F. W. S. STOKES.

ORDNANCE.

APPLICATION FILED MAY 13, 1916.

1,334,413.

Patented Mar. 23, 1920.

2 SHEETS—SHEET 1.

FIG. 1.

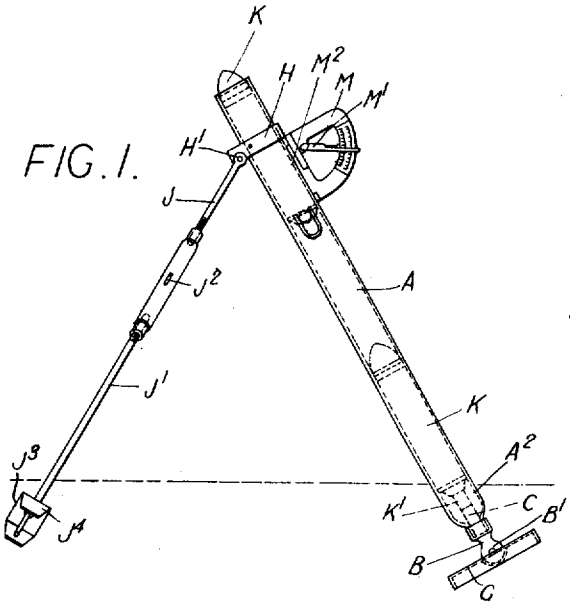


FIG. 2.

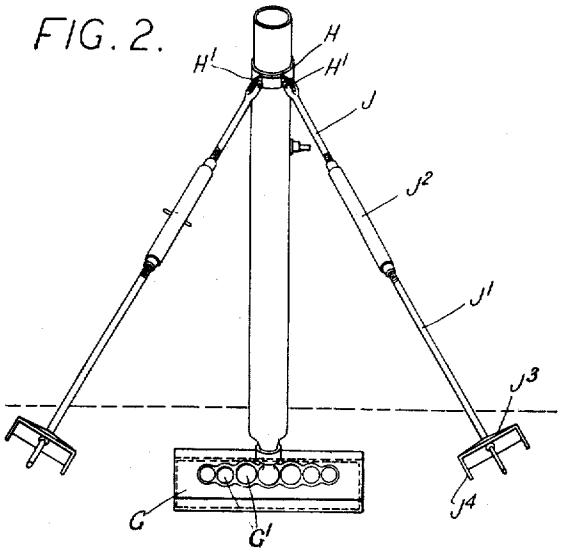
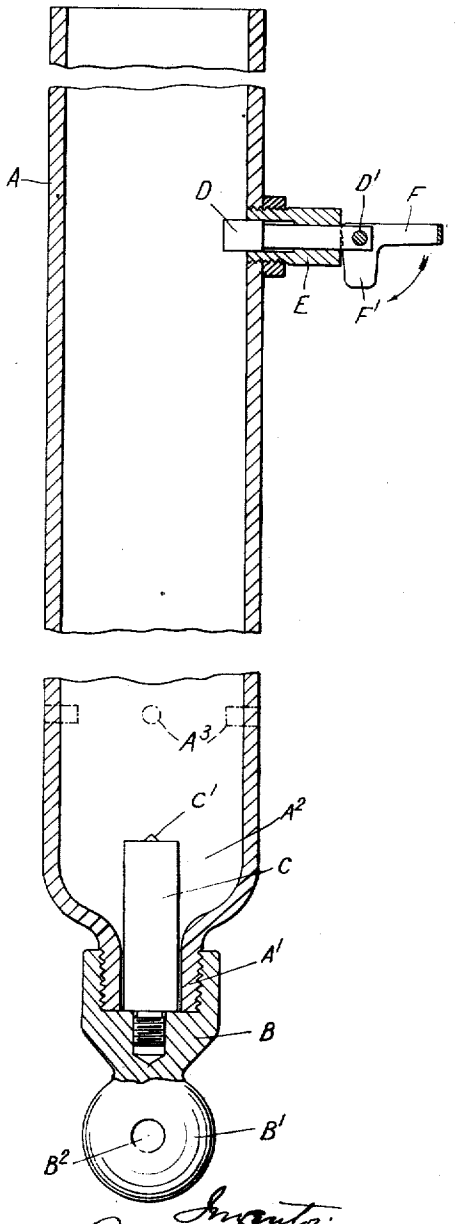


FIG. 3.



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2 SHEETS—SHEET 2.

FIG. 5.

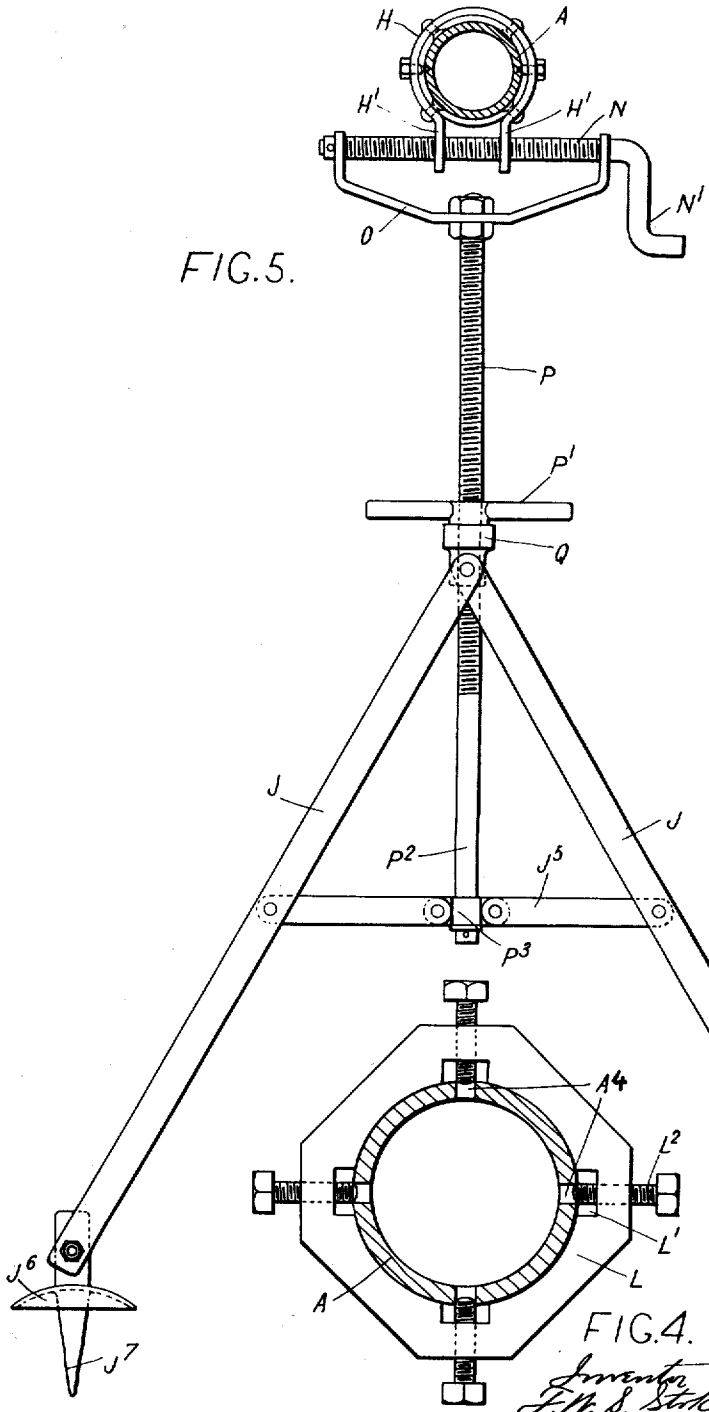


FIG. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK WILFRID SCOTT STOKES, OF LONDON, ENGLAND, ASSIGNOR TO WILLIAM S. PEIRCE, TRUSTEE, ACTING CHIEF OF ORDNANCE, UNITED STATES ARMY.

ORDNANCE.

1,334,413. Specification of Letters Patent. Patented Mar. 23, 1920.

Application filed May 13, 1916. Serial No. 97,388.

To all whom it may concern:

Be it known that I, FREDERICK WILFRID SCOTT STOKES, a subject of the King of England, residing at London, in England, have invented certain new and useful Improvements in Ordnance, of which the following is a specification.

This invention relates to ordnance, more particularly guns of the howitzer type such as trench mortars and has for its object to produce a gun which will be of simple and cheap construction but at the same time capable of throwing a high explosive or other shell for several hundred yards.

According to this invention the gun comprises a barrel having a smooth bore, the rear end of the barrel being closed by a breech cap on which is so mounted a striker that it projects into the breech chamber. The barrel is supported toward the muzzle by means which permit of its adjustment as to height and direction. The breech end of the barrel rests on a plate disposed on the ground the plate and breech end being so formed that the latter can be moved into various positions on the plate and held in the set position by engagement with the plate for the purpose of traversing the gun. Means are provided for temporarily holding a projectile within the bore and adjacent to the muzzle this projectile carrying on its rear end a cartridge containing a propellent charge. The barrel is mounted with its axis inclined at a considerable angle with the horizontal so that when the projectile is released it will slide down into the breech and detonate the cap of the cartridge on the fixed striker. To permit of this the projectile is of such dimensions as to be an easy fit within the bore of the gun. By reason of the striker projecting into the breech chamber there is provided around it a space within which the gases resulting from the explosion of the propellent charge can expand to some extent and thus the maximum bursting pressure which the gun has to withstand is reduced. Hence by providing this expansion space it is possible to construct the barrel of material and in a manner which would not be possible if the full explosive force from the propellent charge was exerted on the walls of the breech chamber.

The accompanying drawings illustrate by way of example constructions embodying the present invention. In these drawings:—

Figure 1 is a side elevation of the improved gun and support set up ready for use.

Fig. 2 is a front elevation of the same.

Fig. 3 is a longitudinal sectional elevation of the gun on an enlarged scale.

Fig. 4 is a cross-section through the breech of a gun showing a modification.

Fig. 5 is a front elevation of a modified form of stand or support for the fore end of the gun.

Like letters indicate like parts throughout the drawings.

Referring to Figs. 1, 2 and 3 the gun comprises a barrel A conveniently formed of a solid drawn steel tube having its rear end reduced in some convenient manner as at A′, the reduced portion being externally screw-threaded. On to this reduced end is screwed a cap B provided with a spherical or otherwise suitably shaped head B′ and having formed or mounted on it a cylindrical plug or block C so that this plug projects through the reduced end A′ of the barrel into the breech chamber A^2. The end of the block C is flat or slightly convex and carries centrally disposed therein a small pointed projection C′ which constitutes a striker. At a suitable point in the length of the barrel A is a hole through which projects into the bore a pin D which is so carried by a sleeve E that it can slide freely therein and constitute a removable catch adapted to hold the projectile when inserted in the muzzle. Pivoted at D′ to the outer end of the pin D is a two-armed lever one arm F of which is so formed as to permit of having attached thereto a cord or the like, while the other arm F′ is so disposed and shaped that when the lever is turned about its pivot D′ the part F′ will bear against the end of the sleeve E and retain the pin D in its withdrawn position so that its inner end does not project into the bore of the gun. The inner end of the pin D is conveniently formed slightly larger

than the outer end so that, by abutting against a shoulder formed within the sleeve E, the complete withdrawal of the pin D is prevented.

A metal plate G of suitable dimensions, flanged or otherwise shaped as to its underside so as to obtain a hold on the ground, has formed in it a series of depressions G′ each adapted to receive the head B′ of the breech cap B.

To the fore end of the gun is attached a support in the form of legs whose length can be varied. A convenient construction of these legs is shown in Figs. 1 and 2. A collar H fixed in some suitable manner around the fore end of the gun is provided with two lugs H′ to each of which is pivoted a suitable length of rod J whose end is threaded with a left hand screw-thread. Another length of rod J′ has one end similarly threaded but with a right hand thread and the two ends of these rods J and J′ engage the correspondingly screw-threaded ends of a turn buckle J^2. Loosely mounted on the other end of the rod J′ is a plate J^3 flanged as at J^4 or otherwise formed on its underside so as to take a hold on the ground.

The gun is set up in the manner shown in Figs. 1 and 2 with the plate G embedded in the ground and the breech of the gun resting thereon with the head B′ of the breech cap engaging one of the depressions G′. The fore end of the gun barrel A is supported by the legs J J′ the plates J^3 on the end of which are embedded in the ground. The gun can now be trained in the required direction traversing being effected by moving the breech to one side or the other so that the end engages a depression G′ in the plate G. The desired elevation is attained by rotating the turn buckle J^2 and so varying the length of the legs supporting the fore end. Suitable adjustment of the length of these legs also has a traversing effect. It will be noted that the gun is set up with the barrel forming a considerable angle to the horizontal. The pin D is now pushed in so that its end projects into the bore of the gun and a projectile K is inserted in the muzzle being retained there by the base of the projectile resting on the pin D. This projectile carries at its rear end a cartridge provided with a percussion cap and the projectile itself is of such dimensions with relation to the bore of the gun that a certain amount of windage is allowed in order to permit the projectile to slide freely down the bore. When the gun is to be fired the pin D is withdrawn by pulling the cord attached to the lever F the pull being maintained until the projectile has left the gun. As soon as the pin D is withdrawn the projectile slides down the bore of the gun into the breech and detonates the cartridge on the striker C′.

In some cases the catch or the like above described as being disposed in the barrel of the gun for the purpose of holding the projectile until it is to be fired, may be entirely dispensed with or some equivalent device combined with the projectile. Thus for instance for quick firing of the gun the projectile may be held in the hand in the muzzle until it is desired to fire the gun when the projectile is released and allowed to fall into the breech. Yet again, by drilling a small hole at a suitable point in the wall of the projectile and inserting a pin therein, the projectile will be retained in the muzzle of the gun as by the above described catch. When the pin is withdrawn by pulling a cord or otherwise, the projectile is released and will fall into the breech and be discharged.

Owing to the manner in which the striker C′ is mounted on the block C which projects into the breech chamber A^2 there is provided around the striker a space in which the gases resulting from the explosion of the propellent charge can expand sufficiently to reduce the maximum bursting pressure on the walls of the gun while, however, allowing them to develop the necessary propellent force. The dimensions of this space for the expansion of the gases is further increased by reason of the cartridge carrying the propellent charge being of less diameter than the projectile and carried in a chamber formed or mounted on the rear end of the projectile. The position of the projectile at the moment of discharge after it has descended into the breech of the gun is indicated in dotted lines in Fig. 1 the expansion space in the breech chamber A^2 being also indicated around the cartridge chamber K′ on the rear of the projectile and the striker block C.

A hole B^2 is conveniently formed in the head of the breech cap B through which a pin can be passed for the purpose of enabling the breech cap to be unscrewed. This permits access to the breech chamber A^2 and also allows the striker block C and the position of the striker C′ to be adjusted. The striker block C is conveniently of the same diameter as the head of the cartridge containing the propellent charge and it may be noted that though this striker block is removable and adjustable in the manner described yet in effect this block together with the cap constitute a fixed breech block for the gun inasmuch as the gun is loaded through the muzzle.

Projections such as A^3 may be formed or provided in the breech chamber A^2 in such a position with relation to the striker C′ that when the cap B is unscrewed to a slight extent the striker C′ can be withdrawn into a position where the head of the cartridge carried by the projectile cannot come in contact with it the projections within the bore

then limiting the rearward movement of the projectile into the breech of the gun.

In order to permit of the propellent force being varied so as to alter the range of the projectile, a device such as that shown in Fig. 4 may be adopted which illustrates a cross-section through the breech of the gun. Holes A^4 are bored radially through the barrel and a collar L is placed over the breech so as to lie over these holes. Recesses L′ with open ends are formed in the collar L in positions corresponding to the positions of the holes A^4 and a series of set screws L^2 pass radially through the collar. The end of each set screw protrudes into a recess L′ and can engage a hole A^4, which it closely fits. By unscrewing one or more of the set screws L^2 a variable leakage of gas from the breech chamber into the air is permitted thus reducing the propellent force of the explosion gases.

The laying of the gun as to its elevation is facilitated by providing a device such as shown in Fig. 1. This comprises a quadrantal plate M mounted in some suitable manner on the upper side of the barrel so as to project radially from the axis thereof. Pivoted to this plate is a lever M′ which carries a spirit level and has its free end forked so that a portion of the lever lies on either side of the quadrant portion of the plate M. This quadrant is graduated on one side with a scale of range distances and on the other side is provided with a time scale corresponding to these distances. When the gun is to be trained the lever M′ is raised until its end cuts the scale at the point corresponding to the distance to which it is desired the projectile should be thrown or at the figure corresponding to the desired time of flight. The elevation of the gun is now varied until the lever M′ is level.

In order to permit of a periscope being mounted on the gun there is formed in the base of the quadrantal plate M a hole or socket M^2 into which can be inserted a rod or pin pivotally mounted on the lower end of the periscope. In this way the periscope can be readily and truly fixed in position and is then available for use in training the gun.

In Fig. 5 is shown a modified construction of support for the fore end of the gun. Here the collar or strap H which surrounds the fore end of the gun has its lugs H′ screw-threaded to engage a screw-threaded bar N carried toward its ends by a U-shaped bracket O. The bar N has a handle N′ by means of which it can be rotated so as to impart traversing movement to the gun barrel A. The bracket O is mounted on the end of a vertically disposed screw-threaded rod P on which is a screw-threaded nut P′, conveniently formed as a hand-wheel. This nut P′ rests on a block Q in which is a hole through which the rod P passes freely. To this block Q are pivoted the supporting legs J. The lower end P′ of the rod P is not screw-threaded and carries loosely thereon a collar P^3 to which are pivoted double links J^5, the other ends of which are pivotally connected to the double legs J at suitable points in their length. The legs J with the links J^5 constitute an articulated frame or support which can be folded up when desired by sliding the collar P^3 up the rod P^2. When the links J^5 and legs J are extended and the ends of the latter placed in the ground the collar P^3 forms a support for the lower end P^2 of the rod P. By rotating the hand-wheel nut P′ elevation or depression of the fore end of the gun can be effected. The lower end of each leg J is provided with a suitable plate or disk J^6 and spiked projection J^7 to insure a good support for the leg on the ground.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, and a striker immovably carried by the block and projecting from the inner face thereof as set forth.

2. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, and a striker carried by the block as set forth.

3. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a striker carried by the block, and means for temporarily holding a projectile in the bore and adjacent to the muzzle as set forth.

4. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, and means for temporarily holding a projectile in the bore and adjacent to the muzzle as set forth.

5. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, and a removable catch protruding into the bore of the barrel and situated toward the muzzle thereof as set forth.

6. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech

cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, a radial hole in the wall of the barrel toward the muzzle, and a pin sliding in this hole so that its end can be caused to project into the bore as set forth.

7. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a striker carried by the block, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal, and a plate adapted to be placed on the ground and shaped to receive the breech end of the gun for which it forms a support as set forth.

8. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, means for temporarily holding a projectile in the bore and adjacent to the muzzle, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal and a plate adapted to be placed on the ground and shaped to receive the breech end of the gun for which it forms a support as set forth.

9. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap fitting on the reduced end of the barrel, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, and a striker carried by this block as set forth.

10. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, means for allowing the escape of gas to a variable extent from the expansion space through the wall of the breech chamber, a striker carried by the block on the breech cap and means for temporarily holding a projectile in the bore and adjacent to the muzzle as set forth.

11. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, a removable catch protruding into the bore of the barrel and situated toward the muzzle thereof, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal, and a plate adapted to be placed on the ground and shaped to receive the breech end of the gun for which it forms a support as set forth.

12. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap fitting on the reduced end of the barrel, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, a gas expansion space in the breech chamber around the block, a striker carried by the block, and means for temporarily holding a projectile in the bore and adjacent to the muzzle as set forth.

13. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap fitting on the reduced end of the barrel, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, a gas expansion space in the breech chamber around the block, a striker carried by this block, a removable catch protruding into the bore of the barrel and situated toward the muzzle thereof, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal and a plate adapted to be placed on the ground and shaped to receive the breech end of the gun for which it forms a support as set forth.

14. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap having an external protrusion, a block mounted on the breech cap and projecting into the breech chamber, a striker carried by this block, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal, and a plate having a series of depressions formed therein, each depression shaped to receive the breech cap protrusion, the plate being adapted to be placed on the ground and form a support for the gun breech which can be adjusted thereon for traversing purposes as set forth.

15. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap fitting on the reduced end of the barrel and provided with an external protrusion, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, a striker carried by this block, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal, and a plate having a series

of depressions formed therein, each depression shaped to receive the breech cap protrusion, the plate being adapted to be placed on the ground and form a support for the gun breech which can be adjusted thereon for traversing purposes as set forth.

16. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap having an external protrusion, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, a removable catch protruding into the bore of the barrel and situated toward the muzzle thereof, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal, and a plate having a series of depressions formed therein, each depression shaped to receive the breech cap protrusion, the plate being adapted to be placed on the ground and form a support for the gun breech which can be adjusted thereon for traversing purposes as set forth.

17. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap fitting on the reduced end of the barrel, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, a gas expansion space in the breech chamber around the block, means for allowing the escape of gas to a variable extent from the expansion space through the wall of the breech chamber, a striker carried by the block, a radial hole in the wall of the barrel toward the muzzle, a pin sliding in this hole so that it can be caused to project into the bore, and means for withdrawing this pin, as set forth.

18. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap having an external protrusion and fitting on the reduced end of the barrel, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, a gas expansion space in the breech chamber around the block, means for allowing the escape of gas to a variable extent from the expansion space through the wall of the breech chamber, a striker carried by the block, means for adjustably supporting the fore end of the barrel with its axis forming a considerable angle with the horizontal, a plate having a series of depressions formed therein, each depression shaped to receive the breech cap protrusion, the plate being adapted to be placed on the ground and form a support for the gun breech which can be adjusted thereon for traversing purposes, a radial hole in the wall of the barrel toward the muzzle, a pin sliding in this hole so that it can be caused to project into the bore, and means for withdrawing this pin as set forth.

19. In a gun of the howitzer type the combination of a barrel having a smooth bore, a breech cap having an external protrusion, a block mounted on the breech cap and projecting into the breech chamber, a gas expansion space in the breech chamber around the block, a striker carried by the block, a removable catch protruding into the bore of the barrel and situated toward the muzzle thereof, a plate adapted to be placed on the ground and shaped to receive the breech cap protrusion and form a support for the gun breech, two legs pivotally connected to form a collapsible support for the fore end of the gun barrel, screw means for adjusting the height of this support and for traversing the fore end, and a collar on the fore end of the barrel to which the support is connected as set forth.

20. In a gun of the howitzer type the combination of a barrel formed of tubing having a smooth bore and one end reduced to constitute the breech, a breech cap having an external protrusion and fitting on the reduced end of the barrel, a block mounted on the breech cap and projecting into the breech chamber through the opening in the reduced breech end of the barrel, a gas expansion space in the breech chamber around the block, a striker carried by the block, a radial hole in the wall of the barrel toward the muzzle, a pin sliding in this hole so that it can be caused to project into the bore, means for withdrawing this pin, a plate having a series of depressions formed therein, each depression shaped to receive the breech cap protrusion, the plate being adapted to be placed on the ground and form a support for the gun breech which can be adjusted thereon for traversing purposes and fixed in one of the depressions, two legs pivotally connected to form a collapsible support for the fore end of the gun barrel, screw means for adjusting the height of the support and for traversing the fore end, a collar on the fore end of the barrel to which the support is connected, and a clinometer mounted on the gun barrel and comprising a graduated quadrant and a pivoted arm movable over this quadrant and provided with a spirit level as set forth.

21. In a gun of the howitzer type, the combination of a barrel having a smooth bore and a closed breech end, and a striker rigidly secured to the breech end of the barrel and projecting into the body of the barrel, for the purpose described.

22. In a gun of the howitzer type, the combination of a barrel closed at the breech, a striker secured to the breech end of the barrel and extending into the body thereof,

and means for temporarily supporting a projectile within the barrel adjacent the muzzle thereof, for the purpose specified.

23. In a gun of the howitzer type, the combination of a smooth bore barrel closed at the breech end, a striker arranged within the barrel at the breech end thereof, and means adjustable through the wall of the barrel adapted to temporarily support a projectile within the barrel in advance of the striker.

24. In a gun of the howitzer type, the combination of a smooth bore barrel having a contracted, closed, lower, breech end, a stationary striker within the breech end of the barrel, means adapted to support a projectile within the barrel above the striker, and means for withdrawing said support from operative position.

25. In a gun of the howitzer type, the combination of a smooth bore barrel having a closed, lower, breech end, a support adapted to receive the breech end of the barrel, adjustable means engaging the barrel and adapted to hold the same at the desired inclination, and a stationary striker arranged within the breech end of the barrel, for the purpose described.

26. In gun of the howitzer type, the combination of a smooth bore barrel closed at its lower, breech, end, said breech end being of substantially spherical form, a base provided with a plurality of sockets each adapted to receive the breech end of the barrel, legs engaging the barrel adjacent the muzzle end, and a stationary striker within the breech end of the barrel.

27. A gun of the howitzer type, consisting of a muzzle-loading closed-breech bore, and a stationary centrally located firing pin in the bottom of the bore.

28. A gun of the howitzer type, consisting of a muzzle-loading closed-breech bore, and a stationary firing pin in the bottom of the bore adapted to coöperate with a projectile dropped into the bore of the gun to fire the same.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK WILFRID SCOTT STOKES.

Witnesses:
HARRY PETER VENN,
EUSTACE HENRY BARKER.