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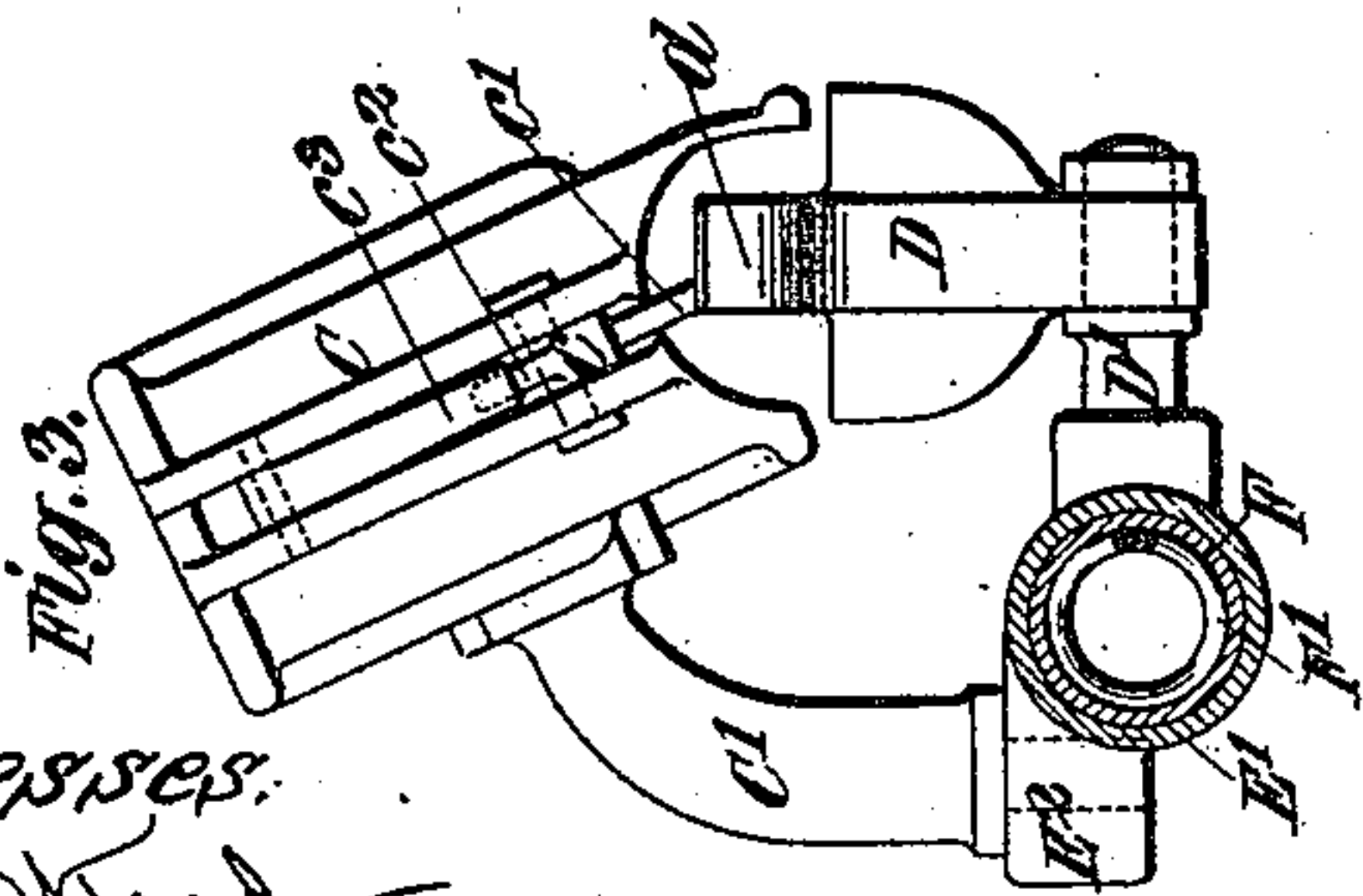
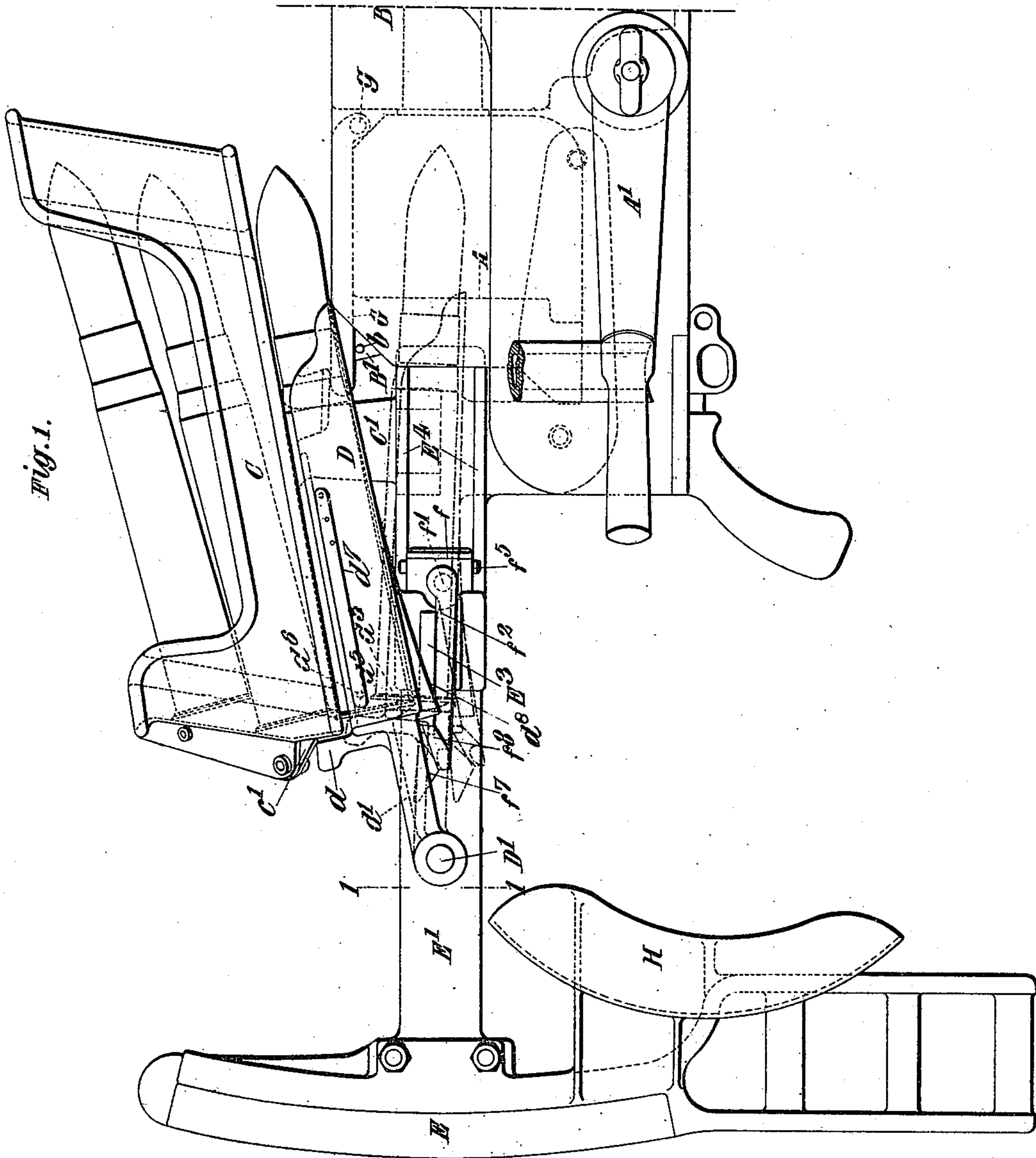
Patented Mar. 6, 1900.

A. T. DAWSON & L. SILVERMAN.
AUTOMATIC GUN.

(Application filed Aug. 21, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:
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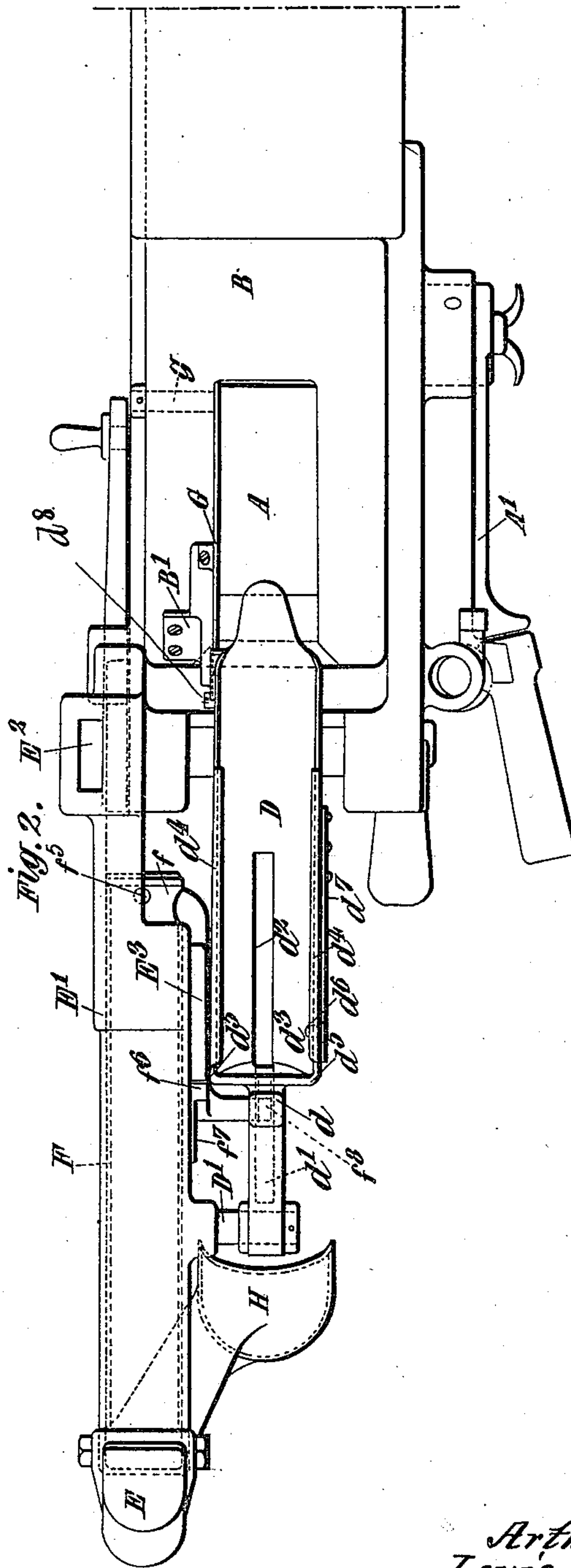
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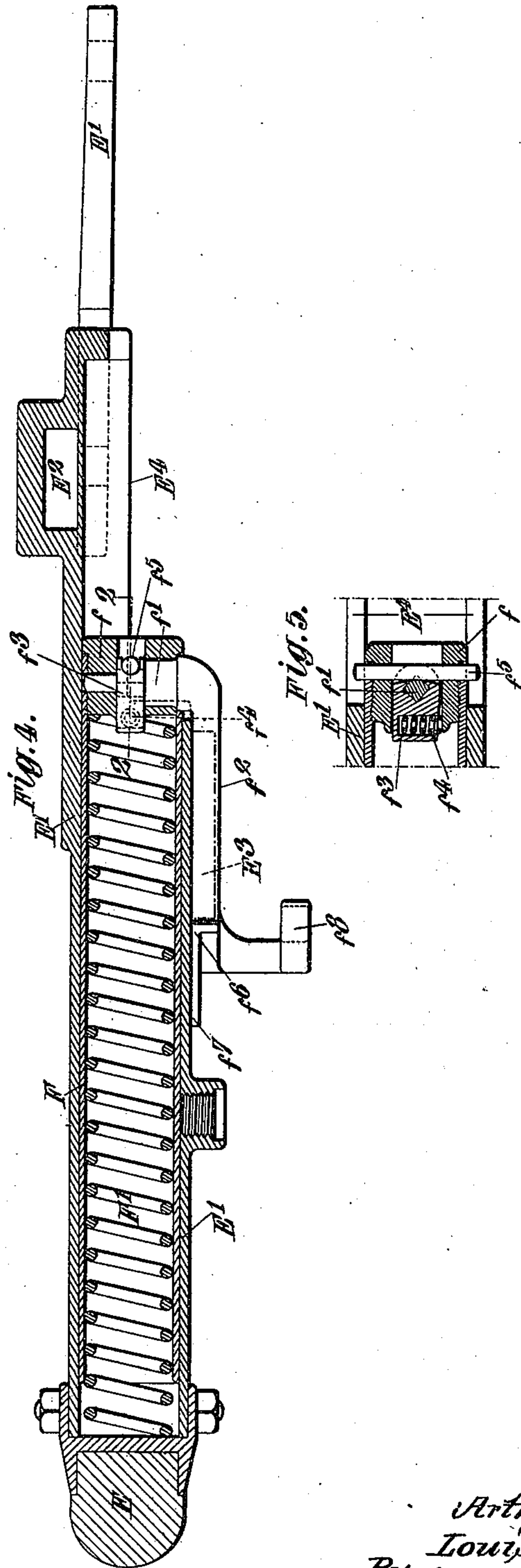
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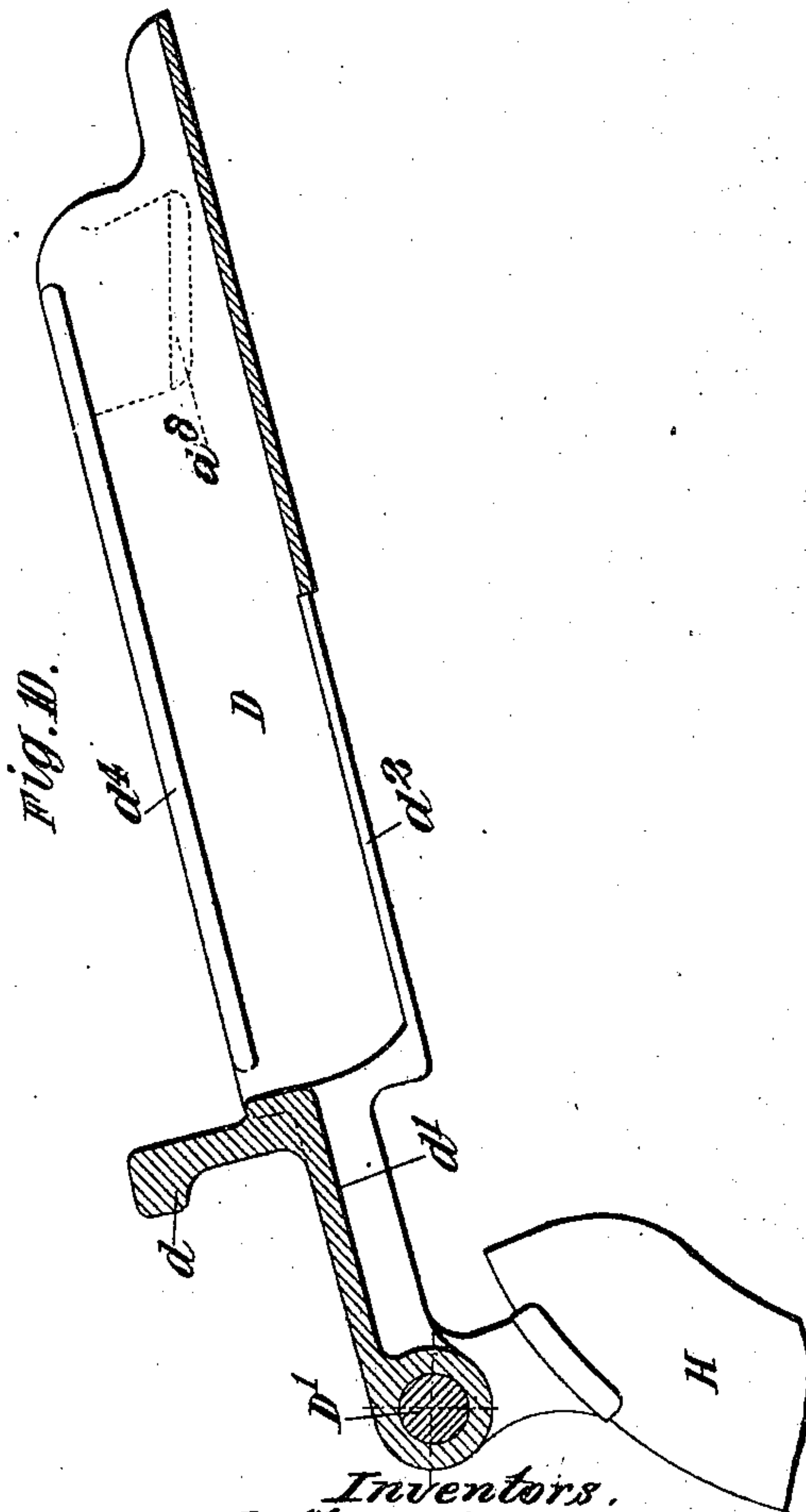
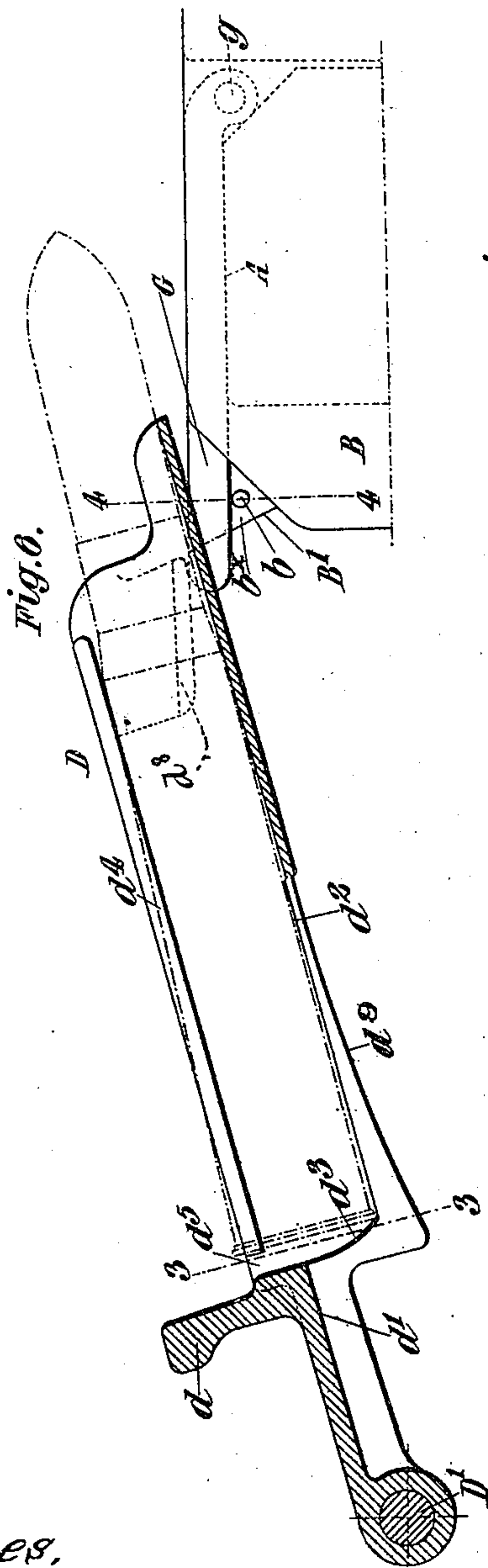
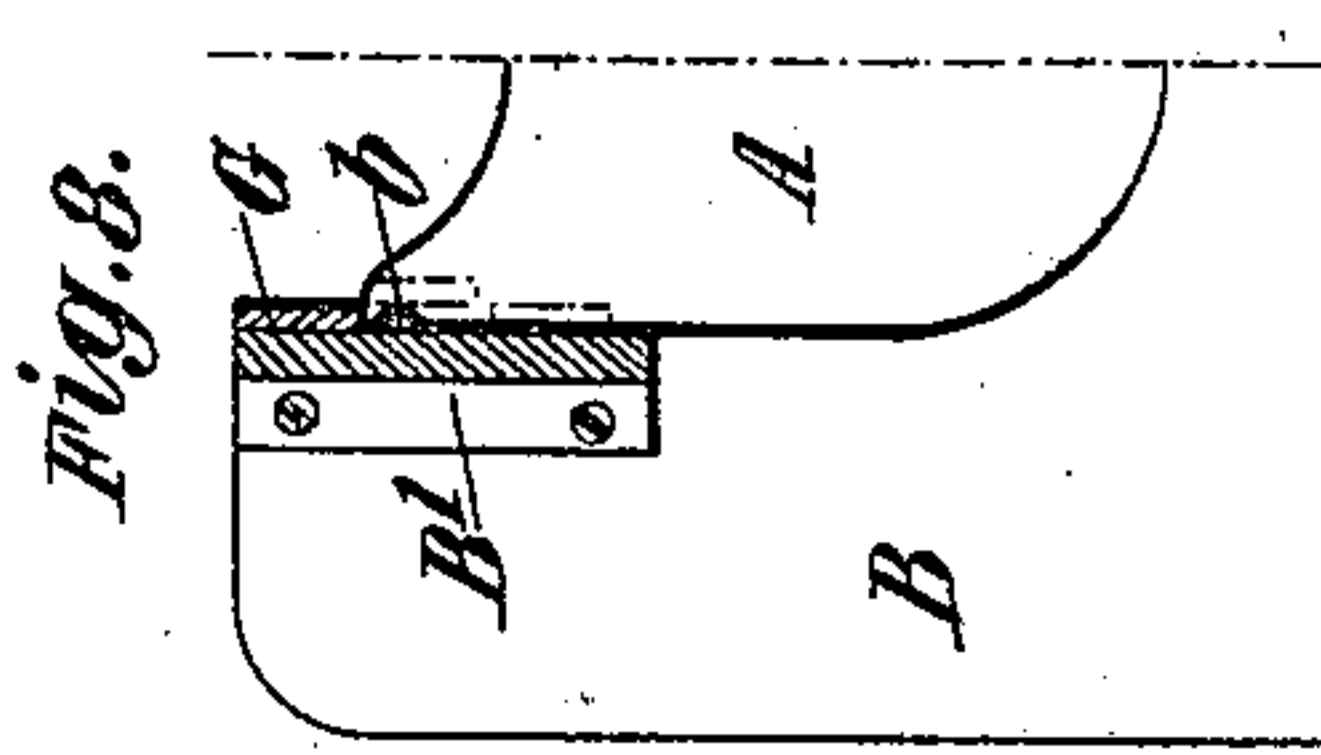
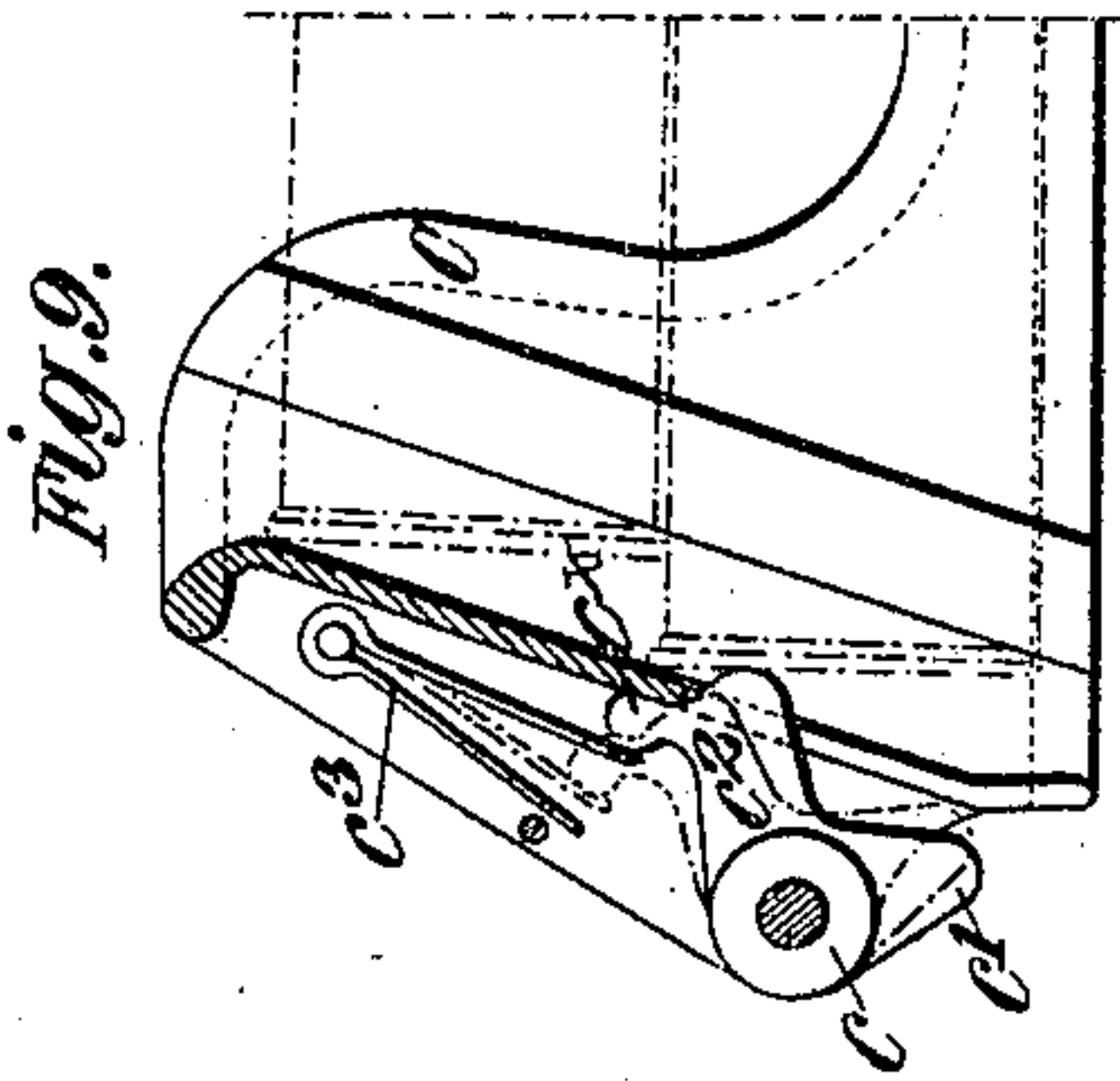
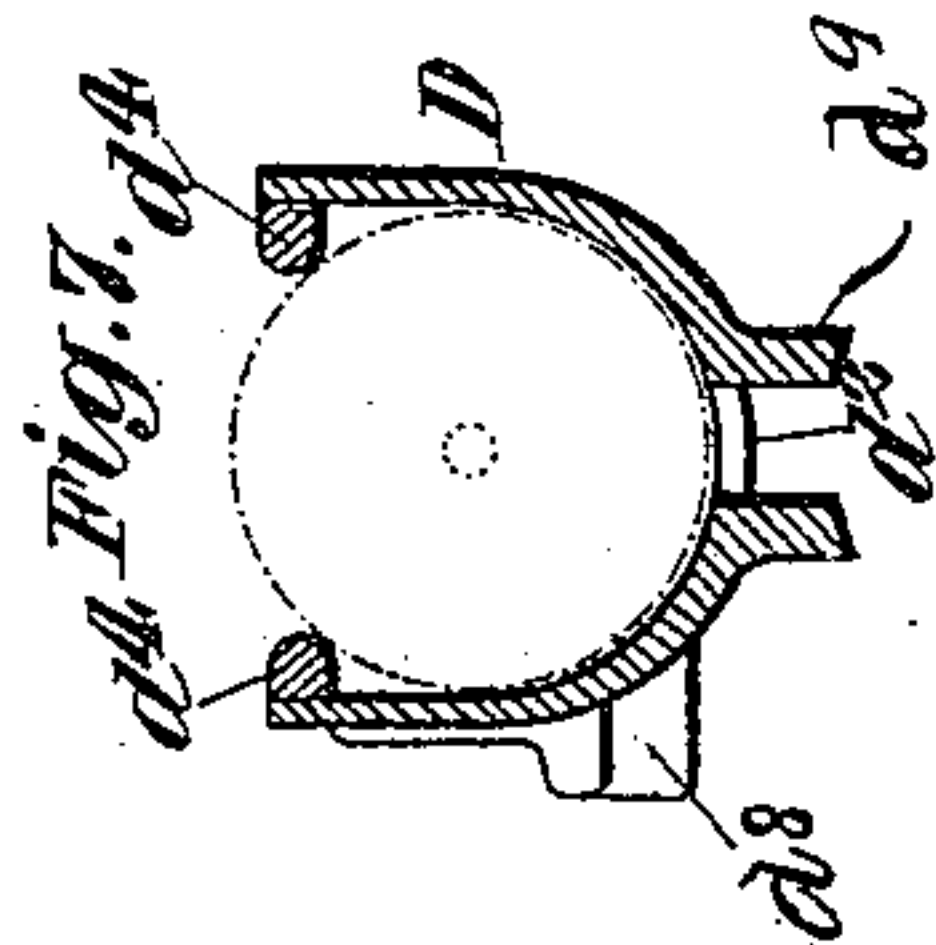
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

ARTHUR TREVOR DAWSON AND LOUIS SILVERMAN, OF LONDON, ENGLAND,
ASSIGNORS TO THE VICKERS, SONS & MAXIM, LIMITED, OF SAME PLACE.

AUTOMATIC GUN.

SPECIFICATION forming part of Letters Patent No. 644,969, dated March 6, 1900.

Application filed August 21, 1899. Serial No. 727,984. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON, late of the Royal Navy, and LOUIS SILVERMAN, engineer, subjects of the Queen of Great Britain, residing at 32 Victoria street, London, England, have invented certain new and useful Improvements in Automatic Guns, of which the following is a specification.

Our invention relates to automatic guns provided with cartridge-feed mechanism of the kind in which the transference of the cartridges from the magazine or hopper to the barrel is effected by causing a cartridge to be thrown from the magazine or hopper into a pivoted carrier, which, as the breech-block descends in opening the breech, turns about its pivot to bring the cartridge it contains in alinement with the breech end of the barrel, when by the action of a spring-piston the said cartridge is thrown from the carrier into the barrel.

An important feature of our present invention is to obviate the necessity of throwing the cartridges from the hopper into the carrier by arranging the said hopper immediately above the carrier, which is of trough shape, so that the cartridges will one by one drop directly into the carrier as they are released from the hopper by the upward movement of the said carrier. We also prefer to so construct the carrier that as a cartridge drops into it from the hopper the said cartridge will be shifted longitudinally in the carrier to bring its flanged end beneath beadings or projections on the upper edges of the said carrier, so that the cartridge will be thereby prevented from rebounding in the carrier when the latter descends to bring the cartridge opposite the breech-chamber and will also be guided as it is pushed longitudinally from the carrier into the said breech-chamber by the spring-piston. We also provide means whereby the descent of the carrier into its aforesaid lowered position is delayed a sufficient time to insure that the empty cartridge-case ejected from the barrel has time to move out of the path of the descending carrier with its cartridge. For this purpose we provide on the gun a friction-piece, preferably in the form of a convex protuberance, which projects into the path of a pivoted flexible arm

employed for raising the carrier and retaining it elevated when the breech-block is closed. As another or additional means of insuring that the carrier shall not prematurely descend we so hinge it relatively to the breech of the gun that its angular position when it is elevated will be such that the ejected cartridge-cases will strike against its lower surface and will thereby prevent its descent until the ejected cartridge-case has moved completely out of the path of the incoming cartridge contained in the carrier. We prefer to form the under side of the carrier with a longitudinal curve or incline for the ejected cartridge-cases to strike or slide against, and by making this curve or incline sufficiently pronounced we can cause it to also act as a deflector for directing the ejected cases downwardly, and thereby preventing their striking the gunner. In the latter case the shield which is usually provided for the protection of the gunner from the ejected cases can be dispensed with. If, however, it is desired to employ a shield, it can be affixed to the shoulder-piece in the ordinary way or it may be attached to the cartridge-carrier, so that it moves therewith. Then the empty cartridge-cases as they are ejected will strike against this shield and will assist in causing the carrier to promptly descend if its movement should for any reason be delayed too long.

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, and Fig. 2 a plan, of the rear part of an automatic gun provided with our improved cartridge-feed mechanism. In the latter figure the cartridge-hopper has been removed. Fig. 3 is a transverse section on the line 1 1 of Fig. 1 looking toward the right. Fig. 4 is a longitudinal horizontal section, on a larger scale, of the stem of the shoulder-piece detached from the gun. Fig. 5 is a detail section on the line 2 2 of Fig. 4. Fig. 6 is a detail sectional view showing, also on a larger scale, the means for preventing the premature descent of the cartridge-carrier. Figs. 7 and 8 are transverse sections taken, respectively, on the lines 3 3

and 4 4 of Fig. 6. Fig. 9 is a detail sectional view of the cartridge-releasing device with which the hopper is provided. Fig. 10 is a detail sectional view similar to Fig. 6, showing the shield attached to the carrier, so as to move therewith.

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

A is the breech-block, which slides in a vertical plane to open and close the breech when the gun is working automatically or when the handle A' is operated, as is well understood.

B is the recoiling barrel, C the cartridge magazine or hopper, and D the cartridge-carrier, hinged at D' to the stem E' of the shoulder-piece or crutch E and supported in its elevated position by a pivoted arm G, which is carried by the barrel and lies just above the breech-block.

F is the spring-piston, located within the stem E', which is made hollow for its reception, the said spring-piston operating at the proper time to expel from the carrier the cartridge it contains, and so throw it into the breech-chamber of the gun.

The aforesaid hopper C is (as already stated) according to our invention situated immediately above the carrier D and arranged vertically or at an inclination to the vertical, as shown in Fig. 3. It is detachably connected with the gun by a projection C' thereon fitting into a socket E², with which the said stem E' is provided. If desired, however, the said hopper may be permanently fixed in position. The cartridges fall by their own weight from the hopper when the releasing device thereon is actuated by the carrier, as the latter assumes its elevated position. (Represented by the full lines in Fig. 1.) In the drawings we have represented the said releasing device as consisting of a pivoted piece c, having two members c' c², the former of which protrudes outside the hopper and lies in the path of a projection d on the carrier. The other member, which is normally pressed inward by a spring c³, is adapted to lie against the flanged end of the lowermost cartridge in the hopper, against which it is kept firmly pressed by the tendency of the said pivoted piece c to turn inwardly under the weight of the cartridges. The said lowermost cartridge is thus jammed between the pivoted piece c and the opposite end of the hopper, and is consequently prevented from falling from the hopper. (See Fig. 9.) When, however, the member c' is acted upon by the aforesaid projection d on the carrier, as the latter rises into its elevated position (represented by the full lines in Fig. 1) the said pivoted piece is shifted into the position represented by the dotted lines in Fig. 9, and so liberates the lowermost cartridge, which consequently falls directly into the carrier, the other cartridges in the hopper at the same time descending a distance of one cartridge. Then immediately the said carrier commences to move downward the member c' of the piv-

oted piece c is released, whereby the other member c² is caused to assume its original position under the action of the spring c³ and prevents the cartridge that is now lowermost in the hopper from escaping.

c^x is a nose on the pivoted piece c for limiting the extent to which the latter can turn inwardly.

The aforesaid piston F is in the form of a tube with a head f at the forward end thereof, such head being provided with a horizontal hole to receive the pivot f' of a catch f². The said pivot is provided with a rectangular portion to receive a short arm f³, which projects into a cavity provided for its reception in the said head f. This arm is formed with a recess to contain a spring f⁴, which acts to normally keep the said arm pressed upward and the catch f² in engagement with a fin or lug E³, which constitutes a fixed abutment on the aforesaid stem E'. The pivot f' of the said catch is retained in place in the said piston-head f by a cross-pin f⁵, which is made long enough to extend a short distance beyond the head at each end, where said pin is formed with shoulders to engage with guide-surfaces E⁴ E⁴ on the aforesaid stem E'. The piston is thereby prevented from turning axially during its reciprocating movements. Within the said piston is arranged the spring F', which bears at one end against the aforesaid head and at the other end against the base of a cavity formed in the shoulder-piece E. When the barrel of the gun recoils, it strikes against the aforesaid head f and pushes the piston backward into the position represented in Figs. 1 and 4, thereby compressing the spring F'. As the piston thus moves, the catch f², by the action of its spring-arm f³, is caused to bring its shoulder f⁶ into engagement with the end of the aforesaid fin or lug E³, whereby the said spring-piston is retained in its retracted position, while the barrel returns to its firing position. The said catch f² is provided with an extension or nose f⁷, which bears against the under side of the aforesaid lug E³ by the action of the said spring-arm f³, when the piston performs its reciprocating movements and prevents any upward movement of the catch until it is in the proper position to engage with the end of the lug E³. Projecting from the aforesaid catch is a finger f⁸, which when the carrier D descends into its lowered position (as represented by the dotted lines in Fig. 1) will lie in a position immediately behind the cartridge in the carrier. When the carrier descends into its lowermost position, the portion d' thereof will depress the said finger f⁸, and thereby disengage the catch from the lug E³. As a consequence the piston will be permitted to fly forward under the action of its spring and so cause the said finger f⁸ to strike the cartridge and project it into the breech-chamber of the barrel. The carrier is formed with a longitudinal groove d² to permit of the free move-

ment of the said finger f^8 therein during the advance of the spring-piston in projecting the cartridge from the carrier.

The carrier is, as already stated, trough-shaped to enable the cartridges to fall into it from the hopper. Its rear end is formed, on the inner surface thereof, with the curve d^3 and its edges with the beadings or projections d^4 . (See Figs. 6 and 7.) The beadings do not extend completely to the rear end of the carrier, but leave a space d^5 to permit the flanged ends of the cartridges to pass as they descend from the hopper. As each cartridge enters the carrier its flanged end meets and slides on the aforesaid curve d^3 . By so doing the cartridge is directed forwardly a sufficient distance to bring its flanged end beneath the said beadings d^4 , whereby the said cartridge is retained in the carrier without liability of rebounding when the said carrier descends to its lowered position. The said beadings also serve as a guide to direct the cartridge truly into the barrel while it is being pushed from the carrier by the spring-piston. Instead of making the inner surface of the rear end of the carrier curved, as above explained, it may be inclined.

d^6 is a resilient stop forming part of a blade-spring d^7 , connected to the carrier. This stop has a beveled or curved inner end and is so situated relatively to the flange of the cartridge in the carrier that it will operate to prevent the cartridge from escaping longitudinally from the said carrier except when the catch of the spring-piston acts on the cartridge to thrust it from the carrier, when the said resilient stop gives way and permits the cartridge to escape.

b is the aforesaid friction-piece, which is shown as a convex protuberance formed on a portion B' , secured to or forming part of the breech end of the barrel in a position to bring said protuberance below the arm G , which is adapted to act in conjunction with said protuberance to delay the descent of the carrier. The said arm consists of a flexible metal blade pivoted at g , and it lies above the breech-block, so as to be lifted with said block when the breech is closed and to be released when said block descends to open the breech. The carrier is provided with a lateral projection d^8 , which rests upon the free end of the said arm G , so as to be supported thereby and to shift therewith. The position of this projection is such relatively to the aforesaid portion B' of the barrel that unless the said barrel fully completes its advance movement after recoiling the said projection will remain supported by the portion B' of the barrel and will therefore prevent the descent of the carrier. The aforesaid convex protuberance is situated only a short distance below the said arm G , so that when the breech-block is opened the arm will in its descent come against the protuberance, over which the said arm cannot pass without slight lateral movement; but the arm is made sufficiently flexible or elas-

tic to yield laterally under slight pressure, so that although it does not immediately drop completely when the breech-block descends, yet a slight pressure thereon or vibration thereof when the carrier contains a cartridge is sufficient to cause said arm to pass over the said protuberance and drop down and allow the carrier also to fall. If there be no cartridge in the carrier, the flexible arm will not pass the protuberance, because the weight of the carrier itself is insufficient to cause the arm to bend laterally, as aforesaid, and consequently the carrier will remain in its elevated position. This will be found very convenient when it is desired to open the breech-block and expose the breech of the gun for inspection. A slight pressure of the hand on said carrier will, however, cause the arm to pass the protuberance and the carrier to descend, if desired.

H is the shield, which in Fig. 1 is rigidly connected to the shoulder-piece E of the gun, as is usual. In Fig. 10 we have, however, represented this shield of curved formation and as forming part of the carrier, so as to move therewith, in which case the blow struck against the shield by the ejected cartridge-case will supply the necessary force for causing the carrier to descend should it for any reason be restrained too long from falling.

d^9 is the longitudinal curve with which we prefer to form the under side of the carrier, the curve being such that as the ejected cartridge-cases strike said curve they will be directed downward, and thereby be prevented from striking the gunner. The shield H will in such case not be required. It will of course be obvious that this curve also serves the purpose of delaying the descent of the carrier, as stated above.

When it is desired to effect the loading of the gun by hand, the aforesaid hopper C is removed and the cartridges are placed one by one into the carrier by the gunner and will be brought opposite the breech-chamber of the gun and be projected therein, as already explained. We may also, if desired, use the hinged carrier without the spring-piston and project the cartridge therefrom into the barrel by pushing it by hand.

What we claim is—

1. In cartridge-feed mechanism for automatic guns, the combination with a hinged cartridge-carrier adapted to be raised to receive a cartridge and to be depressed to bring said cartridge into a position to be thrown into the barrel, of a cartridge-hopper superimposed above said carrier, and of means for liberating the lowermost cartridge in the hopper to permit it to fall into the carrier as the latter rises into a position to receive it substantially as described.

2. In cartridge-feed mechanism for automatic guns, the combination with a hinged cartridge-carrier adapted to be raised to receive a cartridge and to be depressed to bring said cartridge into a position to be thrown into

the barrel, of a cartridge-hopper superimposed above said carrier, of an escapement device on the hopper which acts to prevent the cartridges from escaping by jamming action on the lowermost cartridge in the hopper, and of a projection on said carrier for actuating the said escapement device as the carrier assumes its elevated position, substantially as described:

3. In cartridge-feed mechanism for automatic guns, a hinged cartridge-carrier of trough shape with longitudinal beadings at its edges and with a curved or inclined back portion which acts to longitudinally shift the cartridge as it falls into the carrier and to thereby bring its flange beneath the said beadings, for the purposes specified.

4. In cartridge-feed mechanism for automatic guns, the combination with the recoiling gun-barrel, of the hinged cartridge-carrier having a lateral projection which rests on a part of the breech end of the barrel until it completely advances after recoiling, and a pivoted arm to bear against said lateral projection of the carrier and support it in its elevated position at such an angle to the axis of the breech of the gun that the ejected cartridge-cases will strike it and prevent its premature descent substantially as and for the purpose specified.

5. In cartridge-feed mechanism for automatic guns, the combination with the hinged cartridge-carrier and the pivoted arm by which it is elevated and supported, of a friction-stop in the form of a convex protuberance which lies beneath the said pivoted arm and past which said arm has to be moved by bending laterally in order to permit the carrier to descend substantially as and for the purpose specified.

6. In cartridge-feed mechanism for automatic guns, the hinged carrier constructed on its under side with the longitudinal, permanently curved or inclined cartridge-case guide d^9 for acting directly upon the ejected cartridge-cases and directing them downward, substantially as and for the purposes described.

7. In cartridge-feed mechanism for automatic guns, the combination with the hinged carrier, of a shield adapted to move therewith and capable of being struck by the ejected cartridge-cases substantially as and for the purposes specified.

8. In a cartridge-feed mechanism for an automatic gun, the combination of a hinged carrier having a longitudinal groove, a tubular

stem arranged at one side of the carrier and having a fixed abutment on its exterior, a spring-piston working in said stem, a catch pivotally mounted on the spring-piston and engaging said fixed abutment when the piston is retracted, and a finger carried by the said pivoted catch, lying in the path of said hinged carrier and constructed to enter and work in the longitudinal groove of the latter, substantially as and for the purposes described.

9. In a cartridge-feed mechanism for an automatic gun, the combination of a hinged carrier having a longitudinal groove, a tubular stem having a fixed abutment on its exterior, a spring-piston working in said stem, a catch pivotally mounted on the spring-piston to engage the fixed abutment when the piston is retracted and constructed at its rear end portion with an extension to bear against the under side of said fixed abutment, and a finger projecting laterally from said pivoted catch into the path of the hinged carrier when it descends and constructed to work in the said longitudinal groove, substantially as and for the purposes described.

10. In a cartridge-feed mechanism for an automatic gun, the combination of the hinged carrier, a tubular stem arranged at one side of the carrier and having a fixed abutment on its forward end portion, a spring-piston working in the tubular stem, a catch pivoted on said piston and provided at its pivotal point with an arm, a spring acting to normally press said arm upward and the catch into engagement with said fixed abutment, and a device operated by the carrier in its descent to actuate the catch and disengage it from the abutment, substantially as and for the purpose described.

11. In cartridge-feed mechanism for automatic guns the combination with the hinged carrier, the pivoted catch, the fixed abutment and the spring-piston, of a transverse pin connecting the said catch to the spring-piston, and of shoulders on the ends of said pin to slide against guiding-surfaces on the stem of the gun substantially as and for the purpose specified.

In testimony whereof we have hereunto set our hands, in presence of two subscribing witnesses, this 22d day of July, 1899.

ARTHUR TREVOR DAWSON.
LOUIS SILVERMAN.

Witnesses:

WALTER W. SHARPE,
HENRY KING.