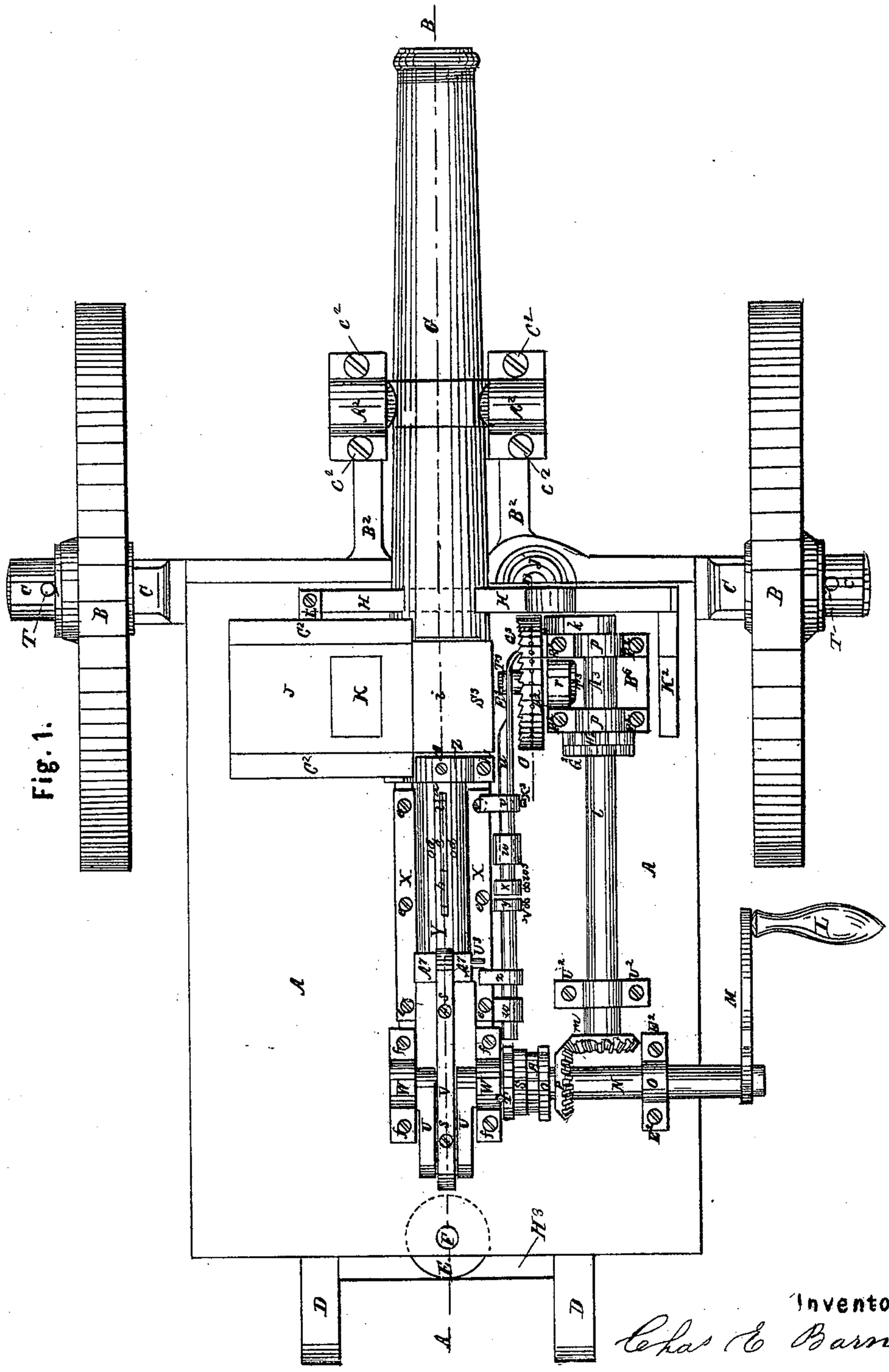
4 Sheets—Sheet 1.

# C. E. BARNES.
## Machine Gun.

No. 15,315.

Patented July 8, 1856.

Fig. 1.




Inventor.
Chas E Barnes

4 Sheets—Sheet 2.

# C. E. BARNES.
## Machine Gun.

No. 15,315.

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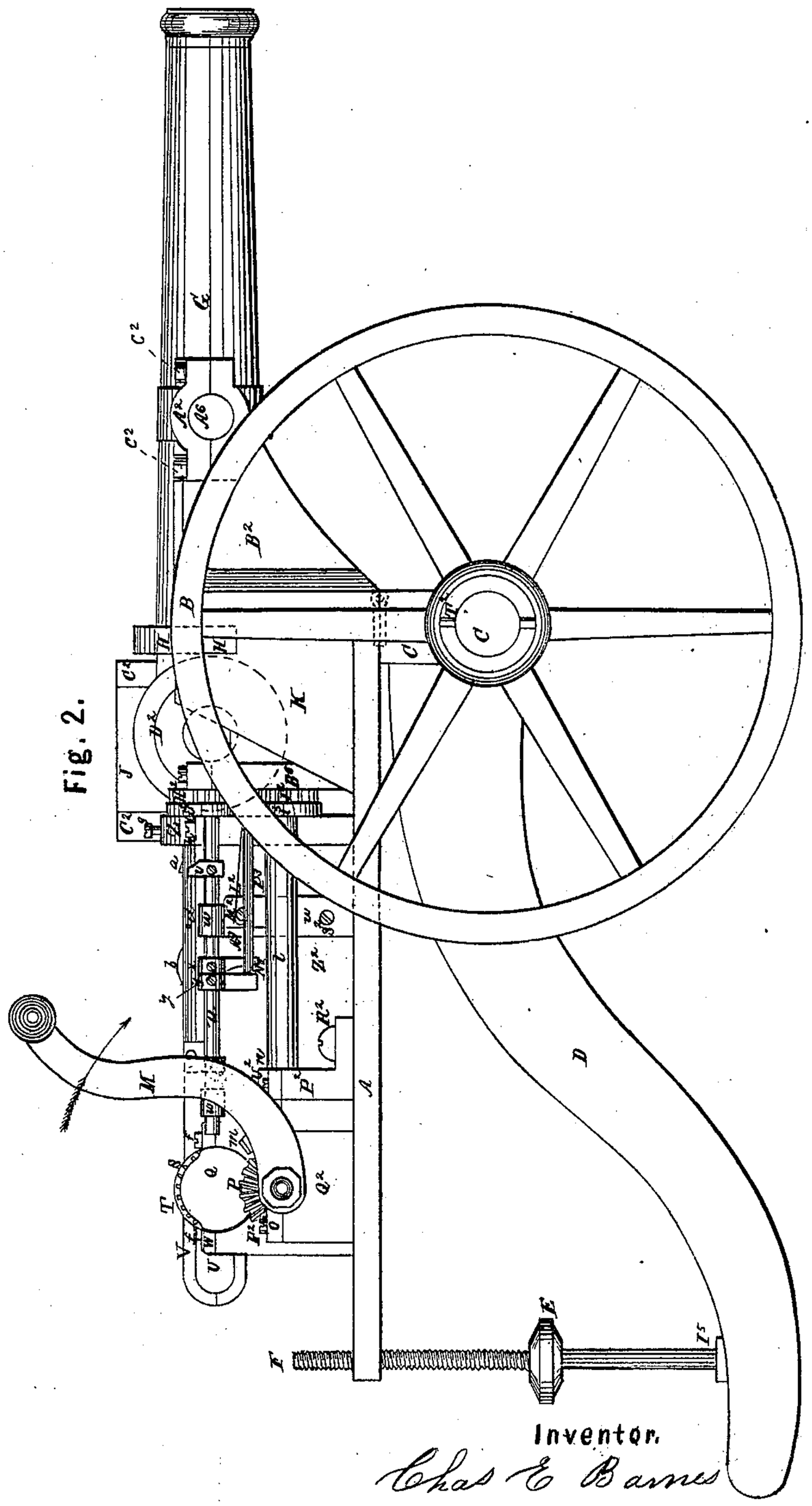
Fig. 2.



Inventor.

Chas E Barnes

Sheet 3.
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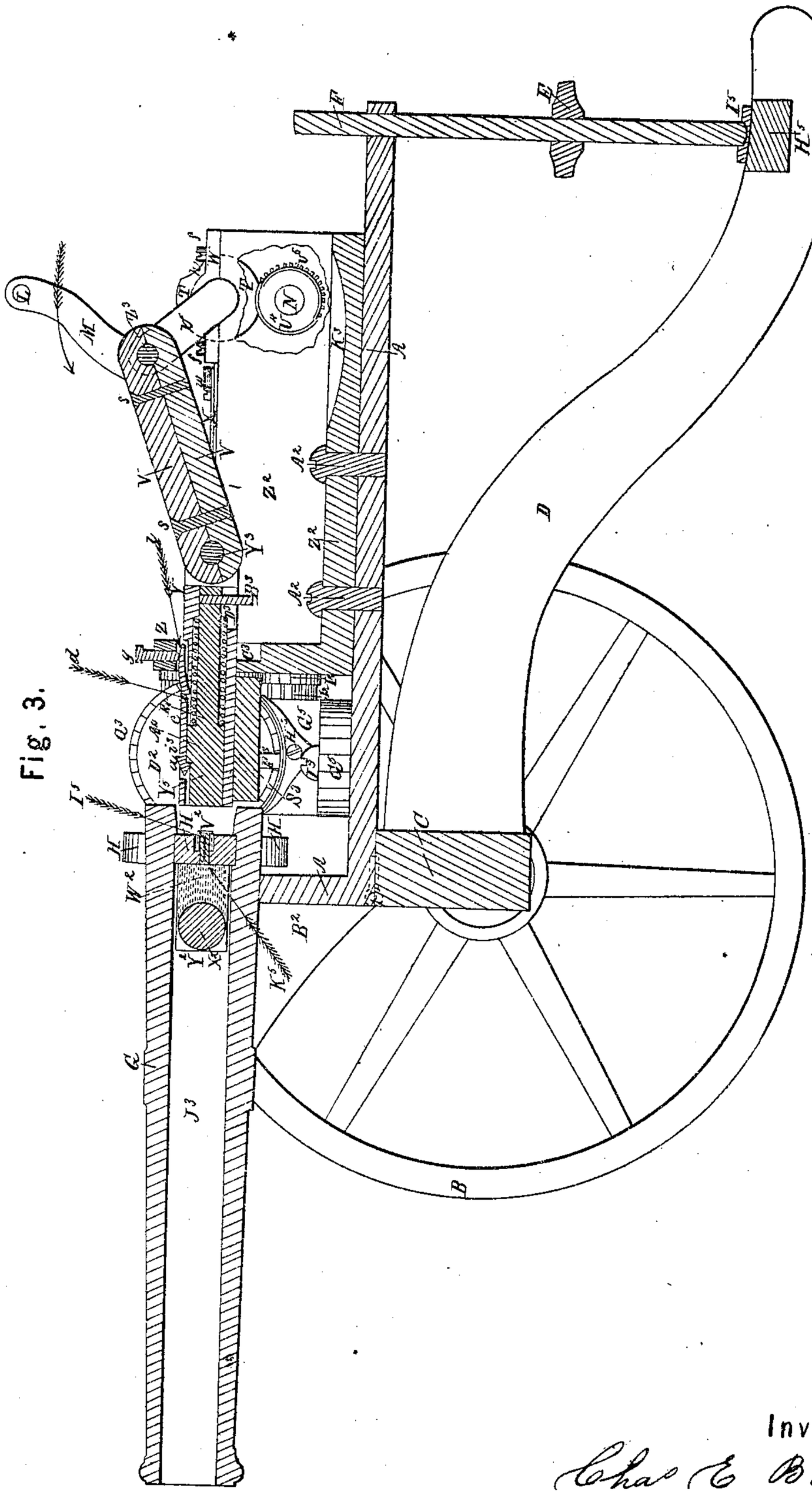
# C. E. Barnes.

## Machine Gun.

No. 15315. Patented Jul. 8. 1856.

Fig. 3.



Inventor.
Chas E Barnes

4 Sheets—Sheet 4.

# C. E. BARNES.
## Machine Gun.

No. 15,315.

Patented July 8, 1856.

Fig. 17.

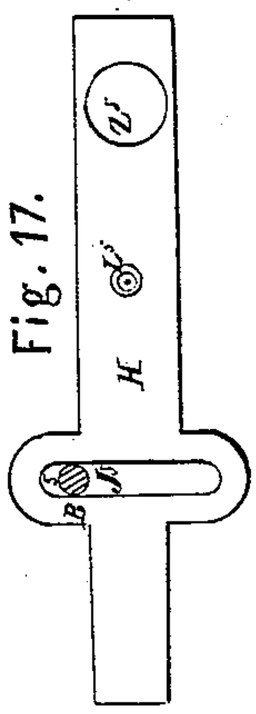


Fig. 18.

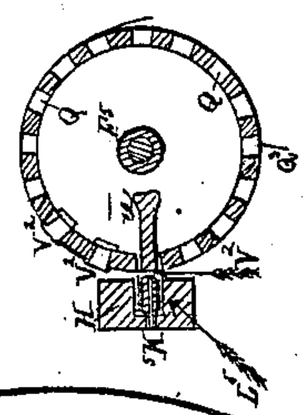


Fig. 4.



Fig. 19.



Fig. 13. Fig. 14. Fig. 15. Fig. 16.

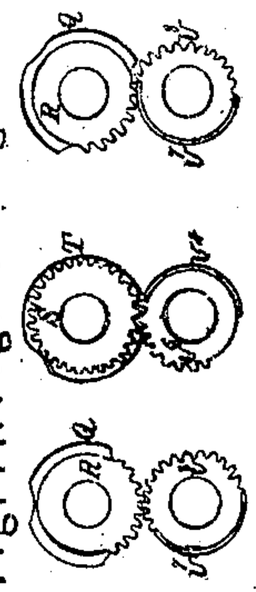
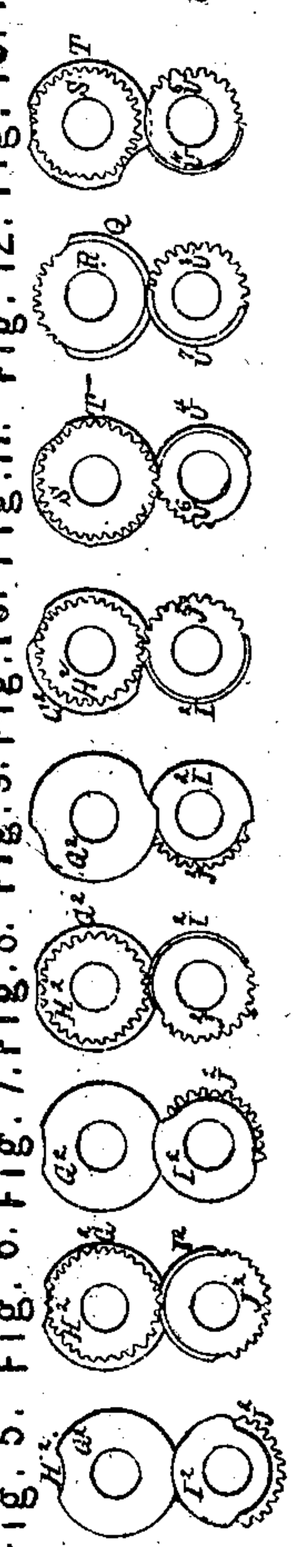


Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12.



Inventor.

Chas E. Barnes

# UNITED STATES PATENT OFFICE.

CHARLES E. BARNES, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO C. E. BARNES AND M. W. OLIVER.

## IMPROVED AUTOMATIC CANNON.

Specification forming part of Letters Patent No. **15,315**, dated July 8, 1856.

*To all whom it may concern:*

Be it known that I, CHARLES EMERSON BARNES, of Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a novel and useful Automatic Cannon; and I hereby declare that the following specification, in connection with the accompanying drawings and references thereon, constitute a lucid, clear, and exact description of the construction and use of the same.

In referring to said drawings, Figure 1 denotes a plan or top view; Fig. 2, a side elevation of the same; Fig. 3, a longitudinal and vertical section on line A B, Fig. 1, showing the parts beyond or toward the bottom of the drawing. Fig. 4 indicates a longitudinal and vertical section, also on line A B, Fig. 1, showing the parts beyond or toward the top of the drawing. Fig. 5 denotes an elevation of the cams $G^2$ and $I^2$ fastened to the gears $H^2$ and $J^2$ in position shown at Fig. 1. Fig. 6 is an elevation of the gears $H^2$ and $J^2$, which are fastened to the cams $G^2$ and $I^2$, as shown in position indicated in Fig. 5. Fig. 7 is an elevation of the cams $G^2$ and $I^2$ and part of the gear $J^2$, to which the cam $I^2$ is fastened, as in position shown at Fig. 4. Fig. 8 is an elevation of the gears $H^2$ and $J^2$ attached to the cams $G^2$ and $I^2$, shown in position at Fig. 4. Fig. 9 denotes an elevation of the cams $G^2$ and $I^2$ connected with the gear $J^2$, in position as shown in Fig. 3. Fig. 10 denotes an elevation of the gears $H^2$ and $J^2$ attached to the cams $G^2$ and $I^2$, shown in position at Fig. 3. Fig. 11 denotes an elevation of the gears S and $U^6$ fastened to the cams T and $U^4$, shown in the position indicated in Fig. 1. Fig. 12 denotes an elevation of the gears R and $U^8$ attached to the cams Q and $U^7$, shown in the position as at Fig. 1. Fig. 13 is an elevation of the gears S and $U^6$ connected to the cams T and $U^4$, in position shown at Fig. 4. Fig. 14 is an elevation of the gears R and $U^8$ connected to the cams Q and $U^7$, shown when the machine is in position as at Fig. 4. Fig. 15 denotes an elevation of the gears S and $U^6$ connected to to the cams T and $U^4$, shown in position at Fig. 3. Fig. 16 denotes an elevation of the gears R and $U^8$ connected to the cams Q and $U^7$, in position shown at Fig. 3. Fig. 17 is a view of the breech-pin disconnected from the machine, showing its slot $J^5$, with the crank-wrist $B^8$ therein. Fig. 18 is a vertical section of the cap-wheel, cap-nipple, and breech-pin on line C D, Fig. 1. Fig. 19 is an inner elevation of the cap-wheel $D^2$, and an end elevation of the breech-pin H, and side elevation of the slide-rod *u*, for moving the caps from this wheel to the nipple, and dog $F^3$ in one of the notches $G^2$ of this wheel, and the rod $P^3$ for operating this dog.

The elevation of the cams and gears shown from Figs. 5 to 16 show them disconnected from my machine.

The nature of my invention consists in self loading and discharging cannon by means of the vibrating plunger which forces the cartridge into the cannon, and which plunger contains the hammer, so operated as to explode the cap; and the cap-wheel for self-capping the gun, together with the arrangement and operation of the working parts, these parts being operated by intermittent and reciprocating motions produced by my within-described arrangement of gears and cams, substantially as as within shown, so as to cause every movement to be in harmony with the others to effect the desired object by the turning of a single crank.

To enable persons skilled in the art to which my invention appertains to construct and carry out the same, I will describe it as follows:

I construct an iron platen, (seen at A, Figs. 1, 2, 3, and 4 of the accompanying drawings,) to which is fixed the principal working parts of my machine. At the forward end of the platen A, I form two stands, (seen at $B^2$, Figs. 1, 2, 3, and 4,) which are so constructed as to receive the cannon G by its trunnions, (seen at $A^6$, Fig. 2,) they being held down by the box-caps $A^2$ and screws $c^2$, Figs. 1 and 2. The forward end of the platen is connected to the axle-tree C, Figs. 1, 2, 3, and 4, by two strong hinges, (seen in dotted lines at Figs. 2, 3, and 4,) which constitutes the turning-point for the platen A, one part of each of which hinges is secured to the platen and the other to the top of the axle-tree C, so that the gun and parts for self-operating it may be elevated or lowered to hit the desired object at which the cannon-ball or projectile is being fired or projected by means of the screw F and wheel E,

Figs. 1, 2, 3, and 4, operated by hand, when desired, the lower end of this screw being sustained in the step $I^5$, Figs. 2, 3, and 4, which is fastened to the cross-bar $H^5$, Figs. 1, 3, and 4. The cross-bar $H^5$ is fastened to the lower ends of the two side pieces of the cannon-carriage. (Seen at D, Figs. 1, 2, 3, and 4.) The upper ends of these side pieces are firmly fastened to the axle-tree C, which is supported by the wheels B, Figs. 1, 2, 3, and 4, the wheels being held thereon by the pins $T^2$. (Seen at Figs. 1 and 2.

Figs. 1 and 2 indicate the first position of my machine—viz., when the plunger Y is drawn to its extreme backward movement. Fig. 3 shows the second position, in which the cannon is just ready to be discharged, and the third, in Fig. 4, shows the position of the various parts just after the cartridge has been deposited in the cannon-barrel.

The barrel G of the cannon is drilled entirely through from end to end, as seen at $J^3$, Figs. 3 and 4. Then a square hole is formed transversely through and near the breech, into which is fitted the sliding breech-pin, (seen at H, Figs. 1, 2, 3, 17, 18, and 19,) so that it may freely slide back and forth. I then form an iron stand, (seen at $Z^2$, Figs. 2, 3, and 4,) and firmly secure it to the platen A by the screws $A^2$, Figs. 3 and 4, and recess this stand, as seen at $K^3$, Figs. 3 and 4, for the crank U to clear as it revolves. The two sides of the stand $Z^2$ project up to receive the ways or slides X, Figs. 1 and 3, which are fastened down by the screws *e*, Fig. 1. I then construct a plunger or ram-rod of iron, (seen at Y, Figs. 1, 2, 3, and 4,) the forward portion of it being made round to fit the hole in the cannon after sliding through the guide Z, Figs. 1, 2, 3, and 4, and the back end is made square, as seen at $A^7$, and grooved so as to fit and slide on the inner edges of the ways X, which constitute the back guide for the plunger Y to slide upon.

To the platen A, I fasten the stand $O^2$, Fig. 2, which constitutes, with the cap Q, Figs. 1 and 2, the outer bearing for the drive-shaft N, Fig. 1, while the inner bearing is formed by drilling a hole in the stand $Z^2$. I construct a crank-shaft, (seen at U, Figs. 1, 2, 3, and 4,) and suspend it so as to freely revolve in bearings formed in the stand $Z^2$. The caps W and screws *f*, Figs. 1, 2, 3, and 4, hold down this crank-shaft, on the inner end of which is secured the gears S and R and cams T and Q, Figs. 1, 2, 3, 11, and 12, which are operated by gears $U^6$ and $U^8$ and cams $U^4$ and $U^7$, (seen at Figs. 3, 11, and 12,) which are secured to the inner end of the drive-shaft N, by which they are revolved. The peculiar construction and shape of these cams and gears are shown in Figs. 11 and 12. The drive-shaft is supposed to revolve continually as the arrow points when the cannon is being fired, and the plunger Y must have an intermittent motion. Consequently a sufficient number of teeth of the gears S and R and $U^6$ and $U^8$ are removed, and the cams must be shaped as seen at Figs. 11 and 12 in the first, and 13 and 14 in the second, and 15 and 16 in the third position of the movement of my cannon.

About midway of the drive-shaft N, I fasten a bevel-gear, P, which gears into and drives another similar bevel-gear, *m*, Fig. 1, fastened to the back end of the secondary drive-shaft *l*, Figs. 1 and 2, which shaft has its bearing in the stand $P^2$, held to the platen A by the screw $R^2$, with its cap *n* held down by the screws $U^2$, and the other bearing is formed by drilling a hole into the stand $B^6$.

To the forward end of the shaft *l*, I fasten the gear $J^2$ and cam $I^2$, which connect with and operate the gear $H^2$ and cam $G^2$ on the secondary crank-shaft $A^8$, which turns in bearings formed in the top of the standard $B^6$, the box-caps *p p* forming part of these bearings, they being held down by the screws $F^2$. The crank *k* drives the breech-pin H by the wrist $B^8$, which fits a slot formed through the breech-pin, as seen at $J^5$, Fig. 17.

I construct a connecting-rod of two pieces of metal, (seen at V, Figs. 1, 2, 3, and 4,) which are held together by the screws S, same figures. One end of this connecting-rod is fitted to the wrist $Z^3$, Figs. 3 and 4, of the crank U, and the opposite end to the plunger $Y^3$, so that by turning the crank U it will vibrate the plunger Y by its wrist $Y^3$, Figs. 3 and 4, being connected to the rod V, as will be hereinafter seen. The plunger Y is made hollow to receive the hammer $Y^5$, Figs. 3 and 4, which is fitted so as to slide freely within the plunger Y. A portion of the back end of this hammer is turned or made smaller than the front part, around which reduced part is coiled a spiral spring, (seen at $D^3$, Figs. 3 and 4,) one end of which presses against the shoulder $F^4$, near the back end of the plunger Y, and the other end against the shoulder $E^4$, formed on the hammer $Y^5$ by turning its back end smaller than the forward end of it, so that when the forward end of the latch *c* is raised by its part *b* coming in contact with the lower end of the screw *g*, Figs. 1, 2, 3, and 4, the hammer $Y^5$ will instantly fly forward and strike and explode the cap $V^2$ on the nipple $L^5$ in the breech-pin H, as seen in Figs. 3 and 18, and of course discharge the cannon.

I construct a percussion-cap wheel (seen at $D^2$, Figs. 1, 2, and 3) with a central hub, (seen at $F^5$, Fig. 18,) which turns on the stud $T^3$, Figs. 1, 17, and 18, fastened to the stand $B^6$ by the box-cap *r*. This cap-wheel is constructed with several recesses in its periphery, (seen at $Q^3$, Figs. 1 and 18,) in which are placed what are called "hat-caps," $V^2$, Figs. 3, 18, and 19, the rim on them preventing their dropping through the recesses $Q^3$ into the center of the wheel.

The cap-wheel $D^2$ is placed directly back of the breech-pin H, so that the cap-nipple $L^5$ in it will be directly forward of one of the caps $V^2$, when the rod *u* will be slid forward by the pin $U^3$ in the plunger Y coming in contact with the stand or arm *v*, held onto the rod *u* by the screw $X^3$, and move one of the caps $V^2$

from the recess $Q^3$ in the cap-wheel $D^2$ and deposit it on the nipple $L^3$. (Seen at Figs. 3 and 18.)

I construct a cap-rod (seen at *u*, Figs. 1, 2, 18, and 19) which freely slides in the stands *w*, Figs. 1, 2, and 3, which are fastened to the stand $Z^2$ by the screws $S^2$. The forward end of the cap-rod *u* is guided by a slot formed through it, (seen at $Q^4$, Fig. 19,) which fits onto the stand $T^3$, Figs. 1, 18, and 19.

On the inner end or edge of the cap-wheel $D^2$ is formed a series of notches (seen at $G^2$, Figs. 1, 3, and 19) corresponding with the percussion-cap recesses $Q^3$ therein. I form a ratchet-arm, $F^3$, (seen at Figs. 1, 3, and 19,) kept or pressed into the notches $G^3$ of the cap-wheel $D^2$ by the spring $L^2$, Fig. 2, held to the stand *w* by the screw $M^2$, its upper end being fitted to turn on the stud $T^3$, Fig. 1, while its lower end is fitted to the notches $G^3$. About midway between the center of the stud $T^3$ and lower edge of the cap-wheel $D^2$, I connect one end of the rod $P^3$, Figs. 1 and 19, by the pivot $P^4$, Fig. 19, while near at the opposite end of it passes through and is guided by the projection $A^9$, Fig. 2, and is bent around and passes between the stands *x* and *y*, held to the rod *u* by the screws $V^3$ and $W^3$, Figs. 1 and 2, as seen at $N^2$, Fig. 2, so that these stands will move the rod $P^3$ by the moving of the rod *u* to push the cap $V^2$ from the cap-wheel $D^2$ onto the nipple $L^5$.

I form a catch on the hammer $Y^5$, as seen at $A^9$, Figs. 3 and 4, so that the forward end of the latch *c*, Figs. 1, 3, and 4, turning on the center *d*, Figs. 1, 2, 3, and 4, may be forced down forward of the catch $A^{10}$ by the spring $C^8$, Fig. 4, to hold the hammer $Y^5$, after the hammer has been held by its pin $B^3$ coming in contact with the surface $D^8$, Fig. 4, of the stand $Z^2$, until the spiral spring $D^3$, Figs. 3 and 4, has been pressed against the shoulder $E^4$, Figs. 3 and 4, of the hammer $Y^5$ sufficient to force it forward, when liberated, to explode the cap $V^2$, Figs. 3, 18, and 19, so that when the plunger and hammer are drawn back by turning the crank M by the handle L, Figs. 1, 2, and 3, until it arrives at the position indicated at Fig. 3, then the projection or beveled end *b*, Figs. 1, 2, 3, and 4, on the back end of the latch *c*, Figs. 1, 3, and 4, comes in contact with the lower end of the screw *g*, Figs. 1, 2, 3, and 4, which presses it down, and consequently raises the opposite end, so as to uncatch it from the hammer $Y^5$, which is then instantly driven forward by the spring $D^3$ with sufficient force to explode the cap $V^2$ and discharge the cannon.

I construct a cartridge box stand (seen at $C^2$, Figs. 1, 2, and 4) and secure it to the platen A, just back of the breech of the cannon. To this stand I fit the cartridge-box, (seen at J, Figs. 1, 2, and 4,) so that it may freely slide back and forth in the stand $C^2$.

A recess or mortise is formed entirely through the cartridge-box J, as seen at K, Fig. 1, into which the cartridge $Y^2$, Figs. 3 and 4, is laid or dropped just before the breech-pin is slid forward.

I construct a cartridge-receiver, which is a part of the stand $C^2$, as seen at $S^3$, Figs. 1, 3, and 4, the lower part of it being semicircular, as seen at *i*, Fig. 1, and the same diameter and height as the bore of the cannon. Into this cartridge-receiver the cartridge $Y^2$ is dropped from the cartridge-box J when it is moved forward, and this movement is effected by being connected to the breech-pin H by the arm I, Fig. 1, so that the same movement which is imparted to the breech-pin H is conveyed to the cartridge-box J, as will be understood. The cartridge is by this movement dropped into the receiver $S^3$, as seen at *i*, just in time for the plunger Y to push it into the bore of the cannon.

The cartridges are formed of tin or any other desired substance, as seen at $Y^2$, Figs. 3 and 4, the back end, of course, being cloth in all cases. The powder is seen at $W^2$ and the ball at $X^2$, Figs. 1 and 2.

There is one cam under the cam Q, and a gear under the gear R, Fig. 1, both being seen at $U^6$ and $U^4$, Figs. 3 and 11, and are fastened to the inner end of the drive-shaft N; also, the gear $U^8$ and cam $U^7$, Figs. 1, 2, 14, and 16, are fastened to the inner end of the drive-shaft N. The elevation of these cams and gears, (shown from Figs. 5 to 16,) indicating the three positions mentioned in the beginning of this specification, conveys all the necessary information and description of them, as they are shown in the machine and connected to it, and these elevations disconnected from the machine will give any competent person knowledge to construct and arrange them, their shape in full being seen in these elevations.

At *j* is formed a recess in the platen A, Fig. 1, in which may be placed a wet sponge, if desired, to wet the breech-pin at each discharge of the cannon, to keep it cool, if necessary.

I form a stand (seen at $K^2$, Figs. 1 and 2) for the breech-pin H to slide in, to give it an outward support while it is being operated by the crank *k*, Fig. 1, and wrist $B^8$, Fig. 17. A hole is formed through the breech-pin, (seen at $Z^5$, Fig. 17,) which is the same size of the bore of the cannon, (seen at $J^3$, Figs. 3 and 4,) so that when the breech-pin H is drawn one way it will allow the cartridge $Y^2$ to be pushed into the cannon through the hole $Z^5$ in the breech-pin H by the plunger Y, and when the breech-pin is driven back it will inclose the cartridge in the cannon, ready for firing, as will be readily understood.

The nipple $L^5$ can be seen, as it is fastened to the breech-pin H, and the hole $K^5$, Fig. 3, through or over which the cap $V^2$ is exploded by the hammer $Y^5$ to fire the cannon. When the cannon is fired the force of the explosion through the fuse will be sufficient to throw the hammer $Y^5$ back to catch on the shoulder $A^{10}$, which constitutes its cocking. If the force of explosion should fail or miss to cock the hammer $Y^5$, then the pin or stud $B^3$ in this hammer $Y^5$ will come against the surface $C^3$ of the stand

$Z^2$ when the hammer and plunger Y are being drawn forward, and in that manner cock the hammer. In case either of these should fail to effect the desired result—*i. e.*, cock the hammer and stop further movement unless the parts work or operate correctly—I form a catch (seen at $i^3$, Figs. 1, 2, 3, and 4) on the forward end of the latch *c* for effectively stopping of the backward movement of the plunger Y by the catch $i^3$, Figs. 1, 2, 3, and 4, coming in contact with the lower end of the screw *g*, if the hammer within the plungers hould not be cocked or thrown back by the force of the discharge of the cannon or the stud $B^3$ coming in contact with the surface $C^3$, Fig. 3, sufficient to allow the catch on the under side of the latch *c* to catch onto the shoulder $A^{10}$, which holds this hammer $Y^5$ in place until the latch *c* is moved or pressed down by its bevel (seen at *l*) coming in contact with the lower end of the screw *g* to explode the cap and fire the cannon, as before mentioned. This stop arrangement is to effectually prevent accidents in case of hangfire and clogging the cannon with a surplus of ammunition, which will be of the utmost importance to do, as will be well known to persons skilled in the art to which my invention appertains.

I claim—

1. The arrangement by which I impart a reciprocating and intermttent motion to the breech-pin H by gears $H^2$ and $J^2$ and cams $G^2$ and $I^2$, Figs. 1, 2, and 3, or their equivalents, so that the gun or cannon may first receive the cartridge, and then close the bore of the cannon back of the cartridge, bringing the nipple on which the percussion-cap is placed in the center and immediately back of the end of the cartridge, ready for firing, essentially in the manner and for the purposes fully set forth.

2. Giving the ramrod or plunger Y a reciprocating and intermittent motion for placing the cartridge $Y^2$ within the gun, and firing it, when so placed, by means of a hammer, $Y^5$, in the plunger Y operated by the spring $D^3$, Figs. 3 and 4, and latch *c*, Figs. 1, 3, and 4, arranged and operated essentially in the manner and for the purposes fully set forth.

3. The cap-wheel $D^2$, Figs. 1, 2, and 3, and its slide-rods *u* and $P^3$, Figs. 1, 2, 18, and 19, so arranged and operated as to place or deposit the cap upon the nipple $L^5$, Figs. 3, 17, and 18, when the breech-pin H is drawn back, so that it can be then advanced or slid into the gun, with the cap placed on the nipple $L^5$ therein, ready for firing, essentially in the manner and for the purposes fully set forth.

4. The cartridge-box J, Figs. 1, 2, and 4, so arranged and operated by the breech-pin, or otherwise, as to deposit the cartridge $Y^2$ into the receiver $S^3$, ready for the plunger Y or ramrod, to force it into the bore of the gun, essentially in the manner and for the purposes fully set forth.

5. The catch $i^3$, or its equivalent, on the latch *c*, or otherwise formed, arranged, and operated to stop the movement of the firing apparatus, to prevent accidents and clogging the cannon with surplus ammunition, essentially in the manner and for the purposes fully set forth.

CHAS. E. BARNES.

Witnesses:

JOHN P. CRANE,

E. W. SCOTT.