2 Sheets—Sheet 1.

# EATON & TURNER.

## Machine Gun.

No. 37,159.

Patented Dec. 16. 1862.

Fig. 1

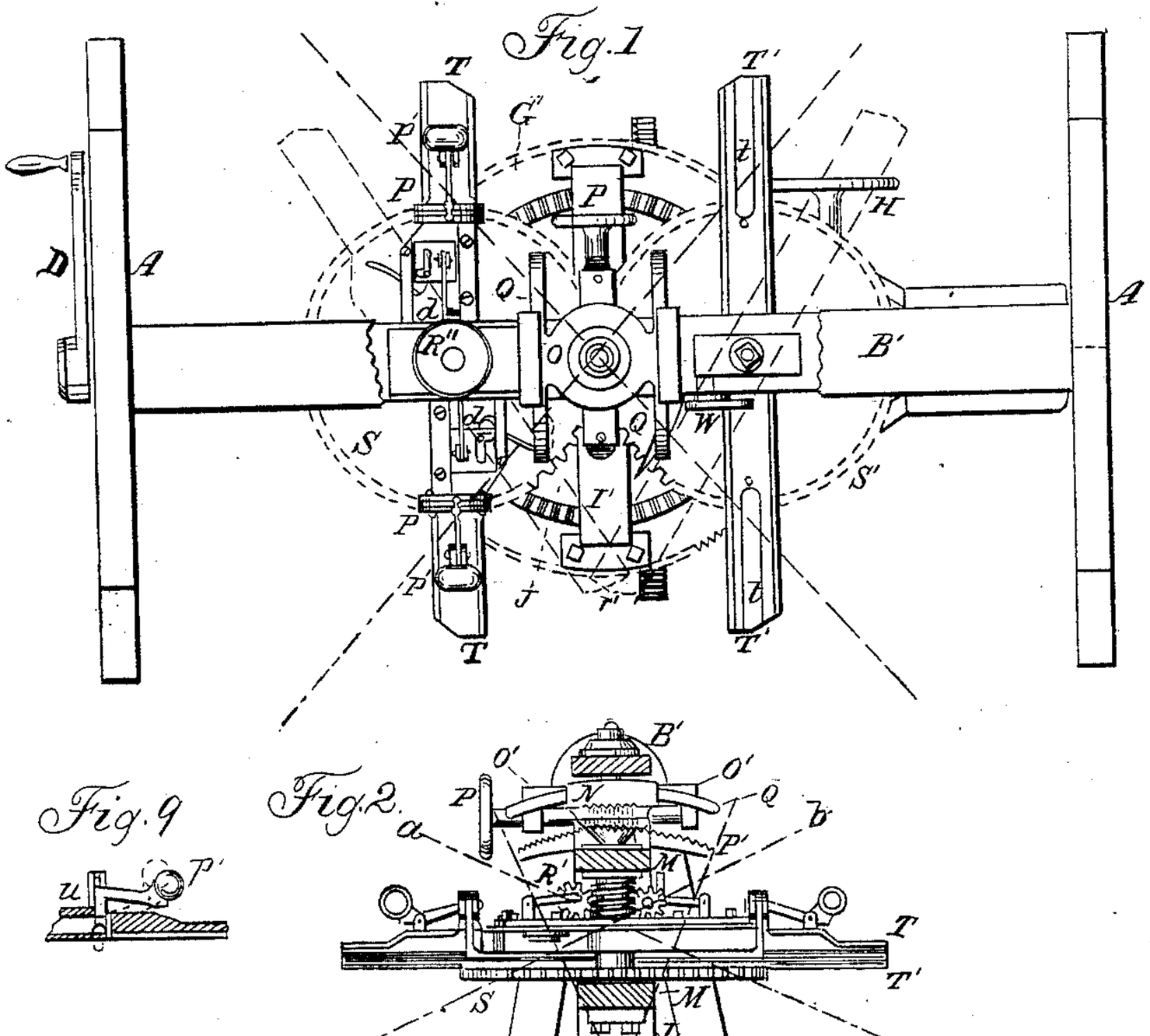



Fig. 9




Fig. 10


Fig. 11.

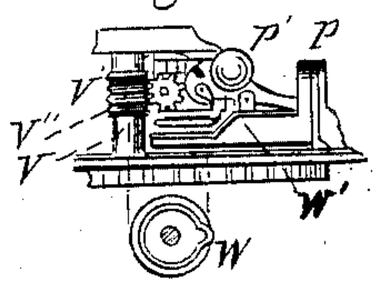



Fig. 2.

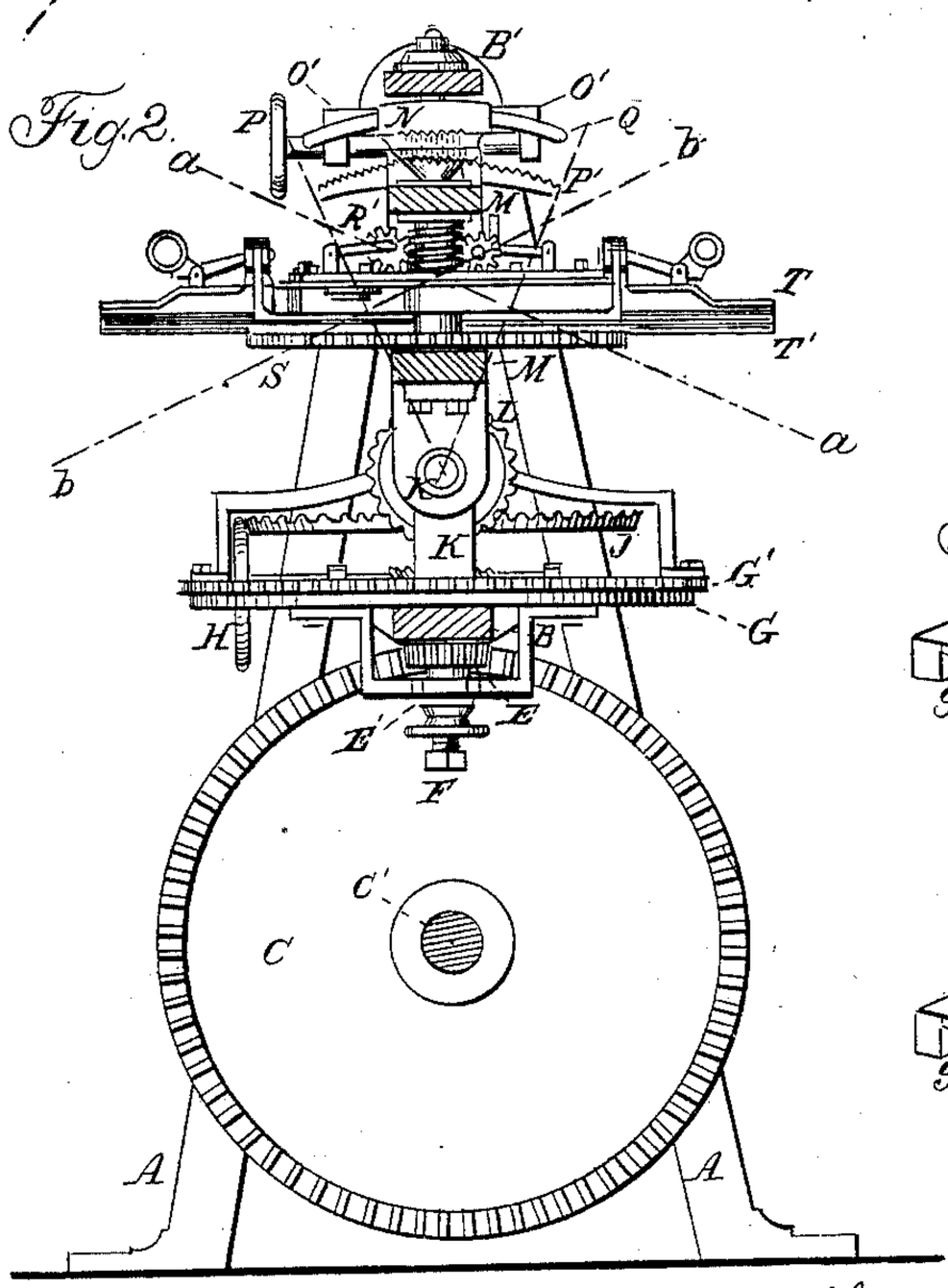



Fig. 15

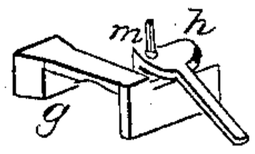
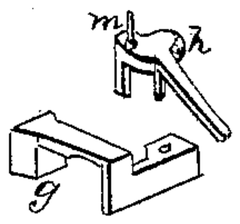



Fig. 16




Witnesses.

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2 Sheets—Sheet 2.

# EATON & TURNER.
## Machine Gun.

No. 37,159. Patented Dec. 16. 1862.

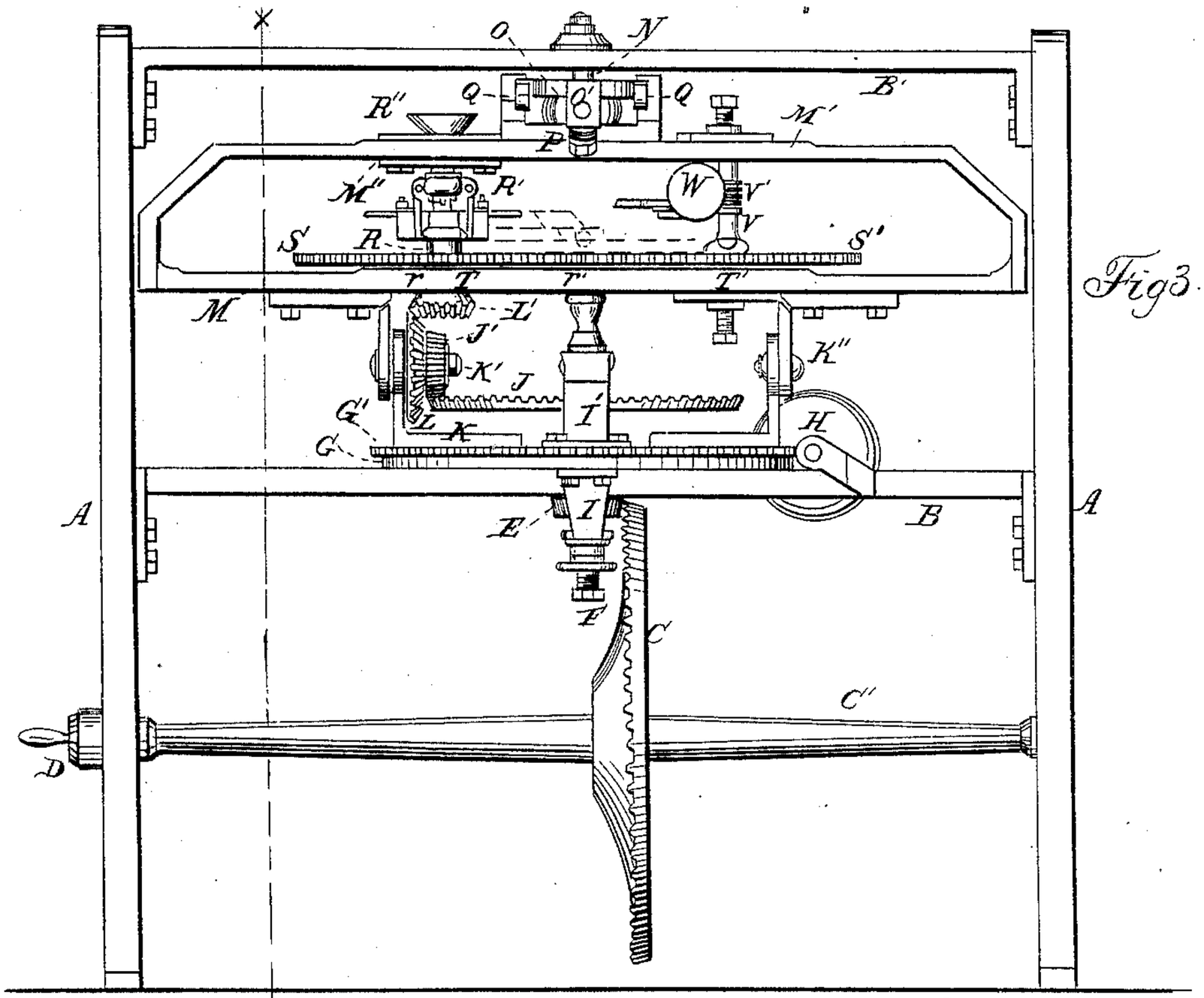


Fig 3.

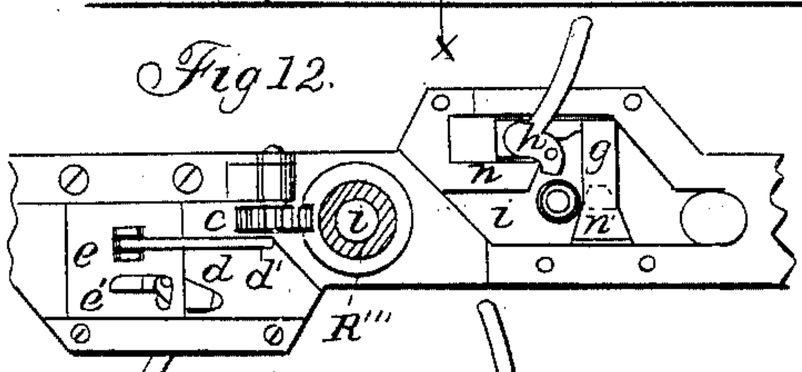


Fig 12.

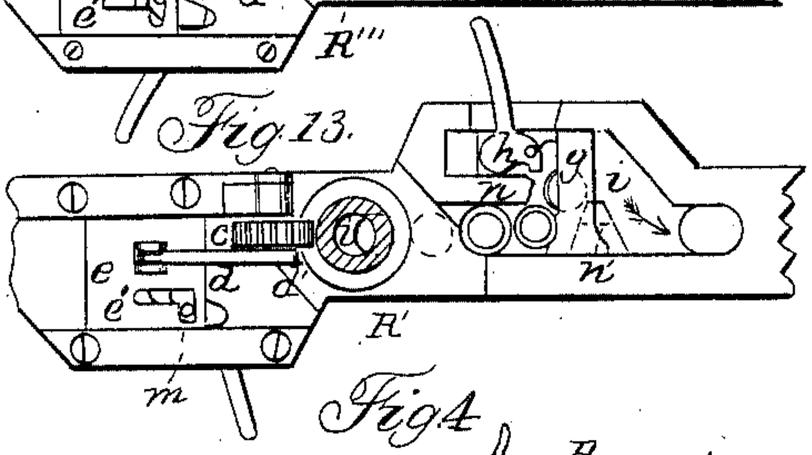


Fig 13.

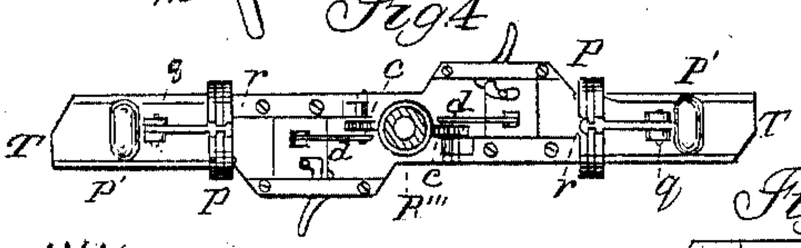


Fig 4

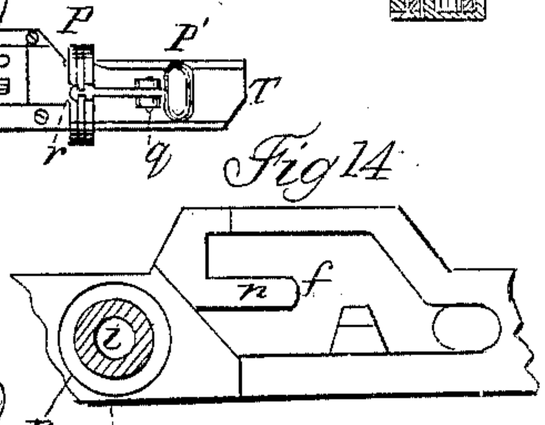


Fig 14

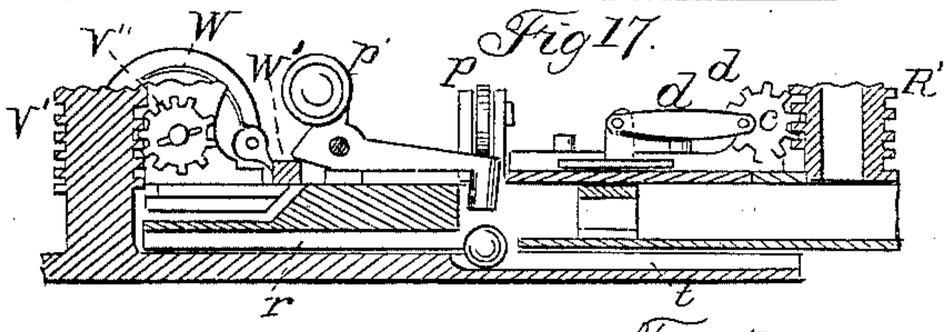


Fig 17.

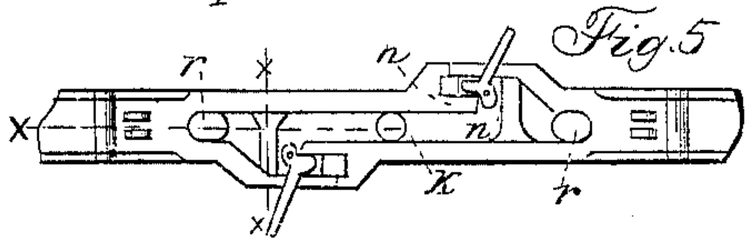


Fig 5.

Fig 6.

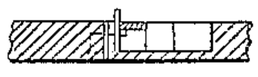

Fig 7.

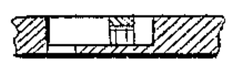

Fig 8.

**Witnesses.**

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**Inventor.**

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# UNITED STATES PATENT OFFICE.

GILBERT C. EATON AND SAML. W. TURNER, OF CLEVELAND, OHIO.

## IMPROVEMENT IN CENTRIFUGAL GUNS.

Specification forming part of Letters Patent No. **37,159**, dated December 16, 1862.

*To all whom it may concern:*

Be it known that we, GILBERT C. EATON and SAMUEL W. TURNER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in an Engine which we denominate a "Compound Centrifugal Gun;" and we do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top view. Fig. 2 is a vertical section in the direction of the line *x x* in Fig. 3, and Fig. 3 is a side view. Figs. 4 to 17, inclusive, are detached sections.

Like letters refer to like parts.

The nature of our invention relates to the construction of an engine by means of which balls of various sizes may be discharged with great rapidity, velocity, and precision by compound centrifugal force alone, the balls being introduced between two grooved arms, which revolve with great velocity and unitedly form what we denominate the "barrel," the several parts being so constructed and arranged that any desired altitude or range can be given to the projectile.

A A represent the end pieces of the frame-work, and B B′ the supporting-bars. Both the end pieces and bars must be made very substantial and be firmly secured together.

C is a driving-wheel secured to the middle of the shaft C′, which has its bearings in the end pieces, A A. The power may be applied by means of a crank, D, upon the end of the shaft, or otherwise. The wheel C gears into a small pinion, E, which is situated upon the lower end of an upright shaft, E′, which runs upon the point or step F. The shaft E′ passes through the center of a circular face-plate, G, which is firmly secured to the supporting-bar B. The shaft E′ also passes through an adjusting-plate, G′, which rests upon the plate G. The plate G′ is adjusted to any desired point of the compass, as indicated by the red lines in Fig. 1, by means of an adjusting-screw, H, which works in the edge of the plate G′. The point F, upon which the shaft E′ runs, is supported by a stirrup, I, which is attached to the lower side of the plate G, the upper end of the same shaft being supported by a bridge-tree, I′, which is in like manner secured to the upper side of the traverse-plate or turn-table G′.

J is a multiplying bevel-gear wheel secured to the upper portion of the shaft E′, and gears into the pinion J′, which pinion has its support from the upper side of the traverse-plate or turn-table G′, as seen at K K′. Upon the shaft K′ is secured a multiplying-wheel, L, which gears into the pinion L′.

M M′ is an adjustable frame, which supports the revolving grooved arms hereinafter to be described, upon the under side of which is situated the pinion L′. The frame M M′ is supported at one end by an articulation upon the shaft K′, and at the other end by a corresponding articulation, K″, so that it can be adjusted to any desired angle within the limits of the lines *a a b b* in Fig. 2. The upper section of this frame M M′ is supported by a pivot or point, N, which passes through the upper piece of the frame-work B′ on a line vertical to the point of the step F. The point of the pivot-screw N sets into a circular plate, O, Figs. 1 and 3, from each side of which is a stud, O′, for the support of a screw, P. This screw P works in a segmental gear, P′, by means of which the frame M M′ can be set at any angle within the limits of the lines *a a b b* in Fig. 2, the axis K′ K″ forming the point of articulation. Above the screw-gear P′ is placed segmental arms Q, which work in ways, and thus the parts are kept firm and steady. The shaft R of the pinion L′ passes upward through the frame-piece M and terminates above M′ in the hopper R″, the shaft being hollow down to the part seen at R in Fig. 3.

V is a shaft corresponding in position to that seen at R. It is not hollow, and is not provided with a hopper, as is the shaft R. Upon each of these shafts is secured spur-gear wheels S S′, which gear into each other, and having the same number of teeth, it follows that both shafts R and V have the same velocity.

To the shaft R is secured a grooved arm, T, (shown detached in Fig. 4, and in section enlarged in Figs. 12, 13, 14.) The hollow shaft R passes through a hollow screw, R‴, which is fastened to the under side of the piece M′ at M″, as shown in Fig. 3. The screw R‴ is

thus stationary, while the arm T rotates within the hollow shaft R. The two ends of the arm being duplicates of each other, a description of one end will serve for both.

*c* is a small pinion having twelve teeth, which fit the stationary screw R‴. This pinion *c* being attached to the arm T, it follows that twelve revolutions of the shaft R and arm T will produce one revolution of the pinion *c*.

*d* is a connecting-rod, that is attached to the sliding plate *e*, which is provided with a right-angled slot, *e′*. This plate *e* covers the cavity *f*, Fig. 14, in the arm T.

Figs. 15 and 16 show detached a sliding stop, which is placed in the cavity *f*, Fig. 14. This stop is shown in place at *g h* in Figs. 12 and 13. When the arm T is in rapid motion the centrifugal force keeps them in position seen in Fig. 12. Now, if a ball, *i*, is placed in the hopper R″, it will by its gravity fall through the hollow shaft R till it is arrested by the cavity in the arm T, which, by its centrifugal force, carries it onward till it lodges in the throat of the stop *g h*, Fig. 12; but the action of the screw R‴ upon the pinion *c* is changing the position of the stop *g h* by means of its action upon the sliding plate *e* from the position seen in Fig. 12 to that shown in Fig. 13. When the pin *m* enters the angle of the slot *e′* the centrifugal force of the ball moves back the stop *h* to the position seen in Fig. 13, and the ball *i* passes out in the direction of the arrow into the groove of the arm; but it is again arrested by a pair of clutches, *p*, (shown in Fig. 4.) In the act of drawing up the stop *h* so that the ball can pass, as seen in Fig. 13, the stop *g* is also drawn up, so that the passage between the points *n* and *n′* is too narrow for the passage of the ball, and the next succeeding ball (or a series of them) remains as seen in Fig. 13 until the pinion *c* performs another complete revolution, for as soon as the ball passes the stop *h* the stop falls back into the position seen in Fig. 12, and prevents the outward passage of the ball until the pinion *c* completes its revolution, pending which the stop *g* moves back to the position seen in Fig. 12. It follows, therefore, that if the two pinions *c c* are set or adjusted in opposition to each other every six revolutions of the arm T will pass a ball through one or the other of the stops, and if the adjustment is equal the intervals of the passage of the balls will be equal. From the position of the clutch *p* the arm is grooved upon the under side to the end, as seen at *r* in Figs. 2, 3, and 17, along which the ball is carried in the act of being discharged.

T′ is an arm secured to the shaft of the cog-gear S′, with the groove *t* upon the upper side, so that in their joint revolution both of the arms act simultaneously upon the ball to effect its discharge the instant it is released from the clutch *p*.

Upon each end of the arm T is a weighted lever, *p′*, which has its fulcrum at *q*, Figs. 1 and 4. (Shown also in section in Fig. 9.) When the arm is in rapid motion the centrifugal force acts upon the weight *p′*, in concert with its gravity, to keep the lever in the position shown in Fig. 9, the long arm pressing against the upper ends of the clutches *p*, as seen at *u*, Fig. 9. The consequence is that the weight of the ball is not sufficient to separate the clutches as long as they are kept in position by the weighted lever *p′*. We have provided means for raising this lever at certain intervals corresponding with the passage of the balls through the stops *g h*. For this purpose the shaft V is provided with a screw, V′, having the same lead as the screw R′, which screw puts in motion a pinion, V″, and this pinion carries on its shaft the cam W, which moves at every entire revolution an inclined plane, W′, toward the weighted lever *p′* and lifts it from the position seen in Fig. 9 to that seen in Fig. 11, thus leaving the clutches *p* free to act from the impulse of the ball *i*, and the clutches, being thus left free to act, instantly release their hold upon the ball. The ball, being in this manner set free, is carried outward in the grooves *r t* of the arms by their compound action, and is discharged at *r′* in Figs. 1 and 3.

What we claim as our improvement, and desire to secure by Letters Patent, is—

1. The stirrup I and bridge-tree I′, in combination with the plate G and turn-table G′, arranged as specified, for the purpose of giving horizontal range to the ball.

2. The turn-table G′, in combination with the articulation K′ K″, for the purpose set forth.

3. The frame M M′, in combination with the articulation K′ K″, for giving altitude to the projectile, as specified.

4. The arms T T′, operating in concert within the frame M M′, for the purpose specified.

5. The stops *g h*, operated as and for the purpose set forth.

6. The clutches *p* and weighted lever *p′*, in combination with the cam W, arranged and operating as and for the purpose specified.

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S. W. TURNER.

Witnesses:
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A. W. MCCLELLAN.