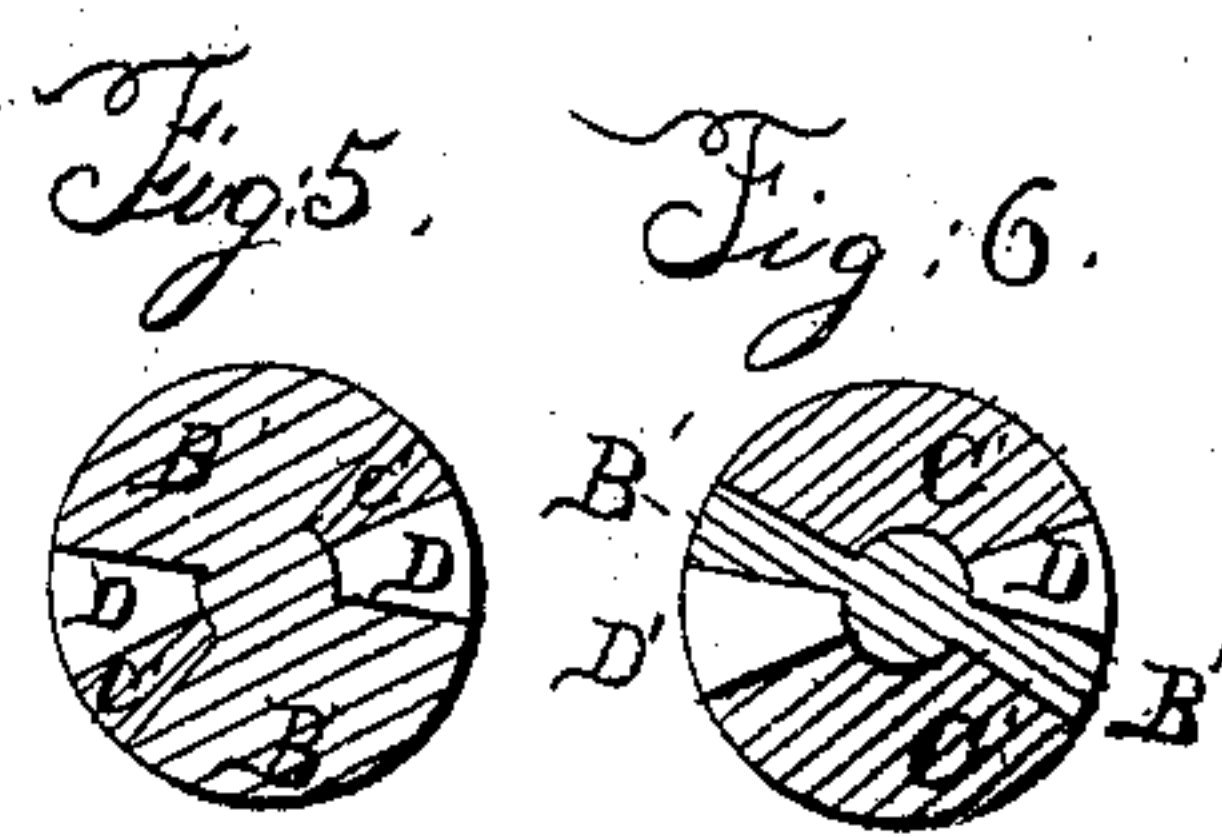
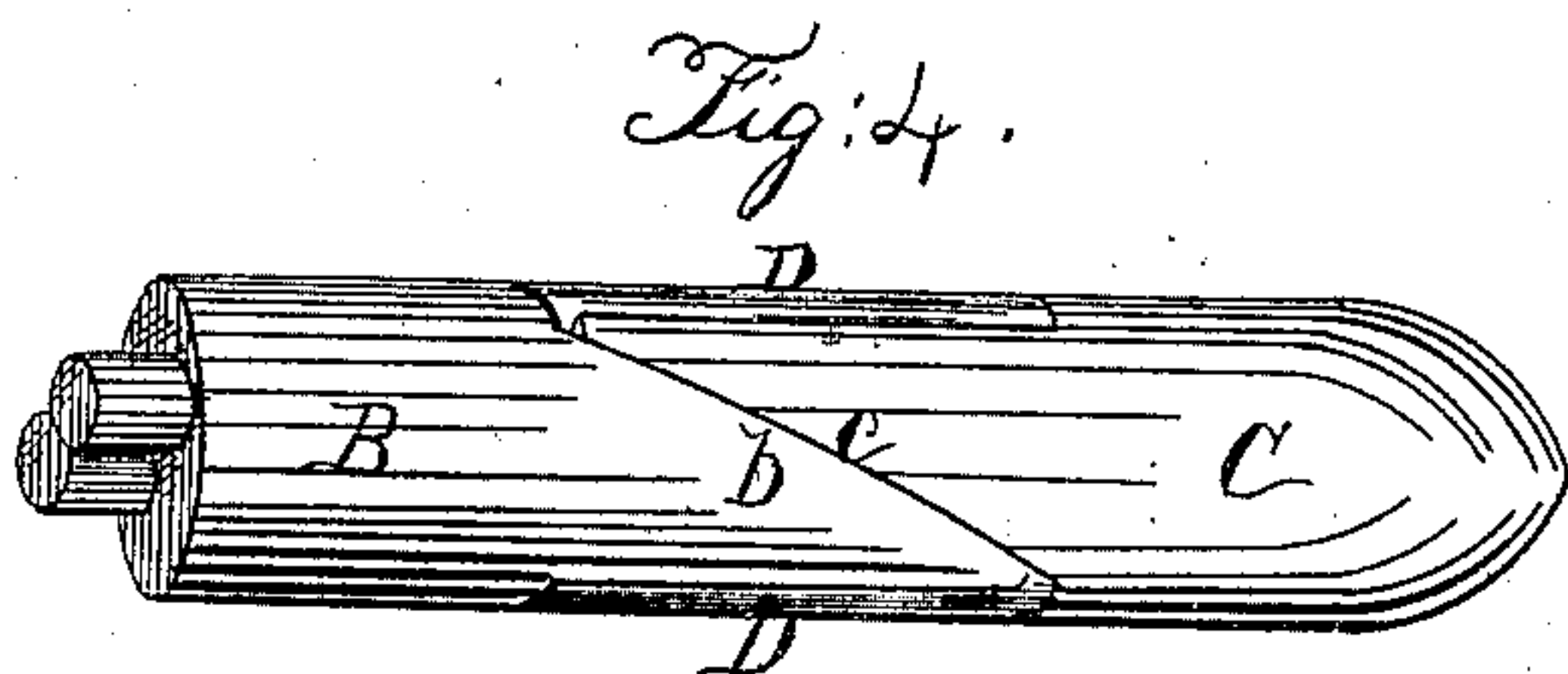
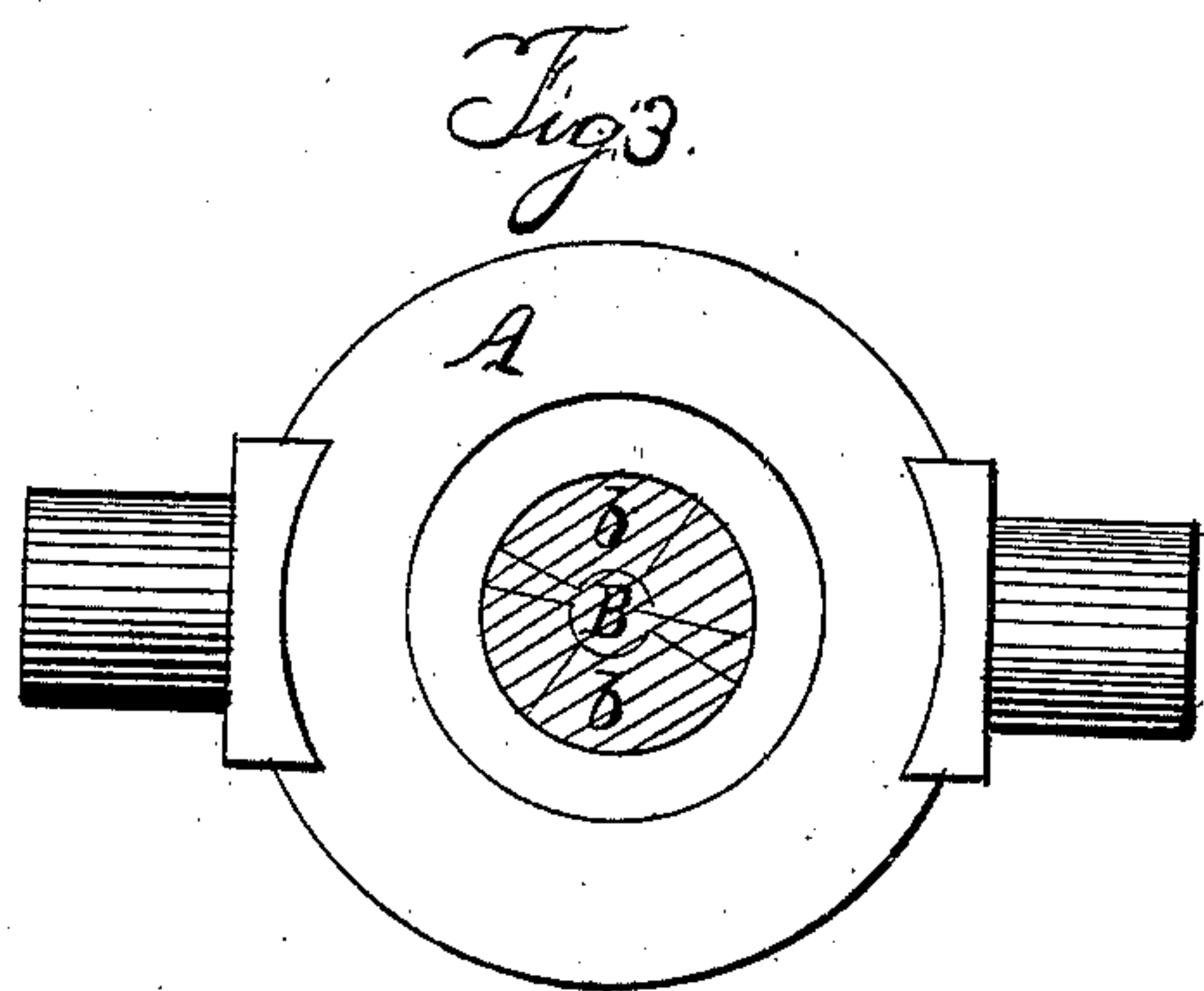
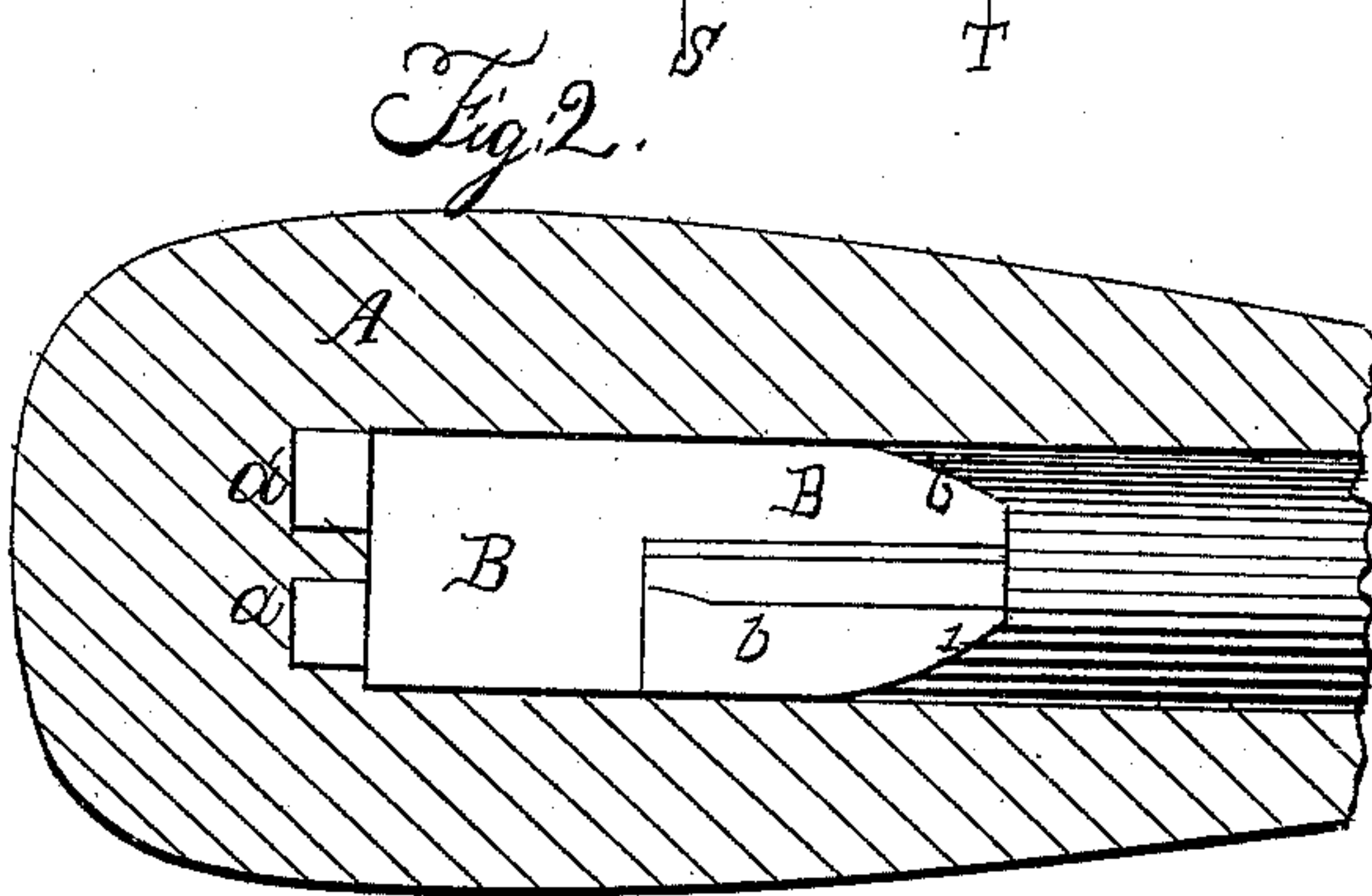
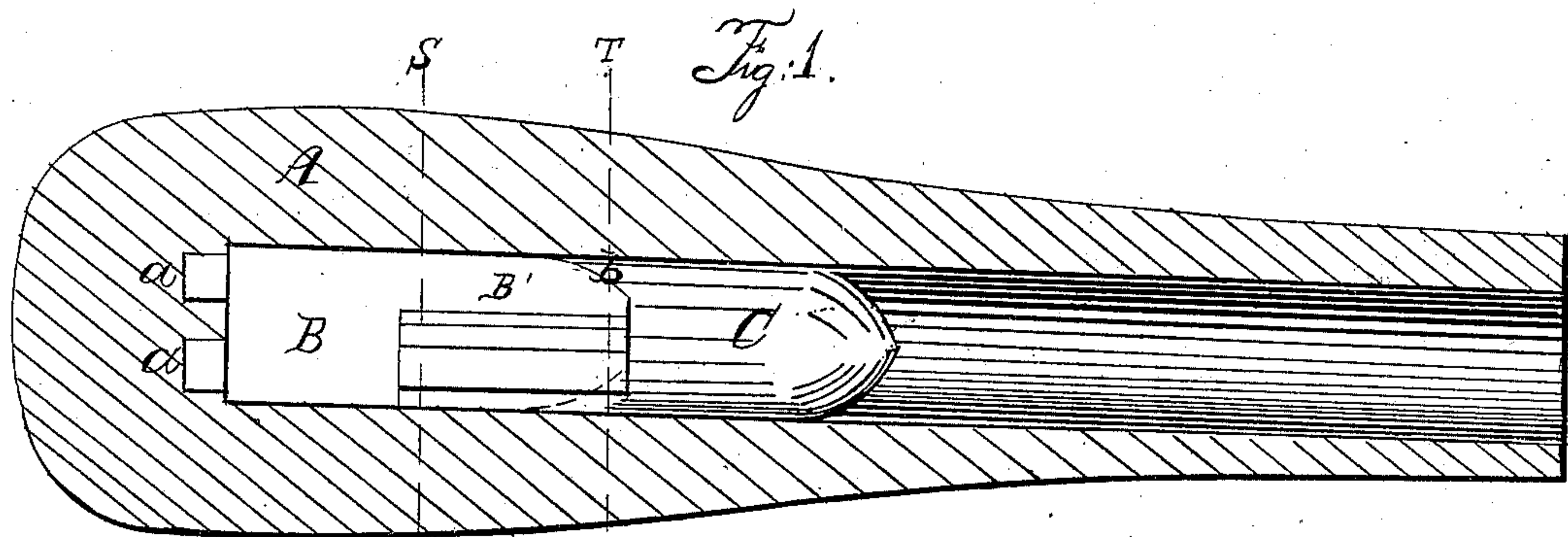


T. F. REILLY.

Projectile.

No. 34,693

Patented Mar. 18, 1862.



Witnesses,

C. H. Babcock
W. H. Stetson

Inventor,

Terence Fred Reilly

UNITED STATES PATENT OFFICE.

TERRENCE F. REILLY, OF NEW YORK, N. Y.

IMPROVEMENT IN ROTATING PROJECTILES FOR SMOOTH-BORED ORDNANCE.

Specification forming part of Letters Patent No. 34,693, dated March 18, 1862.

To all whom it may concern:

Be it known that I, TERRENCE F. REILLY, of the city, county, and State of New York, have invented a certain new and Improved Means of Firing Projectiles from Smooth-Bored Ordnance with a Spinning or Rifle Motion; and I do hereby declare that the following is a full and exact description thereof, which has been prepared with a view to the obtaining of Letters Patent therefor.

The accompanying drawings form a part of this specification.

My invention allows the firing of elongated or other projectiles with as vigorous a twisting motion as can be obtained by the ordinary method of grooving the interior of the gun and adapting the projectile thereto, while the smoothness or cylindrical character of the bore avoids most of the difficulties experienced in the packing or stopping the windage of ordinary rifled-ordnance projectiles, and avoids all the evils accruing from the violent friction of hard parts of ordinary projectiles against the sides of the grooves.

My gun and my shot or projectile both differ from those in ordinary use.

To enable those skilled in the art of making and using ordnance and ordnance cartridges and projectiles to make and use my invention, I will proceed to describe the parts by the aid of the drawings.

A is a gun, of any ordinary form externally, and mounted in any approved manner; but the vent or touch-hole is duplex or double, as will be described further on, and the interior is provided with two recesses, *a a*, at the base or end of the bore, as represented.

B is an internal breech-piece, of the form represented in the drawings, and adapted to be firmly held in the base of the bore of the gun, so that it cannot be twisted or rotated.

The several figures all show this part, and may be here described.

Figure 1 is a longitudinal vertical section of the gun A. It shows the breech-piece B in its place, and the projectile C rammed home in the position it occupies when the gun is loaded, but does not represent the cartridge, which is applied between them in a peculiar manner, to be described below. Fig. 2 is a like longitudinal vertical section of a portion of the gun A. It shows the breech-piece B in its

place without the projectile or cartridge. Fig. 3 is a front or end view of the gun. It shows the breech-piece B in its place without the projectile or cartridge. Fig. 4 is a perspective view of the breech-piece B and projectile C, applied together in the same manner as they lie in the gun before the discharge, or, rather, in the same manner as they lie in the gun after the fire has communicated to the powder and the projectile has commenced to move, but has moved only a little distance. Similar letters of reference indicate like parts in all these figures, as also in Figs. 5 and 6. Fig. 5 is a cross-section on the line S S in Fig. 1. It shows the two parts B' B' of the breech-piece B and the two parts C' C' of the projectile C as they exist at that plane, with the two spaces for the powder between them. Fig. 6 is a cross-section on the line T T in Fig. 1. It shows the same parts, B' B' and C' C', with the spaces for the powder, as they exist at that plane.

It will be observed that the forward end of the breech-piece B and the rear or hinder end of the projectile C are forked, or each formed into two projecting parts, and that one side of each projection is straight, and that the opposite side of each is twisted.

It will further be observed that the twisted faces *c c* of the projectile C coincide perfectly with the twisted faces *b b* of the breech-piece B, and that all these surfaces are parts of what are sometimes termed "true-screws" or uniform spiral-inclined planes. The piece B is armed at its back with stout projections, as represented, which fit tightly into the recesses *a a*, above described, and prevent it from turning in the gun, so that any portion of the force of the explosion which shall tend to rotate B and C in opposite directions shall result in imparting a spiral or rifled motion to the projectile C alone. The forms and relations of these important parts B and C being now understood, it will be observed that there exists between the plane faces of the projections on each two segmental, or, rather, sectoral, spaces, D D. These spaces receive the powder, which is placed for the purpose in bags or cartridges of nearly corresponding form, and deposited in their places at the proper time during the loading of the gun.

The loading of my gun requires care to see that the cartridges and projectile are placed

aright, but obviously involves no difficulty not easily surmounted by a skillful gunner provided with a very simple rammer adapted to hold the charge in position while being driven home.

To clean the gun, I provide a sponge (not represented) which is adapted to fit into the spaces and perform its proper functions with the slight spiral motion allowable therein.

The effect of the explosion of the two quantities of powder is to press by the well-known laws of elastic fluids with equal force on equal areas of the confining-surfaces without regard to their positions. It follows from the positions and relations of the surfaces that while the powder acts at the commencement on a small area of the projectile to urge it forward, it acts on a large area of the plane sides of the bifurcations $C' C'$ to impart a spinning motion to the projectile, or, rather, to press the faces $c c$ with great force against the faces $b b$, which, as the projectile moves forward, produces a spinning or twisting motion, the character of which is affected by the "pitch" or twist of the said surfaces. As the projectile C acquires velocity and moves forward, a smaller portion of the force of the powder is felt or expended in giving the twisting motion and more in giving the forward motion, so that before the spiral surfaces $b b$ have been entirely passed over by the rear ends of the spiral surfaces $c c$ the force tending to urge them together has become greatly lessened, while the forward motion, as also the force producing the latter, has increased. The surfaces $b b$ and $c c$ therefore part company gently and the ball moves forward through the smoothly-bored barrel with an increasing forward motion, due to the continued application of the force of the powder behind it, and with a very brisk and sufficiently rapid twisting or rifle motion, due to the peculiar effect produced by my invention at the early stages of the explosion.

It is obviously desirable that the two quantities of powder shall be fired at the same absolutely simultaneous periods. To effect this I can employ two touch-holes leading one to each space or cartridge D and fired by a quick match or the like, as is represented in the drawings, Fig. 3; but I do not consider it essential to the success of my invention to employ two touch-holes, because the fire of one cartridge or quantum of powder in the space on one side will readily communicate through small openings, which may be left for the purpose, or which in practice are certain to exist accidentally, and fire the powder opposite. In any event it is evident that the instant the projectile has commenced to move there is a free communication between the two spaces or cartridges, and the second quantity of powder will then commence to ignite.

The form of the cross-section of the bifurcations or forks of both B and C are as represented, the central portion of C being removed and the forks of B stoutly united to

promote the strength of B , and to facilitate the manufacture of the parts with reasonable accuracy. It will be obvious that the making of the part B separate from the gun and securing it in the base of the bore is a matter of convenience merely, and not absolutely necessary in order to produce the form of the surfaces and the effect desired. If it be practicable to give a proper form—equivalent in effect to that of the front of B —to the base of the bore of the gun without introducing any piece B , the effect of my method of firing will be the same as above described.

I have described my invention as applied to a muzzle-loading gun; but it can be applied with success to breech-loading pieces, care being taken to make the forward end of the breech-pin, or its equivalent, of the proper form and to place the powder in the proper position. And although I design that my invention shall be most immediately serviceable for heavy guns, it is not limited in its usefulness to any size or style of piece, but may be used on any.

For loading my gun, when muzzle-loading, as represented, I prefer for convenience to attach my cartridges to the ball in their proper position, by any convenient means, before it is required for use, forming in effect what is known as "fixed ammunition." This preparation facilitates the loading and insures with certainty that the parts shall attain their proper relations in the gun, ready to act, as described, when the fire is applied.

I pack or envelop my ball or projectile C with any suitable material to check the windage, nearly all the means employed for such purpose on the known styles of rifle-projectiles being capable of use in my invention with greater success than in a grooved gun.

The body or main portion of my projectile C , as also a portion of the rear or forked part, can be made hollow, if desired, and the projectile charged and fired with the effect of other shells.

It will be evident that the joining of the forks $B' B'$ by the cylindrical center B^2 , as represented, is not absolutely necessary, as the segments or sector form of these parts, as also of $C' C'$, may be carried nearly or quite to the center, in which case B' and C' will be formed precisely alike; or the cylindrical center can be formed on C , so as to connect the forks $C' C'$, and the forks $B' B'$ may be separated thereby, being produced with a space between for the purpose.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. So forming and arranging the projectile, the explosive material, and the interior of the gun that the explosion shall act directly upon the shot in such manner as to give it a rifle motion, substantially as herein set forth.

2. Controlling the twisting or rifle motion of a projectile rotated within a smooth-bored

gun, as above described, by means of surfaces *b b c c*, arranged to act upon each other in the manner and with the effect herein set forth.

3. Forming the parts *B' B'* or equivalent abutments at the base of the bore of the gun upon a piece, *B*, separate from the gun, for the purpose herein set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

TERRENCE FRED. REILLY.

Witnesses:

G. H. BABCOCK,
D. W. STETSON.