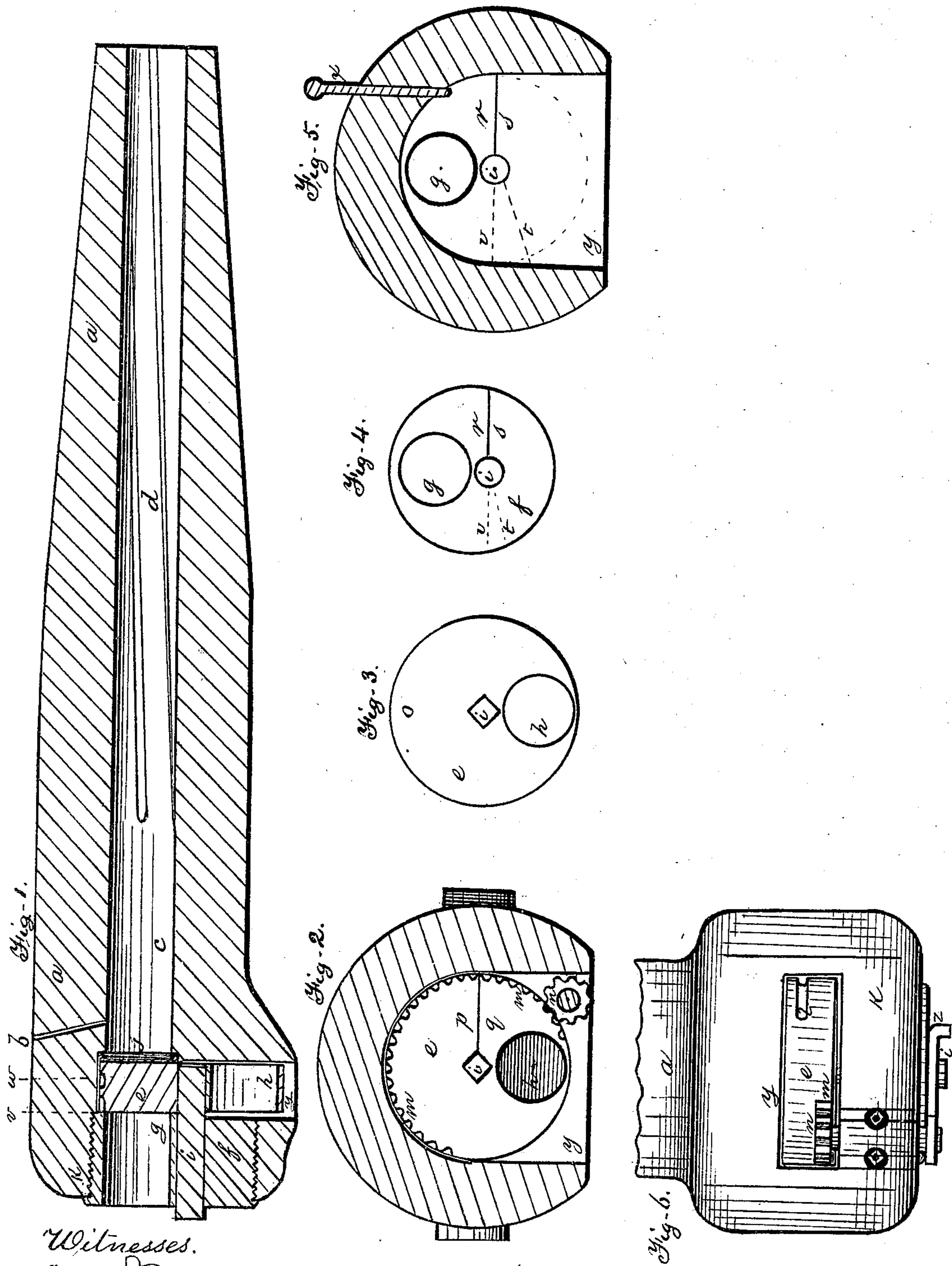


W. W. HUBBELL.
Breech-Loading Ordnance.

No. 149,478.

Patented April 7, 1874.



Witnesses.
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IMPROVEMENT IN BREECH-LOADING ORDNANCE.

Specification forming part of Letters Patent No. 149,478, dated April 7, 1874; application filed March 18, 1874.

To all whom it may concern:

Be it known that I, WILLIAM WHEELER HUBBELL, of the city of Philadelphia, State of Pennsylvania, have invented a Breech-Loading Cannon, of which the following is a specification:

The object of my invention is to load at the breech, for all sizes of cannon, with serge-bag cartridge and elongated projectile, and secure it tightly to fire, and open the breech freely to load, conform to expansion and contraction, and produce a durable serviceable gun by the peculiar construction of a circular breech-block, and of the breech of the barrel, with their appliances, to operate together as described, and shown in the accompanying drawings.

Figure 1 is a section through the axis of the entire cannon. Fig. 2 is a cross-section of Fig. 1 on the line *v*. Fig. 3 is a view of the front face of the circular breech-block. Fig. 4 is a front view of the face of the screw breech-piece *f*. Fig. 5 is a cross-section of the barrel of Fig. 1 on the line *w*, showing the front of the rear or breech when made of solid metal in place of the screw-breech *f*. Fig. 6 is a view of the lower face of the breech of the gun, with the circular breech-block *e* within the recess *y*.

Like letters refer to similar parts.

a a is the barrel, with rifled bore *d*, touch-hole *b*, and chamber *c*, to receive the projectile and serge bag cartridge. *j* is a circular ring or bush, of square bar steel, iron, or copper, to form a joint or face for the rear face of the chamber *c*, against which the front face of the circular breech-block is tightly borne to form a close joint. *k* is the breech end of the barrel, and into it is firmly fitted a screw breech-piece, *f*, having a loading-hole, *g*, through it on a line with the chamber *c*, and fully as large in diameter. Below this loading-hole *g* is a shaft, *i*, extending parallel with the axis of the bore, and through the breech-screw *f*, which sustains the circular breech-block *e*. This breech-block moves backward and forward on this shaft, and half-way around and back with it, when squared, as shown; or on it when made round through the wheel. The breech *k* contains a mortise upward from the under side, as shown in Figs. 1, 2, 5, and

6, letter *y*. The mortise is open at the bottom. The sides are parallel and the top semi-circular, having a strong body of solid metal at the sides and top to connect the breech *k* with the barrel *a*, and endure the recoil stress of the discharge. The width of this recess is about equal to the diameter of the bore, and is made to receive the circular breech-block, of sufficient thickness and diameter for the size of the gun. The front face of the breech-screw *f* forms the rear face of the recess against which the circular breech-block bears. In Fig. 5 this face is shown in the solid metal of the breech. It is made either or both ways, and always has the loading-hole *g* and shaft-hole *i* through it, and also has the face formed with an inclined circular bevel from the line or face *r* to *u* and *t*. The face is about a quarter of an inch highest at *r*, and bevels across the loading-hole *g* to *u* in a half-circle, which forms the face on which the recoil stress is received from the circular breech-block. The bevel from *t* to *u* is to tighten firm upon as the breech-block moves up to inclose the charge. The bevel may extend from *t* to *s*; or this part may be level, leaving *r* the highest face, and extending horizontally, so that the resisting bevel-face is about equal both sides of the charge, or charging-hole, or bore of the gun. The breech-block is constructed of a diameter about twice and a half that of the chamber *c*, so as to admit the loading-hole *g*, the shaft *i*, and the inclosing-face *o* within its circuit. The front face *o*, Fig. 3, of this breech-block is at right angles to the axis of its shaft *i* and the axis of the chamber *c*, and the solid part *o*, Fig. 3, bears against the bush-ring or joint *j* of the chamber to inclose the charge to fire; and, by turning this breech-block half-way on its shaft, or with it, it presents the loading-hole *h*, opposite the chamber, to sponge out, and insert a new charge through the hole *g* in the breech, through the hole *h* in the block, into the chamber *c*, which are then coincident, and form a continuous channel for the passage of the charge forward in loading. The rear face of this breech-block is shown in Fig. 2. This rear face is also constructed with a circular bevel, the reverse of that on the breech-screw *f*, or breech-face *r u t s*, Fig. 5, and fits it

firmly on the upper semicircle $r u$ when tightened up. The letter p denotes the highest part of the bevel-face, and q the lowest part. The line between them is the shoulder between the top and bottom of this circular inclined plane or bevel-face. In making a half-turn, therefore, of this breech-block against the beveled breech-face the wheel is forced forward on its shaft against the joint j of the chamber and tightly incloses the charge; and reversing the breech-block half a turn releases this bearing and brings the loading-hole h in line, to insert another charge. The front face o of the circular breech-block, being wide, allows it to tighten up or turn more or less than half-way, to firmly secure the charge with a tight joint, as the contraction or expansion from cold or heat, or the accumulation of refuse matter, may require, it being self-regulating in this respect, owing to this construction, which is vitally important to the success of the gun. In order to turn or move and control this breech-block, cog-teeth $m m$, Fig. 2, are cut on the rear face of its periphery, a little over half the circuit, as shown, into which is geared a pinion-wheel, n , on a shaft with crank, z , secured to the lower face of the breech k , as shown in Fig. 6, the pinion-wheel n being shown in position also in Fig. 2. In case this pinion or crank gets broken I have made the main shaft i of the breech-block with a square, and to project in the rear to receive a crank, and thus turn it directly with this main shaft. The shaft is movable, and secured in place with a slot and pin, or catch. By removing this shaft the breech-block will fall out of the recess y . To place the block, it is raised up into this recess and the shaft slid into it at i . To stop the hole h opposite the chamber, a slot with shoulder l is cut in the periphery of the breech-block, Fig. 6, half-way around, into which drops a pin, x , Fig. 5, extending through and above the barrel. One shoulder, l , coming against this pin, stops the wheel when the hole h is opposite the chamber c ; and when reversed the end of this pin comes against the opposite end or shoulder of this slot l , and by striking the pin it delivers a

blow on the periphery of the breech-block, to start it in case it sticks in large guns, which may at times be possible. The breech k of the barrel is enlarged in diameter, as shown in Figs. 1, 2, 6, in order to make the recess y large enough to receive the circular breech-block and give a thickness of solid metal at the top and sides of the recess, to sustain the enormous recoil stress thrown on it. This thickness should be at least equal to and may be greater than the diameter of the chamber c . The breech-block should be made of steel or good iron, and its thickness about equal to the diameter of the chamber c . The breech-block may be cut across to form a loading-hole. In large ordnance I extend the grooves and lands back through the chamber c , through the loading-hole h , and through the hole g in the breech to the rear, and groove the projectile correspondingly, so that it takes the lands and the grooves on insertion, and passes forward into the chamber c , a rod, with shoulder, being used to regulate the distance of insertion. The projectile is loaded first, then the cartridge. In small or three-inch artillery, the projectile is banded with soft metal and canvas, or otherwise suitable material, and is pressed forward by the discharge from the smooth chamber into the grooves; or these small guns also may have the grooves and lands cut through to the rear and use a grooved projectile. In fact, both large and small guns may be grooved and used either way, this being one of the great advantages of this breech-loading system.

I claim as my invention—

1. The circular breech-block e , provided with bevel-face $p q$, and hung upon shaft i , in combination with the breech of the barrel a , having bevel-face $r s$, the parts being constructed and adapted to operate together substantially as described.

2. The pin x , operating through the barrel a in the slot l , to stop and start the breech-block, as described.

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Witnesses:

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