(No Model.)

M. DARMANCIER.

SHRAPNEL PROJECTILE.

No. 603,525. Patented May 3, 1898.

Fig. 4.

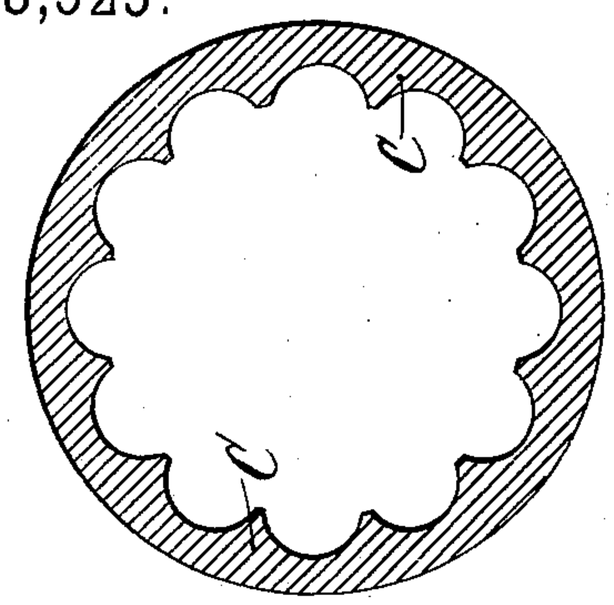


Fig. 5.

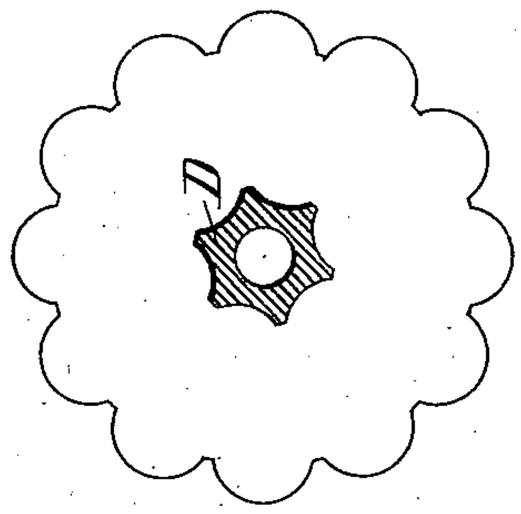


Fig. 6

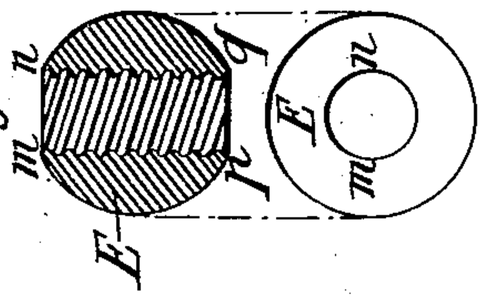


Fig. 2.

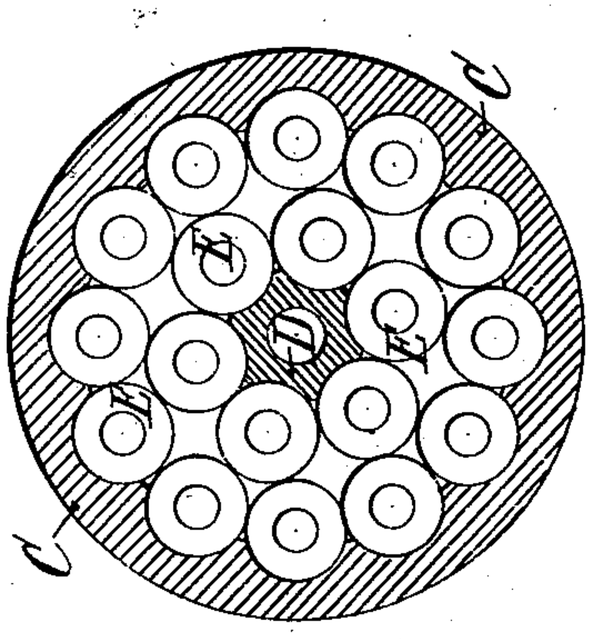


Fig. 3.

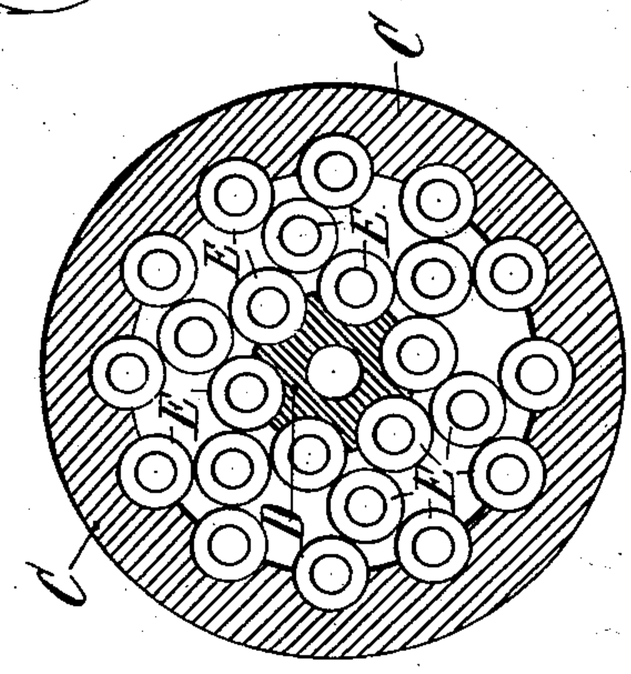
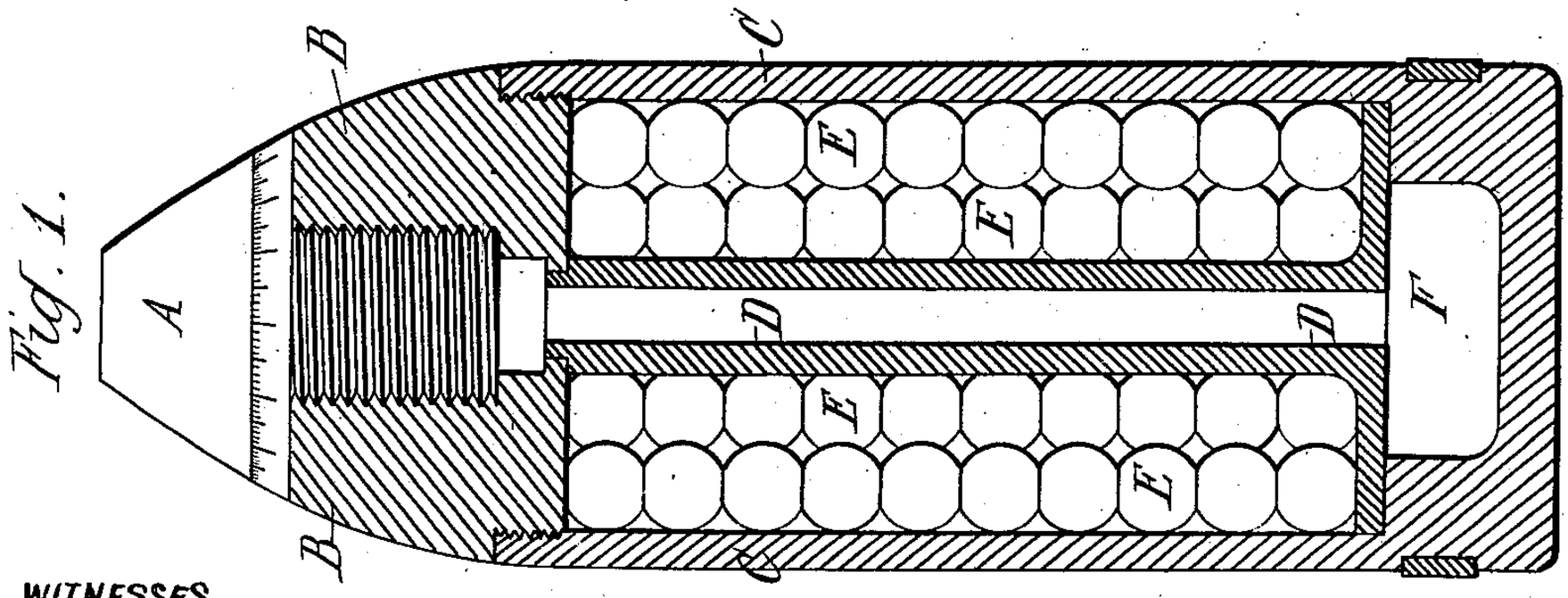


Fig. 1.



WITNESSES.

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UNITED STATES PATENT OFFICE.

MICHEL DARMANCIER, OF ST. CHAMOND, FRANCE.

SHRAPNEL PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 603,525, dated May 3, 1898.

Application filed November 5, 1897. Serial No. 657,514. (No model.) Patented in France December 6, 1894, No. 243,427.

To all whom it may concern:

Be it known that I, MICHEL DARMANCIER, engineer, a citizen of the Republic of France, residing in St. Chamond, (Loire,) France, have invented certain Improvements in the Construction of Forged-Steel Projectiles, (for which I have obtained a French patent, dated December 6, 1894, No. 243,427,) of which the following is a specification.

The effective weight of a ball projectile is the proportion of the weight of the balls contained in such projectile to the total weight of the charged projectile. This being so, any method of constructing projectiles of this kind the result of which in a given caliber and weight is to reduce the weight of the component parts of the empty projectile in order to give to the balls the greatest possible share of the disposable weight is an improvement, since it increases the effective weight of the projectile in question.

The ball projectile which forms the subject of this invention and which is represented in the accompanying drawings is constructed in such a manner as to give the component parts of the uncharged projectile the dimensions strictly necessary to insure its freedom from premature deformation when discharged in a normal manner, excluding all agglomerant substances—such as sulfur, colophony or resin, plaster, stamped separating-washers, and the like—which are ordinarily employed in forged-steel projectiles charged with balls.

In the accompanying drawings, Figure 1 represents a longitudinal section through a projectile charged with balls, taken upon a plane containing the vertical axis of the figure. Fig. 2 represents a horizontal cross-section through the charged projectile. Fig. 3 is a similar view of a modification. Fig. 4 is a horizontal cross-section through the shell of the uncharged projectile. Fig. 5 is a horizontal cross-section through the central tube, and Fig. 6 represents one of the balls used for charging the projectile.

My improved ball projectile comprises a double-acting fuse A, a fuse-holder B in the form of an ogive, a casing or shell of the projectile C, a central tube D, provided with a disk, and balls E.

The fuse A, which is placed in communication with the exploding-chamber F by means of the central tube D, is screwed upon the ogive-shaped fuse-holder B, which latter is in turn attached to the casing or shell C. This casing or shell C, of forged steel, is formed internally with a certain number of longitudinal concave grooves, which are parallel to exterior sides of the shell. In the same manner the central tube D is provided externally with grooves similar to those of the shell, and the contour of the disk of this tube is serrated, as shown in Fig. 5, so as to correspond to the internal dimensions of the cross-section of the shell.

The balls E, Fig. 6, may be of hardened lead and are formed with two parallel flat surfaces *m n p q*, so that they may rest square one upon the other and facilitate the loading of the projectile.

Figs. 1, 2, and 3 show the manner in which the projectile is charged with the balls. Each horizontal layer of balls comprises at the least, Fig. 2, an external row, the balls composing which are lodged partly in the grooves in the shell or casing, and an internal row, the balls of which are partly lodged in the grooves in the central tube.

In some forms of projectile each layer of balls has in addition one or more intermediate rows of balls, as represented in Fig. 3.

The complete loading of the projectile consists in filling it with as many layers of balls as are allowed of by the space comprised between the upper portion of the disk of the central tube D and the lower portion of the ogive-shaped fuse-holder B, Fig. 1.

From the preceding description and by referring to the accompanying drawings it will be apparent that the rotation imparted to the projectile by the rifling of the barrel is integrally transmitted to the balls contained in the projectile (a condition which is essential in order to insure an effective action of the charge of the projectile at the moment of its exploding) by the employment of the grooves formed in the shell or casing, the grooves in the exterior of the central tube, and the serrations upon the circumference of the disk of the tube without using any agglomerant substances, such as those above referred to.

I claim—

1. A projectile having a cavity, the walls of which are provided with a series of longi-

tudinally-extending grooves, and the projectile also having a central tube with longitudinally-extending grooves in its outer surface and with a disk at its inner end, such disk having its periphery serrated to match the grooves of the projectile.

2. A projectile having a cavity, the walls of which are provided with longitudinally-extending grooves, and a tube run centrally through the cavity and having longitudinally-extending grooves in its outer surface.

3. A projectile having a cavity, the walls of which are provided with longitudinally-extending grooves, a tube run centrally through the cavity and having longitudinally-extending grooves in its outer surface, and a series of balls contained within the cavity and arranged in rows lying in said grooves.

4. A projectile having a cavity, the walls of which are provided with longitudinally-extending grooves, a tube running centrally through the cavity and having grooves in its outer surface, the lower end of the tube having a disk with a serrated periphery conforming to the grooves in the walls of the cavity, and balls arranged within the cavity and lying in the said grooves.

5. A projectile, having a cavity, the walls of which are provided with longitudinally-extending grooves and a member run centrally through the cavity and held rigidly therein, said member having longitudinally-extending grooves formed in its outer surface, the grooves being adapted to contain balls stored within the cavity.

6. A projectile having a cavity formed therein, the cavity being provided with longitudinal grooves, a member held rigidly in the cavity and centrally with reference thereto, said member being provided with longitudinal grooves similar to those in the walls of the cavity, and a fuse-holder secured to one end of the projectile to close the cavity and engaging said centrally-disposed member, the cavity being adapted to contain a series of separate balls packed in the grooves.

7. A projectile having a cavity, a tube extending centrally through said cavity and provided with a disk at its lower end, the disk resting on the bottom of the cavity, and a fuse-holder secured to one end of the projectile to close the cavity and having connection with the tube, the cavity being adapted to receive balls packed therein and around the tube.

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

MICHEL DARMANCIER.

Witnesses:

LEON GRANGER,

HASTING RUNOUGH.