

Dec. 21, 1926.

1,611,431

C. H. FROELICH

GUN

Original Filed May 6, 1925

Fig. 1.

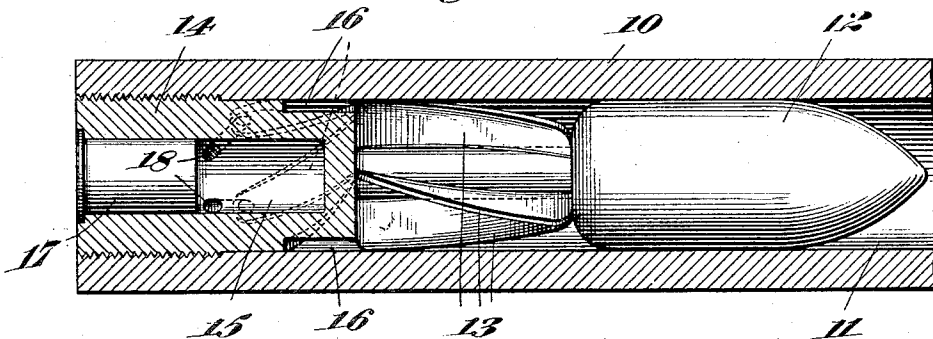


Fig. 2.

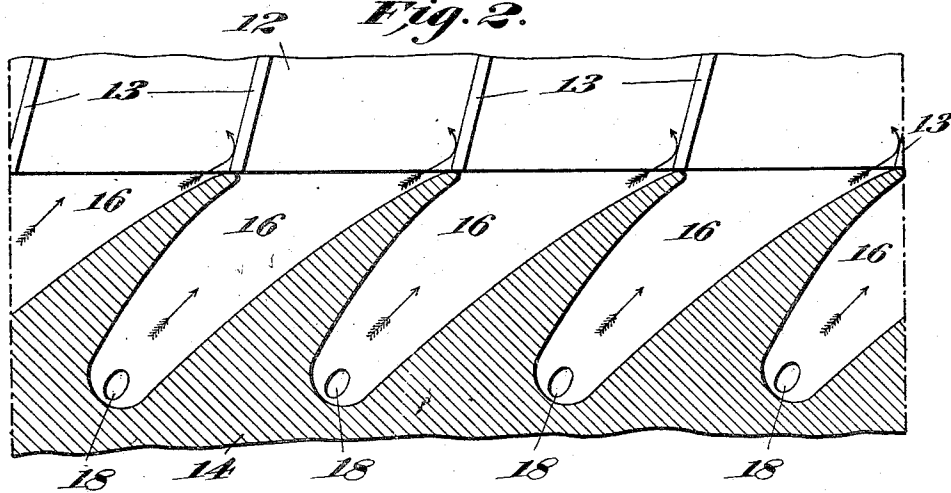
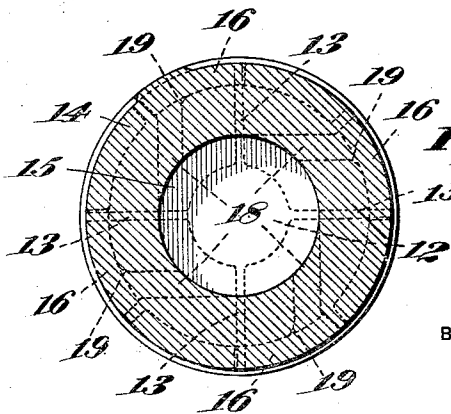


Fig. 3.



INVENTOR

Clarence H. Froelich

BY

and

R. S. A. Dougherty
A. B. Reavis
ATTORNEYS

UNITED STATES PATENT OFFICE.

CLARENCE HERVY FROELICH, OF BETHLEHEM, PENNSYLVANIA, ASSIGNOR TO BETHLEHEM STEEL COMPANY.

GUN.

Application filed May 6, 1925, Serial No. 28,280. Renewed May 18, 1926.

My invention relates to ordnance, more particularly to that type adapted for the projection of bombs, and it has for its object to provide apparatus of this character which shall operate to impart a twist to the projectile before it leaves the gun in order that deflection of the projectile may be better controlled.

It has heretofore been suggested to provide projectiles of the bomb type with inclined vanes in order that a spinning effect may be imparted to the projectile so that deflection thereof may be better controlled. This arrangement, however, has the disadvantage that rotation of the projectile cannot begin before the bomb is in flight and such rotation will begin only very slowly. In addition to the provision of inclined base vanes, it has also been proposed to utilize the effect of helical grooves or lands for the purpose of imparting a rotary effect to the projectile before it leaves the bore of the gun. The latter arrangement has the disadvantage that the rotary effect which it is practicable to impart to the projectile is not sufficient to secure control of deflection to the best advantage. Accordingly, therefore, it is the object of my invention to provide a gun having a bore and a powder chamber which communicate by way of inclined nozzle passages so that explosion gases enter the bore of the gun and the circumferential component of motion thereof is effective to act on the vanes to impart a rotary effect to the bomb or projectile before the latter leaves the gun to an extent sufficient so that deflection of the bomb or projectile may be controlled to the best advantage.

Apparatus made in accordance with my invention is illustrated in the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a longitudinal sectional view of my improved gun;

Fig. 2 is a development view showing the cooperative relation between the nozzle passages and the projectile base vanes; and,

Fig. 3 is a sectional view showing the relationship of passageways affording communication between the powder chamber and the nozzle passages.

Referring now to the drawings for a bet-

ter understanding of my invention, I show a gun tube 10 having a bore 11 adapted to receive a projectile 12 of the bomb type 55 having base vanes 13 preferably inclined.

A member 14 is arranged within the breech end of the tube 10 and it is provided with an interior powder chamber 15, which communicates with the bore 11 by way of 60 nozzle passages 16, the latter being inclined so that explosion gases enter the bore of the tube with a circumferential component of motion effective to act impactively upon the vanes 13 in order to impart rotary motion 65 to the bomb 12 before it leaves the tube 10.

The powder chamber 15 is preferably cylindrical and disposed co-axially with respect to the bore and it is adapted to receive a suitable cartridge chamber 17 for charging. 70 The chamber 15 preferably communicates with the nozzle passages 16 by way of passages 18 disposed tangentially of the chamber 15 and which are inclined forwardly and communicate with the inlet ends of 75 the nozzle passages 16. The outlet ends of the passages 18 are preferably rounded at 19, so as to permit an easier change in direction of escaping gases.

The nozzle passages 16 are helically disposed and widen or diverge toward the outlet ends. These passages are preferably provided by diverging slots which are covered by the tube so that the tube 10 and the member 14 cooperate to provide helical diverging 85 nozzle passages.

As illustrated, the bore 11 of the tube 10 is uniform from end to end so that it is only necessary to provide a powder chamber member 14 having a diameter so as to closely 90 fit the bore, whereby the interior surface of the tube may cooperate with the helical slots to define the nozzle passages.

From the foregoing, it will be seen, that I have provided a gun having a powder chamber, which communicates with the bore by way of turbine-like stator elements and a projectile arranged within the bore and having turbine-like rotor elements so that explosion gases entering the bore from the powder chamber may act upon the projectile not only to expel it from the gun but also to impart rotary motion thereto to a degree 100 sufficient to secure control of deflection.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. The combination, with a projectile having rotor turbine-like means at its base end, of a gun having a powder chamber and stator turbine-like means for conducting explosion gases from the chamber to act on the projectile and its rotor turbine-like means.

2. In a gun for projectiles having base vanes, the combination of a powder chamber and one or more nozzle passages leading from the chamber and adapted to discharge explosion gases against the vanes to impart rotary motion to the projectile before it leaves the gun.

3. In a gun for projectiles having base vanes, the combination of a powder chamber and a series of inclined nozzles affording communication between the powder chamber and the bore of the gun, whereby the circumferential component of motion of explosion gases entering the bore of the gun is effective to act on the vanes to rotate the projectile before it leaves the gun.

4. In a gun for projectiles having base vanes, the combination of a powder chamber and a series of helical nozzle passages affording communication between the powder chamber and the bore of the gun, whereby the circumferential component of motion of explosion gases entering the bore is effective to act on the vanes to rotate the projectile before it leaves the gun.

5. In a gun for projectiles having base vanes, the combination of a powder chamber and a series of inclined helical passages affording communication between the powder chamber and the bore of the gun, whereby the circumferential component of motion of explosion gases entering the bore is effective to act on the vanes to rotate the projectile before it leaves the gun.

6. In a gun for projectiles having inclined base vanes, the combination of a powder chamber and a series of helical passages affording communication between the powder chamber and the bore of the gun, whereby the circumferential component of motion of explosion gases entering the bore is effective to act on the vanes to rotate the projectile before it leaves the gun.

7. In a gun for projectiles having inclined base vanes, the combination of a pow-

der chamber and a plurality of passages arranged tangentially with respect to the chamber and communicating with helical passages leading to the bore, whereby explosion gases may be discharged into the gun bore with a circumferential component of motion effective to act on the vanes to rotate the projectile before it leaves the gun.

8. In a gun for projectiles having inclined base vanes, the combination of a powder chamber and passages arranged tangentially of the chamber and extending forwardly toward the bore of the gun and communicating with helical diverging passages leading to the bore, whereby explosion gases may be discharged into the bore with a circumferential component of motion effective to act on the vanes to rotate the projectile before it leaves the gun.

9. In a gun, the combination of a tube, a member arranged within the tube and providing a powder chamber and a series of helical passages defined by the member and by the tube and communicating with the chamber and with the bore of the tube forwardly of said member.

10. In a gun, the combination of a tube, a member fitting in the breech end of the tube and having a powder chamber, diverging nozzle passages defined by the member and by the tube and communicating with the chamber and with the tube forwardly of said member.

11. In a gun, the combination of a tube, a member fitting in the breech end of the tube and provided with a powder chamber and helical diverging nozzle passages defined by the member and by the tube, said passages communicating with the powder chamber and with the bore of the tube forwardly of said member.

12. In a gun, the combination of a tube of uniform bore, a member fitting the breech end of the tube and having a powder chamber, and a plurality of helical diverging nozzle passages defined by the member and by the tube, said passages communicating with the chamber and with the bore of the tube forwardly of said member.

13. In a gun, the combination of a tube, a member fitting in the breech end of the tube and having a powder chamber, and helical divergent slots closed by the tube to define nozzle passages which communicate at their inner ends with the chamber and at their outer ends with the bore of the tube forwardly of said member.

14. In a gun, the combination of a tube, a member fitting in the breech end of the tube and having a powder chamber and a plurality of helical diverging slots closed by the tube and which communicate at their inner ends with the chamber by inclined passages disposed tangentially with re-

spect to the chamber and which communicate at their outer ends with the bore of the tube forwardly of said member.

15. In a gun, the combination of a tube, 5 a member fitting in the breech end of the tube and having a powder chamber, a plurality of diverging helical slots in the member and closed by the tube so as to define

nozzle passages, and passageways arranged tangentially with respect to the chamber 10 inclined forwardly and communicating with the inner ends of the nozzle passages by way of outlets having rounded edges.

In testimony whereof I hereunto affix my signature this sixth day of April, 1925.

CLARENCE HERVY FROELICH.