(No Model.)

H. H. GRENFELL & J. G. ACCLES.

PROJECTILE.

No. 486,598. Patented Nov. 22, 1892.

Fig. 1.

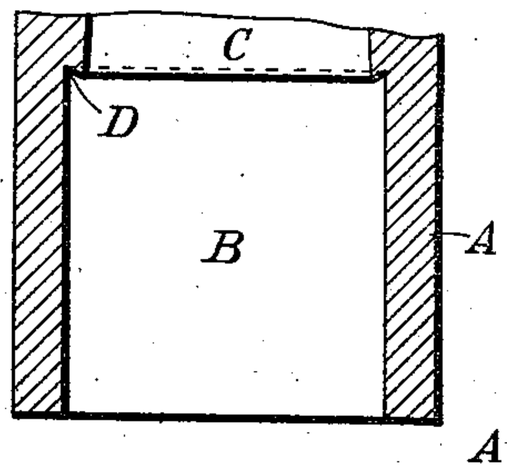


Fig. 2.

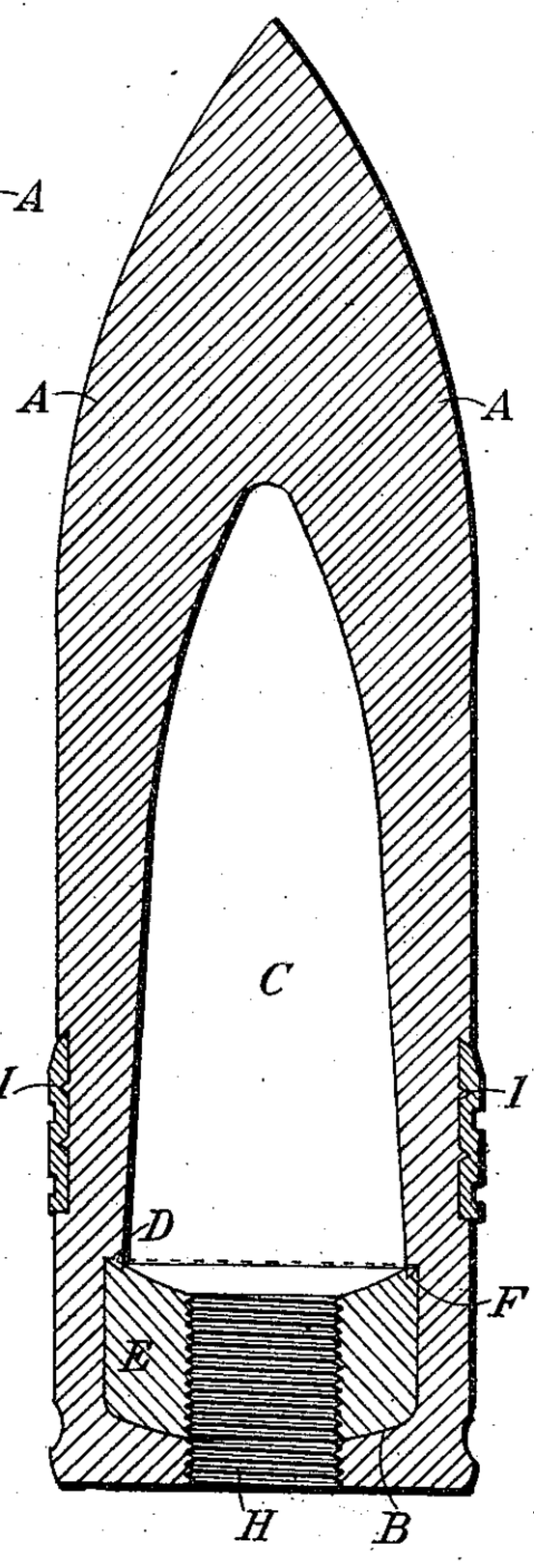


Fig. 3.

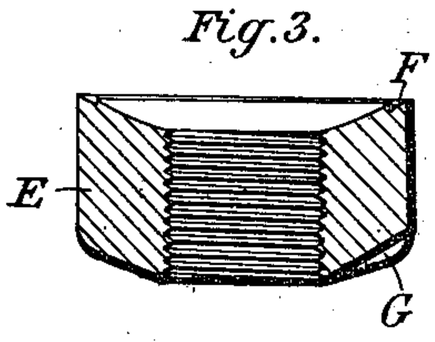
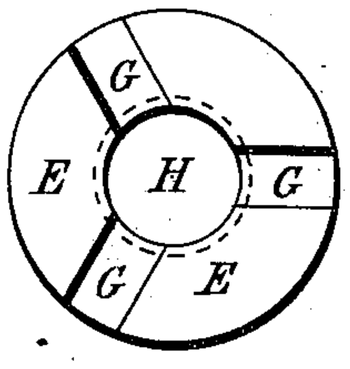


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 486,598, dated November 22, 1892.

Application filed December 19, 1891. Serial No. 415,680. (No model.)

To all whom it may concern:

Be it known that we, HUBERT HENRY GRENFELL, captain Royal Navy, a subject of the Queen of Great Britain, and a resident of London, England, and JAMES GEORGE ACCLES, engineer, a citizen of the United States of America, and residing at Birmingham, England, have invented certain new and useful Improvements in the Manufacture of Projectiles, of which the following is a specification, reference being had to the accompanying drawings.

Our invention relates to improvements in the manufacture of hollow projectiles or shells for ordnance and chiefly to projectiles of that class in which the body is first forged or otherwise formed with its rear end open and is then provided with a separately-formed base or plug inserted and secured in the aperture existing in the said open end. Heretofore in the manufacture of such projectiles it has been customary to secure the base or plug in the shell-body by screwing it into the said aperture, and in the specification of a recent British patent, No. 11,616, A. D. 1890, it is proposed to close the end of the shell-body down over a screw ring or bushing. The method of attachment by screw-threads is, however, objectionable, for the reason that the surfaces of the screw-threads form inclines or wedges, which by the pressure exerted on the base in the discharge of the gun act to open or expand the rear portion of the circumferential wall of the projectile. The deformation caused by such expansion gives rise to undue friction between the surfaces of the projectile and the bore of the gun and to imperfect centering of the projectile therein, the result being more or less inaccuracy in the shooting. Moreover, the said wedging and expanding action is increased when the shell strikes an object—such as an armor-plate, for instance—and shells frequently break in the armor by reason of the excessive friction of the expanded and enlarged base or rear end, and therefore fail to completely perforate the armor-plate and to burst effectively behind it.

Now according to our invention we obviate this difficulty and greatly improve the manufacture of such projectiles as follows—that is to say: Instead of using a screwed ring or bush and securing the same by screwing it into the end of the shell-body and closing the end of the shell-body over it we make the aperture and the plug or bushing plain or smooth and secure the said plug or bushing in the said aperture in such a manner that there will be no wedging or expansive action of the plug upon the body of the projectile.

In order that our invention may be clearly understood, we will now proceed to describe with reference to the accompanying drawings the manner in which we carry it into effect.

Figure 1 shows in transverse section the rear end of a projectile ready for the insertion of the base or bushing according to our invention. Fig. 2 represents a longitudinal central section of a finished projectile with the base or bushing in place therein. Fig. 3 is a longitudinal central section of the base or bushing apart from the projectile, and Fig. 4 shows the outer face of the bushing.

Similar letters of reference indicate corresponding parts in all the figures.

A is the shell-body. B is an aperture in the rear end of the said shell-body of somewhat larger diameter than the cavity C therein, so that at the inner end of the said aperture there is a circular ledge or shoulder D, whereon the base, bushing, or plug E is supported. The sides of the aperture forming its circumference are parallel, as are the corresponding sides of the plug E, which come into contact therewith.

F is a seating formed upon the plug E to fit closely to the said ledge or shoulder D. The surface of the said ledge or shelf is at right angles with the principal axis of the projectile or is inclined toward the said axis and the rear of the projectile.

G G are shallow grooves formed in the outer face of the plug.

H is a screw-threaded opening formed in the plug E to receive a fuse.

I is a driving-ring and gas-check.

We preferably form the plug or bushing E with its rear or outer end somewhat curved or rounded, as shown. The grooves G are provided upon the said bush or plug in order that when the same is inserted in the aperture B the end of the shell-body which extends beyond the end of the base or plug may

be closed down or forced down over the said base or plug into the positions in which it is shown in Fig. 1. Some portions of the metal thus forced down will enter the shallow grooves G, and the plug is thereby very firmly and solidly secured in its place. The said grooves, moreover, prevent any twisting or turning of the base or plug E while being screwed to receive the fuse.

This method of manufacture not only insures freedom from any tendency to expansion and deformation of the shell-body when the gun is fired and when the shell strikes an object, but it insures great regularity and accuracy in respect of the dimensions and weight of the completed projectile. The term "plug" as used in the claims includes any equivalent form of base or bushing.

What we claim is—

1. A hollow projectile provided with a plug near its rear end, having grooves on its outer face, the body of said projectile being provided with a flange upset over said plug and into the grooves thereof.

2. A hollow projectile provided with an enlarged chamber at its rear end, having shoulders at the inner portion of said enlarged chamber, a plug within said chamber, abutting against said shoulders, the body of said projectile being provided with a flange upset over said plug and clamping it against the shoulders.

3. A hollow projectile provided with a plug near its rear end, having grooves on its outer face, the body of said projectile being provided with a flange upset over said plug and into the grooves thereof, said plug and flange having a screw-threaded opening extending therethrough.

4. A hollow projectile provided with an enlarged chamber at its rear end, having shoulders at the inner portion of said enlarged chamber, a plug within said chamber, abutting against said shoulders and provided with grooves on its outer face, the body of said projectile being provided with a flange upset over said plug and into the grooves thereof, clamping the plug against said shoulders.

In testimony whereof we have hereunto signed our names in the presence of two subscribing witnesses.

HUBERT HENRY GRENFELL.
JAMES GEORGE ACCLES.

Witnesses:
JNO. FREDK. PARKES.
ERNEST HARKER.