(No Model.)

2 Sheets—Sheet 1.

T. YATES.

BREECH LOADING ORDNANCE.

No. 360,942. Patented Apr. 12, 1887.

Fig. 8.

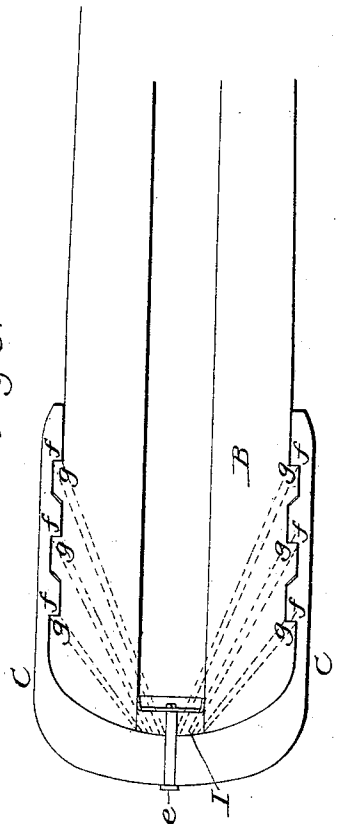


Fig. 1.

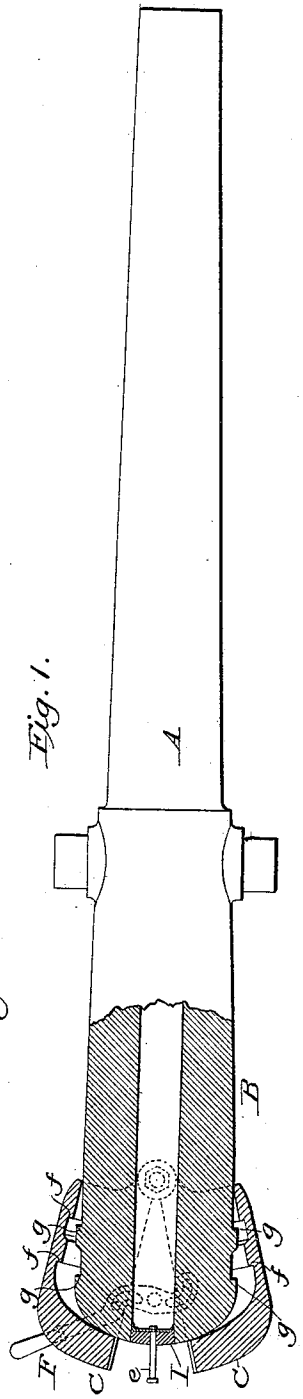
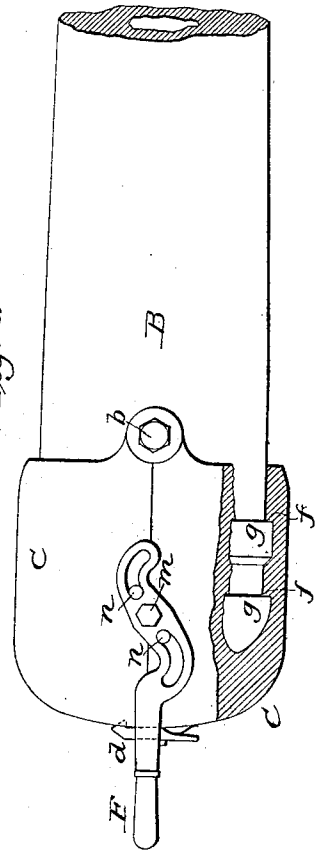


Fig. 2.



Witnesses:

James F. DeHamel.

Walter S. Dodge

Theodore Yates,
Inventor,

by Dodger & Son,

his Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

2 Sheets—Sheet 2.

T. YATES.

BREECH LOADING ORDNANCE.

No. 360,942. Patented Apr. 12, 1887.

Fig. 3.

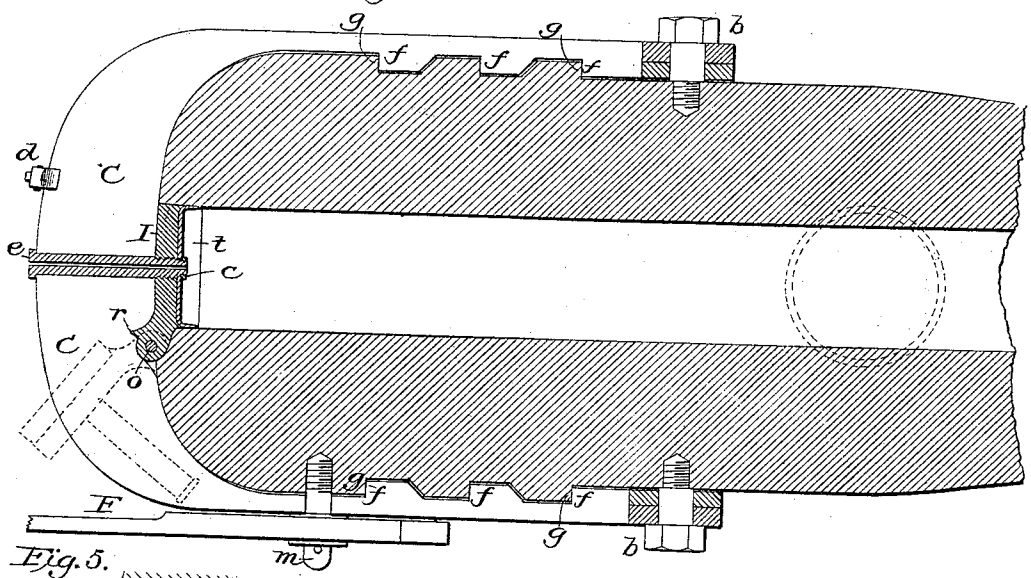


Fig. 5.

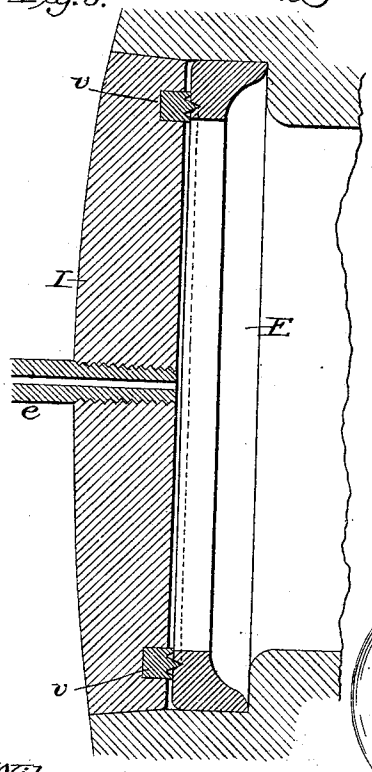


Fig. 4.

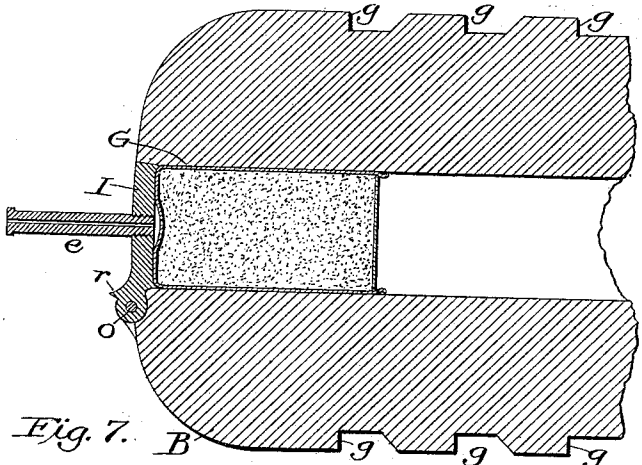


Fig. 7.

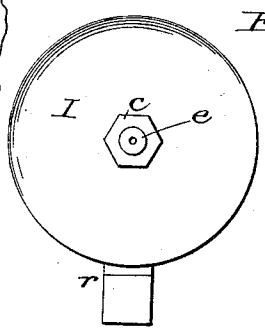


Fig. 6.



Witnesses:

James. J. Quinlan.

Walter A. Dodge

Theodore Yates,
Inventor,

by Dodgerton

his Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

THEODORE YATES, OF MILWAUKEE, WISCONSIN.

BREECH-LOADING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 360,942, dated April 12, 1887.

Application filed January 31, 1887. Serial No. 226,097. (No model.)

To all whom it may concern:

Be it known that I, THEODORE YATES, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Breech-Loading Ordnance, of which the following is a specification.

My invention relates to breech-loading ordnance; and the invention consists in certain improvements in the breech mechanism and devices to operate as a gas-check, as hereinafter more fully described.

Figure 1 is a top plan view with the breech portion, shown in section. Fig. 2 is a bottom plan view of the breech portion, showing the breech closed. Fig. 3 is a central vertical longitudinal section showing the breech-closing mechanism attached, and Fig. 4 a similar view with the breech-closing mechanism detached. Fig. 5 is a transverse longitudinal section illustrating one form of gas-check; and Fig. 6 is a vertical section of another form of gas-check, shown detached. Fig. 7 is a rear face view of the obturating or breech-closing plate, shown detached; and Fig. 8 is a diagram illustrating the lines of force or strain on the breech mechanism.

My present invention is an improvement on the gun for which Patent No. 243,421 was issued to me June 24, 1881, the object being to render the gun more perfect in details of construction and by the addition of some features not shown in the original.

Fig. 1 represents a gun made to a scale as built for use, and in which A represents the chase or front part of the barrel or body, and B the rear or breech portion, the gun being made of cast-iron or steel, and solid, or built up, as may be preferred.

In my former patent the breech-closing mechanism consisted of a shell or case divided longitudinally into two parts, of such a form and size as to fit around and inclose the rear or breech portion when closed, they being pivoted at their front ends centrally to the body of the gun in such manner as to permit them to be swung laterally to open or close the breech, and having near their front an internal annular shoulder to engage, when closed, with a corresponding shoulder on the breech portion of the gun, and hold them against the force generated by the powder in firing the gun, a pivoted lever, F, being used for opening and closing the same.

In the present instance I use the parts the same as before; but instead of enlarging the whole rear portion of the gun to form the retaining-shoulder, I now provide the gun with a series of annular shoulders, *g*, as shown in Figs. 1, 2, 3, 4, and 8, these shoulders being more or less in number, though in practice I find that two are sufficient for guns of the smaller sizes, while more may be used on guns of large size.

It will be observed that the shoulders *g* are made to project from the exterior face or surface of the body of the gun, so as not to weaken the latter, as would be the case if they were formed by cutting away the metal of the body. It is obvious they might be formed by turning grooves in the body of the gun; but in that case it would be necessary to increase the diameter of the breech portion of the gun in order to secure the same strength, and hence I prefer the plan shown.

The shells, or, as I prefer to designate them, "clamps," C C are made with a corresponding series of annular shoulders, *f*, as shown, the opposing faces of the shoulders *f* and *g* both being formed at a right angle to the axial line of the gun, so that when the clamps C C are closed their shoulders *f* will rest solidly against the shoulders *g*, this being rendered possible by the fact that the clamps C C when opened or closed swing in the arc of a circle of which the pivots *b* are the center. It will therefore be seen that as the shells or clamps are swung apart to open the breech their shoulders *f*, moving in the arc of a circle, as described, will move gradually away from the shoulders *g*, and, when closed, will in reverse manner be gradually moved toward the shoulders *g*, and thus be made to seat themselves firmly against the shoulders *g* by merely closing the clamps or bringing them together. The rear faces of the shoulders *f* and *g* are made inclined or beveled, as shown, to enable the clamps to be opened and closed readily, and, as shown in Fig. 3, there is a slight space left between these inclined faces, and also between the exterior of the gun and the interior of the clamps at all points except at the points

where the pivots *b* are applied between the faces of the shoulders *f* and *g* and at the rear end of the gun. The object of leaving this space, which should be about one-twentieth of an inch, is to prevent the vibration of the metal of the gun caused by the discharge from being transmitted direct to the clamps C, and which might tend to throw them open. The clamps are made to fit close upon the gun at the points where the pivots *b* are located, so as to prevent the clamps from sagging when opened, as they otherwise would, and which would cause the shoulders *f* and *g* to strike and prevent the clamps from closing properly. So, too, they are made to fit snugly at the rear end or breech and at the shoulders *f* and *g*, so as to hold the breech parts firmly in place to resist the strain or force generated by the discharge.

I use the pivoted lever F, with its curved slots engaging a pin, *n*, projecting from the under side of each clamp C, the same as in my former patent, and as shown in Fig. 2 and in dotted lines in Fig. 1. I also apply a spring-latch, *d*, to one of the clamps, it being arranged to engage in a recess in the other clamp, as shown in Figs. 2 and 3, this preferably being located above the bore, so as to be out of the way when loading the gun or manipulating the breech mechanism, the object or function of this latch being merely to hold the clamps in place when the gun is being moved about and prevent their being shaken open.

In using the gun as shown in my previous patent, I made use of a breech-plug or cartridge-head to prevent the escape of gas at the breech; but I now add what I term an "obturating-plate," which, as shown, consists of a solid plate, I, of metal. (Shown detached in Fig. 6 and in place in Figs. 1, 3, 4, and 5.) This plate is hinged to the breech of the gun by a pivot, *o*, below the bore, so as to enter and fit the same when closed, both it and the bore being slightly beveled to enable the plate to readily swing into and out of its seat in the rear end of the bore, as shown. At its center I secure a vent plug or tube, *e*, to receive the the friction-primer for firing the charge, this tube *e* being made of the requisite diameter to give it the necessary strength, and of sufficient length to project slightly beyond the rear ends or face of the clamps C C when the latter are closed, as shown in Figs. 1, 3, and 8. A projection or shoulder, *r*, is formed on the rear face of this plate to strike against the breech end of the gun when the plate is swung downward, as shown in dotted lines in Fig. 3, the tube *e* serving also as a handle for opening and closing the obturating-plate I. It will of course be understood that the pivot *o* of the plate I should be located in rear of the center of gravity of said plate, so that it will remain in place when closed, and also that a suitable notch or recess will be made in the adjoining edges of the clamps C C at the point where the tube *e* rests when the parts are closed, and also that a small recess for the shoulder *r* will be formed on the inner faces of the clamps at the proper place.

Various forms or kinds of gas-checks may be used in connection with this breech mechanism. In Fig. 3 I have shown a gas-check consisting of a cup-shaped disk, *t*, made of steel or other suitable material, as being secured to the face of the plate I, it being held fast by nut, *c*, on the inner end of tube *e*, which projects through a hole in the center of the disk *t*, as shown, the disk *t* being shown in section detached in Fig. 7.

In Fig. 5 I have shown a gas-check consisting of an expanding ring, E, set in an annular recess formed in the rear end of the chamber of the gun, its front edge being reduced in thickness, so as to be more readily expanded by the pressure of the gas and be thereby forced outward against the surrounding wall and prevent the escape of gas at that point. The inner face of this ring is beveled or made of an ogee form, as shown, so that the gas will force it backward at the same time that it expands its front or thinner edge, and in the rear face of ring E, I form a V-shaped annular groove. In the face of plate I, I form an annular groove, in which I fit a ring, *v*, of copper or other suitable metal, the face of which projects somewhat from or beyond the face of plate I, as shown, and on the projecting face of the ring *v*, I form an annular projection, corresponding in form to the groove in ring E, so as to fit snugly therein, as shown, the parts being forced and held together just in proportion to the pressure of the gas in the chamber. A joint thus constructed is more effective than one composed of two plain faces, and thus the ring E, in connection with the other parts, operates as a perfect gas-check. While I have shown but one of these interlocking grooves and projections, it is obvious that more may be used, if desired, and this feature may be applied to any style of breech-loading gun in which the breech-closing device, whether plate or plug, is put in behind the ring E and moved forward against it, regardless of how the breech-closing plug or device is held in place against the ring E, whether by swinging clamps, as shown, or by screw-threads, or by a key or wedge. As shown in Fig. 5, the hole in the ring E is made as large or a little larger than the chamber of the gun, to enable the charge to be inserted through it, it being understood that the ring E remains in place when the plate I is removed or swung open.

In Fig. 4 I have shown the charge of powder as being inclosed in a case, G, which may be made of compressed fiber, prepared paper, or of metal, as may be found most convenient and suitable. To make this serve as a gas-check and prevent it from cracking or rupturing at the angle around its base, I make its rear end concave on its exterior, as shown in Fig. 4, the object being to secure thereby a surplus of material, which, when forced back

against plate I by the gases within will tend to expand the rear end of the case and force the material outward all around at the angle tight against the supporting-walls of the chamber at that point, and thus cause it to effectually pack the joint and prevent its being ruptured; or, as is obvious, the obturating-plate I may have a lip, similar to that on ring E, formed on its inner face, to serve as a gas-check; but I prefer to make the gas-check, whatever its form, detachable, so that it may be changed from time to time as may be necessary.

The advantages of this method of constructing the breech mechanism are, first, its great simplicity, consisting, as it does, of so few pieces, easy and simple to make; second, its great strength, for, as the clamps and the locking-shoulders are applied to the exterior of the gun, they present a much greater area of bearing-surface than do the threads of the interrupted screw so generally used in breech-loading ordnance at the present time, and the extent of surface of the clamps enables them to be made comparatively light or thin on their sides, thus rendering the gun symmetrical in appearance. The simplicity and ease of its operation is also a great point in its favor, especially as the parts are not liable to bind or stick fast by the expansion caused by rapid firing and consequent heating.

On examining the diagram, Fig. 8, it will be seen that there is no tendency of the clamps C C to be forced open by the discharge as might at first sight be thought, because all the rearward force of the charge is brought to bear upon that portion of the clamp within the circle described by the bore, and as the clamps are held by the shoulders *g* upon the exterior of the gun the strain or force will be transmitted from the clamps to the shoulders *g* in the directions indicated by the dotted lines, and consequently the force exerted on the clamps in rear of the bore will tend to draw them together and make them hug the gun the tighter. The lever F is used merely as a means of opening and closing the clamps, and, being left loose or unfastened, does not in any manner hold the clamps closed. So, too, the latch *d* is only designed to hold the clamps from being accidentally opened in moving or handling the gun; and both the latch and the lever may be dispensed with, so far as holding the clamps closed when the gun is fired is concerned, as has been proven by firing the gun with these parts disconnected. Another advantage of these clamps is that when the gun is used on shipboard, and where the gun is liable to be turned more or less on its side by the rolling or pitching of the vessel, the clamps being connected by the lever F if they move at all must move together, and as they exactly counterbalance each other they are not liable to swing about, as is the hinged support for the screw breech-plug and the hinged tray for the charge ordinarily used on breech-loading guns of large caliber. It also enables the bore of the gun to be utilized its entire length, with the exception of the small space occupied by the obturating-plate, and thus I secure a gun which has greater length of bore in proportion to the total length than can be secured by any of the systems now in vogue. Moreover, by this plan the strain, which in the guns using the screw-plug is brought to bear on interior where the threads of the plug engage with those at the breech end of the bore, is transferred to the exterior, so that the only longitudinal strain on interior of the gun is simply that due to the friction of the shot, and this in guns lined by the insertion of a tube or tubes is of great importance, as it enables the tubes to be inserted from the rear without screw-threads, and with simply one or more shoulders to prevent any forward movement, thus still further simplifying and cheapening the construction of the gun. This is of special advantage in converting muzzle-loading guns to breech-loaders, and in which case it is now generally thought desirable to line cast-iron guns with a steel tube.

Having thus fully described my invention, what I claim is—

1. The combination, in a breech-loading gun, of the barrel or body of the gun provided with a series of exterior annular shoulders, *g*, and the pivoted breech-clamps C C, provided with a corresponding series of annular shoulders, *f*, said shoulders having their abutting faces arranged at right angles to the axial line of the gun, and having their rear faces inclined, said parts being constructed and arranged to operate substantially as shown and described.

2. The combination, in a breech-loading gun, of the barrel or body of the gun, the pivoted breech-clamps C C, and the obturating-plate I, provided with the vent-plug *e*, said parts being constructed and arranged for joint operation, substantially as shown and described.

3. The combination, in a breech-loading gun, of the breech-clamps C C, pivoted to the body of the gun by vertical pivots, so as to swing laterally in opening and closing, and provided with the internal annular shoulders, *f*, arranged to engage with the corresponding annular shoulders, *g*, on the gun, and the obturating-plate I, hinged to the gun below its bore, the said parts being arranged for joint operation, substantially as shown and described.

4. The obturating-plate I, hinged to the rear end of the gun and provided with the shoulder *r* and vent-plug *e*, in combination with the breech-clamps C C, pivoted to the body of the gun and provided with the annular shoulders *f*, arranged to engage with corresponding annular shoulders, *g*, on the breech portion of the gun, said parts being constructed and arranged to operate substantially as and for the purpose set forth.

5. In combination with the breech-clamps C C, pivoted to the body of the gun and otherwise constructed as described, the spring-

latch *d*, arranged to lock the clamps together and prevent their accidental movement when the gun is being moved, substantially as described.

6. The combination, in a breech-loading gun, of an expansion-ring, E, and a breech-closing plate or device arranged to be thrust or forced in behind and toward said ring, the abutting faces of said ring and breech-closing plate or device being provided with one or more interlocking grooves and projections, substantially as and for the purpose set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

THEODORE YATES.

Witnesses:

WALTER S. DODGE,

ANDREW PARKER.