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TRENCH GUN.

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1,317,419. Patented Sept. 30, 1919.

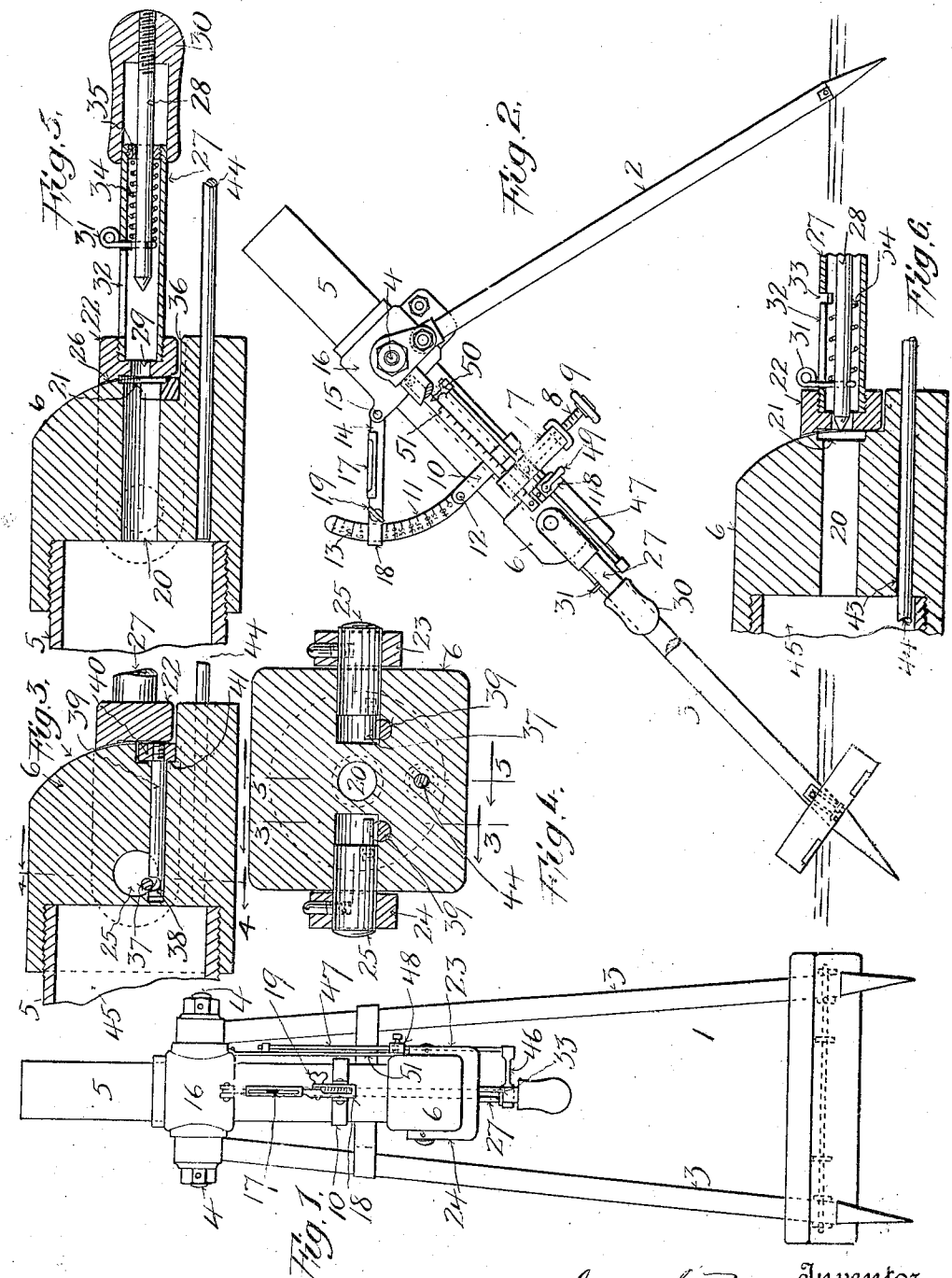


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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TRENCH-GUN.

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To all whom it may concern:

Be it known that I, AXEL G. BERGMAN, a subject of the King of Sweden, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Trench-Guns, of which the following is a specification.

My invention relates to trench guns and more particularly to guns for throwing bombs, grenades and similar devices.

In trench warfare special guns have been devised for throwing or hurling bombs, grenades and similar devices, but explosive charges have not been universally used for throwing the projectiles owing to disadvantages in using such charges for these projectiles at various short ranges. In trench warfare, projectiles in the nature of bombs and grenades are used at comparatively short ranges and it has heretofore been difficult to employ explosive charges for the propelling force and to provide for variations in the range of fire.

Under my present invention it is possible to use explosives for the propelling force and to alter the range of fire very easily and with the necessary degree of accuracy. The change of the range of fire is not made as heretofore, by altering the angle of the gun, but by modifying the action of the explosive charge upon the projectile. Thus, the range of fire may be altered within certain limits without altering the angle of the gun, so that once the gun is positioned it is seldom necessary to change its angle. This is of considerable advantage in trench warfare because of the limited space which the gunners usually have in which to manipulate the gun. It is also an advantage because the trench port through which the gun is fired may be comparatively small.

Another advantage is, that an explosive may be used for the propelling force and the range of fire may be varied and still the parabolic curve traversed by the projectile will always be such as to permit the projectile to clear the ordinary parapet and drop within the trench.

Another advantage is that the propelling charges may consist of blank cartridges all having the same explosive charge and which may be "factory loaded" and the range may be varied by manipulating the gun to modify the action of the explosive on the projectile.

I provide means for varying the angle of the gun but this is only necessary for very wide variations in the range.

In the drawings forming part of this application,

Figure 1 is a plan view of a gun embodying my invention in one form,

Fig. 2 is a side elevation thereof,

Fig. 3 is a sectional view, on the line 3—3 of Fig. 4,

Fig. 4 is a sectional view on the line 4—4 of Fig. 3,

Fig. 5 is a sectional view on the line 5—5 of Fig. 4, and

Fig. 6 is a view very similar to Fig. 5 but with the parts in the position following discharge of the projectile.

I have shown my invention embodied in very simple form having but few parts.

The support 1 may be of any form, but herein I have shown a stand consisting of the forwardly extending legs 2 and rearwardly extending legs 3 all fulcrumed upon trunnions 4 at the sides of the gun barrel 5.

The barrel 5 may be of comparatively light weight because light charges of explosive will usually serve the purpose of throwing projectiles in trench warfare. I have shown a barrel 5 consisting of a metal tube or cylinder having a breech 6 threaded thereon. The barrel need not be rifled as the projectiles may fit loosely therein for all practical purposes. I prefer to load the gun by inserting the projectile, which may be a bomb, grenade or similar device, into the muzzle and allowing it to slide down in the barrel.

The barrel may be swung on the trunnions 4 in relation to its support 1, and if the barrel is arranged as here shown it will tend to swing down at the rear owing to the greater weight being arranged behind the trunnions. A yoke 7 connected between the legs 3 carries an adjusting screw 8 which is operated by the wheel 9, and the rear end of the barrel 5 rests on the end of this adjusting screw. By turning this screw the elevation of the barrel may be altered.

There is a sleeve 10 on the barrel, to which a segmental link 11 is fulcrumed at 12 and this link has a scale 13 to indicate various angles of inclination. An arm 14 pivoted to the sleeve 16 of the barrel at 15 has a spirit level 17 on top and it has a strap 18 surrounding the link 11 and adapted to be clamped at any position thereon by a thumb screw 19. To regulate the elevation of the

barrel 5 to a certain angle the arm 14 is clamped to the link 11 at the point where the desired angle is indicated on the scale 13. The wheel 9 is then turned to the right or left to elevate or depress the barrel, as the case may be, until the spirit level 17 indicates that the arm 14 is level. This will indicate that the barrel is elevated to the degree indicated on the scale.

For discharging the projectile I prefer to use a blank cartridge such as would be used in a rifle. For instance, a blank cartridge of the type of a 45-70 rifle cartridge will suffice to send a two pound grenade or bomb 150 meters.

I have shown the breech 6 provided with a bore 20 to receive such a cartridge from the rear, with an enlargement 21 to receive the rim or flange of the cartridge. It is to be understood that this arrangement is not imperative as the form of the device may be changed to adapt it for other forms of explosive charges.

There is shown a breech block 22 which constitutes part of a yoke, the arms 23, 24 of the yoke being fulcrumed on the trunnions 25 at opposite sides of the breech.

The rear end of the breech 6 is preferably curved on an arc concentric with the trunnions 25 and the breech block 22 is preferably concaved at 26 on a similar arc to make these parts close fitting.

There is a tubular casing 27 threaded to the breech block 22 and it incloses a firing pin 28 which moves through an opening 29 in the breech block to strike the cap of the cartridge. The firing pin is connected with a handle 30 which is slidable along the end of the casing 27, the handle being here shown as threaded to the firing pin.

There is a pin 31 projecting through a slot 32 in the casing 27 and this pin is secured to the firing pin. When the handle and firing pin are drawn back to their extreme position a slight turn of the handle will place the pin 31 in the notch 33 to hold the firing pin in firing position or cocked. A coiled spring 34 surrounding the firing pin and compressed between the fixed pin 35 and the locking pin 31 serves to operate the firing pin. The breech block may rest on the seat 36 when down and I deem it unnecessary to provide any lock for the breech block, although one may be used if desired.

I have shown a simple form of ejector for the cartridges. This comprises pins 37 arranged eccentrically on the trunnions 25 and the pins engage in grooves 38 in parallel rods 39 which slide in the breech 6. These rods 39 carry at their rear end an ejecting bar 40 which sets in a recess 41 at the back of the breech, part of the cartridge flange recess 21 being formed in this ejector bar.

The range of the gun is changed by modifying the action of the explosive charge upon the projectile and for this purpose I have provided a simple device for retaining the projectile at any desired position in the barrel until the cartridge is fired. At the underside of the breech is shown a rod 44 slidable in a bore 43, and it is adapted to be projected at various distances into the projectile chamber or bore 45 of the gun barrel. This rod 44 is connected by a cross piece 46 with a rod 47 which latter is arranged outside and preferably to one side of the barrel, and slidable in a bracket 48. The rods 44, 47 are adapted to be clamped in various positions by means of an eccentric bolt, operated by a handle 49. The forward end of the rod 47 carries an indicator or pointer 50 which coöperates with a scale 51 attached to the side of the barrel. The scale 51 is marked to indicate yards, meters, or any other units of measurement.

Operation: The gun having been properly set up at the desired angle, the handle 49 is turned to release the rods 44, 47 and the latter are moved up or down to bring the pointer 50 to the position on the scale 51 where the desired range is indicated, which may be, say, fifty meters. The handle 49 is then turned to lock the rods 44, 47 in place and these parts will remain in this condition so long as the firing is to be at this same range.

The gunner grasps the handle 30 and swings up the breech block 22, and he will then place the blank cartridge in the cartridge socket 20 and then lower the breech block. The projectile is then inserted into the muzzle of the gun and it slides down until it rests upon the upper end of the rod 44 where it remains until expelled by the force of the explosive.

If the firing pin has not previously been cocked, the handle 30 is drawn back, thus drawing back the firing pin 28 and compressing the main spring 34, and finally the handle 30 is turned to enter the pin 31 in the notch 33. To fire the gun it is only necessary to release the pin 31 from the recess 33 and the main spring will project the firing pin against the cap of the cartridge, and the cartridge will be thus discharged.

The distance the projectile will be fired will depend upon its position in the barrel at the time of the explosion of the cartridge, as determined by the supporting rod 44 and as indicated by the pointer 50 on the scale 51.

The more the rod 44 is withdrawn, the nearer the projectile will be to the breech of the gun and vice versa. The nearer to the breech of the barrel the projectile is held, the greater distance will it be propelled by the explosive and vice versa, provided, of course, that a uniform charge of explosive is always used.

The nearer to the breech the projectile is

supported the greater the effect of the explosive charge upon it and, consequently, the greater the distance it will be projected. On the other hand, the nearer the projectile is to the muzzle the shorter will be the range because the explosive charge will have a space in which to expand behind the projectile and, consequently, its action on the projectile will be much weaker. I have found that quite accurate results may be obtained in a trench gun by thus modifying the effect of the explosive on the projectile. As the barrel of the gun may be retained at the same angle for various ranges the projectiles when fired at different ranges will travel in parabolic curves more or less similar and the projectiles will rise high enough to pass over the ordinary parapet and descend in the trench.

Having described my invention, what I claim is:

1. A trench gun having means for holding the body of a projectile at various positions within its barrel.

2. A trench gun having adjustable means for holding the body of a projectile at various positions within its barrel.

3. A trench gun having a barrel and means along the barrel adapted to be adjusted to hold the projectile at various points with relation to the barrel.

4. A trench gun having a barrel adapted to receive a projectile of less diameter than the barrel and fitting within and wholly inclosed by the latter, the said barrel being normally imperforate, said gun having means for receiving a fixed or standard firing charge, and means for modifying the effect of such fixed or standard firing charge on the projectile to vary the range of fire without altering the imperforate character of the barrel and independently of the elevation of the gun.

5. A trench gun having a barrel adapted to receive a projectile of less diameter than the barrel, and fitting within and wholly inclosed by the latter, means for holding a firing charge, and means for varying the space between the firing charge and projectile to vary the range of fire.

6. A trench gun having a barrel, and means movable along the inside of the barrel adapted to engage the projectile and hold it in varying positions.

7. A trench gun having a barrel, and a rod movable along the inside of the barrel adapted to engage the projectile and hold it in varying positions.

8. A trench gun having a cartridge chamber, a barrel of larger diameter than the cartridge chamber, said barrel adapted to bodily receive a projectile, and means for engaging the projectile at varying points in the length of the barrel to hold the projectile at varying distances from the cartridge chamber.

9. A trench gun having an explosion chamber, in which the firing charge is exploded, a barrel of greater diameter than the projectile to be fired and adapted to receive the body of the projectile, and means for holding the projectile within the barrel with means for varying the distance between the explosion chamber and the projectile whereby to vary the range of fire.

10. A gun of the class described including a barrel from which a projectile is adapted to be fired, said gun having a cartridge chamber, and said barrel having a bore for the projectiles of larger diameter than the cartridge chamber, and means movable in said bore and adapted to support the projectiles at different positions in the bore, for the purpose set forth.

11. A gun of the class described including a barrel from which a projectile is adapted to be fired, means for holding an explosive charge for the projectile, and means for modifying the action of the explosive on the projectiles to vary the range, comprising a rod movable in the bore of the barrel for supporting the projectile at different positions therein, a rod movable with said first rod and arranged along the outside of the barrel, and means for indicating the positions of said rods.

12. Apparatus for firing projectiles comprising a projectile-receiving chamber, and means for positively positioning the projectile in said chamber to vary the size of the expansion space at the rear of the projectile and to vary the length of the chamber in advance of the projectile.

13. Apparatus for firing projectiles comprising a projectile-receiving chamber, and means comprising stop mechanism for positively positioning the projectile in said chamber to vary the size of the expansion space at the rear of the projectile and the length of the chamber in advance of the projectile.

14. Apparatus for firing projectiles comprising a projectile-receiving chamber, and means independent of the projectile to indicate a plurality of different positions which the projectile is capable of assuming in said chamber.

15. Apparatus for firing projectiles comprising a firing chamber, and means independent of the projectile for positioning the same to vary the size of the chamber.

Signed at the city, county and State of New York, this 7th day of September, 1915.

AXEL G. BERGMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."