

No. 673,161.

Patented Apr. 30, 1901.

P. DU BUIT.

ACCELERATING EXPLOSIVE.

(Application filed Jan. 23, 1900.)

(No Model.)

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

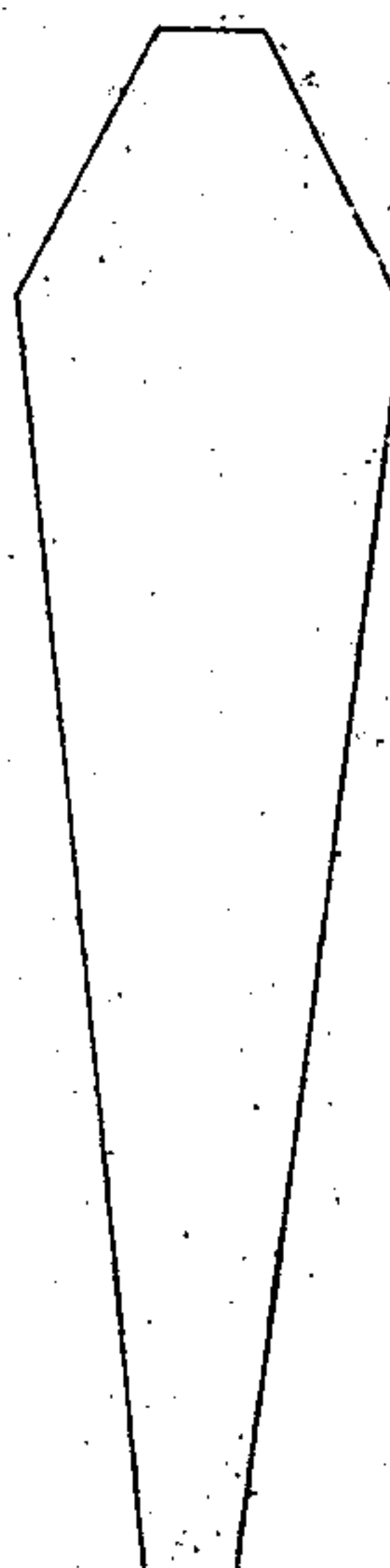
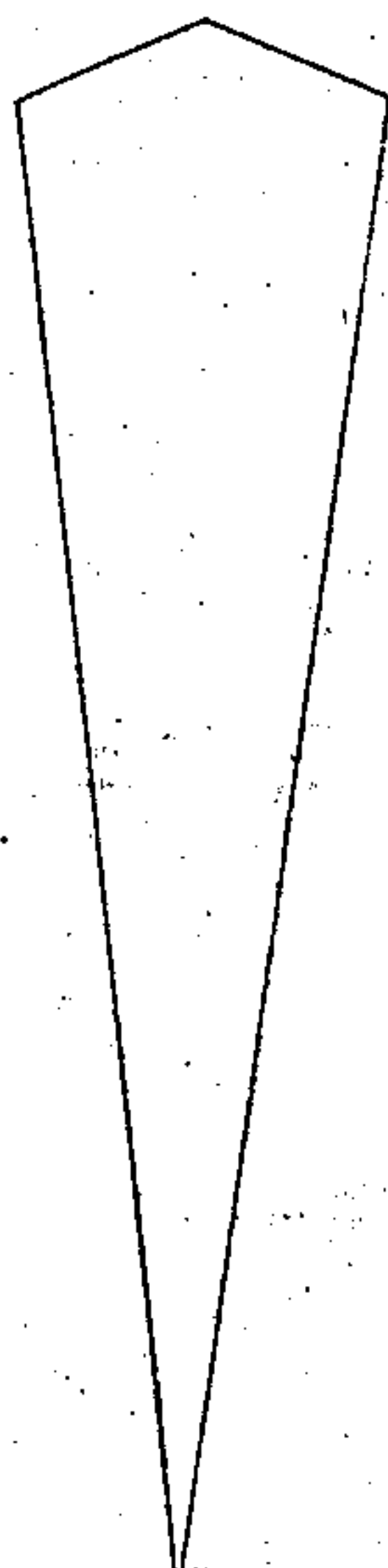
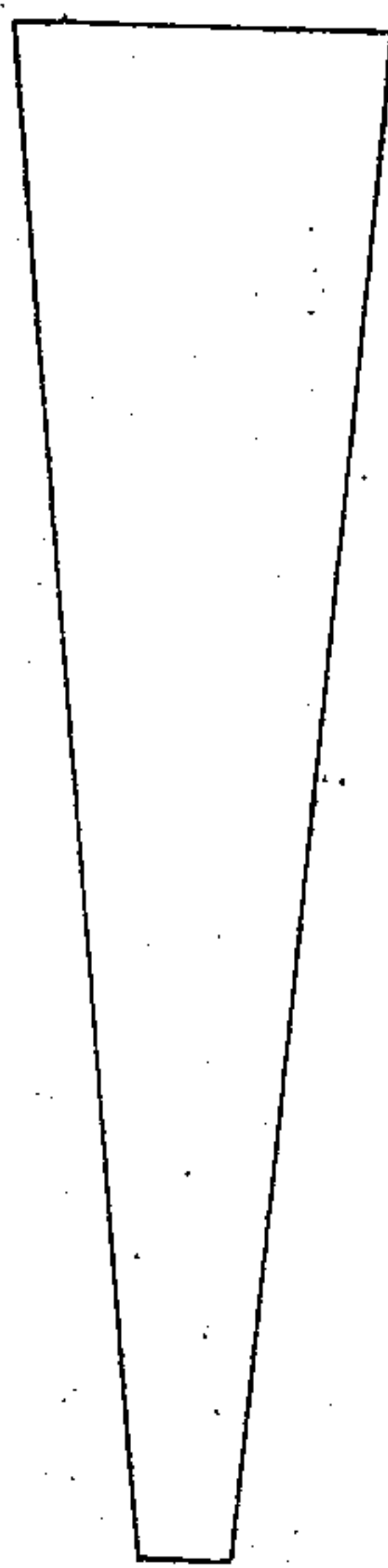
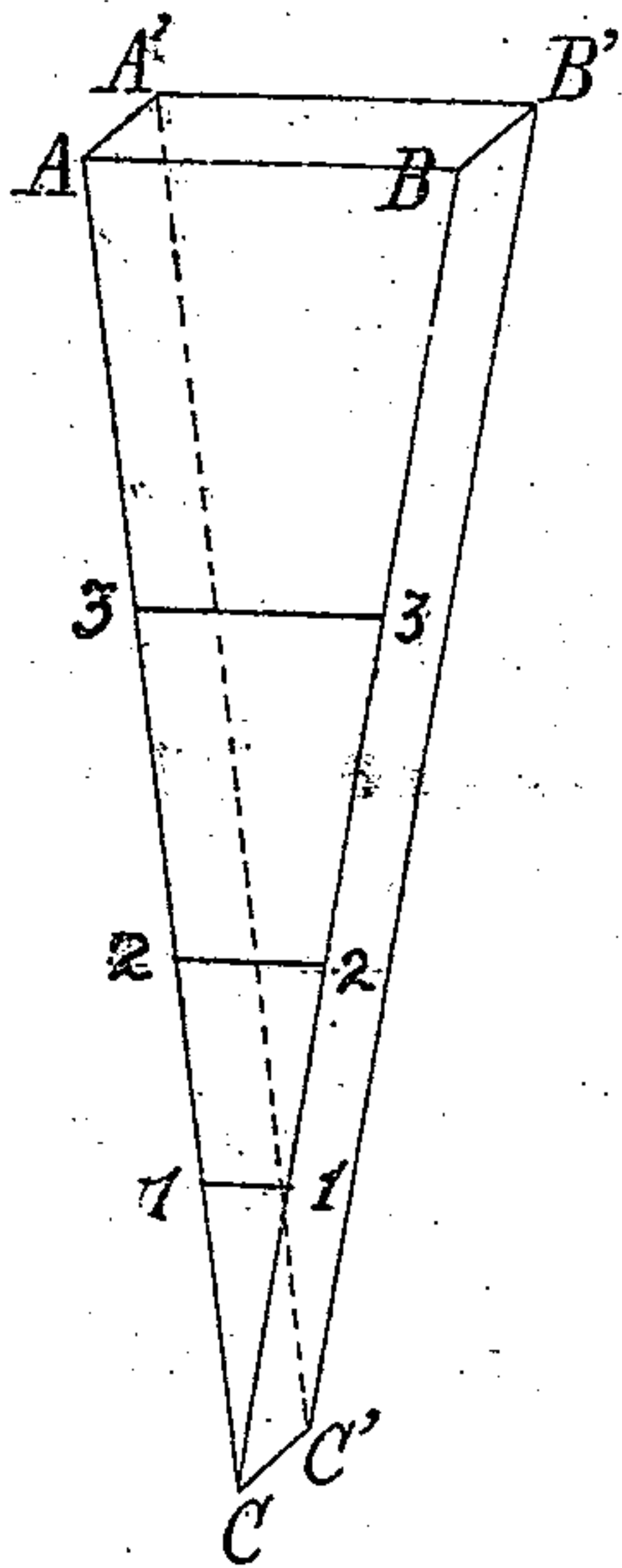


Fig. 8.

Fig. 6.

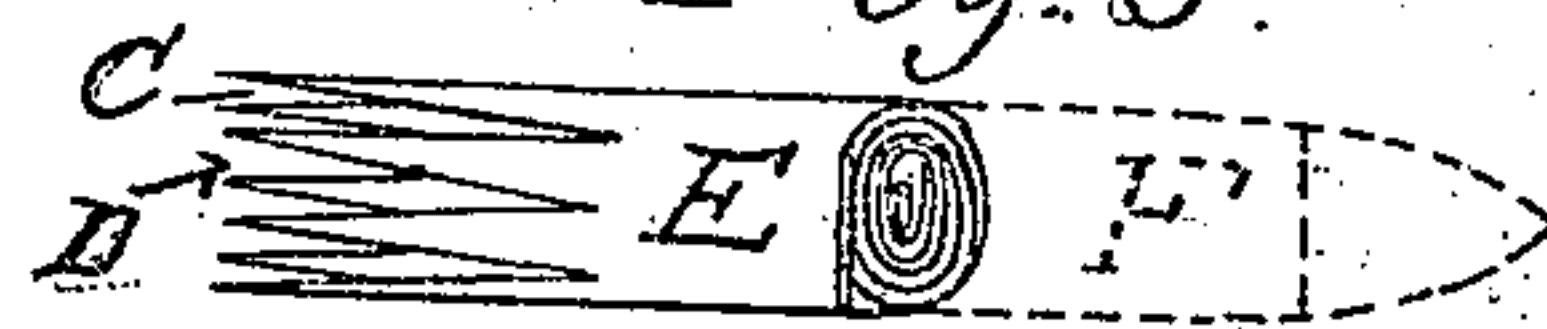
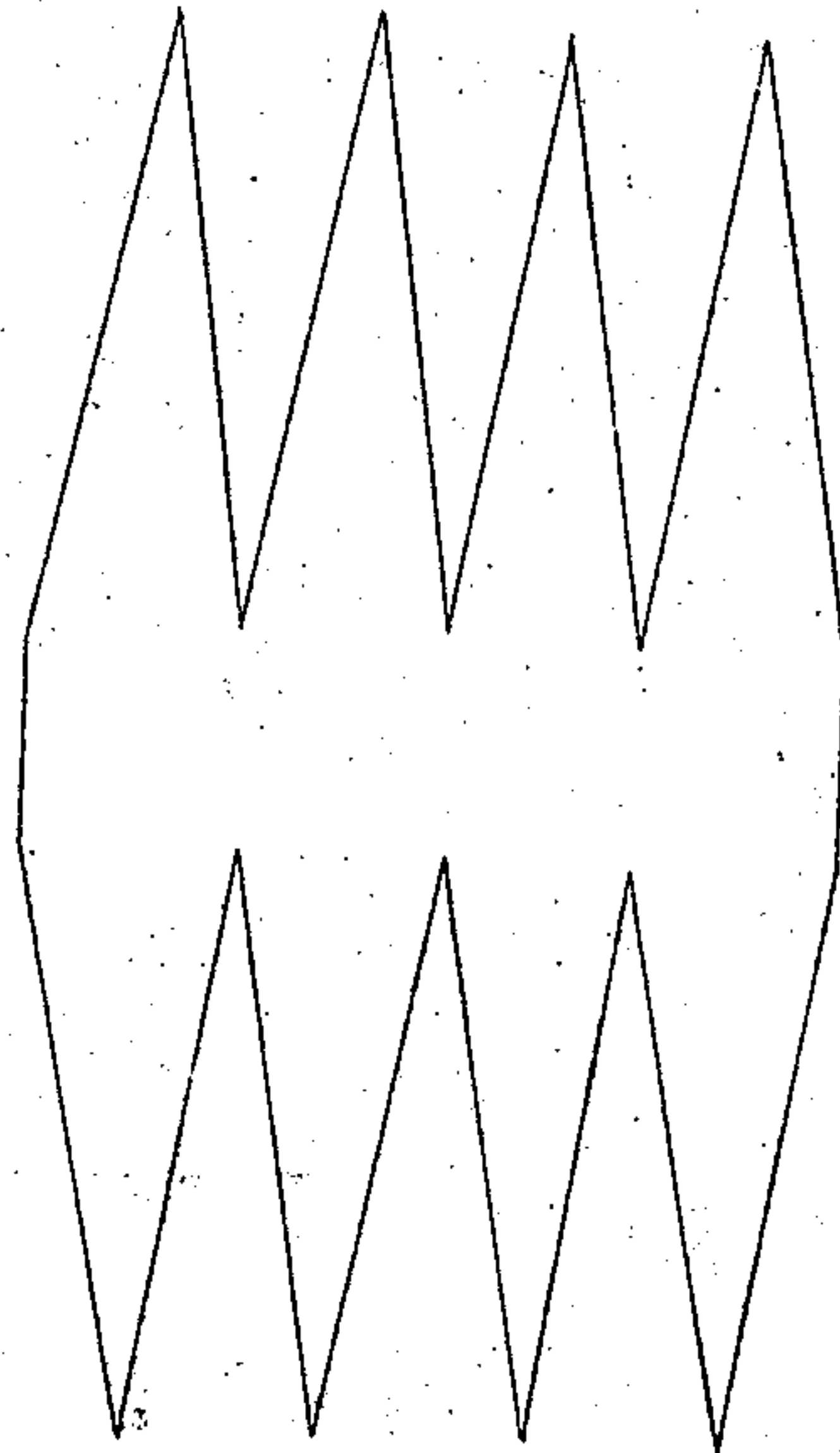
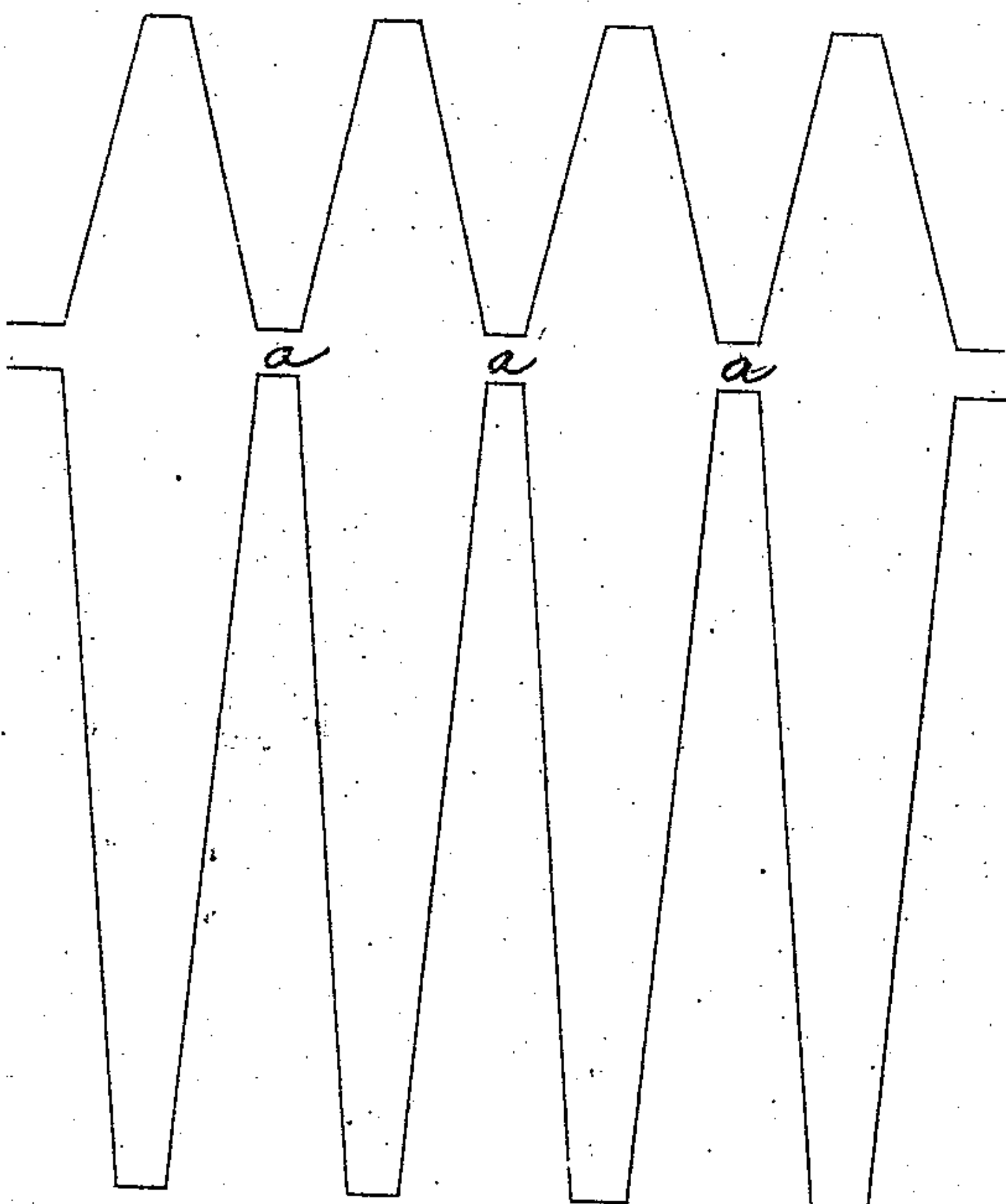


Fig. 7.



Attest:
J. H. Lusk
J. H. Lusk

Inventor:
Paul Du Buit
by Philip Hanes
his atty.

UNITED STATES PATENT OFFICE.

PAUL DU BUIT, OF PARIS, FRANCE.

ACCELERATING-EXPLOSIVE.

SPECIFICATION forming part of Letters Patent No. 673,161, dated April 30, 1901.

Application filed January 23, 1900. Serial No. 2,509. (No model.)

To all whom it may concern:

Be it known that I, PAUL DU BUIT, engineer, of the city of Paris, in the Republic of France, have invented new and useful Improvements in and Relating to the Manufacture of Accelerating-Explosives, which are fully set forth in the following specification.

It has long been recognized as desirable that the explosive charge in ordnance should not be combusted instantaneously, since the enormous pressure thereby generated is liable to burst the gun, and, moreover, if the charge burn more slowly—that is, “progressively” or with an “accelerating” effect—not only is this danger averted, but the initial expansive force starts the projectile on its way, and the continued combustion acts with greatest efficiency in continuously accelerating the velocity of the already-moving projectile until the latter has been projected from the muzzle or until the charge has been completely consumed. It has been proposed to make explosives accelerating; but such systems are in general based on the composition of the explosive.

My invention consists in determining the proper shape to be given the elements composing the explosive—that is, of the “grains” composing the “powder”—and in determining the arrangement of such grains.

In order to push my invention to the farthest limits of efficiency, I have devised a system for controlling the time of combustion of a given charge of a given composition in a given gun and for a given projectile with regard to the time occupied by that projectile in leaving the muzzle of that gun, whereby the entire combustion of the entire charge will have been completed at the instant the projectile leaves the muzzle.

My invention is based upon the recognition of the fact that the combustion of an explosive under pressure takes place upon the surface of the elements of the charge—that is, on the surface of the grain of the powder where it is exposed to the flame of the detonator—so that (the explosive being under pressure, as above, and combustion taking place only from the direction of the detonator) if the grain be given an elongated tapering form and if the tapered end be presented

to the detonator in the very beginning only a comparatively small volume of gas is evolved; but (the cross-section of the grain increasing as in geometric ratio) in each successive period the volume of gas evolved becomes correspondingly greater and greater—a true accelerating effect.

In the drawings, Figure 1 is a perspective view of one form of powder-grain that embodies my invention. Figs. 2, 3, 4, and 5 are diagrammatic views illustrating as many modifications. Figs. 6 and 7 show a sheet containing a number of such elongated tapering projections, being embodiments of the same invention; and Fig. 8 shows such a sheet rolled into a core ready for insertion in a cartridge.

In Fig. 1, A A' B' B represent the base of a flat grain that has the elongated triangular faces A B C and A' B' C' and the long and narrow rectangular edges A A' C' C and B B' C' C, producing thereby the edge C C', which in use is to be presented toward the detonator.

In Figs. 2 to 5 instead of having the triangular faces the grains are given the various configurations shown.

In Fig. 6 the elongated tapering grains are united by connections *a* to form a sheet, and in Fig. 7 they are joined directly for the same purpose.

The sheets may be rolled into a compressed core, two or more sheets being superimposed, if desired, and then arranged, as in Fig. 8, with the tapering end toward the detonator. In Fig. 8 I have illustrated such a core, D representing the location of the detonator and F indicating the projectile. E is the core or charge, having its tapering projections C presented toward the detonator.

When the gun is fired, the flash from the detonator acts first upon the reduced ends of the tapered projections, and then the remainder of the core or charge is attacked, with a true acceleration of effect proportionate to the successive cross-sections exposed, the comparative amount of gas (and expansive energy) evolved at successive periods being indicated by the lines 1 1 2 2, &c., in Fig. 1. The foregoing principle holds good under varying conditions, and the elongated tapering shape of the “powder-grain” may be applied

with advantage to any kind of powder for a gun of any caliber and with a projectile of any weight.

In order to obtain the best results, so that the entire charge will have been consumed at the very instant the projectile leaves the muzzle or possibly a moment before, I have devised the following system and arrangement: A screen is set up or a silk handkerchief or the like is suspended freely in front of the gun, but a little to one side of its muzzle. Taking grains of any convenient thickness, the gun is fired. If the powder is not entirely consumed, this fact will be indicated by black blotches, the remains of unconsumed powder deposited on the screen or handkerchief. In such case I reduce the thickness of the sheets of the explosive and proceed to fire another charge. This proceeding is continued, with slight reductions of thickness each time, until the freedom of the screen from the deposits indicates that the entire charge has been consumed. On the other hand, if at the first attempt the screen or handkerchief is unstained I proceed to increase the thickness of the sheets of powder until the fact of a stain on the screen after a

discharge indicates that the limit of efficiency has been reached.

Of course I do not limit myself to the precise geometric configuration given nor to the precise arrangement indicated; but,

Having fully described my invention, I claim—

1. An accelerating-explosive of suitable composition formed into a sheet that is provided with a number of tapering projections at an edge thereof, substantially as and for the purpose set forth.

2. An accelerating-explosive constituting the core or charge in a cartridge, the same consisting of a sheet of suitable composition presenting a number of tapering projections arranged side by side at an edge thereof, and the said sheet being rolled up, substantially as and for the purpose described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PAUL DU BUIT.

Witnesses:

DOMINIQUE CASALING,
EDWARD P. MACLEAN.