No. 821,331. PATENTED MAY 22, 1906.

E. J. BLOOD.

CANNON.

APPLICATION FILED SEPT. 5, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

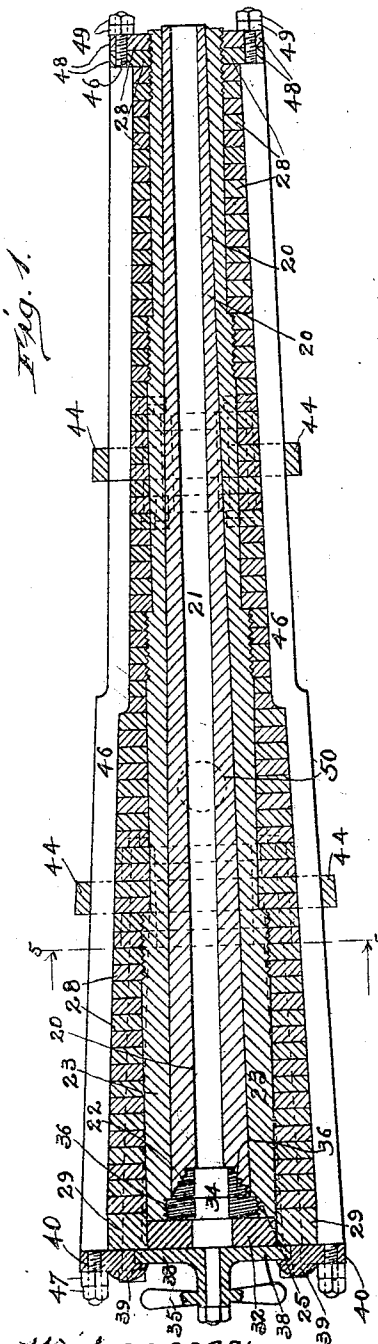


Fig. 2.

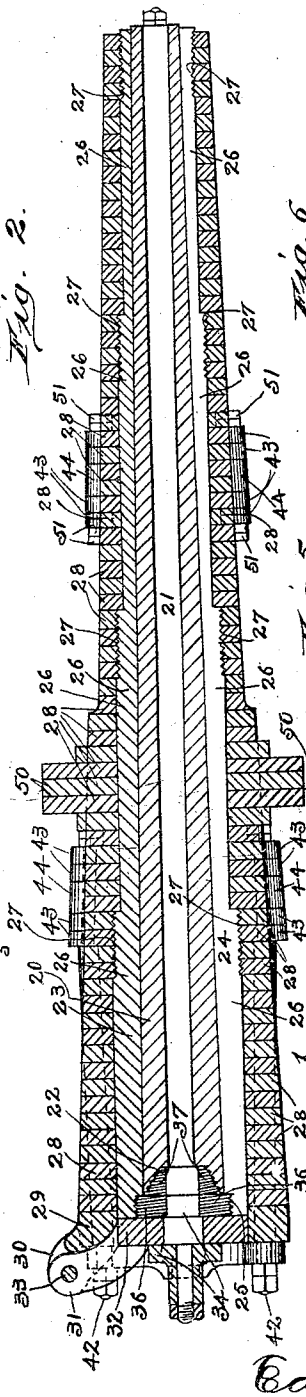


Fig. 6.

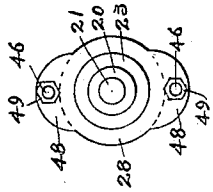


Fig. 5.

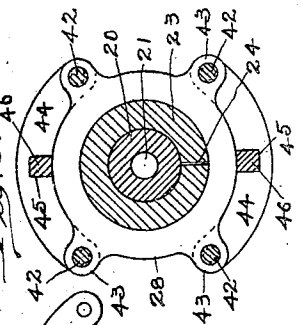


Fig. 4.

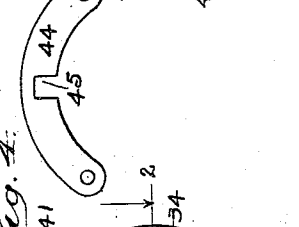
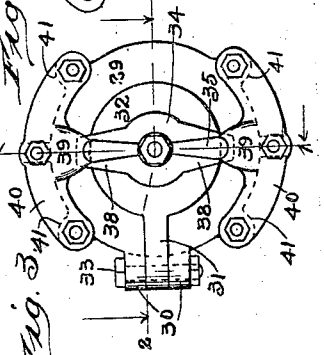


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 8.

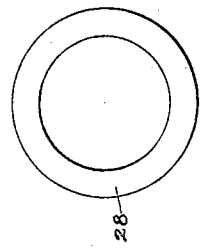


Fig. 10.



Fig. 12.

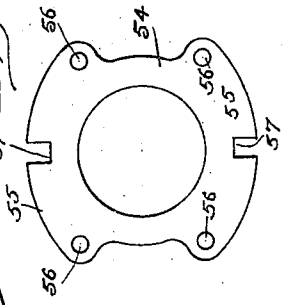


Fig. 16.

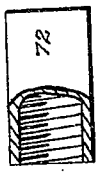


Fig. 15.

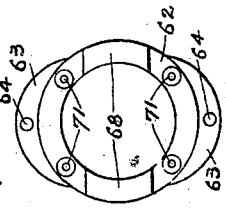


Fig. 5.

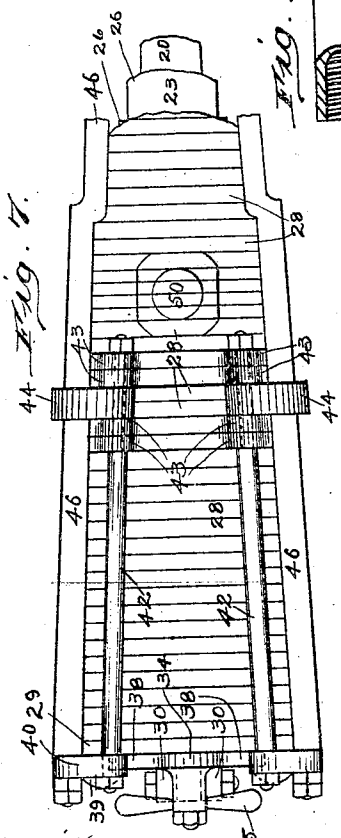


Fig. 9.

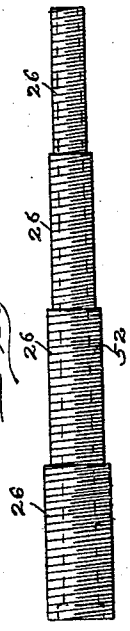


Fig. 11.

Fig. 14.

Fig. 13.

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UNITED STATES PATENT OFFICE.

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CANNON.

No. 821,331. Specification of Letters Patent. Patented May 22, 1906.

Application filed September 5, 1905. Serial No. 276,938.

To all whom it may concern:

Be it known that I, EDWIN J. BLOOD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cannons, of which the following is a specification.

My present invention relates to improvements in the construction of heavy ordnance or guns and cannons; and the objects thereof are, namely: to provide simple and efficient means by which heavy ordnance can be more readily constructed and at much less cost than heretofore and in such a manner that a much better grade of steel may be incorporated in the body of the cannon than is possible to use in the old form of heavy forgings; to provide a cannon in which by reason of the particular construction, arrangement, and operation of its various parts the initial strain of the gun may be produced and regulated by mechanical means independent of the agency of heat and which neutralizes or prohibits the vibration produced by the discharge or explosion of powder from causing granulation or crystallization of the fiber of the metal of which the cannon is composed; to enable heavy cannon to be constructed with all the advantages of great weight, but without the disadvantages thereof, the same being made and assembled or mounted piece by piece in a very short time; to construct a gun possessing greater strength, as well as greater durability, and which, by the nature of its construction, admits of an accurate calculation being made to show the power of resistance which it possesses and enables the builder to detect and reject impure or weak metal, which is inadvertently incorporated in large guns constructed by the old or ordinary method; to provide means to resist or counteract the concussion at the rear of the bore which shall not be limited, restricted, or confined by the diameter of the bore, thus allowing any details of the construction to be enlarged upon to augment the strength or resistance to withstand the concussion; to neutralize or counteract the recoil and to enable the gun to be taken apart and put together at pleasure, thus greatly facilitating its transportation for use or other purposes; also, to permit the inner barrel to be readily removed when injured and another one to be inserted in its stead.

Other objects and advantages of the invention will appear in the subjoined description and explanation.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view taken on line 1 1 of Fig. 3, looking in the direction indicated by the arrows, of a cannon embodying one form of my invention. Fig. 2 is a longitudinal sectional view taken on line 2 2 of Fig. 3 looking in the direction indicated by the arrows. Fig. 3 is a view of the breech end of the cannon. Fig. 4 is a detached view of one of the segmental straps or saddles used for securing the longitudinal ribs on the disks or plates comprising a part of the cannon. Fig. 5 is a cross-sectional view taken on line 5 5 of Fig. 1 looking in the direction indicated by the arrows. Fig. 6 is a view of the muzzle end of the cannon. Fig. 7 is a side view in elevation of the rear portion or breech part of the cannon. Fig. 8 is a detached view of one of the metal disks or plates which encircle the sleeve which surrounds the inner barrel. Figs. 9 and 10 are detached views showing modifications in the construction of the sleeve which surrounds the barrel. Fig. 11 is a perspective view of one of the longitudinal ribs. Fig. 12 is a detached face view of a modified form of one of the disks or plates used for securing the segmental straps or saddles in place. Fig. 13 is a face view of a modified form of one of the disks or plates which encircle the inner sleeve. Fig. 14 is a view in side elevation of a portion of two sections of the modified forms of disks shown in Fig. 13, illustrating said sections bolted together. Fig. 15 is a face view of one of the end disks for said sections, and Fig. 16 is a view of an internally-screw-threaded bushing sometimes used on the stepped sleeve.

Like numerals of reference refer to corresponding parts throughout the different views of the drawings.

The reference-numeral 20 designates the barrel of the gun, which is tapered on its outer surface from its breech end to the muzzle end thereof and is provided with a longitudinal bore 21 throughout its entire length. The rear or breech end of the barrel 20 is provided with a flaring and screw-threaded opening 22 to receive and engage portions of the breech-block, as will be presently ex-

plained. Surrounding the barrel 20 is a sleeve 23, which is preferably provided with a longitudinal slot 24 throughout its entire length and has its bore tapered from the breech end to the muzzle end to correspond with the taper of the outer surface of the barrel. The rear end of the bore of the sleeve 23 is provided with a screw-threaded enlargement 25 to receive and engage a portion of the breech-block. The outer surface of the sleeve is reduced by steps or in sections from its rear portion to its front end, thus forming a number of portions 26 of different size in cross-section, but each having its outer surface in parallelism with the walls of the bore in the barrel. At its front part each of the portions 26 is provided with screw-threads 27 to engage similar threads on some of the plates or disks 28, which surround the sleeve and are preferably formed of rolled sheet-steel of any desired thickness or size, those located on the rear portion of the sleeve being greater in diameter than those on the front portion thereof in order to produce weight and strength at the desired point of the cannon to neutralize the effect of concussion and to counteract the recoil. Fitted on the breech end of the sleeve 23 is a breech-plate 29, which is provided at its periphery on one of the sides of the cannon with apertured lugs 30, between which an extension 31 on a piece 32 is pivotally secured by means of a bolt 33, which passes through said lugs and extension. The breech-block 34 is swiveled in an opening in the piece 32 and is provided on its outer surface with a handle 35, used for turning the same, and on its inner surface with screw-threaded segmental portions 36 and 37, the former engaging the screw-threads 25 in the rear portion of the sleeve and the latter engaging the screw-threads 22 in the rear portion of the barrel. The breech-block is provided exteriorly of the piece 32 with oppositely-projecting extensions 38, which are adapted to engage, when the said block is in its locked position, inwardly-projecting lugs 39 on the segmental straps or saddles 40, which are located diametrically opposite each other on the outer surface and at the periphery of the breech-plate, which has apertured lugs 41 to receive the rear ends of rods 42, which pass through said lugs and suitable openings near the ends of the straps 40, which are bolted thereon. The steel plates or disks 28 are placed on the sleeve 23 and forced against the front surface of the breech-plate 29 and firmly held in position by means of other disks 28, which are provided with screw-threads to engage the threads on the front portion of each of the parts 26 of the sleeve. Some of the plates 28 at the front part of the portion 26 of the sleeve adjacent to the breech end of the gun are provided with apertured lugs 43 to receive the front portions of the rods 42, which, as before stated, engage at their rear ends the straps 40 on the breech-plate.

Located diametrically opposite each other on the outer surface of the plates just in front of the portion 26 of the sleeve adjacent to the breech of the gun are segmental straps 44, each of which has near its ends an opening, through which the rods 42 pass, said rods also passing through at their front ends openings in lugs 43 on other disks or plates 28, surrounding the sleeve in front of the first step from the rear thereof. Each of the straps 44 is provided at about its middle with a recess 45 to receive the ribs 46, which extend longitudinally of the cannon from one end thereof to the other and have their ends reduced and screw-threaded, as is clearly shown in Fig. 11 of the drawings. The rear end of each of the ribs 46 passes through openings in the lugs 41 on the breech-plate and through openings in the ends of the straps 40 thereon and are firmly secured in place by means of nuts 47, while the front ends of each of the said ribs pass through openings in lugs 48 on the disks or plates 28, located at the front or muzzle of the cannon and are held in place by means of nuts 49 thereon.

Just in front of the first step or portion 26 from the rear of the cannon or at a suitable point on the sleeve several of the disks or plates 28 are provided with extensions 50, which are formed to provide cylindrical trunnions or an axis for the cannon. At a suitable distance in front of the second step or portion 26 from the breech end of the cannon are located diametrically opposite each other and on the outer surface of some of the disks or plates 28 two other straps or saddles 44, which are of the same construction as those just above described and serve to brace the ribs 46 against lateral movement. The last-named straps 44 are interposed between disks 28, having lugs 43 thereon and which disks are secured together by means of bolts 51, which pass through openings in the ends of said straps and in said lugs.

Instead of using a sleeve constructed as shown in Figs. 1 and 2 of the drawings and above described I may employ a sleeve 52 of the construction illustrated in Fig. 9, in which each of the portions 26 thereof is entirely screw-threaded instead of having their front portions only threaded. In using this modified form of sleeve it is evident that all of the disks or plates 28 employed to encircle the same should be internally screw-threaded, so that they can be screwed to place thereon.

In Fig. 10 is illustrated another modification in the construction of the sleeve which I may sometimes employ and which consists in employing a sleeve 53, which has its outer surface unthreaded and tapered from its breech end to its front or muzzle end. In

using the sleeve of the construction illustrated in Fig. 10 the disks 28 used thereon are without internal screw-threads and are forced on the sleeve from its tapered to its enlarged end.

Instead of using the disks or plates 28, having the lugs 43, as shown in Figs. 2 and 5 of the drawings, I may employ disks 54, to be located on each side of the straps 44 of the construction illustrated in Fig. 12, which consists in forming said disks with enlargements 55, oppositely disposed and providing each of said enlargements with openings 56 near its ends for the securing bolts or rods and with a recess 57 at about its middle for the reception of the ribs 46.

In some instances I may employ disks or plates 58, having openings 59, (see Fig. 13,) to receive tie-rods 60 and secure said disks together in sections, as shown in Fig. 14, which sections may be placed and secured on the sleeve, which may be of any of the above-named constructions. When this modified arrangement of the disks is employed, the adjacent ends of the sections of said disks are secured together by means of end disks 61 and 62, each of which is provided with oppositely-disposed extensions 63, having openings 64 for the reception of rods 65, which are secured in place by means of nuts 66 on the ends thereof. One of the said end plates is provided with a transverse recess 67, while the other one is provided with a transverse projection 68 to fit therein, as is clearly shown in Fig. 14 of the drawings. When the sections 69 and 70 of the disks 58 are united, as shown in Fig. 14, the ends of the tie-rods 60 will be countersunk in openings 71 of the said end plates.

From the foregoing and by reference to the drawings it will be readily understood and clearly seen that by using a sleeve having a tapered bore to correspond with the taper of the outer surface of the barrel and externally reduced from its breech end to its muzzle end of any of the constructions shown and above described the front portion of the cannon will be much lighter than the rear portion thereof, thus rendering it practicable to use my construction, whereas if the sleeve employed was not reduced toward its front end the construction would be impracticable on account of the great weight at said end. It is also obvious that by reducing the sleeve in steps or portions, as shown in Figs. 1, 2, and 9 of the drawings, the different groups of tension disks or plates 28 to be fitted on their respective portions of the sleeve will require central openings of uniform size; but when a sleeve of the form shown in Fig. 10 is used each disk or plate must necessarily have a different-sized opening.

In assembling the parts of the cannon the tension-disks 28 are placed on the sleeve and held in place by any of the above-named means, when the barrel 20 may be inserted in the breech end of the sleeve and forced forwardly therein, in which operation the sleeve will be slightly expanded by reason of its longitudinal slot, so that its outer surface will uniformly contact with the inner peripheries of the tension-disks thereon. By slotting the sleeve longitudinally it is apparent that the barrel may be more readily removed when it is desired to do so for the purpose of replacing it with a new one. In order to facilitate the placing of the tension-disks on the stepped sleeve and also to prevent the screw-threads of said sleeve forming or starting fissures in said disks, I may employ an internally-screw-threaded bushing 72, upon which the disks may be secured and united together by tie-rods when said bushing may be screwed on the portion of the sleeve therefor.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A cannon comprising an inner barrel, a sleeve surrounding said barrel and reduced by steps or portions from its rear to its front end, a series of plates or disks located on the sleeve and presenting their edges to its outer surface, and means to secure said plates together and on the sleeve, substantially as described.

2. A cannon comprising an inner barrel tapered from its rear to its front end, a slotted sleeve reduced by steps or portions from its rear to its front end and surrounding the barrel, a breech-plate mounted on the rear portion of the sleeve and having apertured lugs, an end plate mounted on the front portion of the sleeve and having apertured extensions, a series of tension plates or disks located on the sleeve intermediate the breech-plate and said end plate and presenting their edges to the outer surface of the sleeve, a plurality of ribs located longitudinally with respect to the barrel and on the outer surface of said plates, the said ribs having their ends secured in the breech-plate and end plate, substantially as described.

3. A cannon comprising an inner barrel tapered from its rear to its front end, a sleeve reduced by steps or portions from its rear to its front end and surrounding the barrel, screw-threads on each of the said steps or portions, a series of plates or disks located on the sleeve and presenting their edges to its outer surface, and means to secure said plates together, substantially as described.

4. A cannon comprising an inner barrel having the rear end of its bore enlarged and screw-threaded, a sleeve reduced from its rear to its front end and surrounding the barrel, the said sleeve having the rear end of its bore enlarged and screw-threaded, a breech-plate mounted on the rear end of the sleeve, a series of plates or disks located on the sleeve,

means to secure said plates together, an apertured piece or plug pivoted to the breech-plate, a breech-block swiveled in said plug and having screw-threaded portions to engage the rear ends of the barrel and sleeve and provided on its outer portion with a handle to turn the same, and means to lock the breech-block in its closed position, substantially as described.

5. A cannon comprising an inner barrel having the rear end of its bore enlarged and screw-threaded, of a surrounding sleeve reduced from its rear to its front end and provided with screw-threads in the rear end of its bore, a breech-plate mounted on the rear end of the sleeve, an end plate on the front end of the sleeve, a series of plates or disks located on the sleeve between the breech-plate and said end plate, segmental straps located on the outer surface of the breech-plate opposite each other, each of said straps having an inwardly-extending projection, ribs secured at their front ends to the end plate and at their rear ends to said straps, an apertured piece or plug pivotally secured to the breech-plate, a breech-block swiveled in the aperture of said piece and having screw-threaded portions to engage the rear ends of the barrel and sleeve and on its outer surface a handle to turn the same, oppositely-projecting extensions mounted on the breech-block to engage those of the straps, substantially as described.

6. A cannon comprising an inner barrel having the rear end of its bore enlarged and screw-threaded, a sleeve surrounding the barrel and reduced by steps or portions and having the rear end of its bore provided with screw-threads, a breech-plate mounted on the rear end of the sleeve, a series of tension-plates located on the sleeve and presenting their edges to the outer surface thereof, means to secure said plates together and on the sleeve, straps located on the outer surface of the breech-plate and opposite each other, each of said straps having an inwardly-extending projection, an apertured block or piece pivotally secured to the breech-plate, a breech-block swiveled in the aperture of said plug and having on its inner surface screw-threaded portions to engage the rear ends of the barrel and sleeve and on its outer portion a handle to turn the same, oppositely-extending projections on the breech-block to engage those on the said straps, substantially as described.

7. A cannon comprising an inner barrel having the rear end of its bore enlarged and screw-threaded, a sleeve surrounding the barrel and having the rear end of its bore screw-threaded, a breech-plate mounted on the rear end of the sleeve, a series of tension-plates located on the sleeve, means to secure said tension-plates in place on the sleeve, straps located on the outer surface of the breech-plate and opposite each other, each of said straps having an inwardly-extending projection, an apertured plug or piece pivotally secured to the breech-plate, a breech-block swiveled in the aperture of said plug, and having on its inner surface screw-threaded portions to engage the rear end of the barrel and sleeve and on its outer portion a handle to turn the same, and oppositely-extending projections on the breech-block to engage those on said straps, substantially as described.

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