

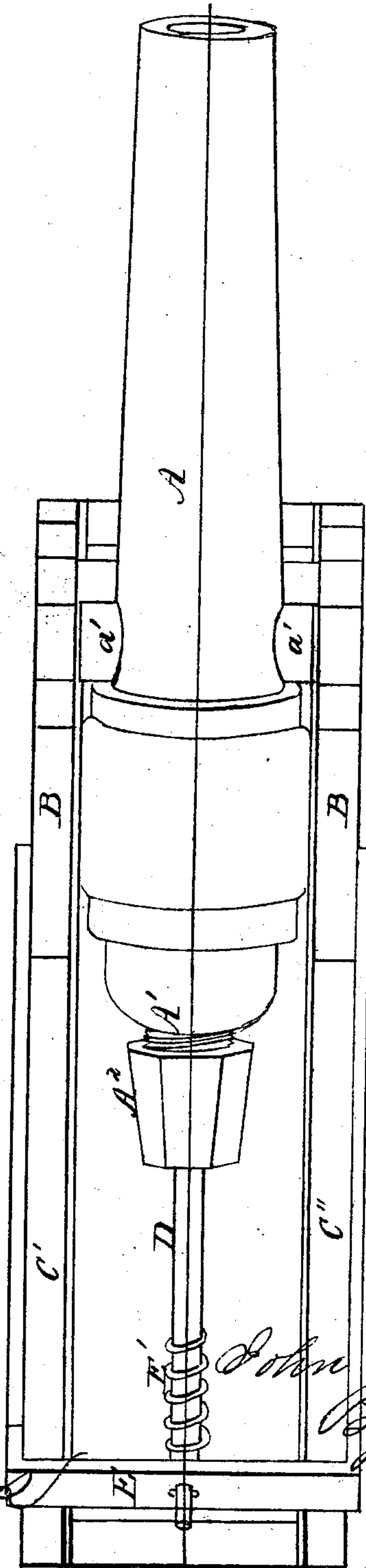
J. B. ATWATER.

Ordinance.

No. 43,382.

Patented July 5, 1864.

Fig. 1.



Witnesses

Chas. L. DuBois  
C. D. Smith

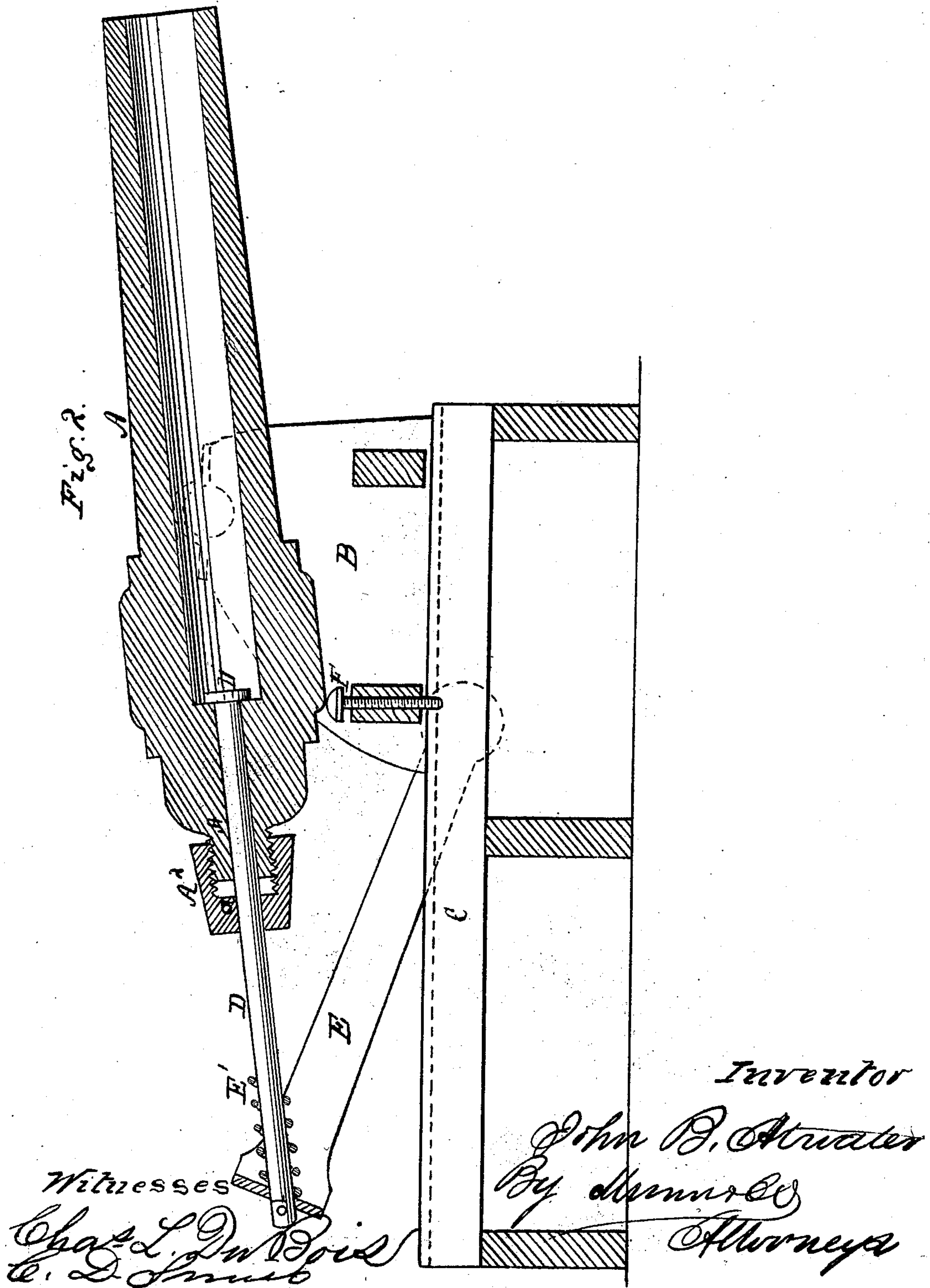
Inventor

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# UNITED STATES PATENT OFFICE.

JOHN B. ATWATER, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN PROVISION FOR THE RECOIL OF ORDNANCE.

Specification forming part of Letters Patent No. 43,382, dated July 5, 1864.

*To all whom it may concern:*

Be it known that I, JOHN B. ATWATER, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Ordnance; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of a cannon illustrating my invention. Fig. 2 is a vertical longitudinal section of the same in the line  $x x$ , Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to apply the recoil of the gun in such manner as to increase the explosive force of the charge; and to this end the invention consists, essentially, in the employment of a piston, which is passed through a corresponding gas-tight aperture in the breech, and adapted to operate in the manner to be explained.

In order that others skilled in the art to which my invention appertains may be enabled to fully understand and use the same, I will proceed to describe its construction and operation.

In the accompanying drawings, A may represent a cannon mounted upon trunnions  $a'$ , having their bearings in cheeks or standards B B, which are adapted to slide upon ways C' C' of the carriage or bed C. D represents what may be termed a "piston," which passes through a corresponding aperture in the breech. On the end of the piston which passes into the cannon is formed a head, D', the diameter of which may be equal to about one-half the diameter of the bore of the gun, as shown in Fig. 1. On the rear end of the gun is formed a cylindrical screw-threaded projection, A', upon which is fitted a threaded octagonal nut, A<sup>2</sup>, which has in the rear end of its threaded cavity a ring,  $a$ , formed of lead or other suitable soft metal, and employed for the purpose of forming a perfectly gas-tight joint between the rod D and the aperture in the breech, through which it passes. E represents a strong metallic hoop, which may be constructed in the form shown in Fig. 1, and pivoted to the bed or carriage C. The rear end of the rod D is attached to the hoop E by any suitable means, so as to retain the rod in

an immovable position when the gun is discharged. Between the rear end of the gun and the hoop E is interposed a strong spiral spring, E', which acts to lessen the shock of the recoil in the manner to be explained.

F represents an adjustable screw, by which the elevation of the gun may be varied, as desired.

Operation: The normal position of the gun, or that in which it is designed to be fired, is shown in the drawings—that is to say, the gun A is advanced to a position in which the head D' of the piston D fits snugly against the rear end of the bore. The gun being discharged is allowed to recoil, while the piston, being held stationary, enters the chamber of the gun. For a six-inch gun I employ, by preference, a piston-head three inches in diameter, in order to leave exposed to the pressure of the gases upon the rear end of the bore around the head D' sufficient surface to insure a sufficiently powerful recoil. Thus in a gun and piston of the above given diameters the surface of the piston-head D' exposed to the action of the gases would be six square inches, while the rear surface of the bore exposed to pressure around the piston-head would be about twenty-two inches, the preponderancy of pressure upon the bore being sufficient to cause a powerful recoil of the piece, which is adapted to readily run back upon the ways C C. The number of square inches contained in the piston D entering the bore before the shot has left the muzzle of the gun add proportionately to the elastic force of the gases by compressing the same into a smaller compass, and consequently increase in the same relative proportion the power and velocity of the ball. It will be seen that this increase in the power of the gases caused by the occupancy of the bore by the piston begins and continues to apply itself when most needed—that is, just after the inertia of the shot has been overcome by the explosive force of the charge, and when the elastic force of the gases begins to diminish in consequence of the greater space they are allowed to occupy as the ball moves toward the muzzle. Upon a gun carriage or bed of sufficient weight to support a six-inch gun the shock which the piston receives when the charge explodes and the subsequent pressure of the gases would

have scarcely any effect, the same being applied directly to the hook E; and when the piece has recoiled to its full extent, and is about to close up the spiral-spring E', the force of the recoil will have been so far spent that the impact thereof upon the hoop E will be scarcely perceptible.

The soft-metal ring *a* constitutes an effectual gas-check, and as often as the same may become loose by wear the turning of the nut A<sup>2</sup> will compress the ring, and thus cause the ring to form as tight a joint as when first applied.

Having thus described my invention, the following is what I claim as new therein, and desire to secure by Letters Patent:

1. A piston, D, (with or without the head D') adapted to be projected within the bore by the

force of the recoil, in any manner substantially as described.

2. The combination, with the piston D, of hoop or frame E, adapted to hold the said piston against recoil, substantially as and for the purposes specified.

3. The combination of the spring E' with the piston D and hoop E to gradually arrest the recoil of the gun, substantially as set forth.

4. The combination of the stuffing-box A<sup>2</sup> *a* with a piston D, adapted to be projected within the bore by the recoil of the gun, as explained.

J. B. ATWATER.

In presence of—

J. A. HOISINGTON,

C. L. JENKS.