2 Sheets—Sheet 1.

D. TUFTS.

Breech-Loading Ordnance.

No. 203,797. Patented May 14, 1878.

Fig. 1.

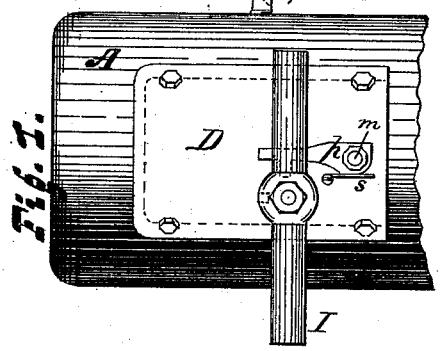


Fig. 2.

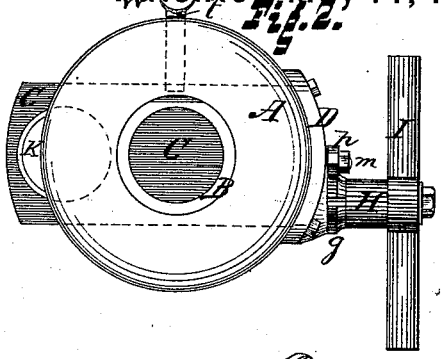
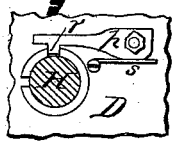


Fig. 3.



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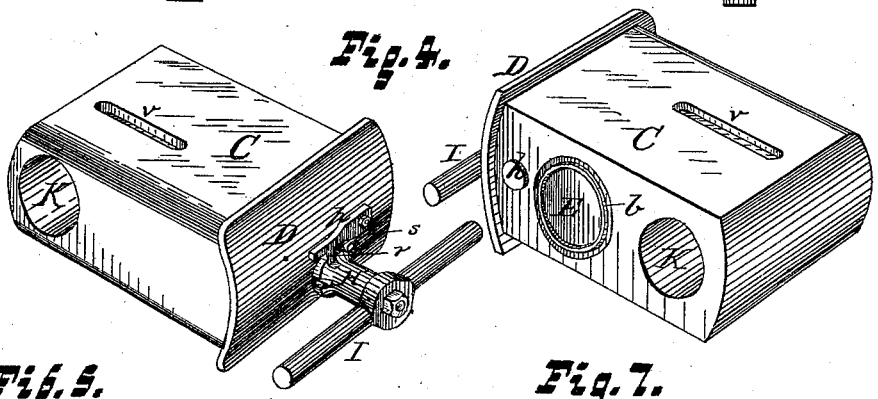


Fig. 5.

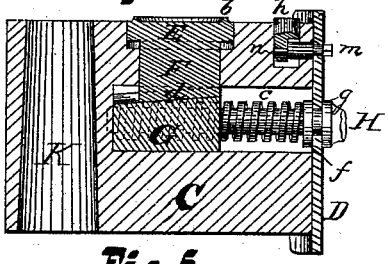


Fig. 7.

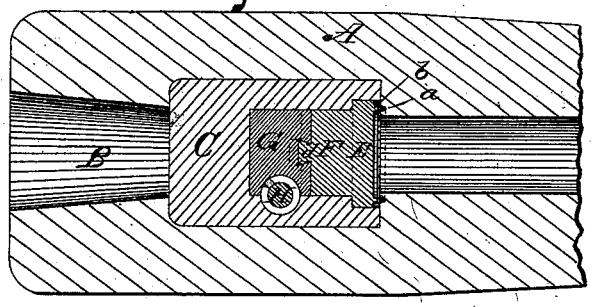


Fig. 6.

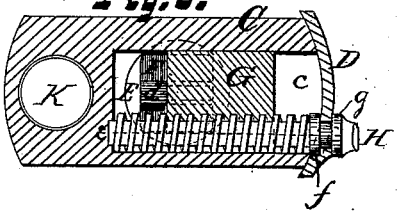


Fig. 8.

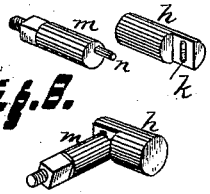
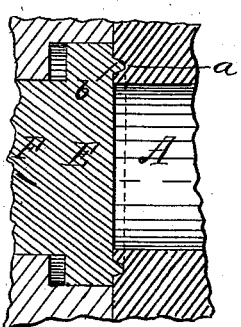


Fig. 9.



Witnesses.

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2 Sheets—Sheet 2.

D. TUFTS.

Breech-Loading Ordnance.

No. 203,797. Patented May 14, 1878.

Fig. 10.

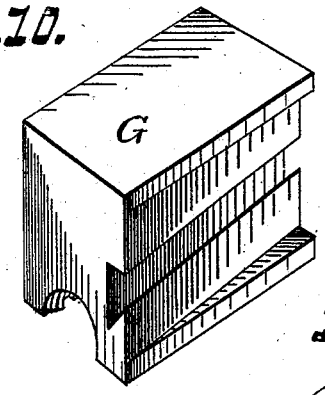


Fig. 11.

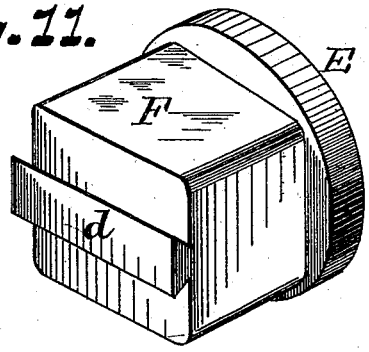
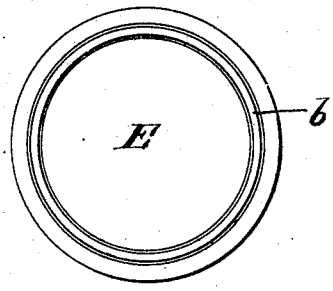


Fig. 12.



Witnesses.
G. Smith.
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Attorneys.

UNITED STATES PATENT OFFICE.

DAVID TUFTS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN BREECH-LOADING ORDNANCE.

Specification forming part of Letters Patent No. **203,797**, dated May 14, 1878; application filed March 15, 1878.

To all whom it may concern:

Be it known that I, DAVID TUFTS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Breech-Loading Guns; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of breech; Fig. 2, a rear end view; Fig. 3, a detail; Fig. 4, two perspectives of breech-block; Fig. 5, a horizontal section of breech-block; Fig. 6, a vertical transverse section of same; Fig. 7, a longitudinal vertical section of gun and breech mechanism; Fig. 8, details; Fig. 9, enlarged detail of Fig. 7; Fig. 10, a perspective of sliding wedge-block; Fig. 11, a similar view of valve and stem; Fig. 12, a face view of valve.

This invention relates to improvements in breech-loading ordnance, particularly of that class in which the breech-block has transverse motion across the breech; and consists in providing the breech-block with a movable valve and the gun with a seat for the same; also, in giving such valve positive motion backward and forward, and in the mechanism therefor; and in the construction and combination of parts, all substantially as hereinafter fully described and claimed.

In the class of ordnance referred to it has been found impossible to so fit the parts as to prevent the retroaction of the gases evolved in the discharge, which, besides diminishing the range and penetrative power, also soil and clog up the mechanism of the breech in a most inconvenient manner. To remedy this, the gas-check has been adopted, a copper or other metallic shell filling up the inner end of the bore and compelling the gases to pass out at the muzzle. This is effective, but expensive, as, once used, the shell is no longer serviceable, and, besides being expensive, necessitates the carrying of a great extra weight. I aim to do away with all this expense and trouble, and by mechanical means so close the breech that no gas can escape, and this without the use of a metallic shell of any kind, but with the ordinary woolen bag, or even the bare powder.

A designates the gun, having the loading-aperture B in its rear end and a transverse opening for the breech-block C, which is of the usual form in outline, and has the attached face-plate D, as shown. In the gun A, on the forward face of the opening and around the bore, and larger in diameter, is a circular groove, *a*, as seen in Figs. 7 and 9.

Set into a suitable opening in the front of breech-block C is a reciprocating valve, E, whose face has an annular ridge, *b*, corresponding to the groove *a*, the two fitting accurately, and ground together to insure perfect contact all around. In this manner the plain portion of the face of valve E operates to close the breech; but, as such closure does not prevent the escape of gas, I have an effectual check for it in the ridge *b* and groove *a*, since the ridge projects beyond the valve-face, and, fitting accurately in the groove, the sinuous junction thus presented places an impassable obstacle to the further travel of the gases, if they get that far.

The stem F of valve E passes back in the breech-block to a rectangular opening, *c*, cut laterally into block C from face-plate D. Stem F has its rear end inclined, and is provided with a similarly-inclined dovetail tongue, *d*. A sliding block, G, fits accurately in opening *c*, and has its forward face inclined, except at the edges, which remain parallel with its rear face, so that the block's edges accurately fit the opening, and has a dovetail groove, the whole face accurately corresponding to the rear face of stem F, so that when block G moves to one side valve E is pushed forward, and when block G moves to the other side valve E is withdrawn by the tongue and groove. This motion of block G is effected by having a screw-thread (preferably left-handed) cut in its bottom portion, and in this is fitted a long left-handed screw-shaft, H, having a bearing, *e*, at its inner end in the breech-block, and the double collar *f g*, respectively, inside and outside the face-plate D, and furnished with a handle, I, at its outer extremity.

Shaft H, having no end motion, by revolving, causes the block G to travel back and forth in opening *c*, and thus valve E is caused to open

or close against its seat in the gun. To prevent accident to the valve in traveling and danger from recoil in firing, I provide means for locking in both positions, which, simultaneously therewith, locks the breech-block in position. In collar *g* of shaft H I make two notches, so situated that one or the other will come uppermost when the valve is opened or closed. In the face of breech-block C is an opening, in which slides the latch-bolt *h*, whose rear end is half cut away and provided with a slot, *k*. Passing through the face-plate D at right angles to bolt *h* is a pin, *m*, having on its inner end the eccentrically-placed stud *n*, which plays in slot *k*, and the rotation of pin *m* thus causes the shooting of bolt *h*, to receive which a recess is cut in the gun, so that when it is "home" the breech-block is locked firmly. On the outer end of pin *m* I fix the latch *p* in such manner that when it is vertical the bolt *h* is withdrawn, and when horizontal the breech-block is locked. But in so locking the breech-block a detent, *r*, on latch *p* falls into one of the notches in collar *g*, whereby the block G and valve E are also at the same time locked either in closed or open position. The latch *p* is supported by a spring, *s*.

Operation: Suppose the breech is, as shown by Fig. 2, in firing position, and locked, as in Figs. 3 and 5. Latch *p* is raised to vertical, releasing shaft H and withdrawing bolt *h*. Then handle I is turned to the left as far as it will go, thereby withdrawing valve E into the breech-block. Next the breech-block is pulled back till its loading-aperture K is in line with opening B in gun A. Its motion is limited by a pin, *t*, in the top of the gun, and a groove, *v*, in the top of breech-block C. The upper end of pin *t* is wrought into a rear sight, W, as shown. When the loading is complete the breech-block C is pushed back to place, handle I turned to the right till valve E is home tight to its seat; then latch *p* is depressed to horizontal, thus locking the breech-block, while its detent *r* locks the shaft H. In now firing the charge not a particle of gas can escape at the breech, because, while the plain face of the valve closes the breech as far as practicable against the escape of too much gas, the ridge *b*, fitting so accurately in groove *a*, absolutely prevents the outcoming of any gas whatever, and this is a result which cannot be accomplished by any plain-faced valve or plug without the use of a gas-checking shell behind the charge, and no spring can occur, as the valve is backed by solid metal all the way.

By this means any form of charge may be used without any necessity for copper or other metallic gas-checks, thus obviating one great expense and inconvenience.

The movable valve is equally applicable to breech-loading small-arms.

I have herein shown what I believe is the most preferable arrangement and form of the principle of my invention; but I in nowise limit myself to it, as it may be varied at pleasure.

I claim as my invention—

1. In breech-loading ordnance of that class in which the breech is closed by the advancement of a plug or valve, an annular ridge projecting beyond the plane of the valve-face and a corresponding groove cut in the valve-seat in the gun, both ridge and groove being wholly without the circumference of the bore, substantially as described, whereby the valve operates to close the breech for firing and the ridge and groove operate independently to check the escape of gases.

2. The combination of the breech-block C, having rectangular recess *c* entering it laterally, the valve E, reciprocating at right angles to the recess *c*, and having the rear of its stem inclined, and the block G, having its forward surface correspondingly inclined, as and for the purpose described.

3. The combination of the breech-block C, having the laterally-extending recess *c*, the valve E, reciprocating at right angles to the recess *c*, and having the rear of its stem inclined, and the block G, having its front edges parallel with its rear edges and the space or front between said edges inclined, substantially as described.

4. The combination of valve E, having in clined rear surface and inclined dovetailed tongue, with the inclined faced block G, having inclined dovetail groove, whereby the movement of block G opens the valve.

5. The combination of latch *p*, pin *m*, stud *n*, cut-away and slotted bolt *h* in the breech-block with a suitable recess in the gun, substantially as described.

6. The combination of bolt *h*, pin *m*, stud *n*, latch *p*, and its detent *r* with the notched collar *g*, substantially as described, for the simultaneous locking of both valve and breech-block.

7. The combination of valve E, stem F, and block G with the recessed breech-block C and gun A, substantially as described, whereby in firing the valve is solidly supported.

8. In combination with the valve E, the sliding block G, having one face inclined, the breech-block C, having lateral recess *c*, and the revolving screw H, said block G being wholly within the breech-block, and said screw H secured against end motion, all arranged and operating substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

DAVID TUFTS.

Witnesses:
JAS. HEMPHILL,
R. WATSON.