



J. W. KLINE.

ORDNANCE.

(Application filed Mar. 5, 1901.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 8.

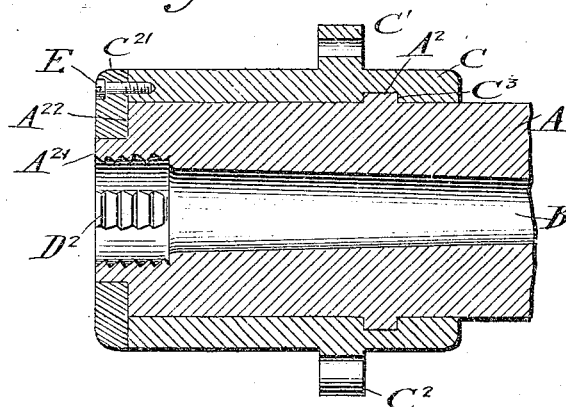


Fig. 9.

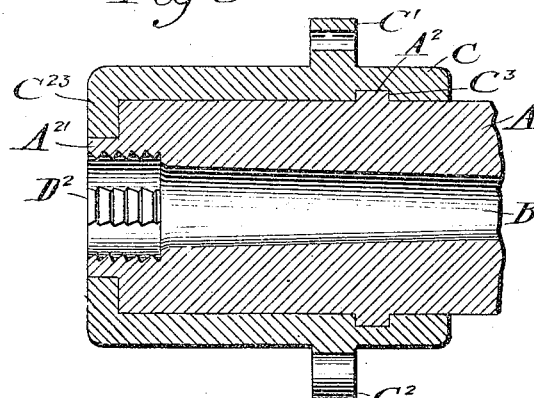
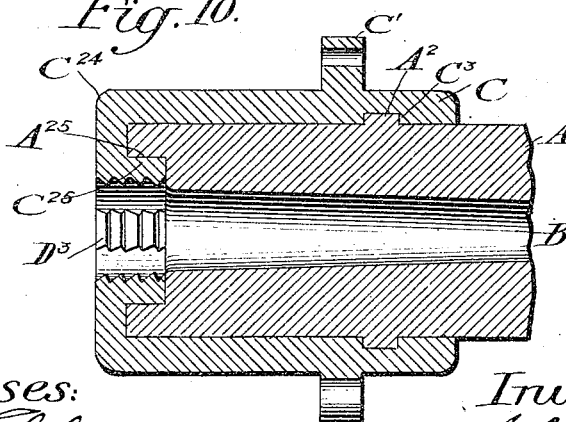


Fig. 10.



Witnesses:

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# UNITED STATES PATENT OFFICE

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## ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 676,649, dated June 18, 1901.

Application filed March 5, 1901. Serial No. 49,837. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. KLINE, a citizen of the United States, residing in the city of Washington, District of Columbia, have invented certain new and useful Improvements in Ordnance; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in breech-loading ordnance, and has for its objects to provide an auxiliary removable jacket or sleeve to be applied to the breech end of the gun and which supports and retains in proper relation to the gun the breech-block and its operating mechanism, to provide means carried on the gun to support the muzzle and prevent the sagging or deflection of the extreme end, and to provide means whereby the body of the gun may be reversed or turned over in its bearings to secure an automatic correction of any sagging at the muzzle.

In the construction of heavy ordnance of high caliber as ordinarily practiced it is customary to build up the gun structure by shrinking the hoops and the jacket on the tube to form a rigid integral structure, to which the recoil mechanism, the carriage-supports, and the breech mechanism are secured. Hence in assembling and fitting these various parts it has been necessary to operate upon the entire heavy cumbersome gun structure, thereby requiring the attention of many skilled workmen and greatly increasing its cost of construction, as well as multiplying the chances of seriously damaging or absolutely ruining the piece by unforeseen accidents to the delicate and complicated mechanism employed in machining the parts. My invention entirely avoids these vital objections, as I employ a separate removable auxiliary jacket which may be applied to or removed from guns of the same type, which carries all of the detachable mechanism, and which may be worked up and assembled with its cooperating parts as an integral structure and then applied to the gun-body, which has been previously made ready. By this means the cost of manufacture will be greatly reduced, the facility with which the parts are machined

will be materially enhanced, and the danger of injuring the entire gun structure, due to accident or carelessness, will be entirely obviated.

In the modern gun of forty or fifty calibers as now constructed it has been discovered that the great weight of the muzzle end projecting far out from the carriage-supports inevitably causes the end of the gun to drop, thereby producing a buckle or bend in the bore, which increases with time. The slightest deviation from the normal alinement of the bore materially interferes with the passage of the projectile through the gun, and even a small drop or deflection is sufficient to result in wedging the projectile in the rifling and, if the charge of powder is large, to rupture the gun at the point of stoppage of the projectile. In either event the gun would be damaged beyond repair.

By my invention I am enabled to wholly avoid the buckling or deflection of the gun-barrel or to correct any deviation that has occurred in a gun already in use. To this end I employ an adjustable stay or support connected to the respective ends of the gun and adapted to support the muzzle or free end and preserve the absolute alinement of the bore throughout. I further contemplate correcting any existing sag or deflection of the gun by reversing or turning the body one hundred and eighty degrees after removing the auxiliary jacket and remounting the gun in its reversed position in the carriage and subsequently resecuring the jacket and its appurtenant parts in place. By this means all of the parts are retained in their proper relation and the deflected tube will settle back to a normal alinement.

My invention is disclosed in the accompanying drawings, in which—

Figure 1 illustrates a modern type of high-caliber ordnance with my improvements attached. Figs. 2, 3, and 4 show details of various modifications of the auxiliary jacket and the means for securing the same to the gun-body. Fig. 5 is an enlarged end elevation of the mechanism shown in Fig. 1. Figs. 6 and 7 are an elevation and a section of the auxiliary jacket shown in Fig. 1. Figs. 8, 9, and 10 are further modifications of the jacket and its securing means.

Referring to Fig. 1, A represents the body of the gun, which is built up in the usual form, with the successive hoops and the jacket shrunk on. The breech end of the gun is finished with a series of keys or lugs A<sup>12</sup> A<sup>13</sup>, disposed about the periphery thereof to afford a securing means for a removable auxiliary sleeve or jacket C', which is bored to accurately fit the butt of the gun and to project over the rear face thereof, as clearly indicated. A fillet A' on the breech end of the gun is adapted to receive a corresponding shoulder C<sup>2</sup>, turned on the inside of the jacket C. The interior of the jacket C is provided with a groove C<sup>12</sup> C<sup>13</sup> to engage the corresponding lugs A<sup>12</sup> A<sup>13</sup> on the gun-body and secure the parts in position. In order to lock the jacket to the gun-body, I provide machine-bolts E, which take through the overhanging flange of the jacket into the metal of the gun-body, as clearly indicated. The breech-block seat D in this particular form is carried by the jacket. (Shown particularly in Figs. 1 and 7.)

Projecting upwardly from the surface of the jacket is a lug C', the purpose of which will be explained later, and on the opposite side of said sleeve are two lugs C<sup>2</sup>, which are adapted to receive the piston-rods O' of the recoil mechanism O, which may be of any preferred form.

Removably mounted on the muzzle end of the gun is a stirrup S, having a projecting lip S' extending toward the muzzle and a rearward arm S<sup>2</sup> at its opposite side. Passing through a suitable perforation in the upper part of said stirrup and secured thereto by a ball-joint R<sup>2</sup> is a tension or stay rod R, which is adjustably secured to the lug C' on the jacket C. A saddle T, fitted to the contour of the gun-body, supports the rod R about midway of its length and affords a suitable bearing for the rod when the same is under tension.

I contemplate applying the breech-plug mechanism as an entirety to the rear face of the sleeve C, and for this purpose I provide a hinge-socket G and the pin-bearing G' to accommodate the pivotal breech mechanism, which may be of any of the well-known types.

It is obvious that many changes may be made in the particular form of the annular jacket C, and the engaging means between the jacket and the gun-body may be varied to suit the particular design of the gun or to meet the exigencies of the strength and proportion.

In Fig. 2 I have shown the jacket of the same general type as that shown in Fig. 1, except that a locking-joint of the bayonet type is provided between the jacket and the gun-body, as shown at A<sup>2</sup> C<sup>3</sup>, wherein A<sup>2</sup> represents the lugs on the gun, and C<sup>3</sup> the grooves in the jacket. In this modification I have shown an annular bushing D' for the breech-block seat. In other particulars this modification is identical with that heretofore de-

scribed and is capable of the same application.

Fig. 3 illustrates a modification in which the locking-joint formed by the grooves A<sup>3</sup> on the gun and the ribs C<sup>4</sup> on the jacket are provided with a dovetail engagement for the purpose of strengthening the joint.

In Fig. 4 I have illustrated the jacket, which is adapted to be applied from the muzzle end of the gun and set back to the seat on the breech end. To accommodate this arrangement, the gun is turned with a shoulder A<sup>4</sup> adjacent to the breech end, which takes a corresponding flange C<sup>5</sup> on the inside of the jacket, and the latter is drawn in position by means of a ring F', which is screwed into said jacket until it finds a firm bearing against the rear face at the breech end of the gun. The usual locking-bolts E are also employed in this modification, and the separable bushing B' is fitted to provide the usual seat for the breech-plug. In Fig. 8 the jacket is cylindrical in form and accurately fits the outer surface of the gun-body near the breech and is secured by means of the locking-joint A<sup>2</sup> C<sup>3</sup>, corresponding to that in Fig. 2. The rear end of the gun is provided with a projecting boss, which is fitted with the breech-plug seat D<sup>2</sup>. The annular shoulder thus left on the rear of the gun is occupied by a ring C<sup>21</sup>, which finds a firm bearing thereon and is screwed to the jacket by suitable bolts, as shown. Fig. 9 differs from Fig. 8 only in the fact that the separate ring C<sup>21</sup> has been replaced by a lateral and integral flange on the jacket, which occupies the annular shoulder on the breech end of the gun. In these two modifications the breech mechanism is supported on the jacket, and the plug finds a seat at D<sup>2</sup>, thereby relieving the jacket from the recoil. A further modification is shown in Fig. 10, wherein the jacket C, which is secured by locking-joint A<sup>2</sup> C<sup>3</sup>, as above described, is provided with a central boss C<sup>25</sup>, carrying the breech-plug seat, which is accurately fitted to an annular recess in the breech end of the gun.

In assembling a gun provided with my improvements it is my purpose to apply the jacket by slipping it over the breech or the muzzle end, according to the particular construction employed, giving it a partial turn and locking the engaging ribs and grooves together, and then securing the jacket in position against further rotation by setting up the bolts E in place, as shown in the various figures. It is to be understood, of course, that the jacket is finished and the parts made ready to receive the breech mechanism before it is applied to the gun, and it is obvious that in handling and working the jacket, as it weighs but a small fractional part of the total weight of the gun, fewer operatives will be required and the parts can be adjusted and fitted with greater facility and at much less expense than by the old method, wherein it was necessary to mount the entire gun-body in a lathe and fit the parts thereto.

It has been found that the modern ordnance of high caliber tends to sag at the muzzle, and unless this tendency is corrected the gun will be ruined after one or more firings by the projectile wedging in the bore. I propose to avoid any tendency to sag at the muzzle by means of the stay-rod above described, and for this purpose the stirrup, which is removably mounted on the muzzle end of the gun and finds a firm bearing on the taper thereof, is drawn up to hold the bore of the gun in alinement by setting up the nut R on the end of the stay-rod, as will be apparent.

In order to correct any sagging that may have taken place, I contemplate turning the gun over through one hundred and eighty degrees to reverse it in position in its carriage. This is accomplished by removing the jacket and its attached parts and revolving the gun about its axis until it is reversed in position, after which the stirrup is turned to proper relation, the jacket secured in its new position, and the stay-rod loosely secured by the nut R to permit the muzzle end of the gun to drop by its own weight until the bore again assumes accurate alinement, when the stay-rod is set to preserve the alinement thus attained.

What I claim as my invention is—

1. In breech-loading ordnance of the character described, the combination with the body of the gun, a removable jacket secured to the breech end thereof and means to secure the breech-block and its operating mechanism to said jacket, said body and said jacket being so related that the body is reversible with respect to the jacket.

2. In breech-loading ordnance of the char-

acter described, the combination with the body of the gun, a removable jacket secured to the breech end thereof, cooperating engaging means on the jacket and the gun-body to lock the jacket in position, so related that the body may be reversed with respect to the jacket, and means to secure the breech-block and its operating mechanism to said jacket.

3. In breech-loading ordnance of the character described, the combination with the body of the gun, a removable jacket secured to the breech end thereof, and cooperating interlocking means on said gun-body and said jacket to secure the parts together, so related that the body may be reversed with respect to the jacket.

4. In breech-loading ordnance of the character described, the combination of the gun-body, a removable jacket secured to the breech end thereof and so related thereto that the body may be reversed with respect to the jacket, and an adjustable stay-rod secured to said jacket and the muzzle of the gun to prevent sagging of the latter.

5. In breech-loading ordnance of the character described the combination of the gun-body, a removable jacket secured to the breech end thereof, a stirrup removably secured adjacent to the muzzle of the gun, and an adjustable stay-rod connected to said jacket and said stirrup.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. KLINE.

Witnesses:

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HUGH M. STERLING.