

No. 791,111.

PATENTED MAY 30, 1905.

A. F. DU PONT.
POWDER DIE.

APPLICATION FILED NOV. 7, 1904.

Fig. 1.

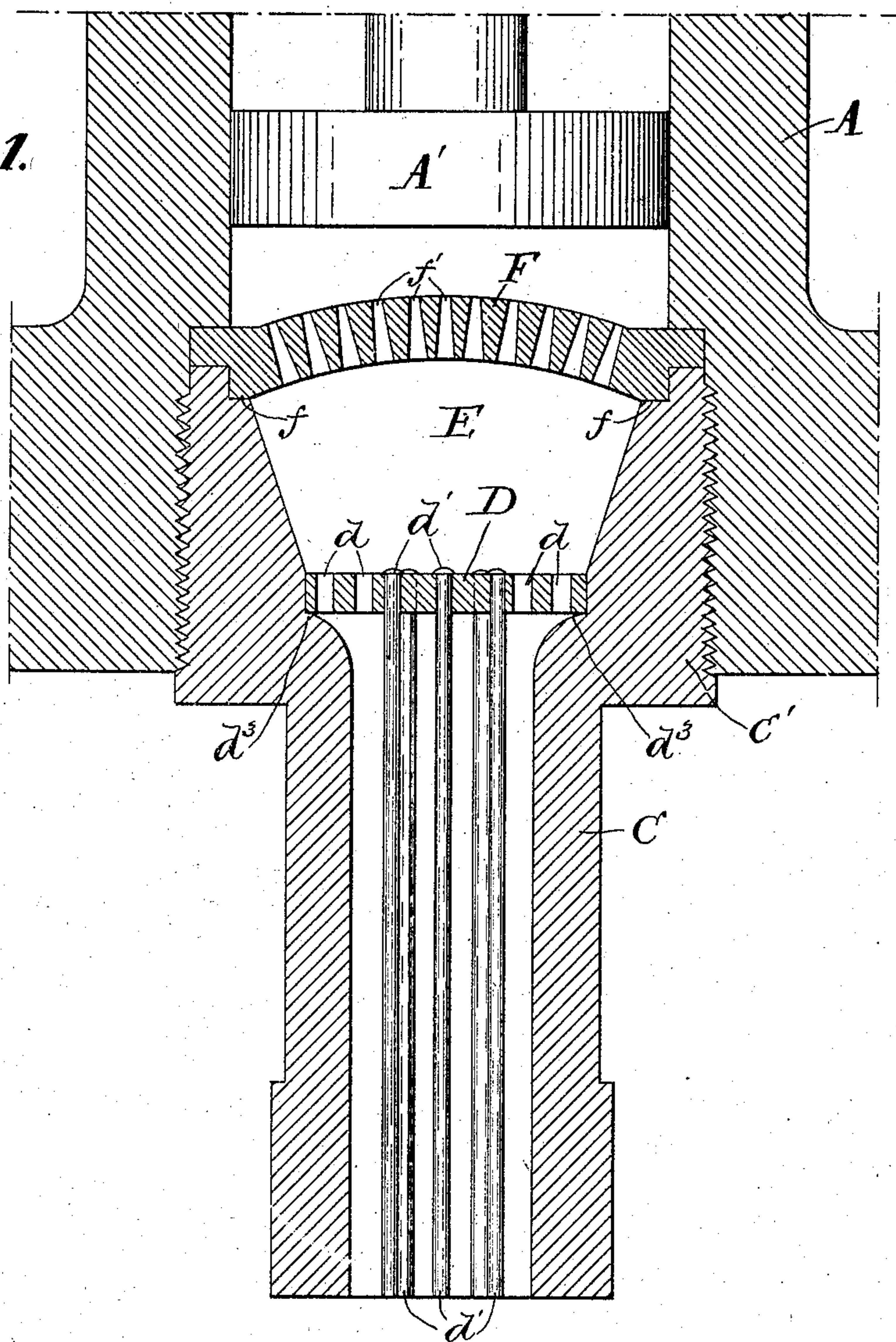
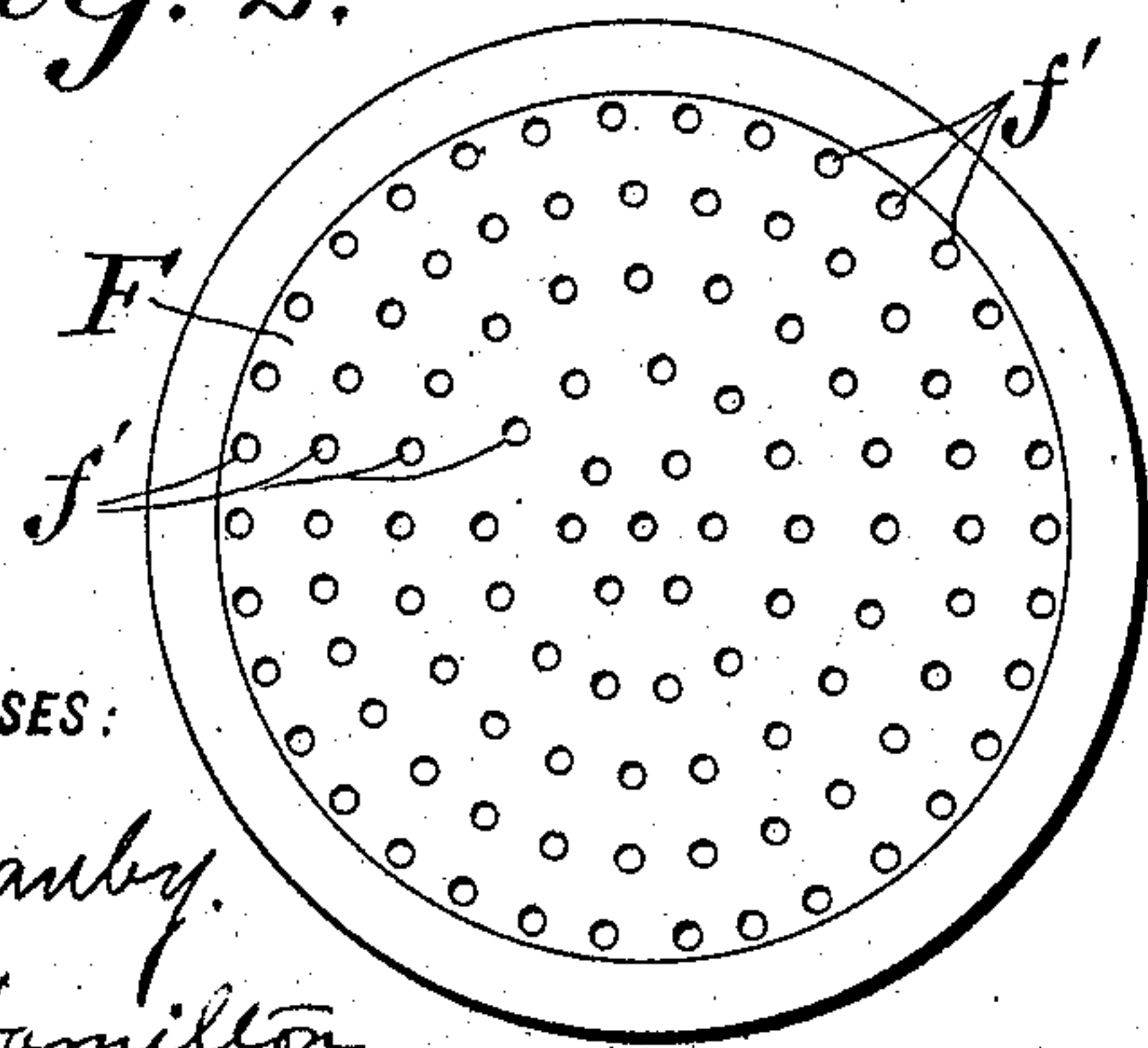


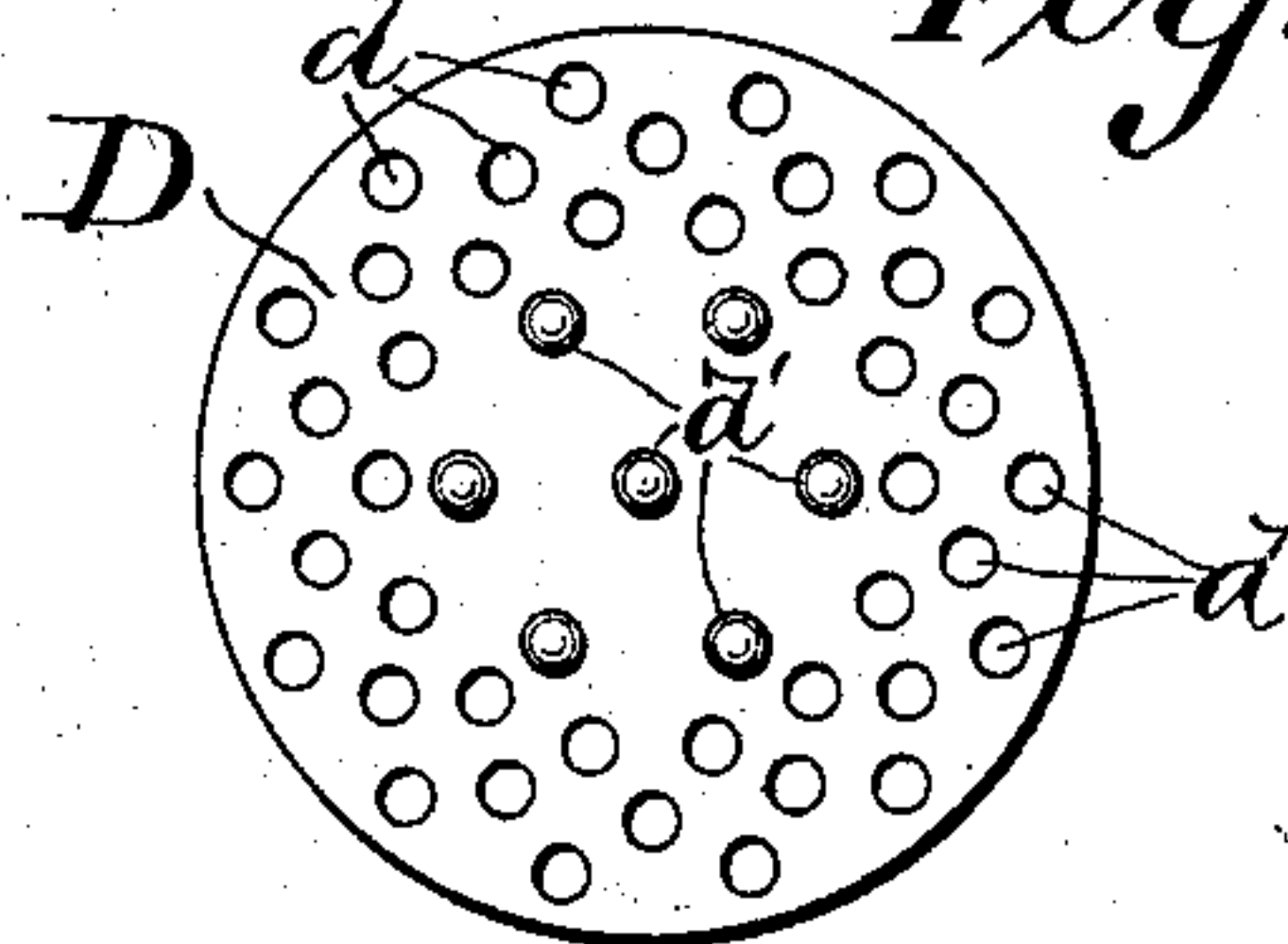
Fig. 2.



WITNESSES:

H. H. Leuby.
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Fig. 3.



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ALEXIS FELIX DU PONT, OF WILMINGTON, DELAWARE.

POWDER-DIE.

SPECIFICATION forming part of Letters Patent No. 791,111, dated May 30, 1905.

Application filed November 7, 1904. Serial No. 231,657.

To all whom it may concern:

Be it known that I, ALEXIS FELIX DU PONT, a citizen of the United States, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Powder-Dies, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain improvement in dies for making powder of multiperforated form. In the ordinary method now in use for this purpose there are two presses— one a double press, which first strains or screens the explosive and then consolidates it, thus bringing it to the most satisfactory condition to pass through the die. The other press is used to force the explosive through the pin-plate and barrel of the die. There are thus two treatments or operations.

I have invented a die in which both the above treatments may be given the explosive in a single operation.

I will first describe my invention as embodied in the accompanying drawings and then point out the invention in the claims.

In the drawings, Figure 1 is a vertical section of my improved die and one end of the pressing-cylinder. Fig. 2 is a top plan view of the screen-plate. Fig. 3 is a top plan view of the pin-plate.

A is the press-cylinder, and A' the piston-head in said cylinder.

C is the pin-barrel, having the head C' externally threaded, whereby it is secured to the internally-threaded end of the cylinder A.

D is the pin-plate, having orifices d and also pins d' extending therethrough and riveted on the back side. These pins extend through the interior space of the barrel from end to end. This pin-plate is secured or rests on the internal shoulder d^3 of the barrel. Above this pin-plate D a distance sufficient to form a chamber E is the screening-plate F, resting or secured on the internal shoulder f . Preferably I make the screen cup-shaped, so that the cross-section forms an arch across the aperture of the die. Through this screening-plate F are orifices f' , of smaller size but of

greater number than the orifices d in the pin-plate D. The chamber above the screening-plate is filled with powder, which under the action of the piston-head A', operated by hydraulic pressure, is forced through the screen-plate F and is blocked or consolidated in the space or chamber E, and is thence forced through the perforations or orifices d and through the barrel C around the pins d' , coming out therefrom as a perforated grain having perforations equal in number to the pins, seven being shown in the drawings. The piston continues on its way through the chamber until all the powder therein has been pressed out through the die.

By screening and blocking or consolidating the powder, as I do in my improved apparatus simultaneously with the pressing out into a string, I do away with the double press now used for straining and blocking the powder before putting it into the final press, which presses it into a string. The screening-plate F also takes out any dirt which may be in the powder before it reaches the pin-plate, great trouble having been experienced heretofore by foreign matter lodging against the perforations in the pin, thus causing an unequal flow of the mass and a corresponding displacement of the pins. By having the perforations in the screen smaller than the perforations in the pin-plate all foreign matter will lodge against the screen, except such small particles as will also go through the pin-plate, and thus not displace the pin. The perforations in the screen while smaller are more numerous than the perforations in the pin-plate and have a larger total area, so that more powder can flow through the screen than through the pin-plate, this inequality creating the blocking or consolidating pressure, before mentioned, in the space E.

My invention may be used for smokeless or other powder or for powders containing nitrocellulose or nitroglycerin or any explosive compound which it may be desirable to manufacture in the multiperforated form, provided its physical properties warrant pressing through a die.

It is obvious that a die on the same principle can be used to manufacture powder in the

form of rectangular strips, round rods or grains, rods with one perforation, or any other desirable form.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In combination, with a die having a perforated pin-plate and pins projecting therefrom, of a perforated screening-plate in line with said pin-plate, there being a chamber formed in the die between said screening-plate and pin-plate.

2. In combination, a powder-receiving chamber, a powder-consolidating chamber, a screen between said powder-receiving chamber and powder-consolidating chamber and a powder-forming die, beyond the consolidating-chamber, having a pin-barrel, and means to apply pressure in the powder-receiving chamber, thereby simultaneously compressing and forming the powder in a single operation.

3. In combination, a powder-receiving chamber, a powder-consolidating chamber, a screen between said powder-receiving chamber and powder-consolidating chamber and a powder-forming die-barrel, and means to apply pressure in the receiving-chamber thereby simultaneously compressing and forming the powder in a single operation.

4. In combination, a die having a pin-barrel and an orificed pin-plate back of the pin-

barrel, a screen separated from the pin-plate, forming between them a consolidating-chamber, a powder-receiving chamber back of the screen, and means to apply pressure to the powder in the receiving-chamber.

5. The combination with a die having a pin-barrel and an orificed pin-plate back of the barrel, of a screen back of the pin-plate, forming between them a consolidating-chamber, a cylinder back of the screen, and a piston working in the cylinder adapted to force the powder successively through the screen, consolidating-chamber, pin-plate and pin-barrel.

6. The combination with a die having a pin-barrel and an orificed pin-plate back of the barrel, of an orificed screen back of the pin-plate said pin-plate and screen being spaced apart, the orifices in the screen being smaller and more numerous than the orifices in the pin-plate, a cylinder back of the screen, and a piston working in the cylinder adapted to force the powder through the screen and consolidate it in the space between the screen and pin-plate, and thence through the pin-plate and pin-barrel.

In testimony of which invention I have hereunto set my hand at Wilmington on this 1st day of November, 1904.

ALEXIS FELIX DU PONT.

Witnesses:

REUBEN SATTERTHWAIT, Jr.,
CLIFFORD V. MANNERING.