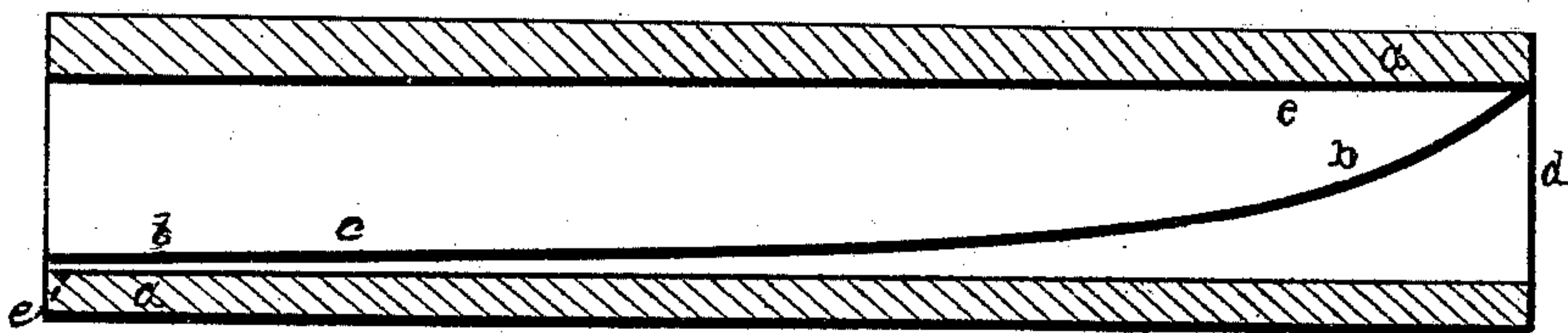


E. G. ALLEN.  
Rifling Fire-Arms.

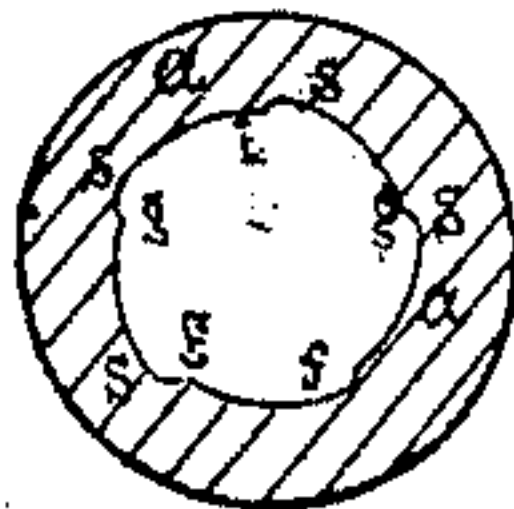
No. 39,024.

Patented June 30. 1863.

*Fig. 1.*



*Fig. 2.*



Witnesses.  
Selden H. Felt  
Charles Lewis  
E. G. Allen

# UNITED STATES PATENT OFFICE.

ENOS G. ALLEN, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN RIFLING FIRE-ARMS.

Specification forming part of Letters Patent No. 39,024, dated June 30, 1863.

*To all whom it may concern:*

Be it known that I, E. G. ALLEN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Mode of Rifling Guns, Pistols, &c.; and I do hereby declare that the following description, taken in connection with the accompanying drawings hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

In gunnery the principal object to be accomplished is, it is evident, as follows: to give accuracy of direction to the projectile during its passage through the gun-barrel in order that the line of its flight may coincide as nearly as possible with the longitudinal axis of the gun. To secure this desideratum the best method known has been to "rifle" the gun-barrel, so as to impart a rotary motion to the projectile around its own axis.

Among the many difficulties found in practice in the use of rifled fire-arms may be mentioned the following: first, the heating of the barrel at its breech, caused by the great friction between the ball and the grooves into which it fits, whereas it is well known that it is highly important, in order to discharge a gun rapidly and with safety, the breech should be kept cool; secondly, the initial resistance occasioned by the grooves in the barrel, whereby the breech is unduly strained, and the gases evolved prevented from acting expansively to the extent they ought to do; thirdly, the great friction upon the grooves soon wears and injures them, and, as any slight inaccuracy in them is fatal to precise shooting, this proves a serious defect; fourthly, the fouling of the grooves, especially at the breech, by "leading"—i. e., by the deposit of metal in the same from the projectile and other causes..

The objects of my improvements are to so rifle a gun-barrel as to insure accuracy of flight of the projectile with the least possible friction at the breech. I have attained these results, and at the same time obviated the defects of the ordinary system of rifling hereinabove mentioned, by forming a series of grooves of a novel construction traced to pro-

duce a progressive twist, what I denominate an "irregular-gain twist," the essential feature of which consists in forming the grooves perfectly straight for a considerable distance from the breech, then winding or curving slightly until they finally receive their full twist at or near the muzzle of the gun. The grooves, instead of being cut in straight or beveled lines, so as to form sharp or obtuse angles in the bottom of the grooves, are curved so as to leave no sharp depression therein.

In the accompanying drawings my improvements are represented. Figure 1 is a central longitudinal section through the barrel of a gun, and Fig. 2 a cross-section through the same.

*a a* represent the barrel of a gun; *b b*, the twists of the grooves. It will be seen by inspection of Fig. 1 that the groove commences at the breech and runs straight to about the point *c*, when it slowly increases its curvature, until suddenly it completes the twist at or near the muzzle *d*. The form of the groove will be seen in Fig. 2, and it will be observed that it is formed by making a curved depression (shown in Fig. 2, and terminating in a slight curved lip, *f*, (as it may be termed,) where it joins with the lands *g g*.

From the foregoing description it will be seen that the peculiar twist given to the rifling allows the ball to be acted upon by the full expansive force of the powder, as it is but slightly retarded, until it reaches the muzzle; and thus also, as there is but very little friction when the ball starts, the breech will be kept comparatively cool. The peculiar shape of the grooves prevents their "leading" or fouling, and also great strain or wear upon them, and finally the projections or "feathers" formed upon the ball induce accuracy of its flight without retarding its speed.

Having thus described my improvements, I claim—

The method of rifling or grooving the barrels of fire-arms by combining the irregular gain twist, as hereinbefore described, with the shallow curved depression, substantially as herein shown and set forth.

E. G. ALLEN.

Witnesses:

LELDELL HETZEL,  
GEO. M. LEWIS.