G. RAMSEY.

PROJECTILE.

APPLICATION FILED APR. 23, 1917.

1,426,907. Patented Aug. 22, 1922.

2 SHEETS—SHEET 1.

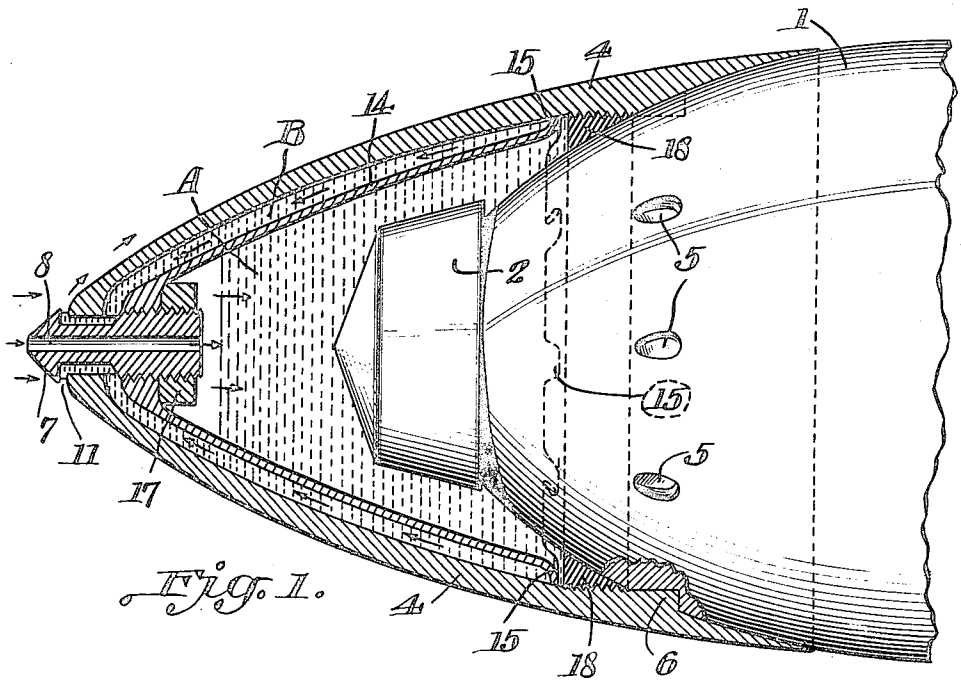


Fig. 1.

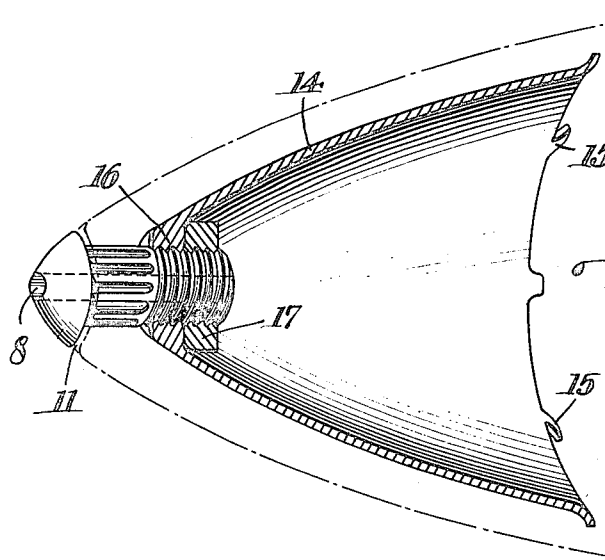


Fig. 2.

Inventor:

George Ramsey.

G. RAMSEY.

PROJECTILE.

APPLICATION FILED APR. 23, 1917.

1,426,907. Patented Aug. 22, 1922.

2 SHEETS—SHEET 2.

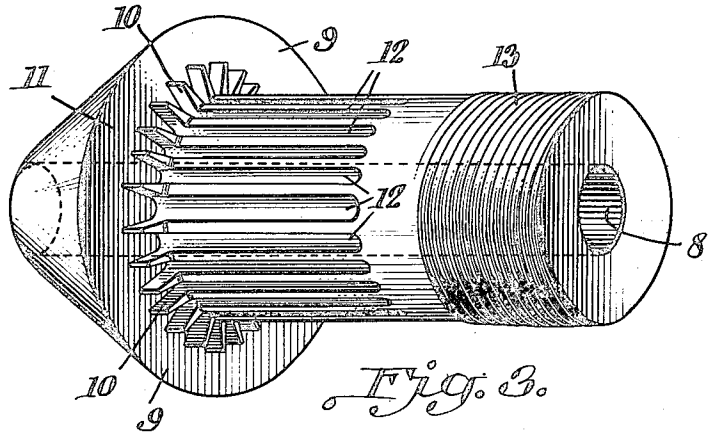


Fig. 3.

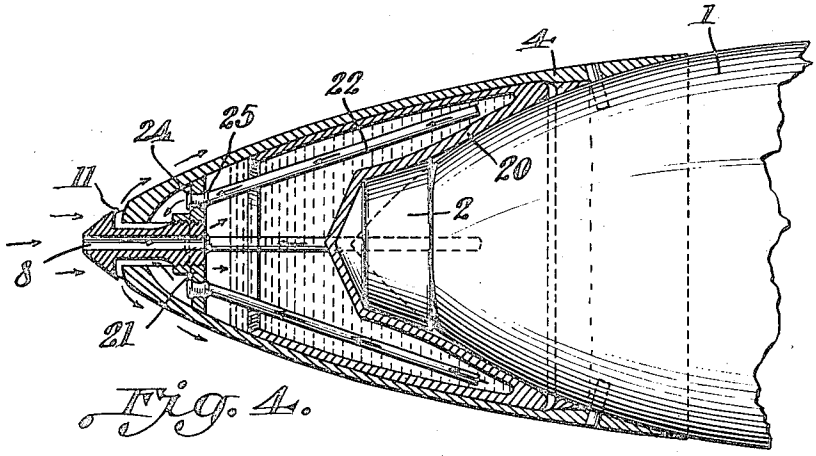


Fig. 4.

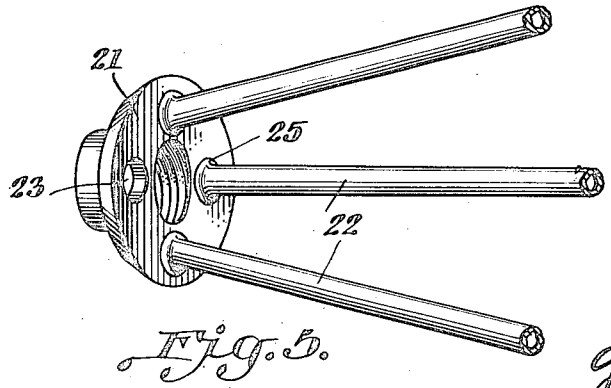


Fig. 5.

Inventor:

George Ramsey

UNITED STATES PATENT OFFICE.

GEORGE RAMSEY, OF BROOKLYN, NEW YORK.

PROJECTILE.

1,426,907. Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed April 23, 1917. Serial No. 164,021.

To all whom it may concern:

Be it known that I, GEORGE RAMSEY, a citizen of the United States, and a resident of the city of Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Projectiles, of which the following is a specification.

This invention relates broadly to ordnance and more particularly to a projectile and devices for lubricating the projectile while in flight.

The principal object of the present invention comprises a device for lubricating high velocity objects while in flight and resides more especially in providing for maintaining the forward portion of the object coated with an anti-friction substance to reduce the friction between the moving object and the medium through which it is traveling.

More particularly the object of the present invention comprises devices for lubricating a projectile during flight by providing an anti-friction covering which is maintained over the forward portion of the projectile during its travel through the air.

Still more specifically the present invention comprises devices adjacent the nose of the projectile cap which are constructed to distribute the lubricant from within the cap over the nose of the cap to enable the same to stream back over the projectile thereby maintaining the projectile lubricated during its passage through the air.

Still further and more specifically defining the present invention it comprises an annular distributing passageway adjacent the nose of the cap, which passageway is connected with a supply of anti-friction material within the cap and capable of being distributed through the annular passageway when the projectile is in flight, whereby the anti-friction material is maintained as a layer between the surface of the projectile and the surrounding air.

Other and further objects of the present invention will in part be obvious and will in part be pointed out hereinafter in the specification by reference to the accompanying drawings wherein like parts are represented by like characters throughout the several figures of the drawings.

Figure 1 illustrates the preferred construction for carrying out the present invention.

Figure 2 illustrates the parts which are added to the standard type of projectile.

Figure 3 is a detail view of the distributing plug used in connection with the present invention.

Figure 4 illustrates a different embodiment of the present invention.

Figure 5 is a detail view of part of the construction illustrated in Figure 4.

In modern ordnance practice projectiles travel at very great velocities and the effective density of the air penetrated by the projectile is very great so that enormous friction is set up between the nose of the projectile and the air particles contacting therewith. This friction is so great as to heat the projectile during its flight. Obviously this friction is an undesirable element in that it dissipates the energy propelling the projectile thereby shortening the range. If it is possible to reduce and minimize this friction between the air and the projectile, energy to that extent will be conserved and not only will the range of the gun be increased but the projectile will reach its ultimate destination at a higher velocity and thereby deliver a greater impact blow.

This invention provides for lubricating the nose of the projectile during its flight by maintaining a covering of friction reducing material over the nose of the projectile while the projectile is traveling through the air. It is desirable in ordnance practice to retain standard constructions as far as may be possible and to this end one embodiment of the present invention comprises the utilizing the space under the well known Davis cap as a reservoir for lubricating material and providing conduits whereby the lubricant is removed from the reservoir and delivered to the outer surface of the projectile adjacent the nose thereof, whereby substantially the entire projectile is continuously coated during flight with lubricating material.

Referring now to the drawings and more particularly to Figures 1 and 2, the projectile 1 may be provided with the well known Johnson nose 2 and may be fitted with the Davis cap 4 as is common practice in projectile construction. While various well known and common attaching means may be provided for securing the cap 4 to the projectile 1, preferably this cap is secured by providing recesses 5 in the nose

of the projectile into which recesses projections 6 from the cap 4 are adapted to interlock. It is to be noted that the recesses 5 and the projections 6 are constructed to resist forces coming against the cap 4 in a direction substantially parallel to the axis of the projectile. The nose of the cap 4 is cut away and provided with an opening through which the distributing plug 7 extends and into which this plug is securely mounted. The distributing plug (see Fig. 3) is provided with a longitudinal opening 8 and with an overhanging ledge 9 beneath which are supporting lugs 10 that maintain the overhanging ledge 9 spaced slightly from the nose of the cap 4 to provide an outlet opening 11 (see Fig. 1), through which the lubricant may pass from the grooves 12 in the body of the plug. The lower end of the plug is screw threaded as at 13 for the purpose which will now be described. A partitioning bell 14 (Figs. 1 and 2) is adapted to fit within the cap 4 thereby dividing the cap into concentric compartments A and B. The partitioning bell 14 is preferably formed of sheet metal and is provided on its lower end with spacing lugs 15 that are adapted to contact with the inner surface of the cap 4 and maintain the bell 14 uniformly spaced from the inner wall of the cap. The forward end of the bell is screw threaded as at 16 to be carried upon the screw threads 13 of the distributing plug 7, and the bell is preferably reinforced at this point. A lock nut 17 is adapted to be screwed upon the end of the distributor plug 7 to prevent rotation of the projectile is its flight from causing the parts to move or separate while the projectile is in flight. In order to sustain the base of the cap a screw threaded ring 18 may be positioned within the cap 4 to take up shocks from the lubricant.

The device may be assembled by placing the partition bell 14 within the cap 4; then drawing the bell 14 within the cap until the spacing lugs 15 tightly engage the inner side wall of the cap by rotating the plug 7 which acts as a connecting bolt. The lock nut 17 is then secured in position and after the ring 18 is secured within the base of the cap 4 the entire nose may be filled with suitable lubricant and the cap 4 may then be secured upon the nose of the projectile 1. If desired the lubricant may be omitted until after the cap 4 is in position on the nose of the projectile and then the lubricant may be supplied through the air inlet opening 19 which is axially alined with the axis of the projectile. The lubricant may comprise any material capable of minimizing the air friction and may be either liquid, substantially solid or pasty lubricants or it may even comprise a powdered lubricant. Preferably a type of heavy graphite grease is used and the opening 8 admits heavy air pressure to the lubricant within the compartment A thereby forcing the lubricant in the direction of the projectile. The forward air passing the distributing opening 11 produces an asperating effect so that there are forces at the base of the compartment B driving the lubricant into this compartment and there are forces at the tip of this compartment drawing the lubricant out so that when the projectile is in flight the lubricating material issues through the circular or annular distributing opening 11 and streams in a backward direction over the nose of the cap thereby lubricating the entire nose of the projectile and reducing air friction accordingly. The "kick back" of the lubricant when the projectile starts within the gun is due to the inertia of the lubricant and sets up forces substantially parallel to the axis of the projectile. These forces under certain conditions may be of considerable magnitude and are received and supported upon the ring 18, except for such portion of the force as is supported directly in the Johnson nose and the nose of the projectile. Because of the fact that this "kick back" force is substantially a linear force the radial component thereof tending to thrust the side walls of the cap outwardly is minimized by the partition bell 14 and is substantially negligible.

Figures 4 and 5 illustrate a slightly different embodiment of the invention wherein the lubricant is carried within a steel cup 20 that rests directly over the Johnson nose so that the "kick back" of the lubricant is taken up entirely by the steel cup. In order to facilitate the removal of the lubricant from this cup a partition washer 21 is provided and carries a plurality of tubes 22, such as copper tubes or other flexible material, which may be secured within openings 23 by expanding the tubes as at 24 and 25, as is common in the metal working art.

Realizing that the present invention may be embodied in constructions other than the specific devices disclosed herewith it is desired that the specific disclosure herewith shall be considered as illustrative and not in the limiting sense.

Having thus described my invention what I claim is:—

1. A projectile, comprising a body portion, a chamber centrally located with reference to the longitudinal axis of the projectile and adapted to be filled with lubricant, and devices for causing the lubricant to be removed from said chamber while the projectile is in flight.

2. A projectile, comprising a body portion provided with a penetrating nose, an air resistance cap over said nose and forming a chamber surrounding said nose with the

chamber adapted to be filled with lubricant, and means to cause the lubricant to be spread over the surface of the projectile when the projectile is in flight.

3. A projectile comprising a body portion, a cap surrounding the forward part of said body portion and forming a chamber, said cap being provided with an opening at the forward end thereof, and means adapted to distribute material from said chamber to said opening during the flight of the projectile.

4. A projectile being provided with an outlet opening adjacent the forward end thereof, a chamber with the axis thereof substantially coincident with the longitudinal axis of the projectile and adapted to carry a supply of lubricant, and means for causing the lubricant to be discharged through said outlet opening when the projectile is in flight.

5. A projectile having the forward portion thereof provided with an outlet opening, a chamber adapted to be filled with suitable lubricating material, conduit means leading from said chamber to said outlet opening, and means whereby pneumatic pressure is applied to the lubricant within said chamber when said projectile is in flight to discharge said lubricant from said outlet opening.

6. The projectile having an outlet opening adjacent the forward point thereof, a chamber surrounding the nose of the projectile and adapted to carry a supply of lubricant, conduit means leading from said chamber to said outlet opening, and means to provide fluid pressure upon the contents of said chamber when the projectile is in flight whereby the contents thereof are discharged through said outlet opening.

7. A projectile comprising a forward portion having an outlet opening adjacent the point thereof, said outlet opening being so positioned relative to the line of flight of the projectile as to cause an asperating action to be established at said opening when said projectile is in flight, a chamber for storing a supply of anti-friction material, and conduits leading from said chamber to said outlet opening whereby said contents may be discharged while the projectile is in flight.

8. In a projectile, in combination, a body portion, a cap surrounding the nose of said body portion and forming a chamber, a bell-shaped partition member spaced apart from the inner side walls of said cap and dividing the said chamber into compartments, one of said compartments being operatively connected with an outlet opening adjacent the nose of the cap, the other of said compartments being operatively connected with an opening adapted to permit the introduction of air under pressure whereby the contents of said chamber may be discharged through said outlet opening when the projectile is in flight.

9. In a projectile, in combination, a body portion, a cap carried upon said body portion and adjacent the nose thereof, said cap providing a chamber surrounding the nose of said body portion, a bell-shaped partition member within said cap and dividing said chamber into a plurality of concentric compartments, said chamber being adapted to be filled with anti-friction material, conduits constructed to withdraw said material from the outer compartment when the projectile is in flight, and other conduits constructed to provide air pressure on the contents of said inner compartment when the projectile is in flight.

10. In a projectile, in combination, a body portion, an air cap secured to the forward end of said body portion and forming a chamber adapted to receive anti-friction material, a grooved plug constructed to comprise the advancing part of said projectile and being provided with a longitudinal opening, a bell-shaped partition member supported upon said plug and dividing said chamber into concentric compartments, the opening in said plug leading to the inner compartment, and the grooves in said plug leading from the outer compartment whereby the said material within said chamber is discharged through said grooves when the projectile is in flight.

11. As an article of manufacture for heavy ordnance, a distributing plug comprising a substantially cylindrical body portion, grooves within said body portion, an opening extending longitudinally through said body portion, an overhanging portion adjacent the forward end of said plug, and supporting abutments to maintain said overhanging portion spaced from the wall through which said plug is adapted to be extended in order to maintain said grooves as open passages.

12. A munition projectile carrying a reservoir symmetrical with reference to the longitudinal axis of the projectile and adapted to hold a lubricant, a connection between said reservoir and the surface of the projectile, and means for automatically forcing the lubricant from said reservoir to the surface of the projectile to lubricate the surface of the projectile during its flight.

GEORGE RAMSEY.