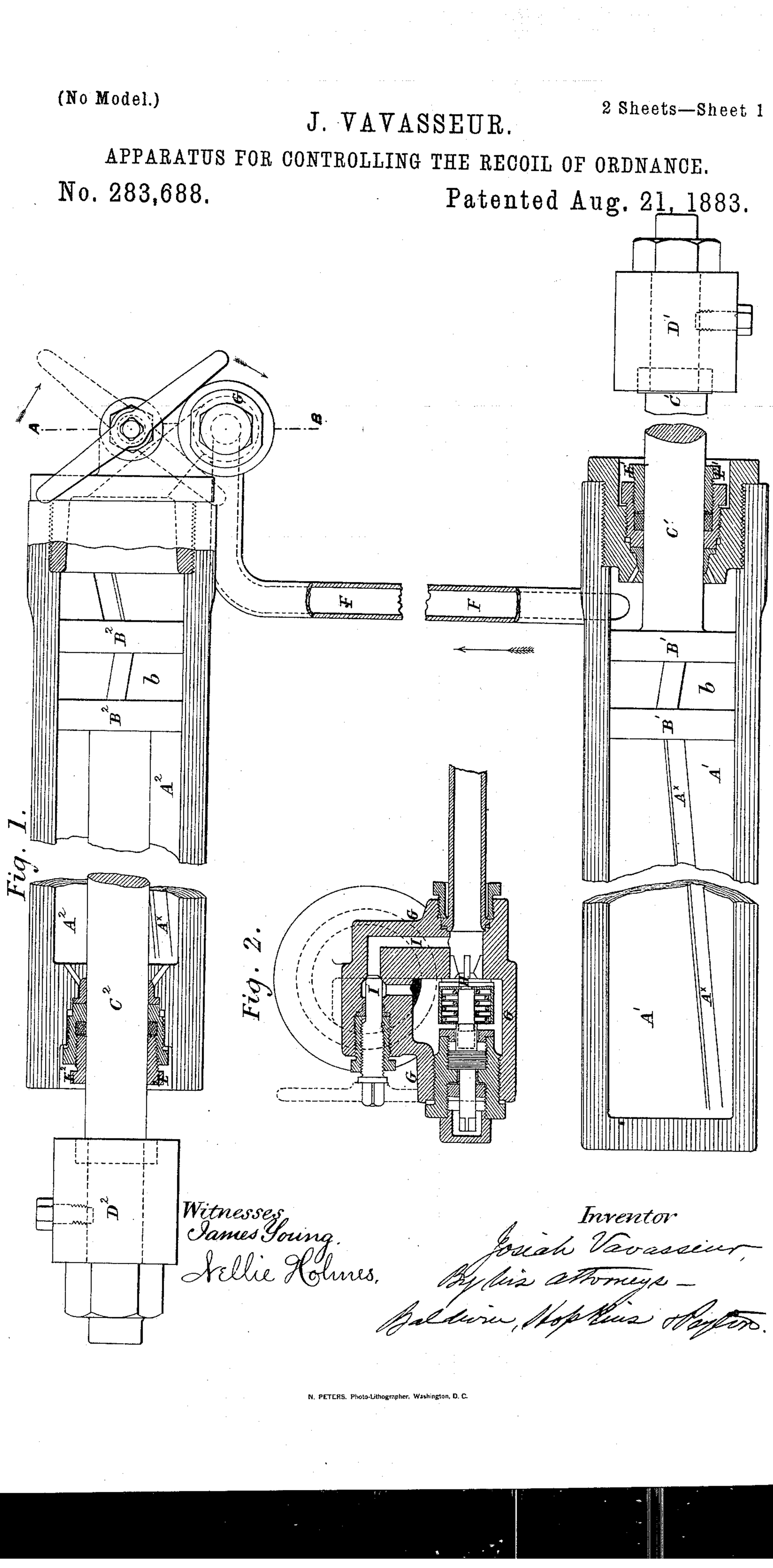
(No Model.)

2 Sheets—Sheet 1

J. VAVASSEUR.

APPARATUS FOR CONTROLLING THE RECOIL OF ORDNANCE.

No. 283,688. Patented Aug. 21, 1883.



Witnesses,
James Young.
Nellie Holmes.

Inventor
Josiah Vavasseur,
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Baldwin, Hopkins & Peyton.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

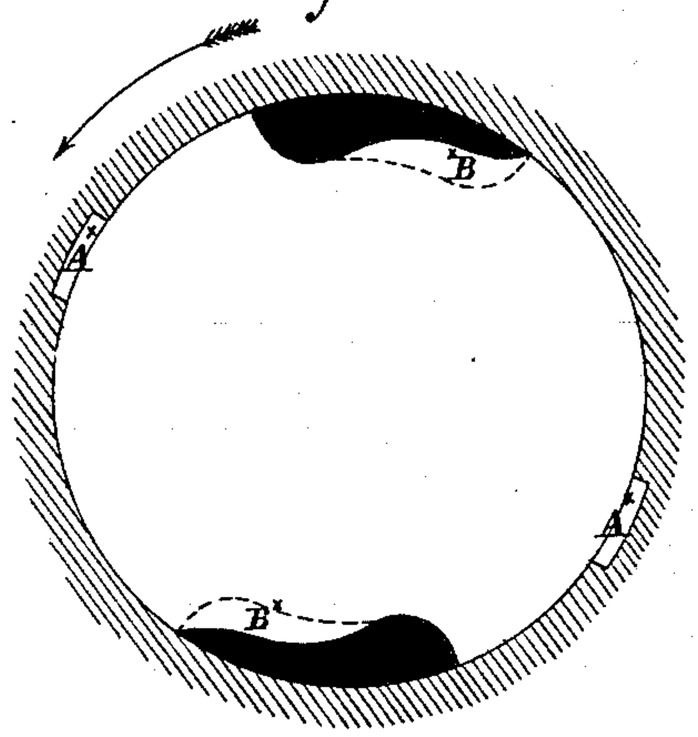


Fig. 4.

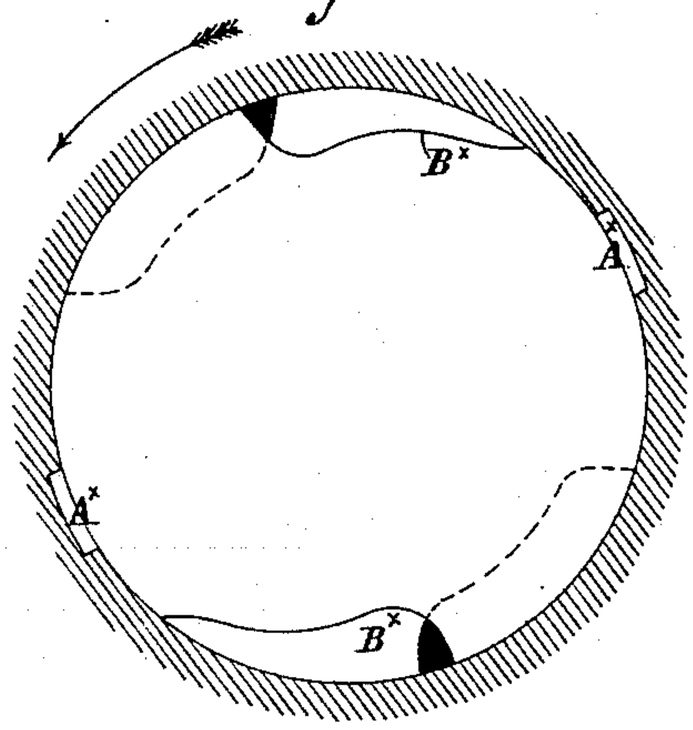
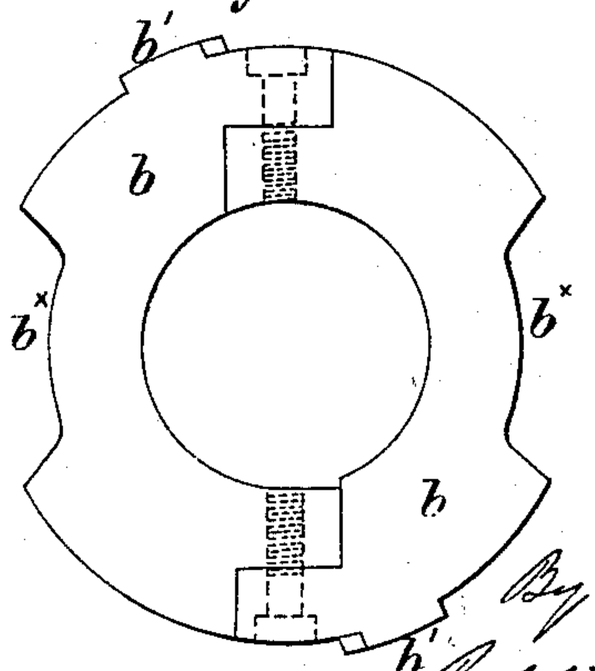


Fig. 5.



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James Young.
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UNITED STATES PATENT OFFICE.

JOSIAH VAVASSEUR, OF BEAR LANE, SOUTHWARK, COUNTY OF SURREY, ENGLAND.

APPARATUS FOR CONTROLLING THE RECOIL OF ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 283,688, dated August 21, 1883.

Application filed January 3, 1883. (No model.) Patented in England August 27, 1877, No. 3,253, and in France August 27, 1877, No. 120,055.

To all whom it may concern:

Be it known that I, JOSIAH VAVASSEUR, a subject of the Queen of Great Britain, and residing at Bear Lane, Southwark, in the county of Surrey, England, have invented certain new and useful Improvements in Apparatus for Controlling the Recoil of Ordnance, (for which I have received Letters Patent in Great Britain, No. 3,253, dated August 27, 1877, and in France, No. 120,055, dated August 27, 1877,) of which the following is a specification.

This invention has for its object improvements in apparatus for working and controlling the recoil of ordnance. For these purposes I employ hydraulic buffers, consisting of cylinders containing oil or other liquid, and pistons working within the cylinders. The piston is perforated or has passages cut on it longitudinally at its outer edge, and the piston-rod is attached to the gun-slide, so that on the recoil taking place the oil or liquid is compelled to pass through the passages in the piston, which passages are of comparatively small area. So far the arrangement does not present any feature of novelty; but according to my invention I cause the passages in the piston to be automatically and gradually closed during the recoil. The piston has a cover or valve perforated or provided with a passage or passages corresponding with the passage or passages in the body of the piston, but not necessarily of the same form. The valve is loosely mounted, so as to turn or oscillate on the piston, and its turning is controlled in such a manner as to contract gradually and finally close the openings in the piston. The amount of contraction and the point at which the passages are closed by the oscillation can be regulated. The turning of the valve as the piston reciprocates is effected by means of projections formed on the valve, which work into helical or rifle grooves in the cylinder. The path or travel given to the valve being invariable, it is obvious that by partially rotating the piston the relative position of the passages in piston and valve and point of closing can be varied. To compensate for the varying space in the cylinder occupied by the piston-rod, I apply to the gun-carriage a pair of hydraulic buffers so arranged that while the piston-rod of one is entering the cylinder that of the other is issuing from it, and I connect the cylinders by a pipe, by which means the fluid-space within the apparatus is maintained constant. I provide upon the pipe an automatic valve, which permits liquid to pass when the recoil takes place, but prevents its return. I also provide a by-pass valve, which, on being opened, permits the gun to run out.

In order that my said invention may be most fully understood and readily carried into effect, I will proceed to describe the drawings hereunto annexed.

In the drawings, Figure 1 is a sectional plan of the apparatus. Fig. 2 is a section on the line A B in Fig. 1. Figs. 3 and 4 are transverse sections, to a larger scale, of one of the cylinders, showing the back of the piston and the cover or valve upon it. Fig. 5 shows the cover or valve separately.

$A' A^2$ are the two cylinders, which are firmly attached to the gun-carriage. $A^\times A^\times$ are rifle or helical grooves formed in the cylinders. B' B^2 are the pistons. $B^\times B^\times$ are passages cut in their sides, by which the liquid may pass them. *b b* are the movable covers or valves on the pistons, which have projections *b'*, entering the grooving of the cylinders, and passages are formed in them at $b^\times$. $C' C^2$ are the piston-rods. $D' D^2$ are brackets upon the gun-slide, in which the piston-rods are fixed. $E' E^2$ are glands at the ends of the cylinders, through which the piston-rods pass. F is a pipe connecting the cylinder A' with the valve-box G, which is in communication with the cylinder A^2. H is a loaded valve in the box G, and I is a by-pass passage and valve.

On firing, the gun and carriage recoil, carrying the cylinders $A' A^2$ with them, the liquid is driven past the pistons through the passages $B^\times$, which are wide open at the commencement of the recoil, but are progressively closed or contracted by the covers or valves. The forms of the passages in the pistons and covers are such that a nearly-uniform resistance is opposed to the recoil throughout until the gun is brought to rest. At the same time liquid is driven through the pipe F, and the valve H lifts. It closes again when the recoil ceases,

and prevents the return of the gun. When it is desired that the gun should run out, the by-pass valve is opened.

In some cases I attach both piston-rods to the front end of the slide, a communicating passage being provided between the two cylinders. The cylinders are filled with liquid when the gun is in the firing position. In this arrangement no means are provided for compensating for the varying space caused by the withdrawal of the rods during recoil.

Having thus described the nature of my said invention and the manner of performing the same, I would have it understood that I claim as my improvements in apparatus for working and controlling the recoil of ordnance—

1. The combination of a hydraulic cylinder and piston-rod, (attached, respectively, to the gun-carriage and the slide,) the perforated piston, and the correspondingly-perforated loosely-mounted valve, by the turning of which the piston passage or passages are closed, substantially as and for the purpose hereinbefore set forth.

2. The combination of the cylinder and piston-rod, (attached, respectively, to the gun-carriage and the slide,) the perforated piston, the correspondingly-perforated turning-valve, and means by which the valve is turned as the piston is reciprocated, substantially as and for the purpose hereinbefore set forth.

3. The combination of the spirally-grooved cylinder and piston-rod, (attached, respectively, to the gun-carriage and the slide,) the perforated piston, and the perforated turning-valve engaging with the cylinder groove or grooves, substantially as and for the purpose hereinbefore set forth.

4. The combination, substantially as hereinbefore set forth, of the two cylinders, the piston-rods, the pistons moving the one inward or toward the back of its cylinder, while the other moves outward or toward the front of its cylinder, and the pipe connecting the back end of one cylinder with the front end of the other, whereby the liquid displaced by the entrance of the piston-rod into the one cylinder is conveyed into the other cylinder as its piston-rod is withdrawn, as described.

5. The combination of the cylinders, the piston-rods, the pistons moving the one inward while the other moves outward, the pipe connecting adjacent ends of the cylinders, (the front of one and the back of the other,) the valve-box, the loaded valve, and the by-pass valve, substantially as and for the purpose hereinbefore set forth.

JOSIAH VAVASSEUR.

Witnesses:
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