No. 653,208. Patented July 10, 1900.

J. H. BROWN.

EXPLOSIVE CHARGE FOR GUNS.

(Application filed Sept. 6, 1899.)

(No Model.)

Fig. 1.

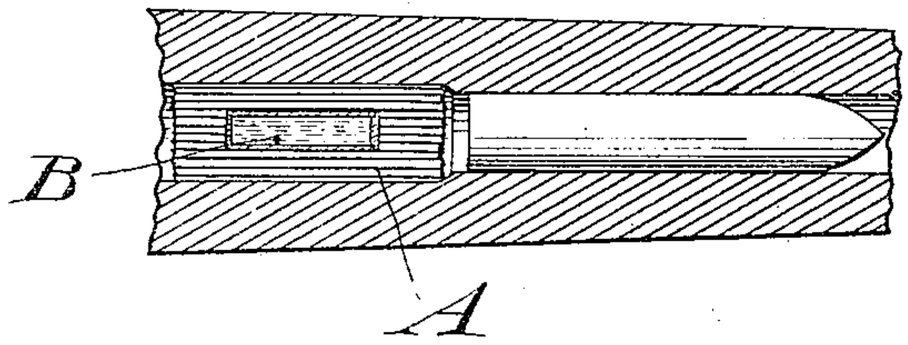


Fig. 2.

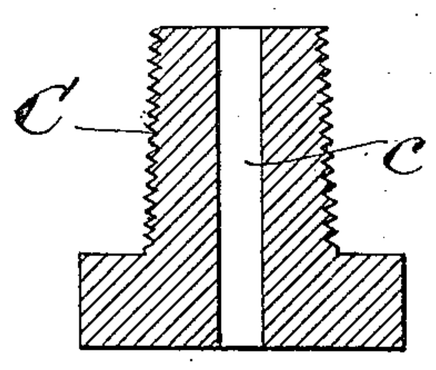


Fig. 3.

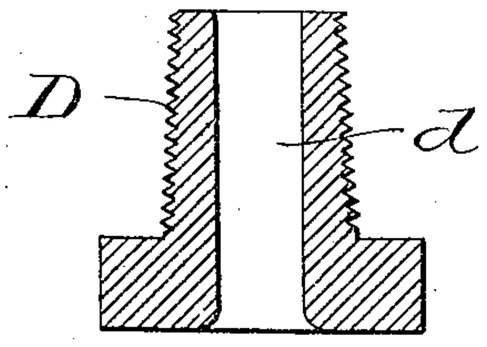
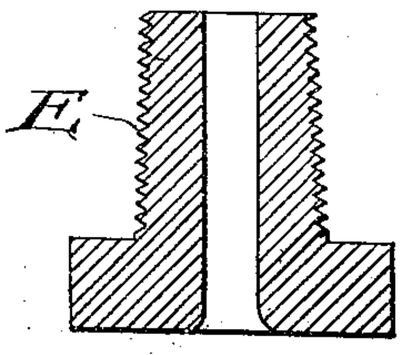


Fig. 4.



Witnesses:-
George Barry Jr.
Fred't Haynes

Inventor-
John H. Brown
By Brown Seward
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UNITED STATES PATENT OFFICE.

JOHN H. BROWN, OF READING, PENNSYLVANIA.

EXPLOSIVE CHARGE FOR GUNS.

SPECIFICATION forming part of Letters Patent No. 653,208, dated July 10, 1900.

Application filed September 6, 1899. Serial No. 729,602. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. BROWN, a citizen of the United States, and a resident of Reading, in the county of Berks and State of Pennsylvania, have invented a new and useful Improvement in Explosive Charges for Guns, of which the following is a specification.

My invention relates to explosive charges for guns and wherever high pressures are required in confined spaces for propelling projectiles; and it consists in an explosive charge composed of powder—either "smokeless" or "black" powder, as commonly called—having therein a body of water held separated from the powder.

In using the expression "a body of water" I do not wish to be understood as confining myself to water pure and simple, as I find it desirable under certain conditions of climate and surrounding circumstances to mix other ingredients with the water or introduce the body of water chemically combined with other materials. For instance, if freezing were to be avoided, glycerin might be mingled with the water.

In the accompanying drawings, Figure 1 represents a section of one form which the explosive charge may assume when inserted in a gun; and Figs. 2, 3, and 4 represent, respectively, a vent-plug before it has been subjected to the pressure of an exploded charge, a similar vent-plug after it has been subjected to the pressure of an ordinary exploded charge, and a similar vent-plug after it has been subjected to the pressure of an exploded charge containing a body of water.

In carrying my invention into effect I introduce into the body of the explosive material A—composed, for example, of rods or grains of powder—one or more small bottles or other vessels B, containing simply water or a mixture of water and some other substance. The vessel or vessels containing the water are made of material—as, for example, glass, tin-foil, rubber, or celluloid—which will readily melt, burn, or break under the heat and pressure of the exploded powder, thereby subjecting the body of water to the intense heat of the burning powder and converting it into steam, which becomes superheated and perhaps finally converted into its component gases. The sudden expansion of the body of water materially increases the pressure produced by the burning powder, and the units of heat which have heretofore been absorbed by the gun-barrel are to a great extent utilized in converting the water into vapor and gas, one or both. This has a tendency to keep the temperature of the gun-barrel low, and the so-called "scoring" which takes place under the heat and high pressures in common use is almost entirely avoided. To bring the result more forcibly to the observation, I have introduced in the drawings full-sized accurate illustrations of three vent-plugs made from the same bar of steel and provided originally with openings of exactly the same size. One of these plugs (denoted by C) illustrates the plug as it appears before subjected to use, its vent *c* being the size it was originally made. The plug D shows its vent *d* about four times the size of the original, the increase being due to the scoring caused by the escape of gases when an ordinary charge of powder was exploded in a cylinder having the vent *d* as its only outlet. The plug E shows the effect of a charge of powder containing a body of water and producing a pressure substantially equal to the pressure of the charge which "scored" the plug D, the vent in this instance showing only a slight increase in size—not more than one and one-half its original size—under the scoring action of the escaping gases.

I have obtained the most satisfactory results by making the body of water about twenty-five per cent., by weight, of the amount of smokeless powder and about twelve and one-half per cent. of the amount of black powder used in the charge. For example, a charge composed of twelve ounces of smokeless powder without the water therein produced an internal pressure of thirty-five thousand pounds to the square inch and produced the scoring illustrated in plug D, while the same amount of smokeless powder of the same kind with three ounces of water inserted therein produced an internal pressure of thirty-six thousand two hundred pounds to the square inch and produced the slight scoring represented in plug E. Again, twenty-four ounces of black powder without the water therein produced an internal pressure of eighteen thousand pounds to the square inch and with three ounces of water therein produced an in-

ternal pressure of twenty-five thousand seven hundred pounds to the square inch, and the temperature of the test-cylinder was about forty per cent. less than it was where the water was not used. I do not, however, wish to limit myself to these proportions, as they may be materially varied in connection with different grades of powder and to produce different internal pressures. The position of the body of water relatively to the explosive is, however, of very great importance. The casing which contains the water should be wholly subjected to the intense heat of the charge, so that it may be completely melted, burned, or shattered and the water instantly acted upon in small subdivisions. This will prevent the fouling of the gun and will insure the effectual change of the water into steam and its component gases.

The explosive charge made up as set forth above may be used for both small-arms and cannon for propelling shells and torpedoes and wherever it is found desirable to obtain a high pressure by an explosive in an inclosed chamber for propelling a projectile and at the same time keep the walls of the chamber at a low temperature. When used in small-arms and cannon, it enables them to be fired more rapidly without undue heating and materially lengthens the life of the gun.

What I claim is—

A propelling charge composed of a body of explosive material and a body of water contained in a casing which may be readily melted, burned or broken and inserted in the body of explosive material, the said body of water being normally held out of contact with the explosive material and subject to the heat and pressure of the explosive material to be brought into intimate contact therewith, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 6th day of September, 1899.

JOHN H. BROWN.

Witnesses:
JOS. H. BLACKWOOD,
WM. R. BLACKWOOD.