G. GRIFFITH.

PROJECTILE.

APPLICATION FILED APR. 1, 1918.

1,283,158. Patented Oct. 29, 1918.

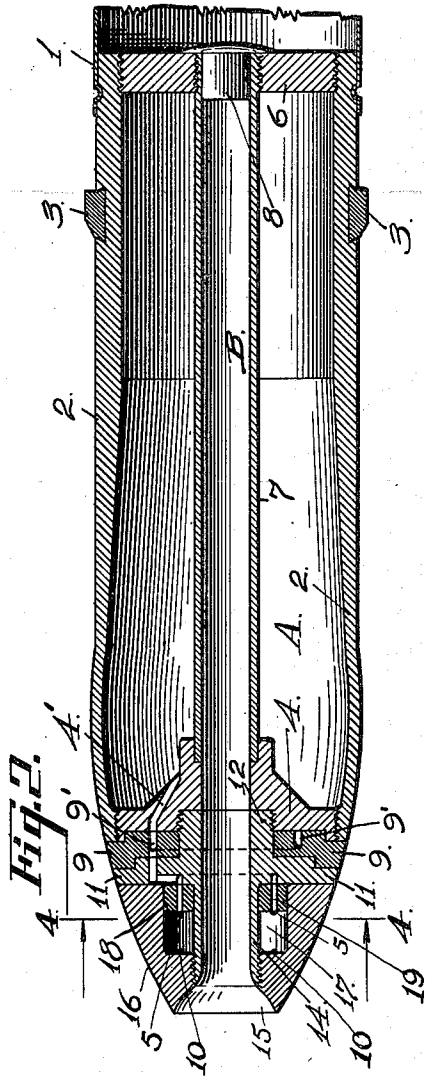


Fig. 2.

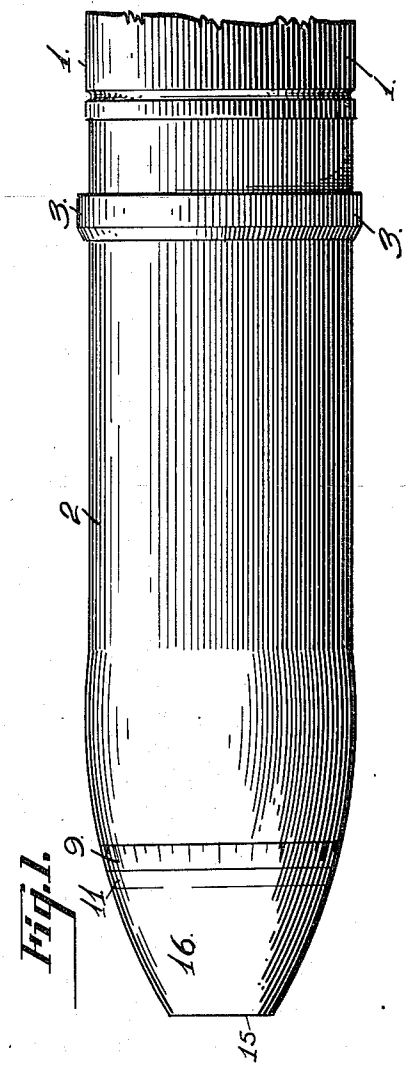


Fig. 1.

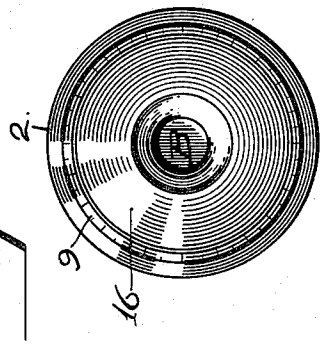


Fig. 3.

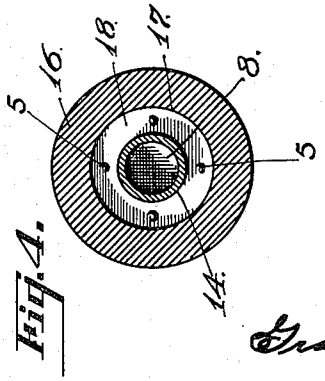


Fig. 4.

Inventor.

Graves Griffith

UNITED STATES PATENT OFFICE.

GRAVES GRIFFITH, OF SAN FRANCISCO, CALIFORNIA.

PROJECTILE.

1,283,158. Specification of Letters Patent. Patented Oct. 29, 1918.

Application filed April 1, 1918. Serial No. 225,952.

To all whom it may concern:

Be it known that I, GRAVES GRIFFITH, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

The present invention relates to projectiles of the type having provision for the prevention of ricochet or deflection in flight upon striking the surface of a liquid body, and has for an object to provide a self-contained means in its construction adapted to bite or cut into a liquid, whatever the angle of impact, rather than to strike surface to surface, as in ordinary construction, and, as an additional object, to provide means for directing centrally and rearwardly the head-pressure to a point of negative pressure at the projectile's base.

To these and other ends the invention consists in certain improvements and combination of parts all as will hereinafter be more fully described, the novel features being more particularly pointed out in the claim at the end of the specification.

In the accompanying drawings, Figure 1 is a side elevation of a projectile embodying my invention. Fig. 2 is a longitudinal section. Fig. 3 is a detail in elevation, and Fig. 4 is a transverse section.

Referring to the drawings, Fig. 1 is a side elevation, illustrating the exterior of the projectile, in which 1 represents the forward portion of a shell containing a propelling charge, 2 the projectile body, 3 the rotating ring, 9 the graduated periphery of the timing ring, 11 means, constituting part of the head, for securing the projectile head to the body, 16 the main portion of the head, and 15 the reëntrant nose.

Fig. 2 is a vertical longitudinal sectional view, in which 1 represents the forward part of a shell containing a propellant charge for driving the projectile, 2 the body of the projectile, 3 rotating band, 6 projectile base, B centrally located channel extending from reëntrant nose 15 to and through the base 6, 8 temporary closure for channel B, A space containing explosive, 7 that portion of channel B lying wholly within space A, 11 and 12 means by which in conjunction with 4 the head 16 is secured to the projectile body 2, 9 timing ring, 9′ arc-shaped fuse-channel in face of timing ring 9, 4′ powder passage leading to explosive in space A, 17 detonating chamber concentric with forward part of channel B, 18 free-moving detonating ring, 5 detonators, 19 flame ducts extending rearwardly through detonating ring 18, 10 annular rib against which detonators 5 are exploded, 14 machined portion of 11 over which detonating ring 18 is fitted, 16 forward portion of projectile head, 15 reëntrant nose of projectile head 16.

Fig. 3 is a view from directly in front, showing head 16, the reëntrant nose 15, the graduated periphery of timing ring 9, and projectile body 2.

Fig. 4 is a cross-section through the head 16 on the line 4—4, showing projectile head 16, cylindrical detonating chamber 17, detonating ring 18, flame ducts 19, forward termination 14 of the channel B, and the closure 8 for channel B.

While the ignition system for delayed fuse-action as here incorporated meets all requirements, it is not desired to be restricted to the use of this system, as there are other means for the accomplishment of this purpose equally applicable.

The projectile upon striking the surface, owing to its peculiarly shaped reëntrant nose, cuts into the water, directing rearwardly a volume of it at greatly accelerated velocity, due to the negative pressure at projectile's base, that would otherwise have to be displaced laterally at a heavy expenditure of energy.

The act of entering the water, the heavier media, checks the speed of the projectile, causing the detonating ring 18 to be thrown forward against the rib 10 exploding the detonators 5, the flames from which pass rearwardly through the flame ducts 19 to the powder train in passages 9′ and 4′, the ignition of which, in turn, fires the explosive charge in chamber A.

Through the setting of the graduated timing ring 9, this explosion may be timed to follow immediately the check in flight of the projectile, or it may be delayed for a predetermined interval thereafter. The intent of delayed fuse-action would be to have

the projectile fall short, in attacks against naval craft, and continue its course under water, as the more vulnerable parts of a vessel are here and the under-water explosion much more destructive.

Upon leaving the muzzle of the gun, owing to the head pressure at reëntrant nose 15 and negative pressure at projectile base, the closure 8, whose purpose is, while traveling the bore of the gun, to prevent gas escape, is displaced leaving a free passage between these two points, affording a means for establishment of equilibrium of pressure therebetween through an induced flow of air from pressure point to vacuum. The reentrant nose cavity should be of ogival or such other form as would present least resistance to the rearward flow of liquid, and its anterior diameter such as to assure cutting or biting into the surface, whatever the angle at which the projectile strikes.

Exteriorly the projectile presents much the appearance of the ordinary projectile, differing only as to nose and base.

Assembling of parts comprising the projectile is simple. The body portion 2, in which the explosive is confined, is threaded at either end to receive the base 6 and front piece 4, in which are openings receiving the extremities of the cylindrical channel 7. The closure 8 for this channel, being of temporary character, is, as to body, of friction-fit. The frontal part of 4 is threaded for the reception of the hub of 11, the hub receiving the timing ring 9 before being screwed into position. The frontal extension of this hub receives the detonating ring 18 which is fitted to slide over it. The extreme front end of this hub is also threaded for the reception of the head 16. The rear central portion of head 16 is chambered, forming, with that portion of channel B adjacent, a detonating chamber for the free-movement of detonating ring 18.

I claim:

In combination, in a projectile of the character described and for the purpose specified, a body portion having an axial aperture therethrough and an annular explosive chamber therein, a closure for the said axial aperture, a head having a recessed nose opening into the said axial aperture, an ignition means within said head comprising an annular chamber having therein an annular, slidable percussion means with flame-ducts therethrough carrying detonating caps, an annular rib carried by the forward end of said annular chamber for receiving the impact of the said annular slidable percussion means, annular spaced diaphragms constituting partitions between and means for joining the said head and the said body, the forward one of the said partitions having therethrough a powder-train passage opening into the said annular chamber, the rearward one of the said partitions having therethrough a number of powder-train passages arranged in arc-form and opening into the said annular explosive chamber, an annular rotatable diaphragm positioned between the said annular partitions and having an arc-shaped powder-train groove in the anterior face thereof some point of which is at all times in registration with the said powder-train passage opening into the said annular chamber, a powder-train passage leading from one extremity of the said arc-shaped groove through the said annular rotatable diaphragm and so positioned as to be brought successively into registration with the said powder-train passages opening into the said annular explosive chamber upon rotation of the said rotatable diaphragm, and means for indicating the degree of this rotation.

GRAVES GRIFFITH.

Witness:
D. B. RICHARDS.