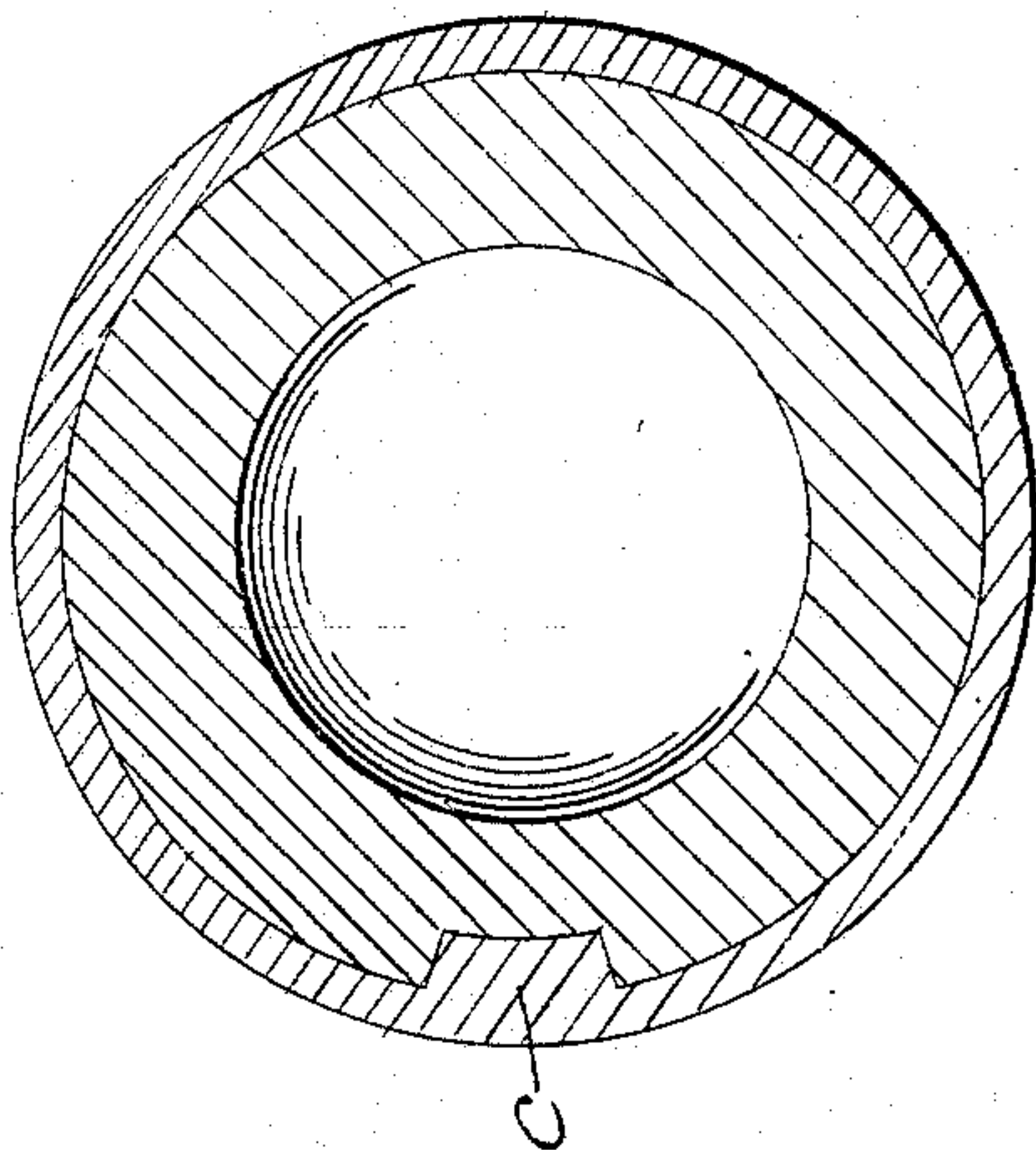


L. W. BROADWELL.  
PROJECTILE.

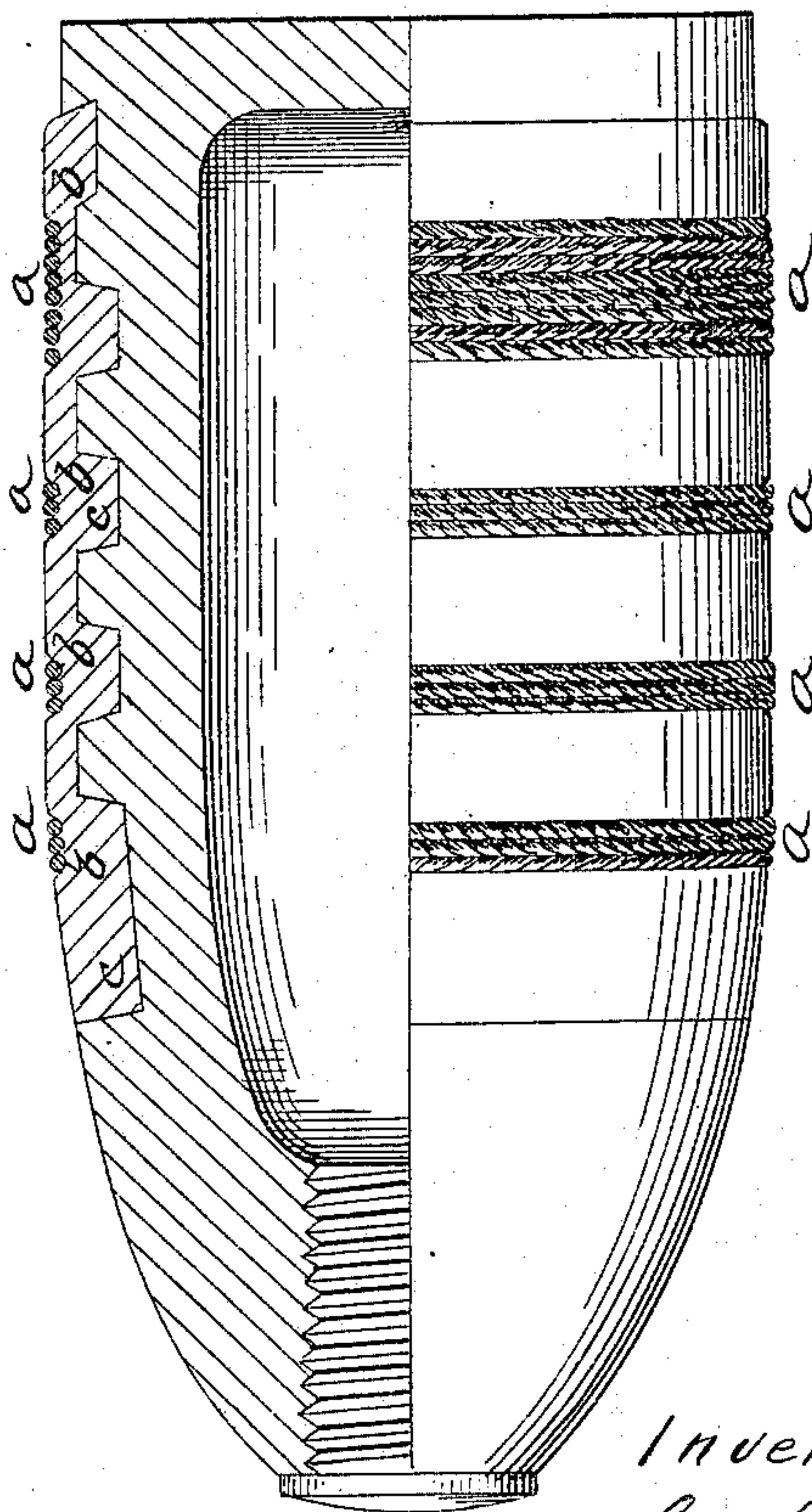
No. 55,761.

Patented June 19, 1866.

*Fig. 2.*



*Fig. 1.*



Witnesses:  
C. D. Smith  
Edward H. Knight

Inventor  
L. W. Broadwell  
By *Munroe*  
Attorney



# UNITED STATES PATENT OFFICE

LEWIS WELLS BROADWELL, OF NEW ORLEANS, LOUISIANA, ASSIGNOR TO  
O. M. CLAY.

## IMPROVEMENT IN PACKING PROJECTILES FOR RIFLED ORDNANCE.

Specification forming part of Letters Patent No. 55,761, dated June 19, 1866.

*To all whom it may concern:*

Be it known that I, LEWIS WELLS BROADWELL, of the city of New Orleans and State of Louisiana, have made new and useful Improvements in Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents my improvement, partly in elevation and partly in longitudinal section. Fig. 2 shows a transverse section.

To enable one skilled in the art to which my invention appertains to construct and use the same, I will proceed to describe it.

The improvement consists in a certain wrapping for an artillery projectile, which shall clean from the bore of the cannon the gaseous deposit of the previous charge, at the same time assisting in giving the rotary motion to the ball by contact with the rifling, and preventing injurious contact of the ball with the bore.

The wrapping operation is performed as follows: I wrap a small hemp or other kind of rather hard-twisted cord, *a*, tightly into the annular recess *b* of a lead-coated artillery projectile, as illustrated in the accompanying drawings. The cord may be fastened upon the projectile by placing the ends thereof in holes or grooves cut in the lead *c* and hammering it over them, or by means of copper tacks, or in any other suitable manner. The cord having been thus placed, I then rub pulverized graphite (plumbago) over the whole and as much as possible into the cord, for the purpose of lubrication, and also to preserve the cord from being burned off before it is driven into the rifle-grooves, where the flame is shut off from it. The graphite (plumbago) lubricates and preserves the bore of the gun, while the cord thoroughly wipes it each round, so that a cannon using projectiles thus prepared may fire one thousand rounds or more, in rapid succession, without once sponging or otherwise cleaning the bore by hand. The bore of the gun being kept quite clean, a greater degree of accuracy is also attained—a result due to this peculiar method of preparing the projectiles.

I wish it distinctly understood that I do not limit myself to the precise method of applying

the cord-wrapping hereinafter described, as it may be slightly varied without departing from the nature of my invention.

A fin, rib, or longitudinal projection on the ball prevents the rotation of the rings relatively to the ball.

In the course of my attempts to find a wrapping for a projectile which would dispense with the necessity for cleaning the bore of the gun after firing, I tried wrapping by a hempen cord, making a seat for the same by turning a continuous spiral groove upon the cylindrical portion of the projectile of a pitch equal to the diameter of the cord, which was wound continuously around the cylindrical portion of the projectile. I found this wrapping answer some purposes very perfectly—that is to say, it removed the gaseous deposit from the bore and enabled the gun to be fired one hundred rounds without fouling or requiring any wiping or cleansing by hand. A difficulty, however, arose from the cord, which, being loosened from the projectile and trailing behind, deflected the ball from its true course and destroyed its accuracy. I attempted to avoid this difficulty by making the wrapping of the projectile to consist of a number of detached annular belts instead of one continuous jacket, and found that the difficulty was partially obviated by the change. The wrapping, being in sections, was more exposed to the action of the flame, which surrounded it in the cylindrical loading-chamber and as it passed the nozzle of the gun, being thereby so far scorched as to be readily detached from the ball immediately after the exit of the latter from the piece.

The object was, and has always been, with me to secure the effective use of the wrapping inside the gun and to dispense with it immediately after the ball leaves the muzzle, for its effect in connection with the ball as it flies through the air can only be injurious. As I have said, making the wrapping in detached sections proves better than the continuous wrapping, possibly because the exterior folds of the cord are more exposed to the action of the flame, and the intervals of the wrapping afford spaces for the circulation of the gases and flame, by which the cord is scorched and disorganized, as well as affording spaces for retaining the results of the mechanical disinte-



gration of the cord in its friction against the bore.

Having thus attained a certain approximation to completeness and not being satisfied, I next commenced reducing the size of the cord so that it should become more effectually disorganized by the friction and flame, and thus be more readily detached from the ball after leaving the muzzle. I soon found a limit in this direction, for it did not remain intact long enough to perform its initial duty in the piece, although the speed and completeness of its separation from the projectile was very satisfactory. I thus found it necessary, in the first place, to have a sufficient stability to the wrapping to remain intact within the bore and perform the duty of cleansing the same, as well as performing the other incidental duties of entering the rifling of the gun and intervention between the ball and the bore. In the second place, it was necessary to have the wrapping quickly detached from the projectile after it had performed its duty in the bore, to prevent interference with the flight of the projectile. The former of these desiderata pointed to a large cord and the latter to a small one, as the large one would preserve its integ-

rity in the bore and the small one would readily part from the projectile; but then the large one interfered with the flight of the projectile and the small one would not withstand the hardship inside the gun for a sufficient length of time. I next sought for some mode of protecting the smaller cord from the flame and friction which should enable it to perform satisfactorily in the bore of the gun, and this I accomplished by means of treating it with pulverized graphite or plumbago, which, being incombustible, affords the required degree of protection.

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

1. The described method of wrapping the projectile by belts of cord which occupy detached annular recesses around the ball.

2. The application to the said fibrous covering of pulverized graphite or plumbago, to serve as a partial protection to the fiber, as and for the purpose described.

LEWIS WELLS BROADWELL.

Witnesses:

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JEREMIAH CURTIN.