C. WALE.

MORTAR FOR THROWING PROJECTILES.

APPLICATION FILED JUNE 12, 1917.

1,322,980.

Patented Nov. 25, 1919.

2 SHEETS—SHEET 1.

Fig. 2.

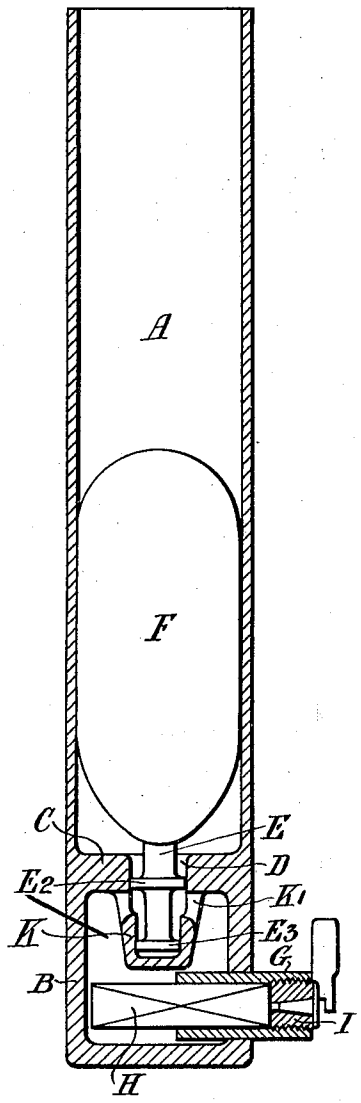
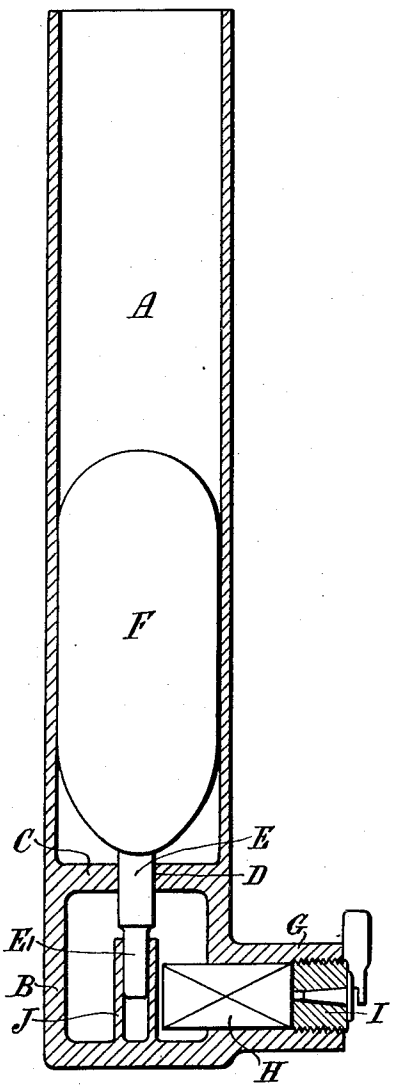


Fig. 1.



Inventor

Charles Wale

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Fig. 4.

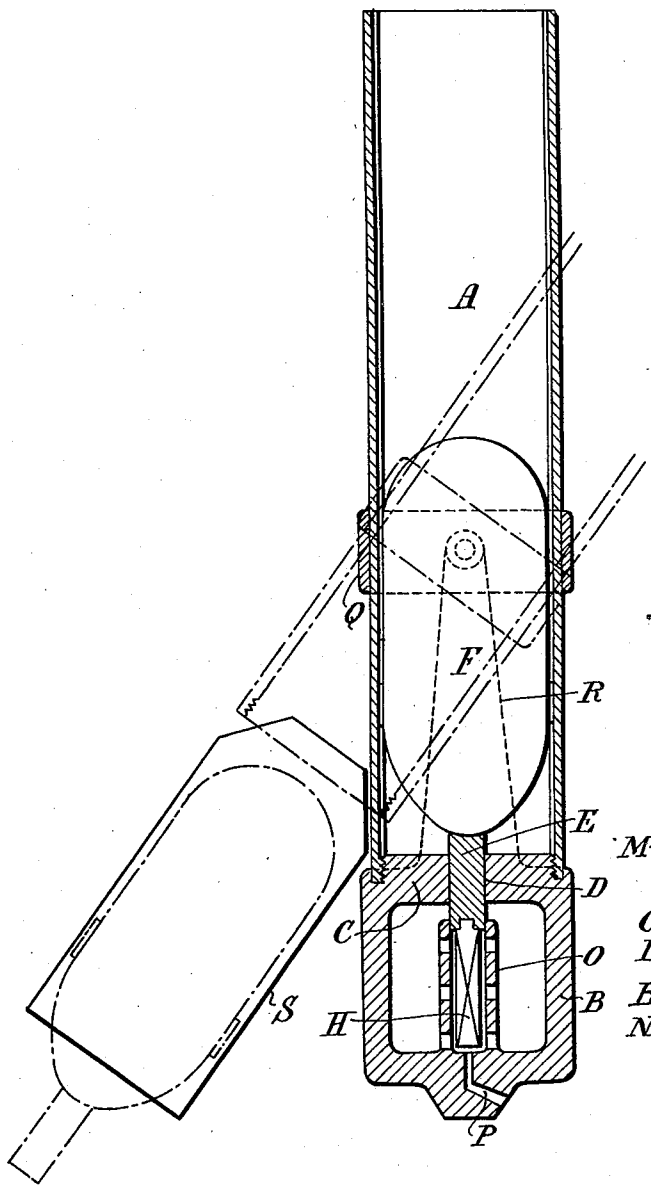
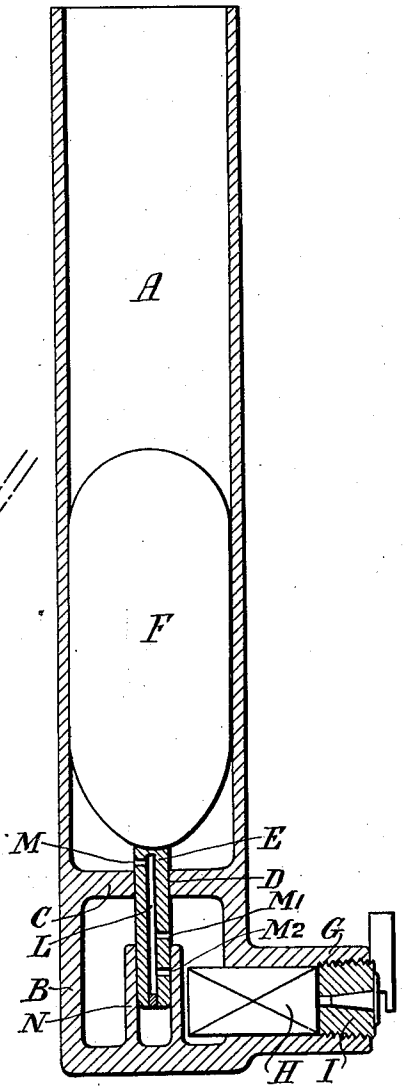


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES WALE, OF NEWCASTLE-UPON-TYNE, ENGLAND, ASSIGNOR TO SIR W. G. ARMSTRONG, WHITWORTH AND COMPANY, LIMITED, OF NEWCASTLE-UPON-TYNE, ENGLAND.

MORTAR FOR THROWING PROJECTILES.

1,322,980. Specification of Letters Patent. Patented Nov. 25, 1919.

Application filed June 12, 1917. Serial No. 174,270.

To all whom it may concern:

Be it known that I, CHARLES WALE, a subject of the King of Great Britain, residing at Elswick Works, Newcastle-upon-Tyne, England, have invented a new and useful Improvement in Mortars for Throwing Projectiles, of which the following is a specification.

This invention relates to improvements in mortars having combustion chambers separate from the barrels.

The object of this invention is to obtain uniformity of range which is effected by delaying the action of the explosion gases generated by cordite or other service propellants.

In all guns of large bore and short range great difficulty has heretofore been encountered in obtaining complete combustion of the firing charge due to the large area exposed to the gas pressure and consequent quick movement of the bomb or other projectile whereby the area of the chamber or part of the gun in which combustion takes place is rapidly increased and therefore the pressure of the gas is reduced to a point which tends to produce uneven burning of the firing charge which results in an inaccurate range.

According to my invention the gun is provided with a separate combustion chamber which communicates with the barrel of the gun, preferably through a restricted opening in a partition separating the barrel from the combustion chamber, and this opening is normally closed by a rod or stem projecting from the bomb. When the charge is fired the gases act on a part of the stem or rod presenting a relatively small area to the gases, but after the bomb has moved a short distance in the barrel the rod or stem is withdrawn from the opening in the partition and the explosion gases are admitted to the barrel and act upon a larger area of the bomb and eject it from the barrel.

The accompanying drawings illustrate four mortars made in accordance with this invention. Figures 1, 2, 3 and 4 are longitudinal sections of the four mortars.

In all the figures, the barrel A of the mortar is separated from the combustion chamber B by a partition C having a hole D through which passes a stem or rod E on a bomb F.

In Figs. 1, 2 and 3, the combustion chamber B has a breech G for the insertion of a charge H, the breech being closed by a breech screw I fitted with firing mechanism.

In the combustion chamber in Fig. 1 is a cylinder J closed at one end and of such a size that the reduced end E^1 of the stem E slidably fits it. When the charge is fired the gases act on the unreduced part of the stem pushing forward the bomb until the hole D is opened, when they enter the barrel and act upon the bomb F.

In Fig. 2, the stem E has upon it two pistons E^2, E^3, of different sizes, the larger piston E^2 fitting into the hole D in the partition C, and the smaller one E^3 into a cylinder K in which are ports K^1 for allowing of the passage of the explosion gases. When the charge is fired the gases act upon the two pistons E^2, E^3. If the pistons were of the same area no movement would be given to the rod, but as the piston E^2 is larger than the piston E^3 the bomb is pushed forward until the hole D is opened, when the gases enter the barrel and act upon the bomb F.

By the arrangement shown in Fig. 2 a hole of large diameter may be made in the partition which is normally closed by the piston E^2 which presents a large area to pressure, but in order that the effective pressure on the exposed portion of said piston may be sufficiently reduced the piston E^3, which presents a smaller area to pressure, is employed. In this way the effective pressure is controlled by the difference between the exposed areas of the two pistons.

In Fig. 3, a passage L and ports M, M^1, M^2, leading into the passage are made in the stem E. The stem E passes through the hole D in the partition C and enters a cylinder N in the combustion chamber B. When the charge is fired the gases pass first through the port M^1 and then into the passage L and issue through the port M into the barrel, thus causing the bomb to move forward and uncover the other port M^2. As in the former cases the hole D is subsequently opened.

In Fig. 4, the breech G is dispensed with and the charge H is inserted through the

hole D in the partition C into a perforated cylinder O in the combustion chamber B. The charge H may be attached to the end of the stem E. The charge is ignited through a hole P, the gases first acting upon the end of the stem E pushing the bomb forward until the hole D is opened, when they enter the barrel and act upon the bomb. When the barrel is rifled it is preferred to insert the bomb from the breech end. To enable this to be done the barrel A is screwed into the combustion chamber B and is carried by a ring Q pivotally mounted on brackets R.

It will be observed that my invention may be applied to a gun in various ways, some of which have been illustrated. In all cases, however, the charge is fired in a confined space and the gases at first act upon a relatively small area of the projectile or a part connected therewith to at first move the bomb slowly for a short distance and then the gases operate upon a greater area to eject the bomb from the barrel.

What I claim is:—

1. A mortar comprising a barrel, a combustion chamber, a fixed or immovable partition between the barrel and the combustion chamber having a hole in it of smaller diameter than said combustion chamber, through which the barrel and chamber communicate for the passage of gases from the chamber to the barrel, means for propelling the bomb by the gases generated in the combustion chamber to give an initial movement to the bomb and for then opening the hole in the partition and admitting gases from the combustion chamber to the barrel.

2. A mortar, comprising a barrel to receive a bomb to be fired, a combustion chamber, a fixed or immovable partition separating the barrel from the combustion chamber and having a hole in it of smaller diameter than the combustion chamber through which gases pass to the barrel and a rod projecting through the hole but removable therefrom for pushing the bomb forward when the charge is fired and for then opening the hole to admit gases to the barrel of the mortar.

3. A mortar, comprising a barrel for a bomb, a combustion chamber, a fixed or immovable partition separating the combustion chamber from the barrel, and having a hole through it of smaller diameter than the combustion chamber to establish communication between the combustion chamber and the barrel, and a rod connected with the bomb and passing through and normally closing the hole in the partition but which is removable from the hole and is adapted to push forward the bomb when the charge is fired and to pass through and open the hole in the partition.

4. A mortar comprising a barrel to receive a bomb to be fired, a combustion chamber, a partition separating the barrel from the combustion chamber and having a hole in it through which gases pass to the barrel, a rod projecting through the hole for pushing the bomb forward when the charge is fired and for then opening the hole to admit gases to the barrel of the mortar, and a cylinder in the combustion chamber into which the rod extends.

5. A mortar, comprising a barrel to receive a bomb to be fired, a combustion chamber, a partition separating the barrel from the combustion chamber and having a hole in it through which gases pass to the barrel, and a rod projecting through the hole for pushing the bomb forward when the charge is fired, said rod being provided with two pistons of different sizes one of which normally closes the opening in the partition and passes through and opens the hole to admit gases to the barrel of the mortar.

6. A mortar, comprising a barrel to receive a bomb to be fired, a combustion chamber, a partition separating the barrel from the combustion chamber and having a hole in it through which gases pass to the barrel, a rod projecting through the hole for pushing the bomb forward when the charge is fired, a cylinder in the combustion chamber and two pistons of different sizes on the rod the larger of which fits the hole in the partition and the smaller fitting the cylinder in the combustion chamber said cylinder being provided with ports for admitting to it the explosion gases.

7. A mortar comprising a combustion chamber, a barrel of materially greater length than the combustion chamber, a fixed or immovable partition between the combustion chamber and the barrel having a hole in it through which the barrel and chamber communicate for the passage of gas from the chamber to the barrel, hole-closing means extending through the hole in the partition which are acted on by the gases generated in the combustion chamber for giving an initial movement to the bomb and for then opening the hole to admit gas from the combustion chamber to the barrel to discharge the bomb therefrom.

In testimony that I claim the foregoing as my invention, I have signed my name this eleventh day of May, 1917.

CHARLES WALE.