

T. E. MURRAY & T. E. MURRAY, JR.  
METHOD OF MAKING OGIVAL SHELLS.  
APPLICATION FILED MAY 9, 1918.

1,293,873.

Patented Feb. 11, 1919.

Fig:1

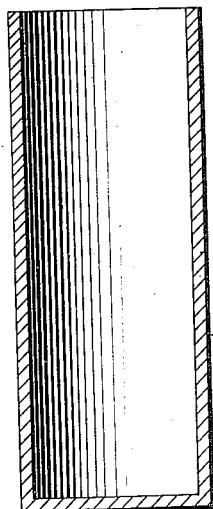


Fig:2.

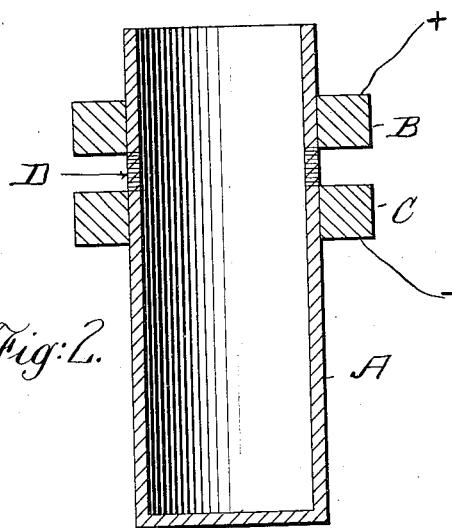


Fig:3.

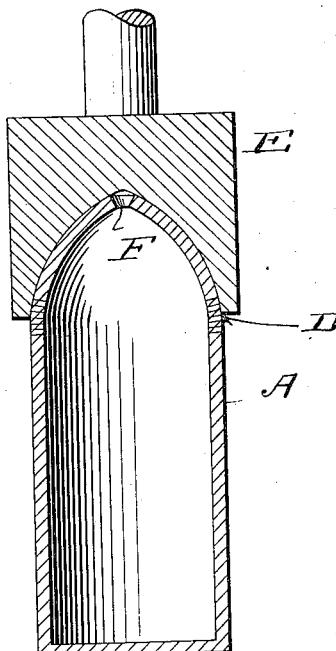


Fig:4.

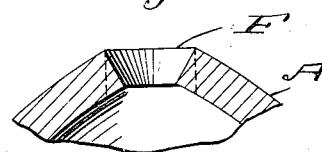
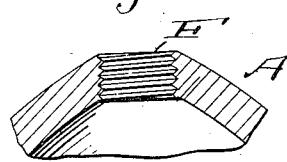


Fig:5.



Inventors  
Thomas E. Murray  
Thomas E. Murray Jr.  
By their Attorney John Benjamin

# UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY AND THOMAS E. MURRAY, JR., OF NEW YORK, N. Y.

## METHOD OF MAKING OGIVAL SHELLS.

1,293,873.

Specification of Letters Patent. Patented Feb. 11, 1919.

Application filed May 9, 1918. Serial No. 233,409.

To all whom it may concern:

Be it known that we, THOMAS E. MURRAY and THOMAS E. MURRAY, Jr., citizens of the United States, residing at New York, in the 5 county of New York and State of New York, have invented a certain new and useful Improvement in Methods of Making Ogival Shells, of which the following is a specification.

10 The invention is a method of making cylindrical ogival ended shells, and consists in the several steps hereinafter more particularly set forth.

In the accompanying drawings—

15 Figure 1 is a longitudinal section of a cylindrical shell body, before the formation of the ogival end. Fig. 2 is a similar section, showing the heating electrodes in place on the shell body. Fig. 3 is a similar 20 section, showing the operation of the forming die. Fig. 4 shows the end portion of the shell in enlarged section, and the fuse orifice as produced by the forming die. Fig. 5 is a similar view, showing the fuse orifice after 25 reaming and threading.

Similar letters of reference indicate like parts.

The shell body A is cylindrical in form, and may be closed at one end. Upon said 30 body are secured, in any suitable way, the ring or inclosing electrodes B, C. Current established between said electrodes passes through the zone D of the shell wall, heats said zone and renders the metal thereof pliable or plastic. The electrodes are then 35 removed from the shell body, which is placed with its open end under the forming die E. When said die is pressed downwardly upon said open end, the wall of the shell is 40 caused to bend inwardly at the plastic zone D, and to conform to the ogival shape of said forming die E, as shown in Fig. 3. The downward movement of the die may be arrested, if desired, before the tip of the ogival 45 end of the shell is completely closed, so that

an opening F concentric with said ogival end is thus produced, as shown in Fig. 4. As this opening is normally of frusto-conical shape, we ream or cut it out internally to make it cylindrical, and then thread it, as 50 shown in Fig. 5, to receive and engage the usual fuse.

We claim:

1. The method of making an ogival shell, which consists in, first, forming the cylindrical body of the shell, second, heating a zone of the wall of said body near one end thereof to render the metal of said zone plastic, and, third, pressing the portion of said wall beyond said zone in a die of ogival 55 contour to cause said wall to bend inwardly at said zone and to assume the ogival shape of said die.

2. The method of making an ogival shell, which consists in, first, forming the cylindrical body of the shell, second, applying to said body two encircling and separated electrodes and establishing the current to heat the zone of the shell wall between said electrodes, third, removing said electrodes, 60 and, fourth, pressing the portion of the wall of said body beyond said zone in a die of ogival contour to cause said wall to bend inwardly at said zone and to assume the shape of said die. 70

3. The method, as set forth in claim 1, the said third step further including the production of an opening concentric with the ogival end formed by said die. 75

4. The method, as set forth in claims 1 and 80 3, with the further steps of cutting or reaming said opening to render the same cylindrical and internally threading the same.

In testimony whereof we have affixed our signatures in presence of two witnesses.

THOMAS E. MURRAY.

THOMAS E. MURRAY, JR.

Witnesses:

GERTRUDE T. PORTER.

MAY T. McGARRY.