

JOSEPH WHITWORTH.

Improvement in Breech-loading Ordnance.

No. 120,842.

Patented Nov. 14, 1871.

Fig. 1.

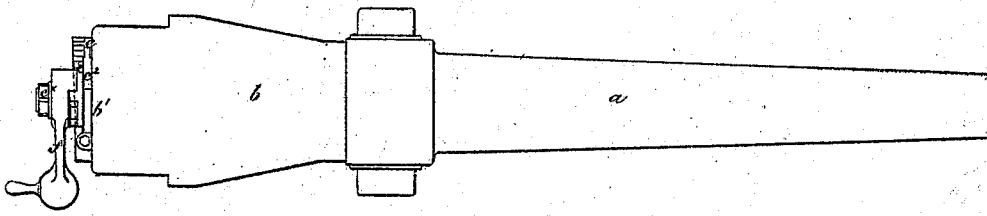


Fig. 2.

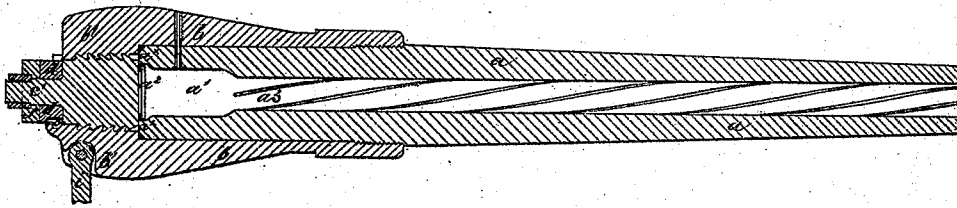


Fig. 3.

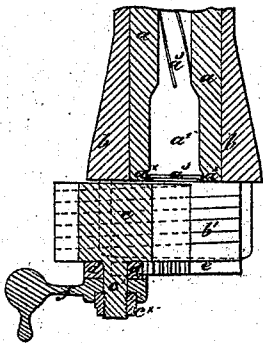


Fig. 4.

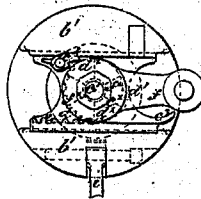


Fig. 5.

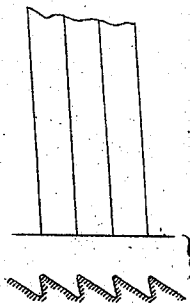
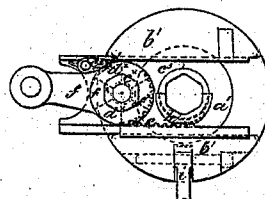


Fig. 6.



Fig. 7.



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JOSEPH WHITWORTH, OF MANCHESTER, ENGLAND.

IMPROVEMENT IN BREECH-LOADING ORDNANCE.

Specification forming part of Letters Patent No. 120,842, dated November 14, 1871.

To all whom it may concern:

Be it known that I, Sir JOSEPH WHITWORTH, baronet, of Manchester, in the county of Lancaster, England, a subject of the Queen of Great Britain, have invented or discovered new and useful Improvements in Ordnance; and I, the said Sir JOSEPH WHITWORTH, do hereby declare the nature of the said invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof—that is to say:

This invention has for its object improvements in ordnance. In constructing breech-loading cannon I employ to close the breech a sliding block working between two portions of the breech-end of the gun under and over the sliding block, which I call block-guides. The faces of the block-guides are grooved with a number of parallel grooves and the upper and lower surfaces of the block are similarly formed. The grooves in the block-guides are nearly, but not quite, perpendicular to the bore, so that when the block is moved along the block-guides into the position where it closes the breech it is drawn up to the breech-face by the grooves, which, for convenience, I may call a straight-line screw. The threads of the screw are angular. Both sides of the threads on the block-guides are inclined toward the muzzle, their sides nearest to the muzzle being undercut, so that when the heavy strain resulting from firing the charge comes upon the block there may be no tendency to force the block-guides apart; but, on the contrary, they are tightly held so that they cannot separate. Where, as is usual, the breech of the barrel-tube is hooped, the block-guides are formed by cutting away the sides of the projecting end of the hoop. Instead of a straight-line screw, which I prefer, the screw may be formed of moderate curvature without departing from the principle of my invention. The above construction allows of the strain, resulting from the discharge of the gun and tending to force out the breech-block, being distributed over so large an area of resisting surface on the faces of the screw-threads that there is no risk of the metal being locally overstrained, and by closing the breech by a single massive sliding block moving along screw-threads, as above, great simplicity and solidity are attained. I recommend the powder-chamber of the gun to be made considerably larger in diameter than the

bore—so large that, although the powder charge be much heavier than is usual, its length may be only about two calibers. The shortness of the powder-chamber facilitates the loading, and the gun can consequently be more rapidly served, and, what is of more importance, the powder is better consumed. The vent is at the top. The sliding breech-block is shaped at the side so as to form a tube or part of a tube of the same diameter as the powder-chamber, and when the breech is open this tube or part of a tube forms a prolongation of the chamber. It is desirable to fit an inner guide, corresponding with the bore of the piece and similarly rifled, into this tubular part, and through this rifled shot-guide the projectile is inserted into the bore, and its length enables it to enter the bore before it passes clear of the guide. This shot-guide is removed before the powder-cartridge is inserted. The guide on the block leads the cartridge truly into the chamber of the gun. The breech-block is worked by means of a rack and pinion. A stud is formed on or fixed in the back of the breech-block and a weighted hand-lever is mounted upon it. On the same stud a pinion is mounted, and it gears with a rack fixed upon the lower guide of the breech-block. The pinion is worked by the hand-lever, the handle and pinion having interlocking projections, allowing, however, the handle some freedom of motion, so that it may be used with a hammer-like action to start the breech-block. A pawl on the block prevents the pinion running off the rack.

Figure 1 is a plan, Fig. 2 a vertical section, and Fig. 3 a horizontal section of a field-piece constructed according to my invention. Fig. 4 is a view of the breech-end with the breech closed, and Fig. 5 is a similar view with the breech open. *a* is the main tube or barrel of the cannon, and *b* is the breech-hoop, which, in the case represented by the drawing, carries the trunnions. In guns of a larger size additional hoops may be used to obtain greater strength. *b'* *b'* are the guides for the breech-block; they are formed by cutting away the sides of the breech-hoop where it projects beyond the breech-face *a** at the end of the barrel or tube *a*. *c* is the breech-block with the straight-line screw upon it interlocking with the corresponding internal straight-line screw on the block-guides *b'*. This screw is shown to a larger scale at Fig. 6. The dimen-

sions of the thread are such as they should be for a bolt of a diameter equal to the distance between the block-guides; and it will be seen that the sides of the threads are inclined inward, so that the recoil of the breech-block has no tendency to separate the guides as it would have if an ordinary V-form thread were employed. The incline of the screw-thread to the axis of the gun is about three degrees. c^1 is a stud projecting from the back of the breech-block, and d a pinion upon it gearing with a rack, e , on the block-guide b' . f is a weighted lever-handle on the same stud, and held thereon by the nut c^x . The interlocking projections on the pinion d and lever-handle f are marked d^x and f^x . As already stated, they allow the lever to be used with a hammer-like action to turn the pinion. e^2 is a pawl on the breech-block, which, by taking into a notch, d' , in the pinion, prevents its running off the rack e except when the pawl is intentionally lifted. g is the vent entering the top of the enlarged powder-chamber a^1 . a^2 is a steel packing-ring, known as the gas-check. a^3 is the part of the bore into which the projectile is introduced in loading; it is very slightly larger than the remainder of the bore in order that the projectile may enter it easily. c^3 is the cartridge-guide formed on the breech-block. In the case represented in the drawing it is somewhat more than a semi-cylinder, but it may be a complete tube. h is the shot-guide; it is held within the cartridge-guide, as is seen at Fig. 5, and it is

shown separately at Fig. 7. In loading, the projectile is inserted through this guide and is led by it into the part a^3 of the bore, the parallel part of the projectile being long enough for the projectile to enter accurately into the bore before it leaves the guide. The projectile having been inserted the guide h is removed to leave a clear passage for the cartridge and the breech is then closed. i is part of the link by which the gun is elevated.

Having thus described the nature of my said invention and the manner of performing the same, I would have it understood that I do not confine myself to the exact details; but

I claim—

1. The arrangement for closing the breech of ordnance by a breech-block moved along and held by grooves, the direction of which is inclined to the breech-face of the gun, substantially as described.

2. The method, substantially as described, of forming the screw-thread so that the force of the explosion on the breech-block may not tend to separate the guides, but rather to draw them together.

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Witnesses:

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