T. A. EDISON.

PROJECTILE.

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1,297,294.

Patented Mar. 11, 1919.

Fig. 1

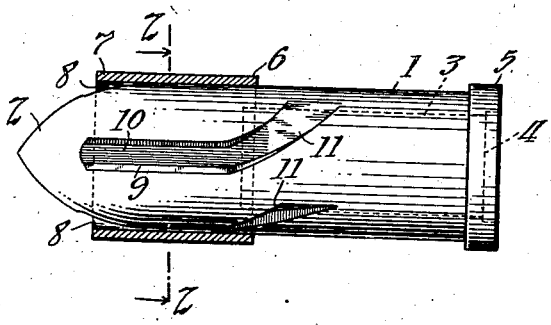
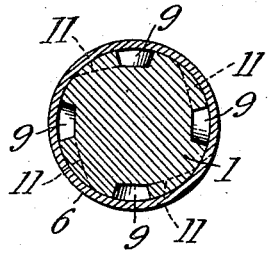


Fig. 2



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UNITED STATES PATENT OFFICE.

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PROJECTILE.

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Application filed January 24, 1916. Serial No. 73,868.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Projectiles, of which the following is a description.

My invention relates in general to projectiles, and more especially to projectiles designed for use in guns of large caliber.

In practically all types of guns now made which discharge only a single projectile at a time, the bores of the guns are rifled or provided with longitudinally extending twisted grooves, whereby a rapid rotary movement will be imparted to a projectile about its longitudinal axis when discharged from such a gun. The rotary movement thus imparted to the projectile produces a gyroscopic action which overcomes the tendency of the projectile to turn end over end, or "hurtle" in its trajectory, and consequently insures the striking of the projectile head on and also greatly increases the degree of accuracy obtainable. In the continued use of such guns, however, the rifled bores thereof erode, this resulting in a loss of accuracy and sooner or later, the "hurtling" of the projectile in its flight. This erosion of the bores in guns of very large caliber, for example, in a 16 inch gun, is very rapid, due to the great pressure, heat, and friction produced in the discharge thereof, and consequently it is possible to discharge such a gun only a few times, with any degree of accuracy and safety, before it is necessary to repair or replace the same, and this, together with the great cost of repairing or replacing such guns, renders the use thereof impracticable.

The principal object of my invention is the provision of a projectile of such construction that when the same is discharged from a smooth bore or unrifled gun, the tendency thereof to "hurtle" or turn end over end in flight is overcome, and the accuracy obtainable is at least as great as that obtainable with projectiles discharged from the rifled guns heretofore used. As the erosion of the bore of such a gun is very slight, and a high degree of accuracy may therefore be obtained therewith during a great number of rounds, my invention renders the use of guns of very large caliber much more practicable than heretofore.

Other objects and features of my invention will be hereinafter more fully described and claimed.

For a clearer understanding of my invention, attention is directed to the accompanying drawing, forming part of this specification, and in which:

Figure 1 is a view in side elevation, partly in section, of a projectile made in accordance with my invention; and

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Referring to the drawing, the projectile comprises a cylindrical body portion 1 and a reduced portion at the forward end thereof, preferably in the form of a pointed head or "nose" 2. The forward or head end portion of the projectile is preferably heavier than the rear end portion thereof, this preferably being accomplished by providing the projectile at the rear end portion thereof with a cylindrical longitudinally extending recess or cavity 3. Accordingly, the projectile has a tendency to travel "head on" in its trajectory. If the projectile is to be used as a shell, the recess 3 may be filled with any suitable explosive, or with an explosive and shot. The recess 3 is preferably closed at the rear end by a suitable member or cap 4 which is substantially flush with the rear end of the projectile. At its rear end, the projectile is preferably provided with a collar 5 which may either be integral therewith or in the form of a sleeve shrunk on or otherwise applied and secured to the projectile. The forward end portion of the projectile is also preferably provided with a cylindrical collar 6, preferably of about one-third the entire length of the projectile, and preferably having an extension 7 projecting a slight distance beyond the body portion 1 and over the reduced portion or "nose" 2, thereby providing an annular space 8 between the extension 7 and the "nose" 2. The collar 6 may be formed integrally with the body portion 1, but is preferably in the form of a cylindrical sleeve which is shrunk on or otherwise applied and secured to the body portion 1 of the projectile. The collars 5 and 6 are of the same diameter and are designed to fit closely the bore of a gun in which the projectile is intended to be used. The projectile is preferably provided with a plurality of longitudinally extending open ended grooves 9 which are preferably equally

spaced circumferentially of the projectile. The grooves 9, for the greater portion of their length, are preferably formed on the exterior of the body portion 1. The forward ends of these grooves, however, preferably terminate in the reduced forward end portion or "nose" 2 of the projectile. Each groove 9 preferably, though not necessarily, comprises a forward straight portion 10 which is preferably parallel to the axis of the projectile, and a rearward portion 11 extending from said straight portion at an angle thereto, preferably at an angle of approximately thirty degrees. The depth of the portions 11 preferably gradually decreases rearwardly of the projectile, as clearly shown in the drawing, until such portions merge in the surface of the body portion 1. The collar 6 covers the grooves 9 for a greater part of their length, thereby forming inclosed channels or passageways which communicate at their forward ends with the annular space 8.

When the projectile above described is discharged from a gun, air is entrapped in the space 8 and forced through the bent or twisted grooves 9, thereby causing the projectile to rotate about its longitudinal axis with great rapidity. The resulting gyroscopic action will prevent the projectile from turning end over end or "hurtling" in its flight. Accordingly, a gun with a smooth bore may be employed for discharging a projectile of this type. As the portions of the projectile engaging the bore of the gun are also smooth, the erosion of the bore takes place very slowly and the life of the gun and the number of rounds during which a high degree of accuracy is obtainable are comparatively great. My invention therefore renders it practicable to employ guns of very large caliber, for example, 16 inch and 18 inch guns. The provision of the projectile with an extension or lip, such as shown at 7, I regard as a very important feature of my invention, as this extension or lip serves to entrap air within the annular space 8 during the flight of the projectile, and it is believed that the air thus entrapped, in the case of a projectile traveling at a great velocity, will prevent "hurtling" of the projectile even though the grooves 9 be omitted or are formed parallel to the axis of the projectile for their entire length. The grooves 9, when formed as shown in the drawing, serve a purpose similar to that of the rifling grooves in the bores of guns as usually made, and may, indeed, be designated as rifling grooves or riflings.

While I have shown and described the preferred embodiment of my invention, it is to be understood that the same is subject to various changes and modifications without any departure from the spirit of the invention and the scope of the appended claims.

Having now described my invention, what I claim and desire to secure by Letters Patent of the United States is as follows:—

1. A projectile comprising a body portion and having one end portion heavier than the other end portion thereof, the heavier end portion of the projectile being provided with a plurality of longitudinally extending open ended grooves formed on the exterior of said body portion, said grooves being covered for a part at least of their length and being spaced circumferentially of the projectile, substantially as described.

2. A cylindrical projectile provided with a plurality of longitudinally extending open-ended grooves, a portion of each of said grooves being substantially parallel to the axis of the projectile and another portion thereof extending from said first portion at an angle thereto, the latter portions decreasing in depth until they merge in the surface of the body portion of the projectile.

3. A cylindrical projectile having a head end portion which is heavier than its rear end portion, the projectile being provided with a plurality of longitudinally extending open-ended grooves, a portion of each of said grooves being substantially parallel to the axis of the projectile and another portion thereof extending from said first portion at an angle thereto, the portions of the grooves which are substantially parallel to the axis of the projectile being nearer the head end of the projectile, and the other portions of the grooves extending rearwardly therefrom and decreasing in depth until they merge in the surface of the body portion of the projectile, substantially as described.

4. A projectile comprising a cylindrical body portion, a reduced portion at one end of said body portion, and a collar on said body portion, said collar extending beyond said body portion over said reduced portion, thereby providing an annular space between said collar and reduced portion, the projectile being provided beneath said collar with open-ended longitudinally extending grooves which communicate with said space, substantially as described.

5. A projectile comprising a cylindrical body portion and a reduced portion, said body portion having an extension projecting over said reduced portion and providing an annular space between such extension and reduced portion, the projectile being provided with a plurality of longitudinally extending open-ended grooves communicating with said space, substantially as described.

6. A cylindrical projectile, the head end portion only of which is provided with a collar and with a plurality of longitudinally extending open ended grooves beneath said collar, said grooves being spaced circum-

ferentially of the projectile, substantially as described.

7. A cylindrical projectile provided with a plurality of longitudinally extending open ended grooves, a portion of each of said grooves being substantially parallel to the axis of the projectile and another portion thereof extending from said first portion at an angle thereto, a part of said angular portions of said grooves being uncovered, and a collar covering the remainder of said grooves, substantially as described.

8. A cylindrical projectile having a head end portion which is heavier than its rear end portion, the projectile being provided with a plurality of longitudinally extending open ended grooves, a portion of each of said grooves being substantially parallel to the axis of the projectile and another portion thereof extending from said first portion at an angle thereto, the portions of the grooves which are substantially parallel to the axis of the projectile being nearer the head end of the projectile than the angular portions of the grooves, a part of said angular portions being uncovered, and a collar covering the remainder of said grooves, substantially as described.

This specification signed and witnessed this 11th day of January, 1916.

THOS. A. EDISON.

Witnesses:

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