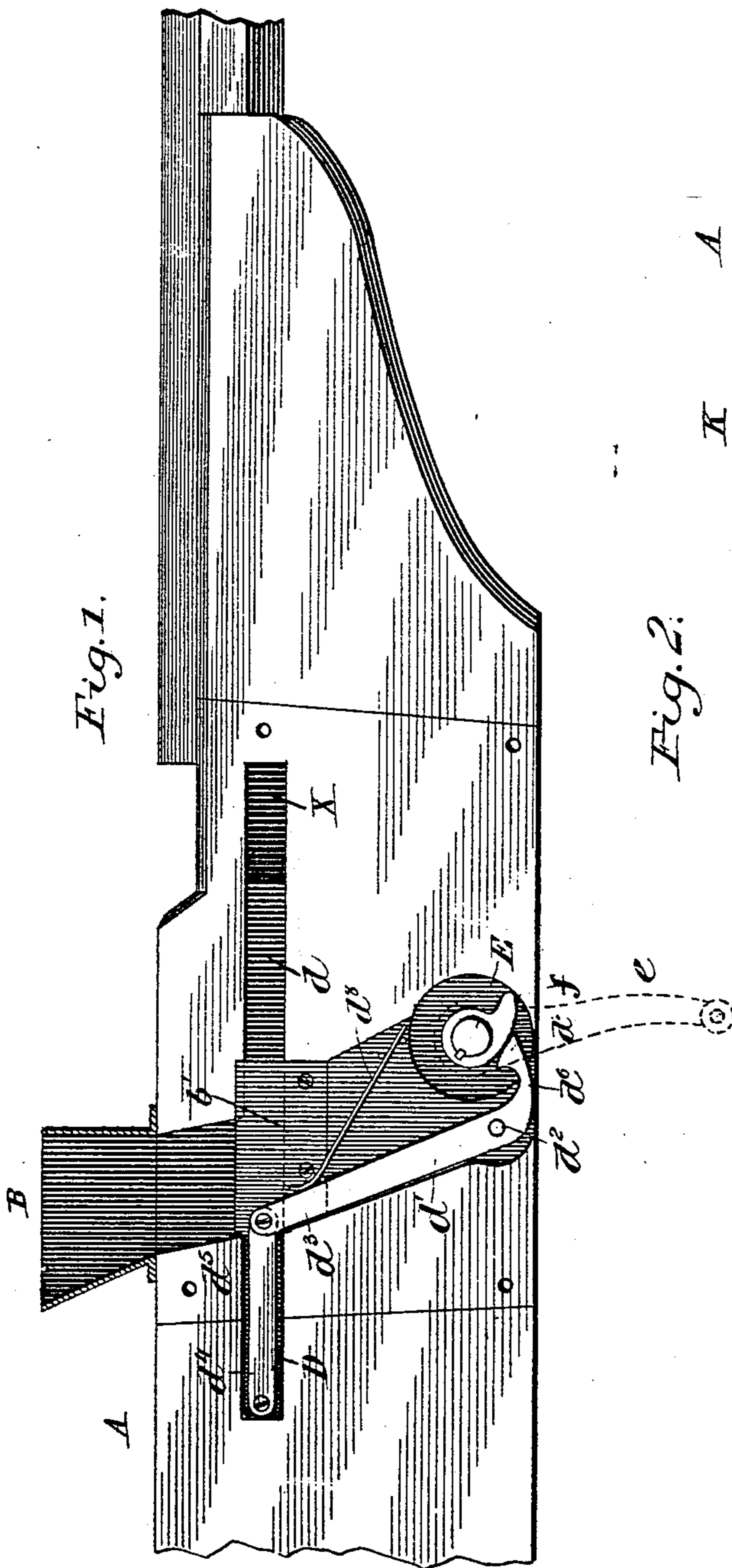


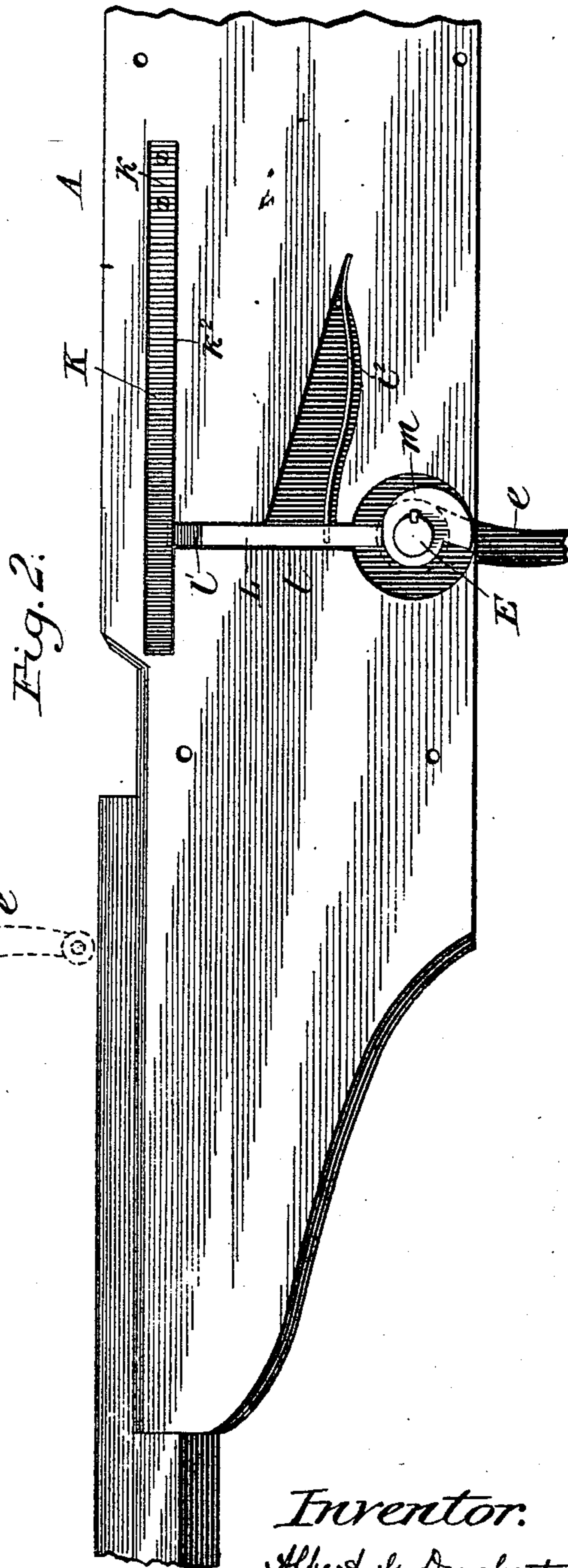
A. G. DOUGHERTY.
MACHINE GUN.

No. 547,717.

Patented Oct. 8, 1895.



Witnesses:
W. M. Reynolds
J. H. Moyers



Inventor:
Albert G. Dougherty
by Oscar Foote
Attorney.

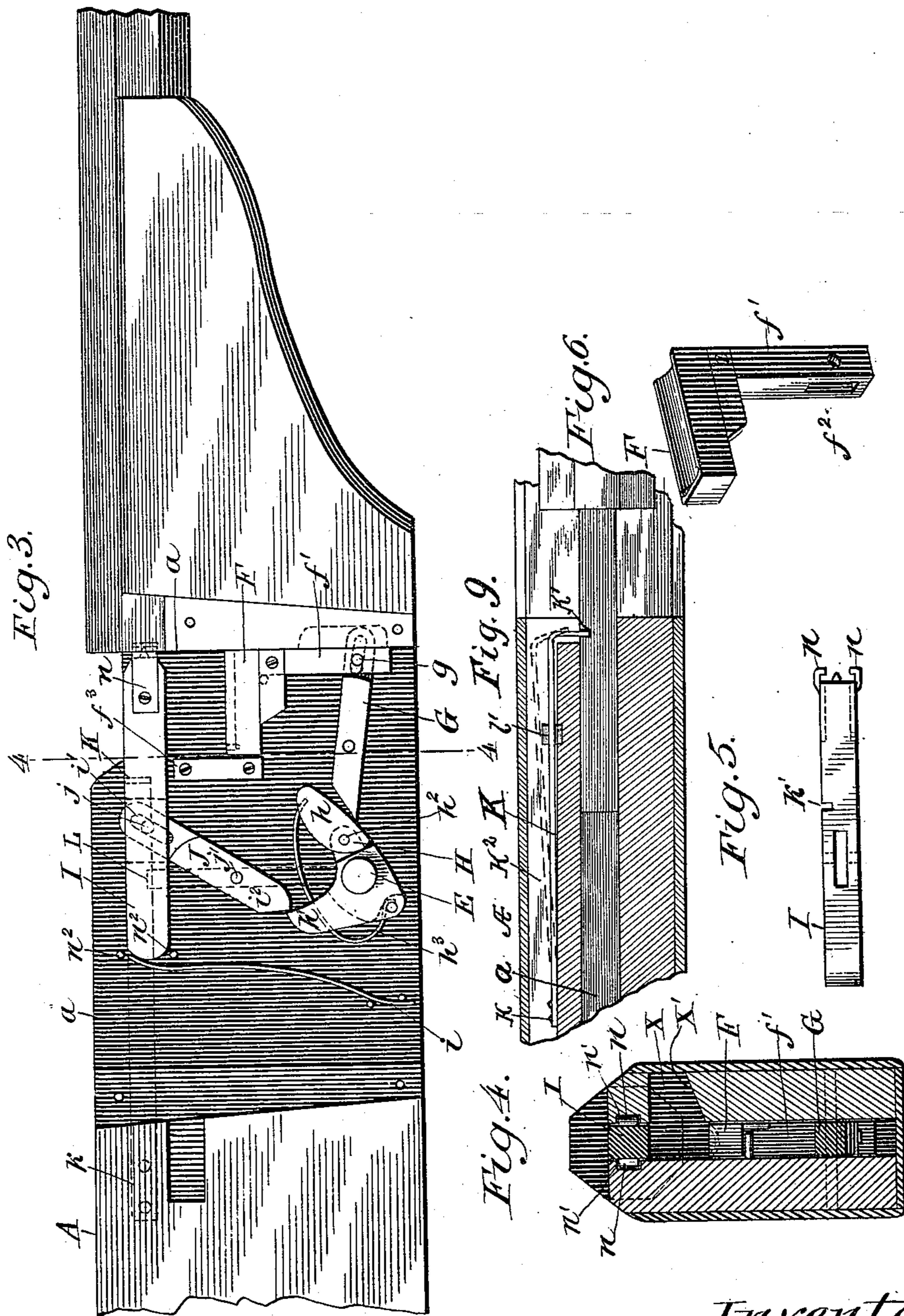
(No Model.)

3 Sheets—Sheet 2.

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Witnesses:
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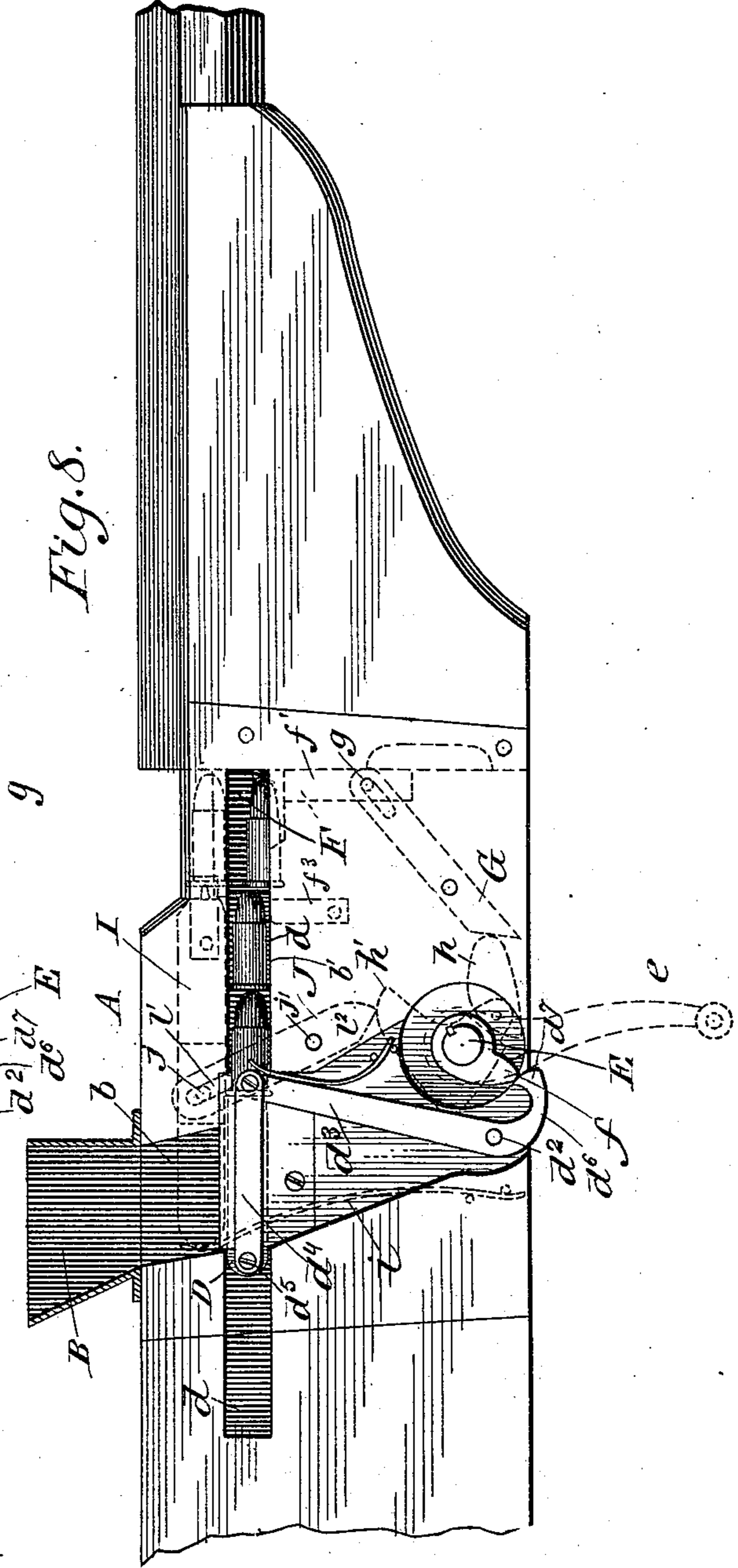
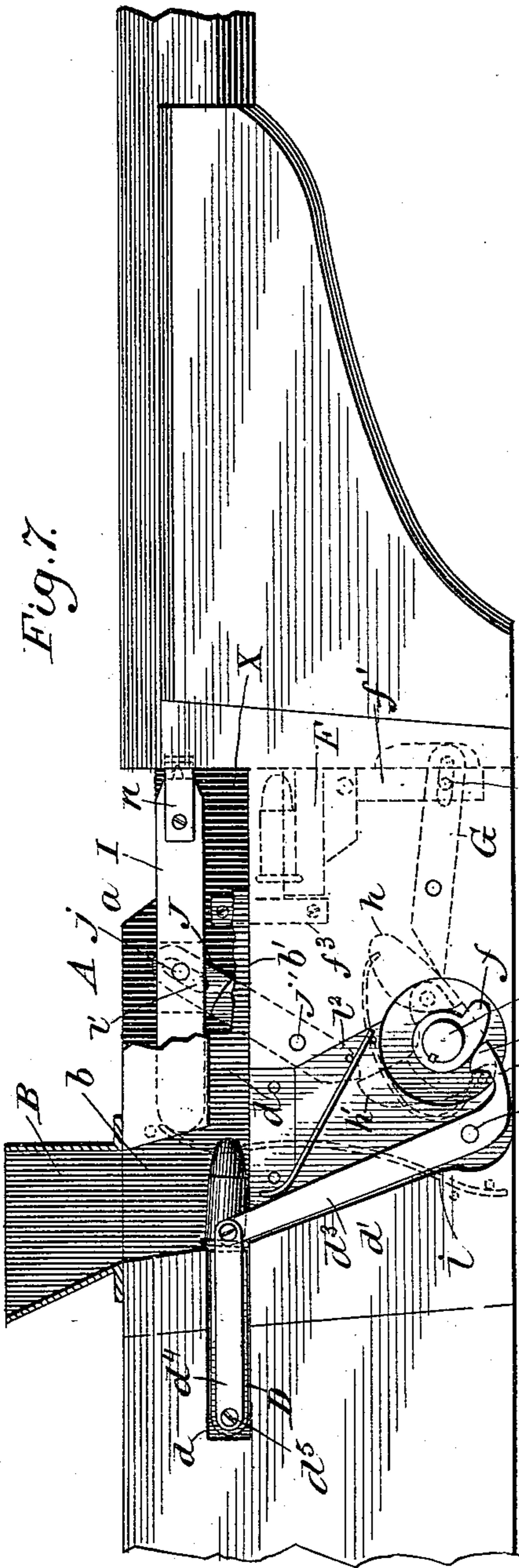
(No Model.)

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A. G. DOUGHERTY.
MACHINE GUN.

No. 547,717.

Patented Oct. 8, 1895.



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UNITED STATES PATENT OFFICE.

ALBERT G. DOUGHERTY, OF CHAMBERSBURG, ASSIGNOR OF TWO-THIRDS
TO THOMAS B. BUSKIRK, OF PAOLI, INDIANA, AND OSCAR FOOTE, OF
WASHINGTON, DISTRICT OF COLUMBIA.

MACHINE-GUN.

SPECIFICATION forming part of Letters Patent No. 547,717, dated October 8, 1895.

Application filed January 13, 1894. Serial No. 496,787. (No model.)

To all whom it may concern:

Be it known that I, ALBERT G. DOUGHERTY, a citizen of the United States, residing at Chambersburg, in the county of Orange and State of Indiana, have invented certain new and useful Improvements in Machine-Guns, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is directed to that class of firearms known in the art as "machine-guns," which have for their object to produce a rapid firing of cartridges which are fed, fired, and discharged by the action of certain mechanisms operated by a crank or similar device.

In machine-guns heretofore employed the mechanisms for feeding, firing, and discharging the cartridges are comparatively very complicated in construction, and thus the liability to wear and disorder is great and the longevity of the arms thereby reduced.

The object of my invention is to produce a machine-gun composed of few and simply-constructed parts and in which the operations are reduced in number as compared with guns heretofore designed and employed.

Generally speaking, my invention consists in a machine-gun the mechanisms of which are adapted to be operated by a crank, in mechanism for feeding forward the cartridges in position to be received by a cartridge-elevator, in a cartridge-elevator to move the cartridge into a position in line with the bore and adapted thereby to discharge the exploded shell, in a breech-block adapted by its movement to simultaneously feed the cartridge into position for firing and to fire the same, in mechanism for preventing the recoil of the breech-block, and in mechanism for extracting the shell.

My invention also consists in the construction, relative arrangement, and operation of the several parts of said mechanisms, all of which will hereinafter fully and clearly appear from a reading of the following description, taken in connection with the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a view in side elevation of a machine-gun embodying my improvements, parts

being broken away. Fig. 2 is a similar view of the opposite side thereof. Fig. 3 is a view of one side of the gun with parts removed, showing the mechanism for feeding the cartridges. Fig. 4 is a vertical transverse sectional view on the line 4 4 of Fig. 3. Figs. 5 and 6 are details of certain of the parts. Fig. 7 is a side view with portions broken away, showing the operating parts in their normal positions. Fig. 8 is a similar view showing the breech-block drawn back and the remaining parts in their corresponding relative positions. Fig. 9 is a detail view illustrating the locking mechanism for the breech-block.

Referring to the drawings by letter, A denotes the breech, which is formed with a chamber α , centrally arranged and adjacent to the inner end of the barrel. One of the walls α' of said chamber is removably secured for convenience of construction. Secured to the breech and extending above the same is a hopper B, which receives the cartridges and from which they fall successively through a chute b onto a ledge b' , where they are in a position to be fed forward by the feeding mechanism, which I will now describe.

D represents a feeder, which slides in a groove d and which is adapted in operation to push the cartridge from the ledge b' toward the elevating mechanism, hereinafter described. The ledge b' is a continuation of the bottom of the groove d .

d' is a bell-crank lever pivoted at d^2 to the breech, one arm of which d^3 is pivotally connected to a rod d^4 , which latter is also pivotally secured to the feeder D at d^5 . The other arm d^6 of the lever d' is free and is provided with a projection d^7 , for a purpose to be presently explained.

E is the crank-shaft, journaled in suitable bearings in the breech, and which has secured thereto at one side a crank-handle e . Keyed on this shaft is a cam f , which at every complete revolution of the shaft engages the projection d^7 of the lever d' and moves the lever against the resistance of a leaf-spring d^8 , which movement is imparted, through the rod d^4 , to the feeder d .

At the rear of the barrel and in proximity thereto is the cartridge-elevator F, the upper

side of which is laterally concave, as shown, to conform to the surface of the cartridge. This elevator is adapted to be moved in vertical lines in order to raise the cartridge into a position in line with the bore of the barrel. Extending downward from the inner end of the elevator is an arm f' , which has a slot f^2 , adapted to receive one end of a rocking lever G, said end being pivotally secured, as shown at g . The arm f' bears against the front wall of the chamber a and serves, with a guide-piece f^3 , to maintain a true movement of the elevator. The elevator is adapted to be raised by the rocking lever G through the action of a cam H, which is keyed to the shaft E within the chamber a , the pivoted projection h on said cam engaging at each complete revolution the free end of the rocking lever G, which is beveled to reduce friction. When said rocking lever G is relieved from the operation of the cam, the parts return to their normal lowered position by the action of gravity.

X is a passage communicating with the groove d , said passage being cut away for about the length of a cartridge toward its forward inner end, the bottom X' thereof being slanted down to the elevator, so as to insure the cartridges falling readily thereon when fed forward by the feeder D.

The mechanism for inserting and firing the cartridge consists of a reciprocating bar I, hereinafter called the "breech-block," which is adapted to be moved backward against the resistance of a leaf-spring i by a rocking lever J, the upper end of which is pivotally connected to said breech-block by a pin j , working in a slot i' in said bar. The lever J is pivoted at j' to the breech and its lower free end i^2 is normally in the path of a projection h' on the cam H. Said cam, by its engagement with the lower end of the rocking lever J, moves the breech-block I to the rear against the resistance of the spring i a distance equal to the length of a cartridge, and when said rocking lever is freed from the action of the cam the spring operates to impel the breech-block forward to insert and fire the cartridge. To provide against recoil of the breech-block, I provide a spring-catch K, one end of which is secured at k to the breech and the other end of which is bent at an angle, and, passing through the breech, engages a recess k' made in the breech-block. The spring-catch K is located within a longitudinal groove k^2 , formed in the breech. The spring-catch is adapted to be disengaged from the breech-block in advance of the action of the cam projection h' .

The mechanism for disengaging the catch and breech-block consists of a slide-rod L, vertically movable in a groove l in the breech, the upper end l' of which is beveled and is adapted when said rod is moved upward to pry the catch outward a sufficient distance to disengage it from the recess k' . This slide-rod L is moved upward against the resistance of a leaf-spring l^2 by a cam m , which is keyed to the shaft E and operates at each revolu-

tion to effect the unlocking of the breech-block, as just described.

Secured to the forward end of the bar I at each side thereof are two extractor-fingers n , which in operation when the locking-pin is being moved rearwardly engage the flange of the cartridge and remove the empty shell. These fingers move in grooves $n' n'$ in the sides of the chamber a , which serve, with the pins $n^2 n^2$, placed, respectively, above and below the breech-block I near the outer end thereof, as guides to insure the movement of said breech-block in a horizontal plane. A firing-pin n^3 is formed on the forward end of the breech-block for the purpose of striking the cap of a cartridge and exploding the same when the breech-block is impelled forward under the action of the spring i .

The cam H, before referred to, has the fixed cam projection h' and the projection h thereon is made yielding, being pivotally secured at h^2 and moved against the resistance of a spring h^3 , which is secured, as shown, within said cam when such projection comes in contact with either of the rocking levers J or G. This yielding cam is designed, as before stated, to actuate the rocking lever G and the elevator F, but the rocking lever J, being within the path of said projection, the latter is made to yield sufficiently to pass the same without actuating the breech-block, which latter is actuated by the fixed projection of the cam.

The operation is as follows: The hopper being supplied with cartridges the latter fall successively through the chute and rest on the ledge b' . The shaft being revolved by turning the handle the feeder is actuated to move the lowest cartridge forward until the latter falls down the incline X' onto the elevator F. A continued revolution of the shaft causes the elevator, through the medium of the yielding projection of the cam and the rocking lever G, to raise said cartridge into a position in axial line with the bore. During this operation the breech-block is unlocked and is moved rearwardly by the action of the fixed cam projection h on the rocking lever J. When the lever J is released by the cam, the spring i impels the breech-block forward and the cartridge, being then in line with said breech-block as well as with the bore, is pushed home and fired by the pin n^3 striking the cap thereof. At this time the spring-catch K enters the recess in the breech-block and locks it against recoil. The next revolution of the shaft is attended with the same results, with the addition that when the breech-block is moved rearwardly the fingers $n n$, which engage the flange of the cartridge, cause its extraction and the ascending fresh cartridge expels the same.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine gun, the feed-chute, the ledge beneath said chute, the feed-arm adapted to slide on said ledge and engage the low-

ermost cartridge in said chute and feed the same forward, the elevator adapted to receive the cartridge from said ledge and elevate the same on a line with the bore, the breech-block adapted to insert, fire and extract the cartridges, the crank-shaft for operating said parts the spring-arm engaging said breech-block and adapted to prevent the recoil of the latter, and means for releasing said spring-arm from engagement with said breech-block, substantially as set forth.

2. In a machine gun, the feed-chute, the ledge beneath said chute, the feed-arm designed to slide on said ledge and engage the lowermost cartridge in said chute and feed the same forward, the elevator adapted to receive the cartridge from said ledge and elevate the same on a line with the bore, the breech-block adapted to insert and fire the cartridge, the extractor fingers on the forward end of said breech-block, the crank-shaft for operating said parts the spring-arm engaging said breech-block and adapted to prevent the recoil of the latter, and the beveled rod for releasing said spring from engagement with said breech-block, substantially as set forth.

3. In a machine gun, the feed-chute, the ledge beneath said chute, the feed-arm designed to slide on said ledge and engage the lowermost cartridge, the levers connected to said feed-arm, the crank-shaft for operating said levers whereby said feed-arm is moved forward, the spring for returning said feed-arm to its normal position, the elevator also operated by said crank-shaft adapted to receive the cartridge from said ledge and elevate the same on a line with the bore, the breech-block also operated by said crank-shaft adapted to insert, fire and extract the cartridge, and means for preventing the recoil of said breech-block, substantially as set forth.

4. In a machine gun, the feed-chute, the ledge beneath said chute, the feed-arm designed to slide on said ledge and engage the lowermost cartridge, the levers connected with said feed-arm, the crank-shaft, the cam thereon adapted to engage and move one of said levers whereby said feed-arm is moved forward, the elevator adapted to receive the cartridge from said ledge and raise the same on a line with the bore, the breech-block adapted to insert, fire, and extract the cartridge, and means for preventing the recoil of said breech-block, substantially as set forth.

5. In a machine gun, the herein-described feeding-mechanism, comprising the chute adapted to receive the cartridges, one on top of the other, the ledge beneath said chute, the feed-arm adapted to slide on said ledge and engage the lowermost cartridge in said chute, the rod or arm pivotally connected to said feed-arm, the depending bell-crank lever pivotally connected at its upper end to said rod or arm, the crank-shaft, the cam thereon adapted to engage and move said bell-crank lever and move the same forward, and the

spring for returning said feed-arm to its normal position.

6. In a machine gun of the class described, a breech-block adapted to insert and fire the cartridges, and means for preventing the recoil of said breech-block, comprising a spring-arm rigidly secured at one end, its free end being bent to engage a recess in said breech-block, and means for releasing said catch from engagement with said breech-block, substantially as set forth.

7. In a machine-gun of the class described, the combination with the breech-block of means for preventing the recoil of the same comprising a spring, one end of which is secured to the breech and having its free end bent to engage a recess in the breech-block, a sliding rod having a beveled end adapted to be inserted beneath said spring and when raised to release it from engagement with the breech-block, a shaft, a cam on said shaft adapted to raise the sliding rod at certain intervals, and means for returning said rod to its normal position.

8. In a machine gun of the class described, the combination with the loading and firing mechanism of mechanism for feeding the cartridges singly thereto comprising a sliding feeder, a rod pivotally connected thereto, a bell-crank-lever pivoted to the breech and having one of its arms pivotally connected to said rod, a projection on the free arm of said lever, a shaft and a cam on said shaft adapted to engage the projection on the lever.

9. In a machine gun of the class described, the combination with the feeding mechanism, of means for raising the cartridges into position to be inserted and fired, comprising an elevator provided with a vertically depending arm, the rocking-lever pivoted to the breech and having one of its ends pivotally secured to said depending arm, the operating shaft, and the cam on said shaft having a pivoted projection adapted to engage the free end of said rocking lever and move the same, whereby said elevator is raised, substantially as set forth.

10. The herein-described improvement in machine guns, comprising the spring-pressed breech-block, the depending rocking-lever pivotally connected thereto, the cartridge elevator having a lower depending arm, the rocking-lever pivotally connected to said arm, the drive-shaft, and the cam thereon having a rigid projection and a yielding projection for engaging, respectively, the rocking-levers of said breech-block and said cartridge-elevator, substantially as set forth.

11. The combination of the feeding mechanism, comprising a feeding-arm, and a bell-crank lever pivotally connected thereto, the spring-pressed breech-block, the depending rocking-lever pivotally connected thereto, the cartridge-elevator having a lower depending arm, the rocking-lever pivotally connected to said arm, the drive-shaft, the cam thereon

having a rigid projection and a yielding projection for engaging, respectively, the rocking levers of said breech-block and said cartridge-elevator, and the second cam on said
5 drive-shaft designed to engage said bell-crank lever and operate the feeding-mechanism, substantially as set forth.

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

ALBERT G. DOUGHERTY.

Witnesses:

LOIS H. BUSKIRK,
CELIA G. RILEY.