

(No Model.)

G. R. ELLIOTT.
PROJECTILE FOR ORDNANCE.

No. 452,567.

Patented May 19, 1891.

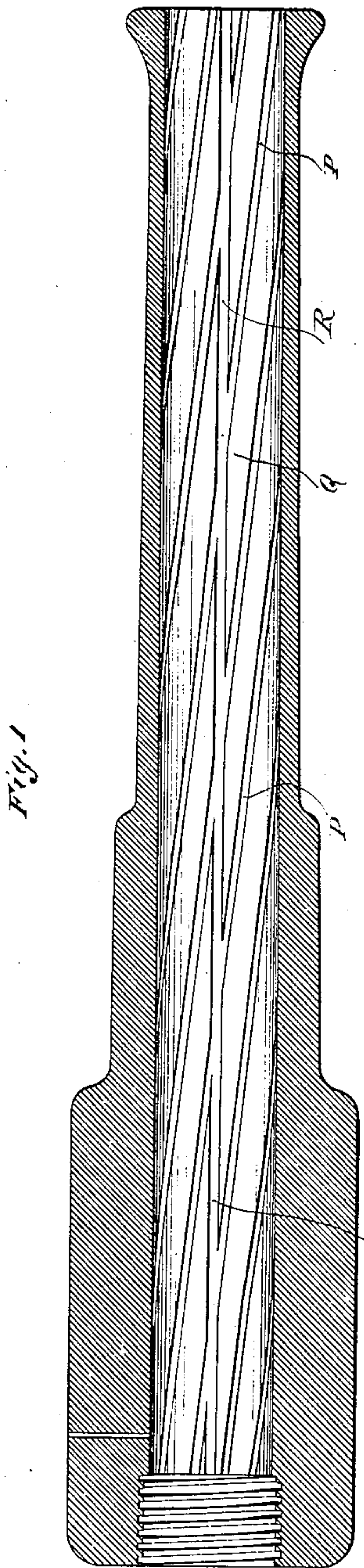


Fig. 4

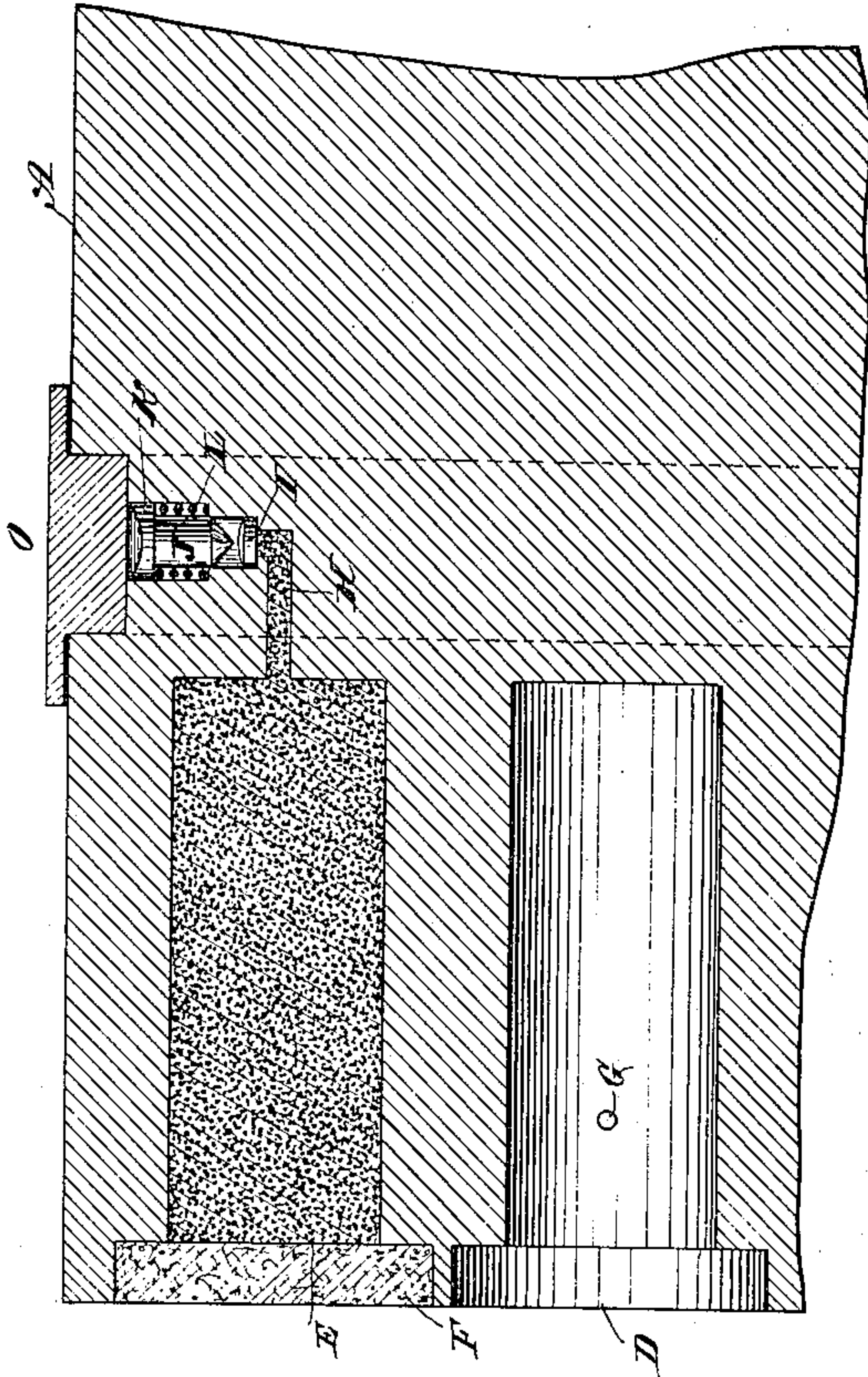


Fig. 2

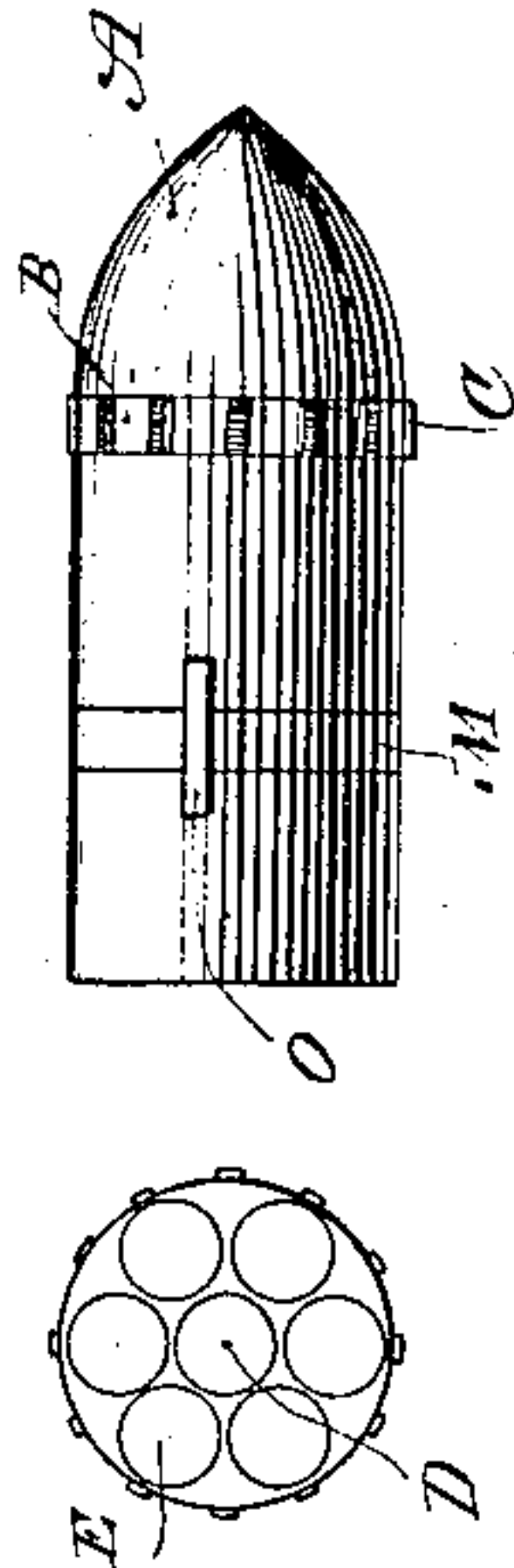


Fig. 3

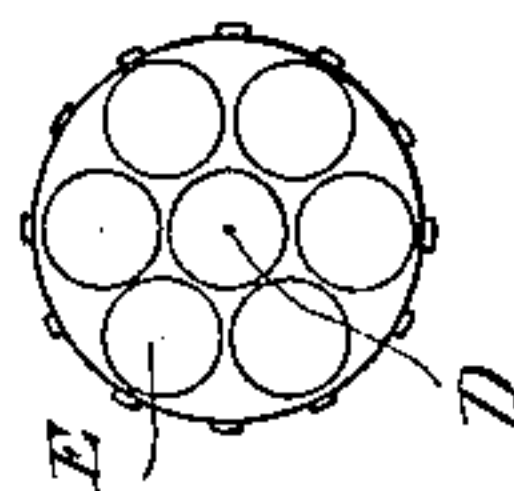
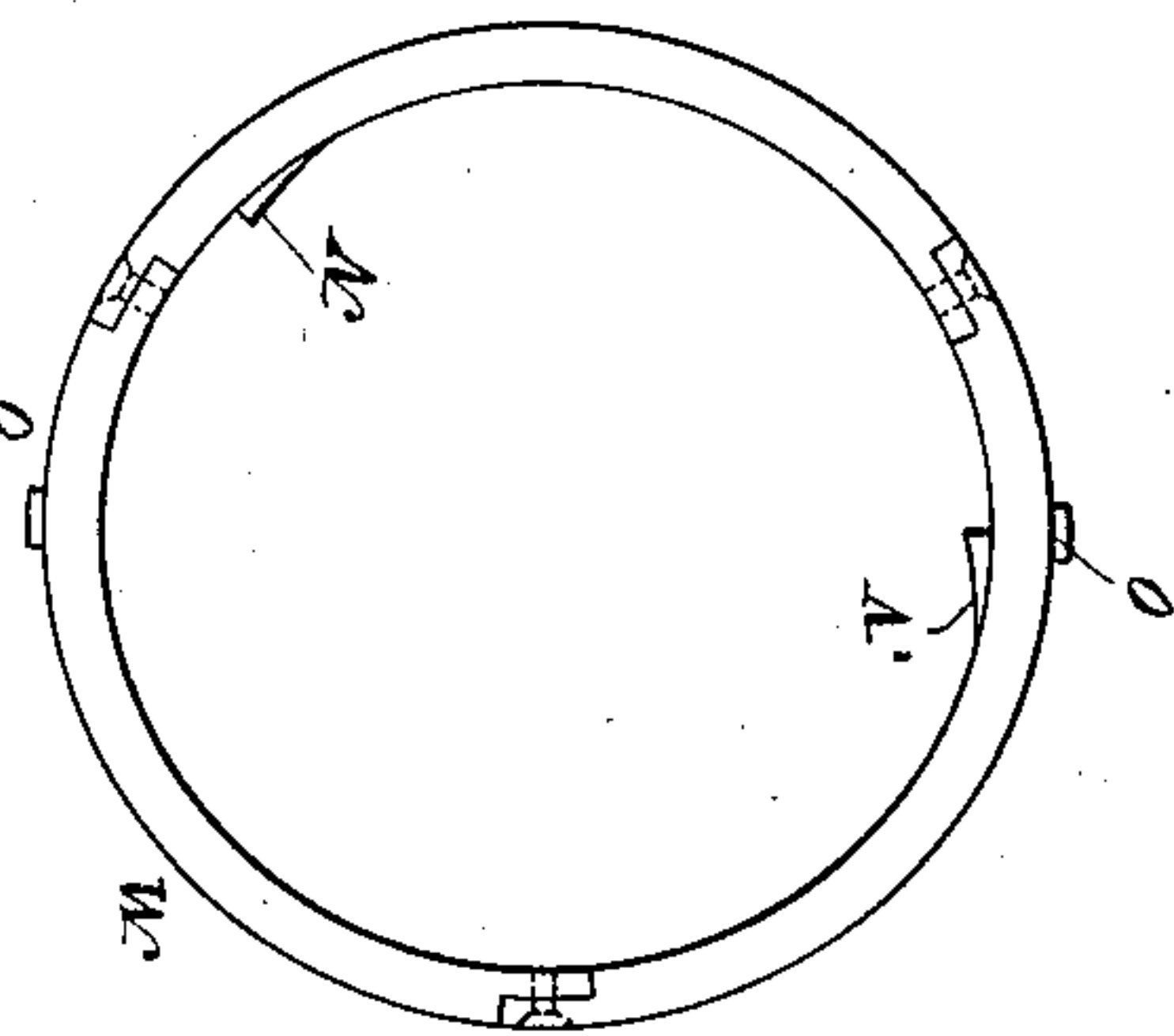


Fig. 5



Witnesses:
Raphael Netter
Eugene H. Johnson

Inventor
Gilbert R. Elliott
By
Ames & Page
Attorneys.

UNITED STATES PATENT OFFICE.

GILBERT R. ELLIOTT, OF NEW YORK, N. Y.

PROJECTILE FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 452,567, dated May 19, 1891.

Application filed August 28, 1890. Serial No. 363,253. (No model.)

To all whom it may concern:

Be it known that I, GILBERT R. ELLIOTT, a subject of the Queen of Great Britain, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Projectiles for Ordnance, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The present invention relates, primarily, to the manner of discharging a projectile from a gun—that is to say, it is the object of the invention to arrange the charge or charges of a gun upon the accelerating plan, or so that the projectile will not receive the full effect of the whole powder charge upon ignition thereof, but will at intervals, while passing up the barrel of the gun, receive the impulses of various separate and successively ignited charges arranged to add their gases to the column of gas already behind and then propelling the projectile. By this arrangement of the propelling charges it is designed to overcome the momentum of the projectile at a low pressure and with comparatively light strain upon the gun, and to maintain a low maximum pressure upon the projectile during the time it is in the gun, whereby a high velocity of the projectile will be secured without severe strain upon the gun.

The special object of the invention is to separate the various charges from one another, so that the explosion of one will not prematurely ignite another, and to successively ignite the charges by positive mechanical means that may be regulated and controlled to secure the desired effect, this in contradistinction to various plans heretofore proposed involving the igniting of one charge directly from another.

The invention therefore consists in a projectile having several separate chambers at its rear end for receiving explosive charges, each such chamber being provided with mechanical exploding apparatus for igniting its contents, which is operated by the rifling of the gun.

Referring to the drawings, Figure 1 is a longitudinal section of a gun rifled on the plan of the invention. Fig. 2 is a plan view of the projectile embodying the invention. Fig. 3 is an elevational view of the rear end of the same. Fig. 4 is a section, on an enlarged

scale, of a portion of the rear end of the projectile, the section being taken through one of the circumferential chambers and through the center chamber. Fig. 5 shows a detail enlarged view of what I term the “firing-ring” of the projectile.

Referring to the views more fully, A represents the projectile, which in general form is of the usual construction of projectiles for rifled guns.

B is the sabot-ring designed to take the rifling of the gun. This ring may be of any desired form or may be substituted by studs. In the present case I have shown the sabot-ring having studs or projections C corresponding in position to the grooves on the inner surface of the barrel of the gun. This ring may be otherwise placed or duplicated if one ring be not found a sufficient gas-check.

In the rear end of the projectile is a central chamber D, which is surrounded by other like chambers E. These chambers are designed to receive charges of powder or other explosive material and are then closed by the disks F, which disks may be made of wood, paper, packing, or other like material, such material being preferred to metal. The central chamber D is provided with a firing-hole G, which is located so as to register with the vent hole of the gun when the projectile is in position for firing. Each of the other chambers has at its rear end a firing-hole H, which communicates with the anvil of the detonating-cap I. Just above this anvil and in a circular radial hole is arranged a firing-pin J, having a cam-head K.

L is a spring on the firing-pin, arranged between its head K and a shoulder just above the anvil of the detonator I, and is of sufficient strength to hold the firing-pin off the explosive cap.

M is the firing-ring. This ring lies in a circular groove in the outer surface of the projectile and flush therewith. The inner face of this firing-ring is provided with two or more cams N, which are of the same width as the thickness of the heads of the firing-pins, and which project into a shallow groove at the bottom of the groove of the ring M, into which shallow groove the heads K also project. The firing-ring is free to move circularly in its groove and by such movement its cams N are brought into contact with the fir-

ing-pins and force their points upon the detonating-caps to explode them. Upon the outer face of the firing-ring are one or more projections or lugs O, which are of the width of the grooves of the gun (to be hereinafter described) and of a height corresponding to the depth of such grooves. These lugs are preferably longer than the width of the firing-ring, so that they may have an extended bearing in the grooves of the gun to prevent their leaving such grooves when the projectile is fired.

Referring now to Fig. 1, P represents the ordinary grooves of the rifling, and Q the lands. This rifling may be of any suitable pitch and of any desired number, width, and depth of grooves. R represents one of two straight grooves which are parallel to and in the plane of the axis of the gun. These straight grooves are preferably of the same width and depth as the inclined rifling which they cross. They may be, however, of a different size and shape, if this be required.

The projectile, having its chambers charged with powder or other explosive material, is to be placed in the breech of the gun with its studs O in the grooves R, in which position its studs C will of course be in the grooves P, and this will bring the firing-hole G of the central chamber of the projectile opposite the vent of the gun. Now upon applying an igniting-flame to the vent of the gun the explosive in the central chamber of the projectile will be ignited, and its confining wad or disk will be blown out and the rear end of the gun will be filled with the gases of explosion, and the projectile started forward along the barrel of the gun. As the projectile moves up the barrel the rifling will cause it to turn upon its axis; but the straight grooves will hold the firing-ring from turning with the projectile, so that very soon after the projectile has commenced to move forward one of the cams of the firing-ring will be forced against a firing-pin and another loaded chamber in the projectile will be exploded, and this action will be repeated until all the loaded chambers have been exploded. In this way successive impulses will be given to the projectile, so that an increasing volume of gas behind the projectile will be preserved and the pressure of the same kept up during the passage of the projectile to the muzzle of the gun. By these means it will be seen that a practically-constant pressure may be preserved upon the projectile during its passage up the barrel, and hence that a higher velocity may be given to it with less strain upon the gun than is possible where the whole powder-charge is exploded at once. By these means the various charges may be positively exploded at times best suited to accomplish the desired results—that is, they may be timed so as to add their gases to the column of gas behind the projectile at just the instant of time when such addition is required to maintain the proper pressure upon the projectile.

It will be understood that the firing-ring of the projectile may have more than two cams or less, as the case may be; also that it may be provided with any suitable device for locking it against rotation while the projectile is being handled and after it has been charged. I do not, therefore, limit myself to any special arrangement of the firing parts of the projectile, as the form to be used in any one case will depend upon the result sought to be accomplished. Neither do I confine myself to the general form of the firing-pin and its detonating cap and anvil, for various of the well-known firing devices may serve in lieu thereof, or the ring might be arranged to act directly upon the fulminates.

I have shown one form of igniting apparatus to illustrate the principle of the invention, which, generally speaking, includes the firing-ring of the projectile arranged to successively explode various loaded chambers and held from revolving with the projectile when in the gun by one or more grooves in the barrel that cross the ordinary rifling or are inclined thereto.

I have explained the invention as applied to a projectile designed to carry its primary charge—that is, the charge that first starts it up the barrel of the gun; but it is obvious that the charges succeeding the primary charge may be as readily exploded and all their effects realized if the projectile be started in the usual way by a charge placed in the breech of the gun behind the projectile.

What is claimed as new is—

1. In combination with a projectile for rifled ordnance, two or more chambers at the rear end of the projectile for carrying explosive material, a movable firing-ring surrounding the projectile and having a stud for taking in a groove in the barrel of the gun, whereby the ring is held against rotation while the projectile is being turned by the rifling of the gun, and detonating mechanism arranged between said chambers and the firing-ring, substantially as described.

2. In combination, in a projectile, a sabot by which the projectile is caused to take the rifling of the gun, a firing-ring M, surrounding the projectile and having cams N, and projections or lugs O, chambers E for carrying explosive material located in the base of the projectile, and a firing-pin J, arranged in the path of the said cams N, substantially as described.

3. In combination, in a projectile for rifled guns, the chamber D, provided with an igniting-hole G, located to communicate with the vent of the gun, chambers E, the movable firing-ring M, surrounding the projectiles and provided with lugs O and cams N, and the firing-pins J, substantially as described.

GILBERT R. ELLIOTT.

Witnesses:

ROBT. F. GAYLORD,
FRANK B. MURPHY,