

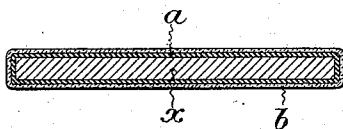
No. 693,547.

Patented Feb. 18, 1902.

F. W. JONES.
GUNPOWDER.

(Application filed Apr. 19, 1900.)

(No Model.)



Witnesses:

A. M. Long.

C. K. Rymann

Inventor.

Frederick W. Jones

By his attorney,

R. L. Swin.

UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM JONES, OF BARWICK, NEAR WARE, ENGLAND.

GUNPOWDER.

SPECIFICATION forming part of Letters Patent No. 693,547, dated February 18, 1902.

Original application filed December 6, 1898, Serial No. 698,413. Divided and this application filed April 19, 1900. Serial No. 13,536. (No specimens.)

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM JONES, a subject of the Queen of Great Britain, residing at Barwick, near Ware, in the county of Hertford, England, have invented a new and useful Improvement in Gunpowder, of which the following is a specification, and for which I have obtained a patent in Great Britain, No. 15,553, dated July 15, 1898.

This application is a division of my application, Serial No. 698,413, filed December 6, 1898.

My invention relates to an improved gunpowder produced by treating granulated gelatinized powder for regulating and controlling the time occupied in the combustion of such powder. Heretofore with granulated gelatinized gunpowder the grains composing a charge were all practically ignited before the projectile had time to move any material distance along the barrel of the gun. Heretofore efforts have been made by varying the size or shape of the grains of powder or forming perforations through the grains to change or vary the time or rate of combustion of the grains and to thereby adapt such gunpowder to guns of different caliber. These objects have been sought because the practically simultaneous ignition of the whole of the grains of a charge is very disadvantageous, because this takes place early in the travel of the projectile and often in a chamber of comparatively small capacity in which there is produced a too-high initial pressure, and thus the weight of the charge and thereby the velocity given to the projectile are unduly limited by reason of the mechanical difficulties of gun construction. Efforts have also been made to slow the combustion of a charge by slowing the combustion of each individual grain. In such cases it has been the combustion of the grains after ignition that has been dealt with. My present invention differs therefrom in dealing with the ignition of the grain before combustion, it being a fact that the actual combustion of each grain is not interfered with, and I have found that a more beneficial effect can be produced by delaying the passage of ignition from grain to grain, and the object of my present inven-

tion is limited to a powder in which the communication of ignition by the primer is regulated progressively, the whole of the grains not being ignited until, so to speak, some time after the initial ignition. The evolution of gas under these circumstances will commence successively in different parts of the charge and not, as heretofore, practically at the same moment in all parts. In this manner I can use larger charges of powder than heretofore with lower initial pressures, and this without having the grains of a size, form, or combustion which will render the combustion of the same too slow to become complete before the projectile reaches the mouth of the gun barrel.

With this powder the combustion of a whole charge is regulated without slowing the combustion or without affecting the explosiveness of any individual grain considered separately. This condition is produced by an adhering thin and mechanically-applied non-penetrating coating and an outer glaze upon the surface of the grains of powder. Such coating is practically continuous, forming an inclosing shell. The coating is of such material as to be non-explosive, but combustible. The said coating is located entirely upon the outside of the grain and wholly surrounding the same, but not penetrating nor in any way affecting the combustion of the grains of powder or the speed of combustion or the explosiveness of the inclosed grains when once ignited, but has the effect of simply delaying or prolonging the time which it takes for one ignited grain to communicate ignition to the next adjacent grain.

In the drawing the figure represents a magnified section of a grain of gelatinized gunpowder *a*, having such coating or shell *a* and such outer glaze *b*, as hereinafter more particularly described.

For such coating or shell *a* I employ a solid wax, preferably carnauba-wax, and in producing this powder I take the manufactured granulated gelatinized gunpowder, which has been prepared by any of the well-known methods, and coat the grains with a non-explosive but combustible solid wax of high melting-point, which has no chemical action on

the substance of the grain and is not capable of penetrating the same. Such a material is carnauba-wax.

In no instance do I employ a solid wax which would cause the grains to adhere at a temperature below 150° Fahrenheit, which may be taken as the limit of service temperature.

In the method of coating I take the grains dried and free from solvent and add to the same a proper proportion of the solid-wax coating material in a finely-divided state. This coating material is usually not added in a greater proportion than three per cent. of the powder treated; but I do not limit myself to this percentage, as it is desirable to arrive at the requisite percentage by experiments in connection with the particular powder to be treated and the gun in which the same is to be used. The powder-grains and the finely-divided or comminuted solid wax are placed in a suitable receptacle and subjected to agitation. I prefer to mix with the powder slightly more of the solid wax than is needed for the mechanically-applied non-penetrating surface coating or glaze, so that thereafter the powder may be separated from the residue of wax by sifting. This solid wax or carnauba-wax during the process of agitation forms a thin mechanically-applied non-penetrating coating on the grains of powder and the rubbing action or attrition incident to such agitation is sufficient to produce the necessary cohesion of the particles of the waxy coating material and the adhesion of the coating or shell formed thereby to the powder-grains, so that the coating completely envelops the powder-grains. This may be facilitated by a slight heating, which in no case must be sufficient to melt the coating material, because should the coating material become melted the substance of the grains would be detrimentally affected and the object of the invention would not be at-

tained. The thickness of the mechanically-applied non-penetrating coating is to be regulated by the percentage of the solid wax mixed with the grains of gunpowder. The same will slightly vary with different powders and different guns in which the powder is to be used. After the grains of powder are thus treated I polish or glaze the same with powdered graphite, forming said outer glaze, in order to render the gunpowder smooth and easy to handle and load into the gun.

The term "grain" is herein used in its ordinary sense as applied to gunpowder, and does not include the particles of which such grains are composed nor "blocks or other pieces or charges" as distinguished from the relatively minute grains of gunpowder nor the relatively granular particles of non-granulated explosives.

I claim as my invention—

1. As a new article of manufacture, a granulated gelatinized gunpowder in which each separate grain is provided with a continuous adhering coating or shell composed of cohering solid particles of a waxy substance that is comparatively slow burning and having a melting-point above 150° Fahrenheit lying wholly upon the surface of the grain and entirely surrounding it, and an outer glaze of powdered graphite, substantially as and for the purpose hereinbefore specified.

2. As a new article of manufacture, a granulated gelatinized gunpowder in which each separate grain is provided with a continuous adhering coating or shell composed of cohering solid particles of carnauba-wax lying wholly upon the surface of the grain and entirely surrounding it, and an outer glaze of powdered graphite, substantially as and for the purpose hereinbefore specified.

FREDERICK WILLIAM JONES.

Witnesses:

GRIFFITH BREWER,
THOMAS WILLIAM ROGERS.