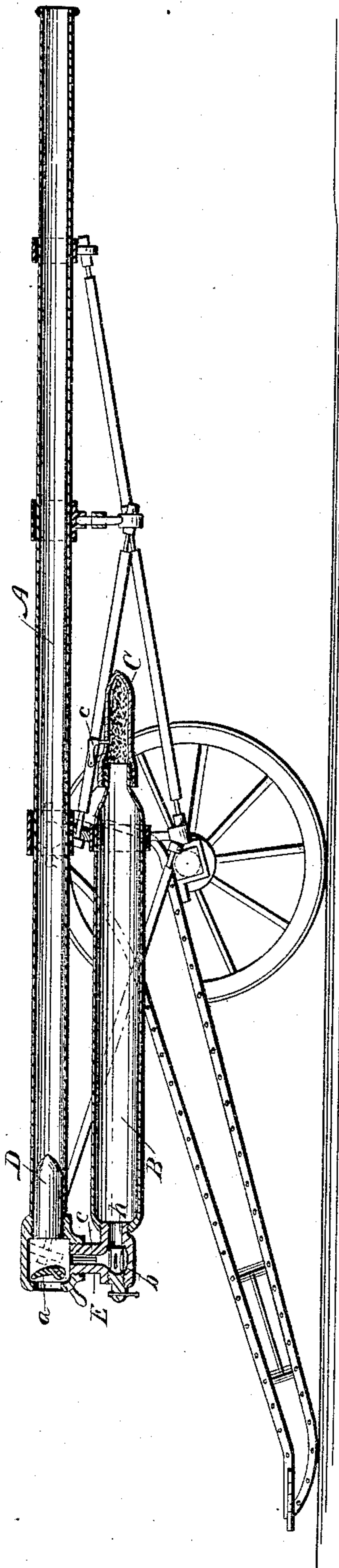


(No Model.)

G. H. BABCOCK.
METHOD OF PROJECTING MISSILES.

No. 430,056.

Patented June 10, 1890.



Witnesses:

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METHOD OF PROJECTING MISSILES.

SPECIFICATION forming part of Letters Patent No. 430,056, dated June 10, 1890.

Application filed September 17, 1885. Renewed May 14, 1890. Serial No. 351,737. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BABCOCK, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented a new and useful Improvement in a Method of Projecting Missiles, of which the following is a specification.

In order that others may understand and practice my invention, I will proceed to describe the same in connection with the projection of shells containing dynamite or other explosives, although the invention is equally applicable to the projection of other missiles.

My invention consists, first, in producing a pressure within a vessel by burning therein, or in a chamber connected therewith, gunpowder or other rapidly-burning combustible and afterward admitting such pressure into the barrel of a gun behind the projectile to be thrown, and, second, in producing a predetermined pressure within a vessel by burning therein, or in a chamber connected therewith, gunpowder or other rapidly-burning combustible, and when such predetermined pressure is attained admitting the same into the barrel of a gun behind the projectile, either with or without the further evolution of gas from the burning combustible.

Heretofore in firing dynamite by means of powder great difficulty has been experienced in preventing the explosion of the dynamite by the heat of the gases. This is easily conceived when it is considered that the temperature of the gases from burning powder is as high as 3,000°, and that nitro-glycerine frequently explodes by simply warming it over a fire or even when thawing it from the frozen state. It is also well known that air at 60° Fahrenheit suddenly compressed to one thousand pounds per square inch will be heated by such compression to 1,300° Fahrenheit, (to a dull red heat,) and when compressed to two thousand pounds per square inch its temperature is raised to 1,700° Fahrenheit, (to a full cherry-red heat,) either of which would set any ordinary combustible on fire. Therefore my invention further consists in interposing a cushion of cooler compressed air or gas between the projectile and the heated products of combustion from the powder or other combustibles.

In the accompanying drawing I have illustrated an apparatus wherewith the above-mentioned methods may be carried out, the view representing such apparatus in section mounted like an ordinary field-piece, in which—

A is the barrel; B, a compression-chamber; D, the projectile; and E, a breech-block and its operative parts, the latter being more particularly referred to in connection with the following description explanatory of the operation of my methods.

The cartridge of powder or combustible *d* is placed within the chamber C and the projectile D inserted in the rear end of the barrel A by opening the hinged breech-cap *a*. A perforated screw-plug *b* is interposed between the chamber B and the space at the rear of the projectile D and a diaphragm *h* placed between the end of said plug *b* and the passage from said chamber B, the object of the plug *b* being to retain the interposed diaphragm in place and provide for its adjustment and removal, the diaphragm being made of such material and strength that it will break at a point of predetermined pressure, which, when released from the chamber B, is transmitted through the plug *b* and breech F to the rear of the projectile D, whereby the latter is projected through the barrel A.

In order to cool the gases as much as possible before coming in contact with the projectile, (which may contain an explosive compound,) I interpose a device, (shown at *c*), which may be composed of strips of sheet-iron, alternately plain and corrugated, rolled together into a cylindrical form and bound with wire. An equivalent of such construction would be made up of a series of small tubes which would take up the heat of the passing gases. For better securing the desired effect, this may be cooled by ice or other means before placing it in the gun, though this will not usually be necessary. As the heated gases pass through this cooler *c* its lower end is first heated, and the proportion may be such that the upper end will not become heated to any objectionable degree until sufficient air or gas is admitted in contact with the projectile in a cool state to protect it

from the heat of the gases of combustion following. As the hotter products of the combustion pass through the cooler *c* in following up the projectile said cooler will be intensely heated. Therefore it is made removable in order that, when desirable, another may be substituted before another charge is fired.

In this application I have claimed my method of operation of my invention and described in connection therewith an apparatus by which such method may be practiced. In another application, simultaneously filed herewith, I have described and claimed such apparatus with modifications, the invention being presented in separate applications in accordance with certain decisions of the Commissioner of Patents.

What I claim, and desire herein to secure by Letters Patent, is—

1. The method of throwing projectiles which consists in developing a gas-pressure by the combustion of powder or similar material in a chamber separate from the gun-barrel and permitting said gas to enter the gun-barrel in rear of the projectile against a predetermined resisting medium to expel the same, substantially as described.

2. The method of throwing projectiles, which consists in developing a gas-pressure

by the combustion of a gunpowder in a chamber outside the bore of the gun and moving a valve by such pressure so as to admit the gas to the bore of the gun, substantially as described.

3. The method of throwing projectiles, which consists in placing the projectile in a gun-barrel, developing a gas-pressure by the combustion of a gunpowder in a chamber outside the bore of a gun, confining said gas until it reaches a predetermined pressure, and allowing said gas to force its way into the gun against a predetermined resisting medium when the proper predetermined pressure has been reached.

4. The method of throwing projectiles, which consists in placing the projectile in a gun-barrel and the powder-charge in a separate chamber communicating with the bore of the gun-barrel in rear of said projectile, but separated from the bore by a closing-piece, developing gas-pressure by combustion of powder, and causing said powder-pressure to open the closing-piece and make its passage to the bore of the gun when a predetermined pressure has been reached.

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Witnesses:

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