and urging the lever s^6 actively upward, and with the pin s^8 set in the stock and arranged to allow the lever s^6 to move freely downward past it but to deflect such lever by the rearward movement of the carriage, and to allow it to escape and rise under the action of the spring and induce concussion on the lever s, and thus to the breech bolt c and an extractor s^5, all arranged for joint operation substantially as herein specified.

9. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^4, provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing-pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the locking bolt k, having arms k', k^2, engaging in such groove, and the lever i pivoted in the carriage and engaging with such locking bolt and operating means therefor adapted to raise and lower said bolt, the restraining and guiding surfaces in the stock adjacent to the groove y, receiving the

projection k^5 from the locking bolt k, arranged to insure that the locking bolt is fully in place before the arm can be fired, all substantially as herein specified.

10. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^1 provided with recesses c^2 corresponding to said vertical grooves in the carriage, the locking bolt k and means for operating it in such grooves and the firing-pin c^6 movable longitudinally in such breech-bolt, the stud h^2 on the hammer h, and the arm z, on the firing pin, arranged to engage in the cocked position of the hammer and arrest the forward movement of the striking pin and to prevent the completion of the forward movement of the latter until the hammer is operated, all substantially as herein specified.

11. In an automatically operating fire-arm, having the barrel r and rigidly attached parts b, a, constituting a carriage, mounted with liberty to move longitudinally within the stock d, under the impulse of the recoil and provided with vertical grooves in the interior, and the breech-bolt c, arranged to move longitudinally in such carriage, and having longitudinal wings c^1 provided with recesses c^2 corresponding to said vertical grooves in the carriage, and the firing pin c^6 movable longitudinally in such breech-bolt, the combination therewith of the locking bolt k having arms k', k^2, engaging in such grooves, and the lever i pivoted in the carriage and engaging with such locking bolt, adapted to raise and lower the latter, the safety lever p subject to the force of the spring q^4 and having an arm p^3 for operating it, automatically engaging the hammer and adapted to insure against the hammer being prematurely moved, by any accidental cause, substantially as herein specified.

In testimony whereof I have hereunto set my hand, at Heidelberg, this 18th day of May, 1894, in the presence of two subscribing witnesses.

ARMAND MIEG.

Witnesses:
G. KIRCHER,
FERDINAND NUREMBURG.