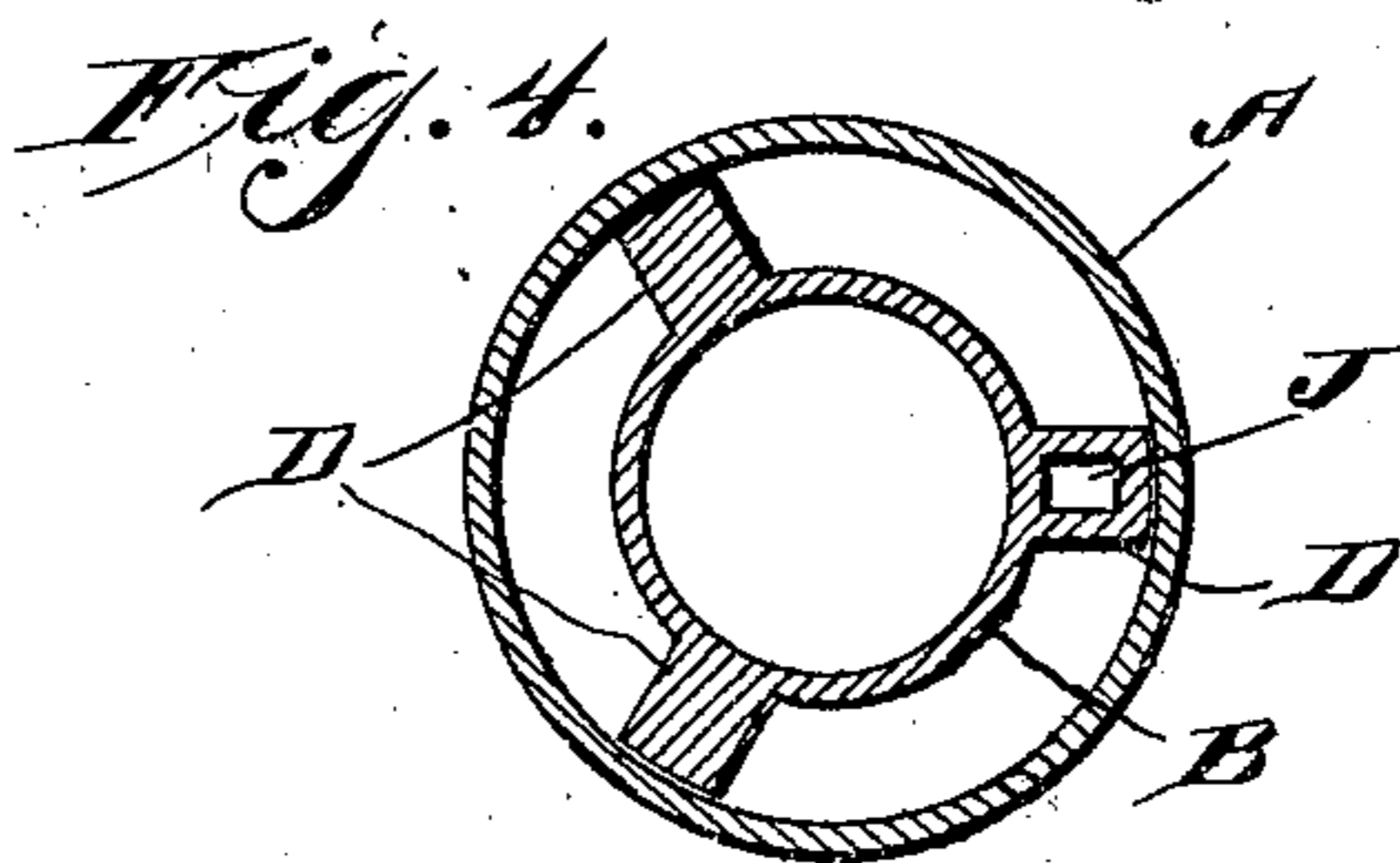
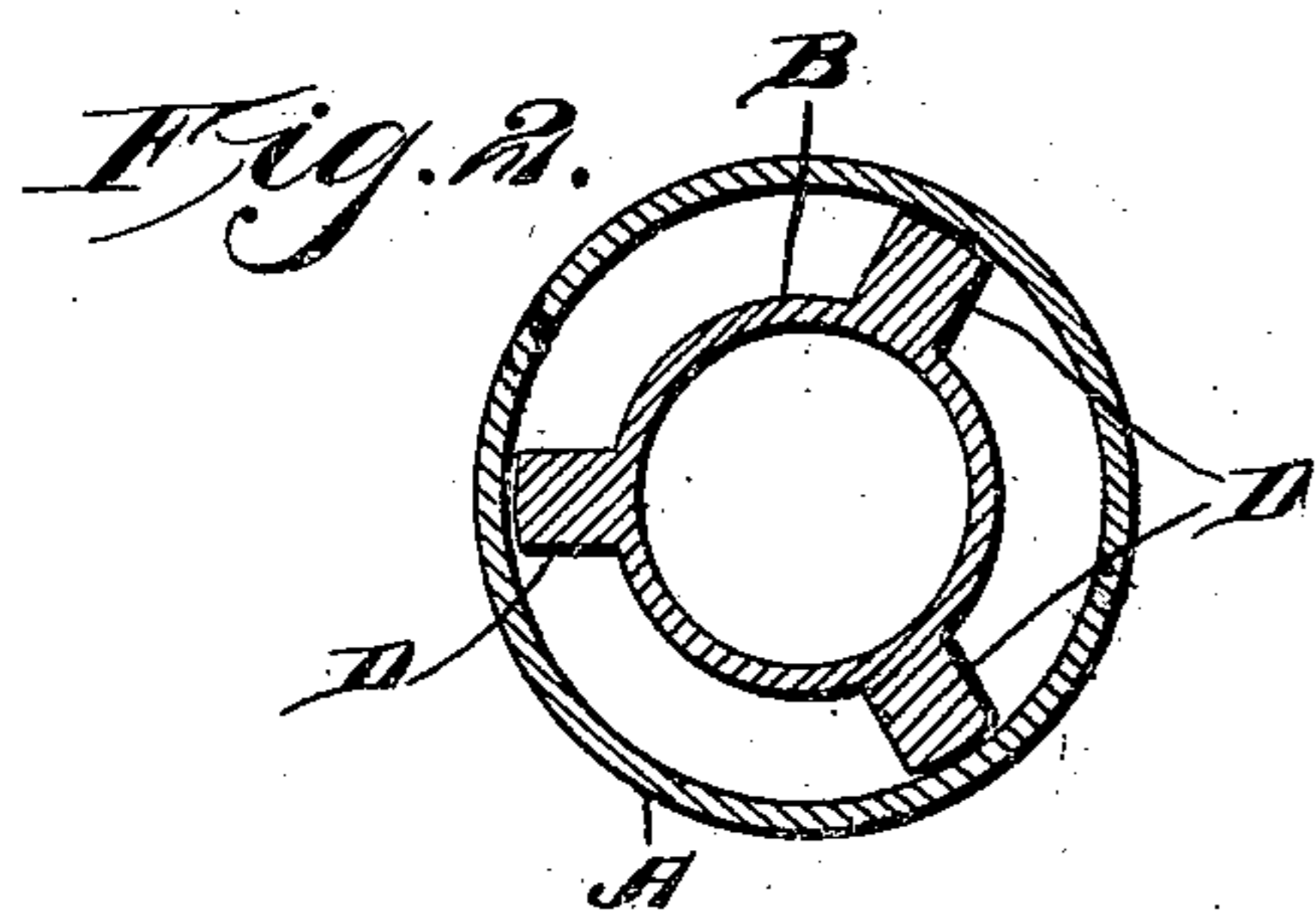
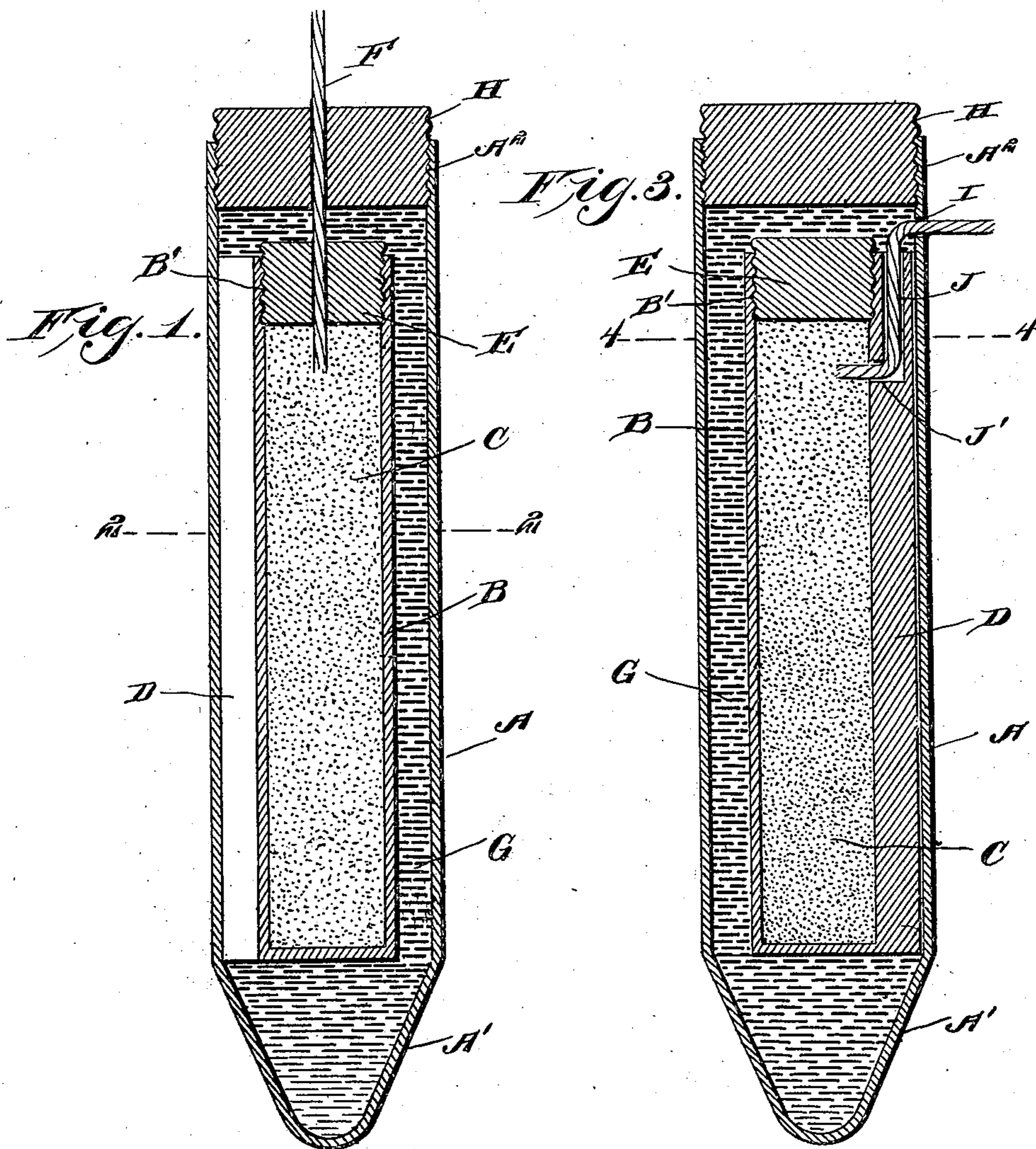


No. 721,432.

PATENTED FEB. 24, 1903.

T. F. DURHAM.  
BLASTING CARTRIDGE.  
APPLICATION FILED MAY 22, 1902.

NO MODEL.



Witnesses

Louis D. Heinrichs  
L. H. Morrison

Inventor

Thomas F. Durham

By his Attorney

W. F. Williams

# UNITED STATES PATENT OFFICE.

THOMAS F. DURHAM, OF PHILADELPHIA, PENNSYLVANIA.

## BLASTING-CARTRIDGE.

SPECIFICATION forming part of Letters Patent No. 721,432, dated February 24, 1903.

Application filed May 22, 1902. Serial No. 108,483. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS F. DURHAM, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a certain new and useful Improvement in Blasting-Cartridges, of which the following is a specification.

My invention relates to a new and useful improvement in blasting-cartridges, and relates to that class of cartridges in which the explosive is contained in an inner tube, which inner tube is inserted in an outer casing, a fire-extinguishing agent, such as water, surrounding the inner tube upon all sides; and the object of this invention is to construct a cartridge which may be molded and two tubes may be sealed by screw-plugs.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal sectional view of my improved cartridge, showing the fuse entering through the center of the screw-plugs; Fig. 2, a section on the line 2 2 of Fig. 1; Fig. 3, a vertical sectional view of my improved cartridge, showing the fuse entering from the side of the cartridge; Fig. 4, a section on the line 4 4 of Fig. 3.

This invention is intended as an improvement over applications for blasting-cartridges filed in the Patent Office June 11, 1901, Serial No. 64,801; also, application Serial No. 101,975, and United States patent issued January 21, 1902, No. 691,367.

In the drawings, A represents the outer tube, which is closed at one end, and this closed end is formed tapering or conical, as represented at A'. This conical end is for the purpose of allowing the cartridge to be more easily inserted in the hole drilled in the substance to be blasted.

In cartridges wherein the end is square this square end will catch upon any protrusions ex-

tending into the hole; but with my improved cartridge with the tapering or conical end it will either pass these projections or push them aside. The opposite end of the outer tube or cylinder A is interiorly threaded, as represented at A<sup>2</sup>.

B is the inner tube, which is closed at one end, and at the other end is interiorly threaded, as represented at B'. This inner tube is adapted to contain the explosive material C. Formed with the inner tube and extending outward radially therefrom are three or more longitudinal ribs D. The inner tube B is considerably smaller than the inner diameter of the outer tube A, and the ribs D extend outward from the tube B just a sufficient distance to allow the tube and the ribs to be inserted in the outer tube or cylinder A. These ribs extend entirely to the closed end of the tube, but may or may not extend to the opposite end of the tube B, and the inner tube B is inserted in the outer tube the closed end first, and the ribs D coming in contact with the inside of the conical or tapering end A' of the outer tube will prevent the inner tube from coming in contact with the outer tube, its only contact being through the ribs D.

The explosive C is first inserted in the inner tube B, and then a plug of wood or other suitable material E is screwed into the open end of the tube B, and a fuse F is inserted through a central opening in the plug E, and the space around the fuse at the upper end of the plug is closed with soap, wax, or other suitable material. This inner tube B is then inserted in the outer tube A, and the tube A is then filled with a fire-extinguishing agent, such as water, (represented at G,) and this fire-extinguishing agent will surround the inner tube and also lie below the same on account of the ribs D preventing the inner tube from coming in contact with the lower end A' of the outer tube A. The open end of the outer tube is then closed by means of a screw-plug H, threaded into the open end, and the fuse F passed through a central opening through this plug H, and this opening is then closed around the fuse by soap, wax, or other suitable material.

In my former patents I have mentioned that the blasting-cartridges might be made of any suitable material and mentioned metal and cardboard; but it has been found by ex-

periment that the metal and cardboard are too expensive. In this invention I mold the inner and outer tube instead of building them up, and the material from which I mold the tubes is fireproof, the preferred material being cement and silica mixed together in proper quantities, molded in the desired shape while soft and allowed to harden. In molding the inner and outer tube instead of building them I am enabled to manufacture the cartridge at a much less cost, and also do away with all liability of an imperfect cartridge on account of leakage, and make the cartridge much lighter, and on account of the hardness of the material composing the cartridge more resistance will be offered to the explosion and therefore better results accomplished.

In Fig. 3 I have shown a modification wherein the fuse does not pass through the screw-plugs, but passes through an opening I, formed through the side of the outer tube above the inner tube, and then downward through a passage or opening J, formed in one of the ribs D, and then into the interior of the inner tube through a right-angle passage J', leading from the passage J. The opening or passage J is closed around the fuse by soap, wax, or other suitable material, as is also the opening I around the fuse, and it will thus be seen that the plugs H and E may be removed or inserted without disturbing the fuse.

Of course I do not wish to be limited to the exact construction here shown, as slight modifications could be made without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful is—

1. In a safety blasting-cartridge, an outer tube closed at one end, said closed end being formed tapering or conical, an inner tube closed at one end and open at the other end, plugs inserted in the open ends of both the outer and inner tubes, three or more longitudinal ribs formed with the inner tube, said ribs extending to the closed end of the inner tube and by engagement with the tapering or con-

ical end of the outer tube holding said inner tube at a distance from the outer tube, said inner and outer tubes being molded from a fireproof material, a fire-extinguishing agent surrounding the inner tube, and a fuse extending from the exterior of the outer tube to the interior of the inner tube, as and for the purpose specified.

2. In a safety blasting-cartridge, an outer tube closed at one end, said closed end being formed tapering or conical, an inner tube having one closed end, screw-threaded plugs threaded into the open ends of both the outer and inner tubes, projections extending outward from the inner tube and by engagement with the tapering or conical end of the outer tube holding the inner tube at a distance from the outer tube, said tubes being molded from a fireproof material, and a fuse extending from the exterior of the outer tube to the interior of the inner tube, as and for the purpose specified.

3. In a safety blasting-cartridge of the character described, an outer tube formed with one end closed, said closed end being conical or tapering, the other end being interiorly threaded, a screw-plug adapted to be inserted in this threaded end, an inner tube formed with one closed end, the other end being interiorly threaded, a screw-plug threaded in said threaded end, longitudinal ribs formed with the interior tube, said inner and outer tubes being molded from a material composed of a mixture of cement and silica, both screw-plugs being provided with central openings, a fuse extending through said central openings from the exterior of the outer tube to the interior of the inner tube, as and for the purpose specified.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

THOMAS F. DURHAM.

Witnesses:

H. B. HALLOCK,  
L. W. MORRISON.